

INTERNATIONAL
STANDARD

ISO/IEC
23003-4

First edition
2015-11-15

**Information technology — MPEG
audio technologies —**

**Part 4:
Dynamic Range Control**

*Technologies de l'information — Technologies audio MPEG —
Partie 4: Contrôle de gamme dynamique*

Withhold

Reference number
ISO/IEC 23003-4:2015(E)



Withdrawn



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms, definitions and mnemonics	1
3.1 Terms.....	1
3.2 Mnemonics.....	2
4 Symbols (and abbreviated terms)	2
5 Technical overview	3
6 DRC decoder	4
6.1 DRC decoder configuration.....	4
6.1.1 Overview.....	4
6.1.2 Description of logical blocks.....	5
6.1.3 Derivation of peak and loudness values.....	8
6.2 Dynamic DRC gain payload.....	11
6.3 DRC set selection.....	12
6.3.1 Overview.....	12
6.3.2 Pre-selection based on Signal Properties and Decoder Configuration.....	13
6.3.3 Selection based on requests.....	16
6.3.4 Final selection.....	18
6.3.5 Applying multiple DRC sets.....	18
6.3.6 Album mode.....	19
6.3.7 Ducking.....	19
6.3.8 Precedence.....	19
6.4 Time domain DRC application.....	19
6.4.1 Overview.....	19
6.4.2 Framing.....	20
6.4.3 Time resolution.....	20
6.4.4 Time alignment.....	20
6.4.5 Decoding.....	20
6.4.6 Gain modifications and interpolation.....	24
6.4.7 Spline interpolation.....	28
6.4.8 Look-ahead in decoder.....	28
6.4.9 Node reservoir.....	29
6.4.10 Applying the compression.....	30
6.4.11 Multi-band DRC filter bank.....	33
6.5 Sub-band domain DRC.....	37
6.6 Loudness normalization.....	40
6.6.1 Overview.....	40
6.6.2 Loudness normalization based on target loudness.....	40
6.7 DRC in streaming scenarios.....	43
6.7.1 DRC configuration.....	43
6.7.2 Error handling.....	43
6.8 DRC configuration changes during active processing.....	43
7 Syntax	45
7.1 Syntax of DRC payload.....	45
7.2 Syntax of DRC gain payload.....	46
7.3 Syntax of static DRC payload.....	47
7.4 Syntax of DRC gain sequence.....	59
Annex A (normative) Tables	60
Annex B (normative) External Interface to DRC tool	74

Annex C (informative) Audio codec specific information	85
Annex D (informative) DRC gain generation and encoding	90
Annex E (informative) DRC set selection and adjustment at decoder	95
Annex F (informative) Loudness normalization	100
Annex G (informative) Peak limiter	101
Bibliography	106

Withdrawn

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia, and hypermedia*.

ISO/IEC 23003 consists of the following parts, under the general title *Information technology — MPEG audio technologies*:

- *Part 1: MPEG Surround*
- *Part 2: Spatial Audio Object Coding*
- *Part 3: Unified speech and audio coding*
- *Part 4: Dynamic Range Control*

Introduction

Consumer audio systems and devices are used in a large variety of configurations and acoustical environments. For many of these scenarios, the audio reproduction quality can be improved by appropriate control of content dynamics and loudness.

This part of ISO/IEC 23003 provides a universal dynamic range control tool that supports loudness normalization. The DRC tool offers a bitrate efficient representation of dynamically compressed versions of an audio signal. This is achieved by adding a low-bitrate DRC metadata stream to the audio signal. The DRC tool includes dedicated sections for clipping prevention, ducking, and for generating a fade-in and fade-out to supplement the main dynamic range compression functionality. The DRC effects available at the DRC decoder are generated at the DRC encoder side. At the DRC decoder side, the audio signal may be played back without applying the DRC tool, or an appropriate DRC tool effect is selected and applied based on the given playback scenario.

Withdrawal

Information technology — MPEG audio technologies —

Part 4: Dynamic Range Control

1 Scope

This part of ISO/IEC 23003 specifies technology for loudness and dynamic range control. This International Standard is applicable to most MPEG audio technologies. It offers flexible solutions to efficiently support the widespread demand for technologies such as loudness normalization and dynamic range compression for various playback scenarios.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 23001-8, *Information technology — MPEG systems technologies — Part 8: Coding-independent code points*