IEC 62665

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Multimedia systems and equipment – Multimedia e-publishing and e-book technologies –Texture map for auditory presentation of printed texts

Systèmes et appareils multimédias – Technologies de l'édition électronique multimédia et des livres électroniques – Carte de texture pour la présentation auditive de textes imprimés

IEC 62665:2015-12(en-fr)

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Systèmes et appareils multimédias – Technologies de l'édition électronique multimédia et des livres électroniques – Carte de texture pour la présentation auditive de textes imprimés

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MULTIMEDIA SYSTEMS AND EQUIPMENT – MULTIMEDIA E-PUBLISHING AND E-BOOK TECHNOLOGIES – TEXTURE MAP FOR AUDITORY PRESENTATION OF PRINTED TEXTS

FOREWORD

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International Standard IEC 62665 has been prepared by technical area 10: Multimedia e-publishing and e-book technologies, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2012 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition.

a) Two different control codes are described by the different terms: "control codes for text" and "control codes for speech".
b) Pack processing and LZSS processing are shown in their additional subclauses.
c) An example of the header file "Speechio.h" is added.
d) An example of error correction encoding is shown in additional Annex D.

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

CDV	Report on voting
100/2431/CDV	100/2507/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.

The committee has decided that the contents of this publication will remain unchanged until the stability 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

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INTRODUCTION

Information interchange via printed documents between blind or visually impaired people has been carried out by using Braille. However, in order to be able to read Braille, particular tuition is required. Learning Braille is very difficult for aged as well as visually non-impaired people.

Printed documents with texts and text-encoded texture maps can be interchanged by ordinary circulation or publication mechanisms. They are readable as ordinary printed materials and comprehensible by blind or visually impaired people with the support of decoding and auditory presentation equipment.

Today, interchanging of printed documents has become wide-spread and international. The text-encoding scheme to generate a texture map should therefore be standardized at an international level.

Patent

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MULTIMEDIA SYSTEMS AND EQUIPMENT – MULTIMEDIA E-PUBLISHING AND E-BOOK TECHNOLOGIES – TEXTURE MAP FOR AUDITORY PRESENTATION OF PRINTED TEXTS

1 Scope

In order to generate a texture map for auditory presentation of printed text information, this International Standard specifies

– a text encoding scheme to generate a texture map,
– a physical shape and dimension of the texture map for printing,
– additional features for texture map printing,
– texture map decoding and an auditory presentation of decoded texts.

These specifications enable the interchange of documents and publications between visually impaired and non-impaired people.

2 Terms and definitions

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

2.1
texture map
two dimensional cell patterns which include alignment lines and a data matrix which is generated from text data compression and error correction encoding

2.2
auditory presentation equipment
equipment including an engine to carry out a text-to-speech

3 Texture map

3.1 Names of elements

A shape and names of a texture map are indicated in Figure 1. The shape represents the M size in Table 1.

Figure 1 – Shape and elements of a texture map

3.2 Size and data volume

Texture maps have four sizes: XS, S, M and L. The corresponding data volumes are shown in Table 1.

Table 1 – Sizes and data volume of texture maps

Size	Number of cells	Number of units	Dimensions at printing mm	Error correction level	Data volume (Double byte characters)
XS	40 × 40	3 × 3	6,8 × 6,8	strong	41
				medium	48
				weak	51
S	73 × 73	6 × 6	12,4 × 12,4	strong	250
				medium	298
				weak	329
M	106 × 106	9 × 9	17,9 × 17,9	strong	651
				medium	768
				weak	840
L	117 × 117	10 × 10	19,8 × 19,8	strong	793
				medium	921
				weak	1 027

NOTE 1 Number of cells: Cells including alignment line.

NOTE 2 Dimensions at printing: Dimensions of a BMP (bitmap) image created by the SpeechioSymbol [1] function (see 3.3.2.2) at printing with 600 dpi resolution.

NOTE 3 Error correction: One of the 3 levels of error correction: strong, medium and weak, is specified by the SpeechioEncode function at encoding texts to a texture map.

NOTE 4 Data volume: The values in this table depend on a compression of text data.

