



IEC 61966-2-4

Edition 1.0 2006-01

INTERNATIONAL STANDARD

**Multimedia systems and equipment – Colour measurement and management –
Part 2-4: Colour management – Extended-gamut YCC colour space for video
applications – xvYCC**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

R

ICS 33.160.40

ISBN 2-8318-8426-8

CONTENTS

| | |
|---|----|
| FOREWORD..... | 3 |
| INTRODUCTION..... | 5 |
| 1 Scope..... | 6 |
| 2 Normative references | 6 |
| 3 Terms and definitions..... | 6 |
| 4 Colorimetric parameters and related characteristics | 7 |
| 4.1 Primary colours and reference white..... | 7 |
| 4.2 Opto-electronic transfer characteristics | 7 |
| 4.3 YCC (luma-chroma-chroma) encoding methods..... | 8 |
| 4.4 Digital quantization methods | 8 |
| 5 Encoding transformations | 9 |
| 5.1 Introduction | 9 |
| 5.2 Transformation from xvYCC values to CIE 1931 XYZ values | 9 |
| 5.3 Transformation from CIE 1931 XYZ values to xvYCC values | 11 |
| Annex A (informative) Compression of specular components of signals | 13 |
| Annex B (informative) Default transformation from 16-bit sRGB values to xvYCC values..... | 14 |
| Annex C (informative) xvYCC/ITU-R BT.709 and sYCC/sRGB compatibility | 16 |
| Bibliography..... | 18 |
| Figure A.1 – Example of the specular compression method | 13 |
| Figure C.1 – Relationship between ITU-R BT.709 and sRGB | 16 |
| Figure C.2 – Relationship between xvYCC and sYCC | 17 |
| Table 1 – CIE chromaticities for reference primary colours and reference white | 7 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MULTIMEDIA SYSTEMS AND EQUIPMENT –
COLOUR MEASUREMENT AND MANAGEMENT –**

**Part 2-4: Colour management –
Extended-gamut YCC colour space
for video applications – xvYCC**

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 61966-2-4 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

| CDV | Report on voting |
|-------------|------------------|
| 100/967/CDV | 100/1026/RVC |

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

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

IEC 61966 consists of the following parts, under the general title *Multimedia systems and equipment – Colour measurement and management*:

- Part 2-1: Colour management – Default RGB colour space – sRGB
- Part 2-2: Colour management – Extended RGB colour space – scRGB
- Part 2-4: Colour management – Extended-gamut YCC colour space for video applications – xvYCC
- Part 2-5: Colour management – Optional RGB colour space – opRGB (under consideration)
- Part 3: Equipment using cathode ray tubes
- Part 4: Equipment using liquid crystal display panels
- Part 5: Equipment using plasma display panels
- Part 6: Front projection displays
- Part 7-1: Colour printers – Reflective prints – RGB inputs
- Part 7-2: Colour printers – Reflective prints – CMYK inputs (proposed work item)
- Part 8: Multimedia colour scanners
- Part 9: Digital cameras
- Part 10: Quality assessment (proposed work item)
- Part 11: Quality assessment – Impaired video in network systems (proposed work item)

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

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

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

The contents of the corrigendum of November 2006 have been included in this copy.

INTRODUCTION

After the publication of IEC 61966-2-1, Amendment 1, the sYCC colour encoding was used to capture, store and print extended colour gamut for still image applications. Users received pleasant benefit by exchanging and reproducing wide-gamut colour images.

Recently, various kinds of displays that are capable of producing a wider gamut of colour than the conventional CRT-based displays are emerging. However, most of the current video contents that are displayed on conventional displays, are rendered for the sRGB-gamut. Users of wide-gamut displays could benefit from wide-gamut colour images by video colour encoding that supports a larger colour gamut.

This standard defines the “extended-gamut YCC colour space for video applications”. It is based on the current implementation of YCC colour encoding that is used in the video industry (namely ITU-R BT.709-5) and extends its definition to the wider gamut of colour range.

Currently in preview, click buy full version

MULTIMEDIA SYSTEMS AND EQUIPMENT – COLOUR MEASUREMENT AND MANAGEMENT –

Part 2-4: Colour management – Extended-gamut YCC colour space for video applications – xvYCC

1 Scope

This part of IEC 61966 is applicable to the encoding and communication of YCC colour used in video systems and similar applications by defining encoding transformations for use in defined reference capturing conditions. If actual conditions differ from the reference conditions, additional rendering transformations may be required. Such additional rendering transformations are beyond the scope of this standard.

2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60050-845:1987, *International Electrotechnical Vocabulary (IEV) – Part 845: Lighting*

ITU-R Recommendation BT.601-5:1995, *Studio encoding parameters of digital television for standard 4:3 and wide-screen 16:9 aspect ratios*

ITU-R Recommendation BT.709-5:2002, *Parameter values for the HDTV standards for production and international programme exchange*