

INTERNATIONAL STANDARD



**Audio archive system –
Part 1-2: BD disk and data migration for long-term audio data storage**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2017 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

INTERNATIONAL STANDARD



Audio archive system – Part 1-2: BD disk and data migration for long-term audio data storage

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.160.30; 35.220.30

ISBN 978-2-8322-4919-2

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions.....	8
3.2 Abbreviated terms.....	9
4 Disk and lifetime for long term audio data storage	9
4.1 Disk for long term audio data storage.....	9
4.2 Lifetime estimation.....	9
4.3 B_{mig} Life for long-term audio data storage	10
4.4 Estimated lifetime rank and display colour	11
4.4.1 Estimated lifetime rank and display colour identification	11
4.4.2 B_{mig} Life and display colour indication on disks and packages	11
5 Test condition, test methods and disks for audio data migration	11
5.1 Ambient conditions for testing	11
5.2 Test methods	11
5.2.1 General	11
5.2.2 Max RSER.....	11
5.2.3 Test area of recorded disk	11
5.3 Test drive calibration.....	11
6 Test result evaluation	12
6.1 Initial performance test result evaluation	12
6.2 Periodic performance test evaluation	12
6.3 Reporting items.....	13
6.3.1 Initial performance test result	13
6.3.2 Periodic performance test result	13
6.4 Management of reporting items.....	13
6.5 Test and migration intervals	13
7 Prevention of deterioration	14
Annex A (informative) Guideline of usage and indication.....	15
A.1 Usage of lifetime rank	15
A.2 Lifetime rank indication and place	15
A.2.1 Lifetime rank indication.....	15
A.2.2 Indication example.....	15
Annex B (informative) Recommendations on handling, storage and cleaning conditions for BD writable disks.....	16
B.1 Handling	16
B.2 Storage.....	16
B.3 Cleaning	17
Annex C (informative) Causes of deterioration for BD disks for long-term data storage	18
C.1 Deterioration	18
C.2 Disk structure.....	18
C.3 Causes of deterioration	18
C.4 Nature of deterioration	19
C.5 Effects of deterioration.....	19

C.6 Unexpected deterioration 19

Bibliography..... 20

Figure 1 – Data migration flow for the initial and the periodic performance tests 13

Figure A.1 – Lifetime rank indication example 15

Table 1 – Category of initial recording performance 12

Table 2 – Category of recording performance at periodic performance..... 12

Table B.1 – Recommended conditions for general storage..... 16

Table B.2 – Recommended conditions for controlled storage 16

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUDIO ARCHIVE SYSTEM –

Part 1-2: BD disk and data migration for long-term audio data storage

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62702-1-2 has been prepared by technical area 6: Storage media, storage data structures, storage systems and equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2894/CDV	100/2970/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Sound recordings such as music, speech, and storytelling are an important human heritage and should be preserved for a long term as much as possible. However, we were not able to record sounds in order to preserve them in the past. The first recoding was achieved by Edison in 1877.

Although various technologies were invented later, most of them have limitations for audio archives because storage lifetime is limited and the sound quality deteriorates when it is transferred to the next generation storage device.

The progress of LSI (Large-Scale Integrated Circuit) technology made digital recording of recorded sound possible. The digital recording is very suitable for audio archiving because the migration is performed by copying digital data.

For this purpose various recording materials exist, such as optical disks, magnetic disks, magnetic tape and nonvolatile memory such as a phase-change memory.

This document specifies physical and logical aspects for a standard of audio archives of various storage types which are typically used for audio archives in markets.

The IEC 62702 series currently consists of:

- IEC 62702-1, which specifies the minimum requirements on physical aspects of optical disks for digital sound recordings; IEC 62702-1-1 specifies requirements for DVD optical disks, IEC 62702-1-2 specifies requirements for BD optical disks.
- IEC 62702-2, which specifies the minimum requirements for digitization of content, format of digitized content, content information and media inspection.

AUDIO ARCHIVE SYSTEM –

Part 1-2: BD disk and data migration for long-term audio data storage

1 Scope

This part of IEC 62702-1 specifies a method of data-quality assurance for writable disks (hereinafter "disks") which are specified for long-term data storage, and a data migration method, which can sustain the recorded data on disks for long-term audio data preservation. The writable disks include BD Recordable disk and BD Rewritable disk.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 16963:2017, *Information technology – Digitally recorded media for information interchange and storage – Test method for the estimation of lifetime of optical disks for long-term data storage*

ISO/IEC 29121:2017, *Information technology – Digitally recorded media for information interchange and storage – Data migration method for optical disks for long-term data storage*

ISO/IEC 30190:2016, *Information technology – Digitally recorded media for information interchange and storage – 120 mm Single Layer (25,0 Gbytes per disk) and Dual Layer (50,0 Gbytes per disk) BD Recordable disk*

ISO/IEC 30191, *Information technology – Digitally recorded media for information interchange and storage – 120 mm Triple Layer (100,0 Gbytes single sided disk and 200,0 Gbytes double sided disk) and Quadruple Layer (128,0 Gbytes single sided disk) BD Recordable disk*

ISO/IEC 30192, *Information technology – Digitally recorded media for information interchange and storage – 120 mm Single Layer (25,0 Gbytes per disk) and Dual Layer (50,0 Gbytes per disk) BD Rewritable disk*

ISO/IEC 30193, *Information technology – Digitally recorded media for information interchange and storage – 120 mm Triple Layer (100,0 Gbytes per disk) BD Rewritable disk*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>