3.3 Encoding scheme of a texture map from texts

3.3.1 General

The process of generating a texture map from texts is shown in Figure 2. The SpeechioEncode function encodes input texts to create cell data that are stored in a buffer called bit string. Then, the SpeechioSymbol function processes the buffered cell data to generate image data of a texture map.

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1 Speechio™ is the trade mark of a product supplied by KOSAIDO Co., Ltd.

This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

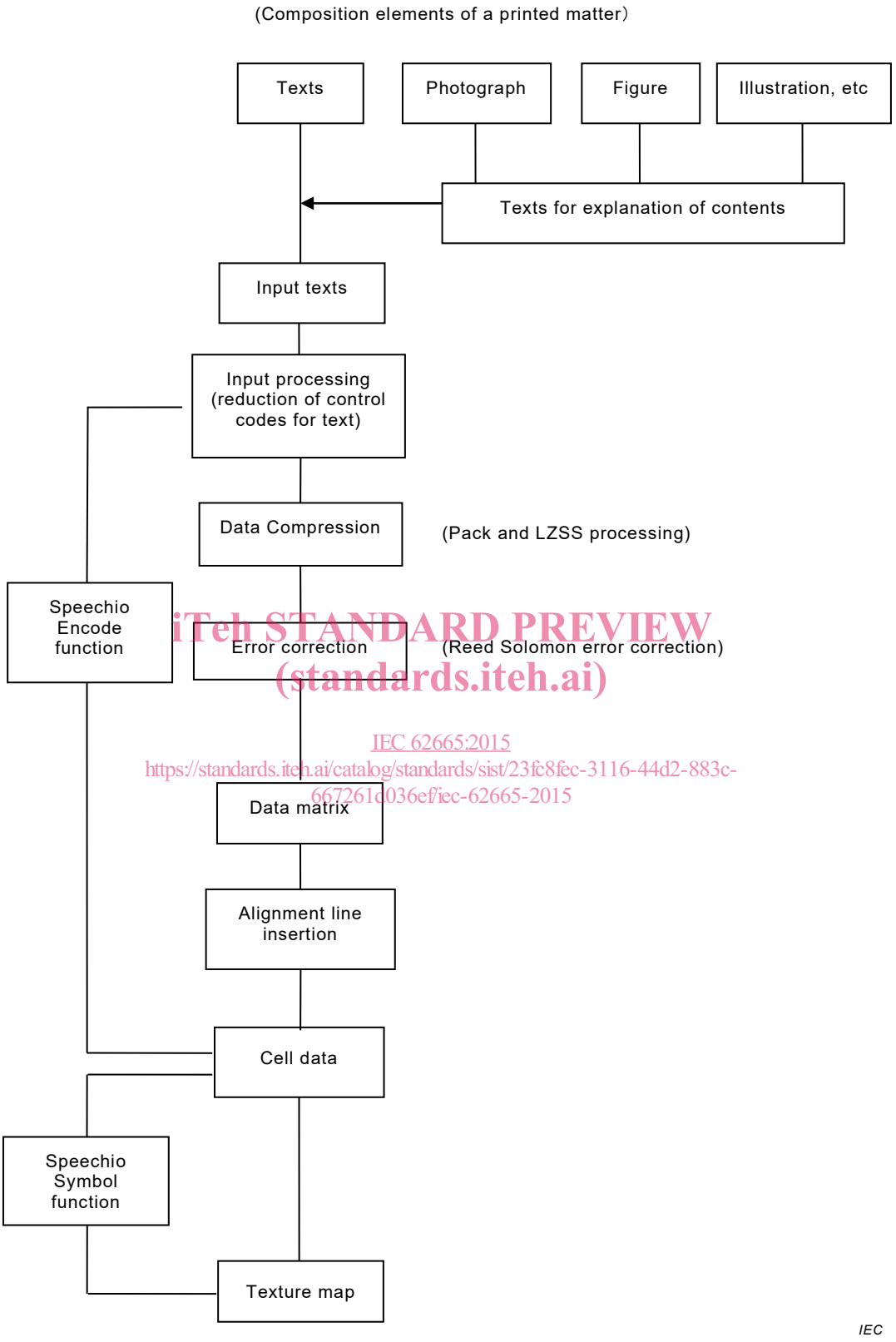

Figure 2 – Process of generating texture map from texts

3.3.2 Processing by SpeechioEncode function

3.3.2.1 Input processing

Input texts represented by Shift JIS code (JIS X 0208) are processed to remove the control codes for text: 0x01 through 0x08, 0x0b, 0x0c, 0x0e through 0x1f and 0x7f (hexadecimal representation). Input text data are delimited by 0x00.

