STANDARDS AND INFORMATION DOCUMENTS

AES51-2020
(Revision of AES51-2006)

AES standard for digital audio – Digital input-output interfacing – Transmission of ATM cells over Ethernet physical layer

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Abstract

This standard specifies a method, also known as "ATM-E", of carrying asynchronous transfer mode (ATM) cells over hardware specified for IEEE 802.3 (Ethernet). It is intended as a companion standard to AES47 (Transmission of digital audio over ATM networks), to provide a standard method of carrying ATM cells and real-time clock over hardware specified for Ethernet.

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Contents

Foreword

These forewords are not part of AES51 *AES standard for digital audio – Digital input-output interfacing – Transmission of ATM cells over Ethernet physical layer*.

This document was prepared by J. Grant for task group SC-02-02-E, under project AES-X143, "Transmission of asynchronous transfer mode (ATM) over an Ethernet physical layer".

The members of the task group were: K. Brown, R. Caine, C. Chambers, P. Eastty, C. Gaunt, J. Grant, K. Gross, U. Horbach, H. Lemcke, M. Page, M. Schindele, J. Strawn, T. Thompson, J. Waas, M. Yonge

John Grant, chair
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SC-02-02 Working Group on Digital Audio Input/Output Interfacing

Foreword to the second edition, 2020

This revision includes minor changes to remove insensitive terms.

J. Grant
Chair, SC-02-02 Working Group on Digital Input/Output Interfacing
2020-11-27

Note on normative language

In AES standards documents, sentences containing the word "shall" are requirements for compliance with the document. 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 for digital audio – Digital input-output interfacing – Transmission of ATM cells over Ethernet physical layer

Introduction

AES47 specifies the carriage of digital audio over asynchronous transfer mode (ATM) networks. ATM was chosen as the technology that provides the best performance with regard to latency, jitter, and other relevant factors.

Ethernet interfaces are more widely available than current standard ATM interfaces, being for instance built into most PCs as standard, and the integrated circuits to implement them are more highly developed and thus easier to use and also considerably cheaper. There are also some user benefits, such as “auto-MDIX” which means that any two interfaces can be connected by a straight-through cable; cross-over cables are never required.

This standard specifies how an ATM service can be provided over Ethernet hardware (ATM-E), thus combining the benefits of both technologies.

Clause 4 specifies the format in which the ATM cells are carried. This format also includes timing information which is sufficiently accurate that for many applications no other synchronisation signal will be required.

Clause 5 specifies a negotiation process whereby when the link is connected equipment can discover whether the link should carry the packets specified in clause 4 exclusively, or traditional Ethernet, or a mixture of the two. Equipment can therefore be designed to discover what kind of network it is plugged into, and use the appropriate format in each case.

0 Preamble

0.1 Patents

Attention is drawn to the possibility that some of the elements of this AES standard may be the subject of patent rights not identified herein. AES shall not be held responsible for identifying any or all such patent rights.

0.2 Documentation conventions

A Courier typeface may be used to identify computer-listing examples to distinguish them from regular text.

Numbers are decimal unless indicated otherwise. Hexadecimal numbers (to base 16) are shown with a subscript suffix 16 (for example, $008A_{16}$)

According to IEC directives, the comma is used in all text to indicate the decimal point.

1 Scope

This standard specifies the carriage of an ATM service over Ethernet hardware. It is intended chiefly for use with AES47, but is not limited to the facilities required by AES47; for instance, equipment that implements AES47 may well also require an Internet Protocol service, either as IP-over-ATM or by interleaving other Ethernet packets with those that carry the ATM cells. Its interface to the Ethernet network is at the MAC layer, so it may be used with different Ethernet physical layers, and hence at different speeds (100 Mb/s, 1 Gb/s, 10 Gb/s, etc).

This standard does not make any normative provisions as regards timeliness of delivery of ATM cells, though this topic is addressed in A.4 (part of an informative annex).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. Clause and figure numbers in references apply to the edition cited. For undated references, the latest edition of the referenced document (including any amendments) applies.

ITU-T Recommendation I.150 (02/99) *B-ISDN asynchronous transfer mode functional characteristics.* International Telecommunications Union, Geneva, CH: International Telecommunications Union.

ITU-T Recommendation I.361 *B-ISDN ATM layer specification.* International Telecommunications Union, Geneva, CH: International Telecommunications Union.

ITU-T Recommendation B.11 *Legal time, use of the term UTC.* International Telecommunications Union, Geneva, CH: International Telecommunications Union.

IEEE Std 802-2001: *IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture* . Institute of Electrical and Electronics Engineers, Inc., Piscataway, NJ., US.

IEEE Std 802.3-2002: *IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications* . Institute of Electrical and Electronics Engineers, Inc., Piscataway, NJ., US.

3 Definitions and abbreviations

3.1 ATM
Asynchronous Transfer Mode
Network protocol used, for example, in AES47

3.2 ATM-E
Ethernet packets containing ATM cell data as specified in this standard

3.3 Octet
a group of 8 bits. An octet may be expressed as a decimal number 0 to 255, or as a pair of hexadecimal numbers. (Example: $5E_{16} = 94$)

3.4 Cell
Fundamental data transport element in an ATM network, carrying 48 octets of payload.

3.5 EtherType
Value defined in IEEE 802.3, “Length/Type” field, and registered with IEEE Registration Authority