Some control codes for speech are added in the input processing. See Annex A.

3.3.2.2 Data compression

The input processed text data are compressed by pack and LZSS processing, as follows.

a) Pack processing

2-byte codes of Katakana and other characters are converted to the corresponding 1-byte codes. The sequence of the codes converted from 2-byte Katakana or other characters is identified by the Katakana mode identifier SO(0x0e) or default mode identifier SUB(0x1a)) respectively, at the beginning of the sequence. The sequence of the 1-byte code of Hankaku characters is identified by the Hankaku mode identifier SI(0x0f) at the beginning of the sequence.

b) LZSS processing

The LZSS algorithm with slide dictionary of 1 024-byte length is employed. Character codes are processed byte by byte and stored in the output buffer from the MSB of the first byte. When the last byte of the output buffer has unused bits, they will be filled with "0".

The position and length of matched characters are indicated by the preceding 2 bits "10", and 10 bits unsigned integer of the offset from the beginning of slide dictionary and 3 bits unsigned integer of the actual length minus 2.

3.3.2.3 Error correction

The Reed Solomon error correction using Galois field GF(2 048) is employed. An example of the error correction encoding is shown in Annex D.

3.3.2.4 Data matrix

The error corrected data are allocated into units consists of 11 × 11 cells to configure a data matrix.

3.3.2.5 Alignment line insertion

Alignment lines are inserted to the data matrix to create cell data, which show the values of cells ("0" (0x30) for white cell, "1" (0x31) for black cell) from the top left to the bottom right of a texture map. The cell data are stored in a buffer called bit string.

3.3.2.6 SpeechioEncode function

The SpeechioEncode function is shown below.

SpeechioEncode

```
short__stdcall SpeechioEncode(
  char data_type[],
  char cell_type[],
  char recover_level[],
  char copyright[],
  short data_size,
```

```
  unsigned char data_code[],
  char path_name[],
  unsigned char bit_string[]
);
```

Functionarity

Encoding of input texts

Argument value

```
data_type
  Type of text data
  =”T” (Japanese text, shift-JIS), ”E” (English text, ascii)
cell_type
  Size of texture map
  ="s"(XS)/="S"(S)/="m"(M)/="M"(L)
recover_level
  Strength of error correction
  ="S"(strong)/="N"(medium)/="P"(weak)
```

NOTE "N"(medium)is recommended for ordinary printing quality of a texture map. For poor printing quality, "S"(strong) is required.

```
data_size
  Byte number of input data
data_code
  Input data
bit_string
  Buffer for encoded data
```

NOTE The area for the buffer has to be reserved for the calling side.

Returned value

```
>0  Normal end: encode data put away to bit_string
=0  Error: failure of encoding
<0  Data volume over: =(byte number of over flow) ×-1)
```

3.3.3 Processing by SpeechioSymbol function

3.3.3.1 Generation of bitmap image

The cell data stored in a buffer called bit string are processed to create a texture map where a cell is configured with 4 × 4 pixels.

3.3.3.2 SpeechioSymbol function

The SpeechioSymbol function is shown below.

SpeechioSymbol

```
short __stdcall SpeechioSymbol(
  short col,
  short row,
  unsigned char symbol_data[]
);
```

Functionality

Generating (symbolizing) a texture map from encoded data.

Argument value

```
col
  Number of cells for horizontal symbol
  =40(XS)/=73(S)/=106(M)/=117(L)
Row
  Number of cells for vertical symbol
  =40(XS)/=73(S)/=106(M)/=117(L)
symbol_data
  Designated bit_string generated by SpeechioEncode function
```

Returned value

```
=0  Normal end
<0  Error
```

3.4 Decoding scheme of a texture map to texts

The process of generating texts from a texture map is shown in Figure 3.