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First edition
2005-05

TeleWeb application –

Part 1:
General description

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

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TELEWEB APPLICATION –

Part 1: General description

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International Standard IEC 62298-1 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This standard cancels and replaces IEC/PAS 62298 published in 2002.

This first edition constitutes a technical revision.

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

FDIS	Report on voting
100/922/FDIS	100/960/RVD

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 62298 consists of the following parts, under the general title *TeleWeb application*:

Part 1: General description

Part 2: Delivery methods

Part 3: Superteletext profile

Part 4: Hyperteletext profile (in preparation)

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- withdrawn;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.

INTRODUCTION

TeleWeb delivers World Wide Web-style content to the TV environment, giving the viewer an enhanced television experience. It can be seen as the successor to Teletext. TeleWeb is not restricted to the TV environment and can be deployed equally effectively in areas like DAB, DRM, and home automation.

This standard gives a general overview of the TeleWeb application.

TELEWEB APPLICATION –

Part 1: General description

1 Scope

This part of IEC 62298 gives a general overview of the TeleWeb application that allows Web-style text and graphics to be broadcast to, and displayed by, suitable decoders.

TeleWeb services can be broadcast in a number of different ways, for example, VBI, DVB, DAB, etc., and to a variety of decoder types, for example, TVs, portable decoders, PCs, etc. These transmission protocols are described separately.

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 62297 (all parts), *Trigger messages for broadcast applications*

IEC 62298 (all parts), *TeleWeb application*

ETSI EN 300 231, *Television systems; Specification of the domestic video Programme Delivery Control (PDC) system*

ETSI EN 300 468, *Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems*

ETSI EN 300 707, *Electronic Programme Guide (EPG); Protocol for a TV Guide using electronic data transmission*

ITU-R BT 1379-1:2004, *Safe areas of wide-screen 16:9 and standard 4:3 aspect ratio productions to achieve a common format during a transition period to wide-screen 16:9 broadcasting*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
button
part of the user interface that enables the viewer to select a page or trigger an event, etc. It may not necessarily exist as a physical button on a remote control handset

3.1.2
Independent Data Line (IDL)
stand-alone Teletext packet containing both control and application data, which does not form part of a Teletext page. The packet address is either 30 or 31

3.1.3
semi-standby
standby mode, currently known in the TV world, in which the small-signal part of the set is powered to support acquisition and signal processing. The picture tube, audio power amplifiers and other large-signal parts are not powered. To the user the set appears to be switched off

3.2 Abbreviations

DAB Digital Audio Broadcasting
DRM Digital Radio Mondiale
DSM-CC Digital Storage Media Command and Control
DVB Digital Video Broadcasting
EPG Electronic Program Guide
ETSI European Telecommunication Standard Institute
GIF Graphics Interchange Format
HTML Hyper Text Mark-up Language
IDL Independent Data Line
JPEG Joint Picture Experts Group
MPEG Moving Picture Experts Group
OSI Open System Interconnection
RGB Red Green Blue
URL Uniform Resource Locator
VBI Vertical Blanking Interval

4 General description of TeleWeb

4.1 Aims

The aim of TeleWeb is to deliver World Wide Web-style content to the living room TV to give the viewer an enhanced television experience. A TeleWeb service broadcasts data files containing text and high-definition graphics to suitable decoders. The data transmitted can be closely linked to events within the accompanying TV programmes, or can be more general in nature to emulate a traditional, but higher definition, Superteletext service.

It is intended that TV-based decoders be implemented in a cost-effective manner without recourse to the technology normally associated with personal computers. In part, this is achieved by limiting the number of different types of multimedia data that can be used within a service. By careful design of the user interface, decoder manufacturers will be able to offer easy-to-use equipment for accessing TeleWeb services without requiring the consumer to be computer-literate. In addition, they will be able to customize their products to differentiate them from those of their competitors.

The encoding and transmission scheme is designed to be as efficient and robust as possible consistent with conveying potentially large data files via a unidirectional channel or bi-directional channel with a low or high data rate.

For example, TeleWeb data can be broadcast via Teletext packets using existing infrastructures. The TeleWeb data stream can be encoded into independent data packets that can be transmitted with minimal interference to existing Teletext services. In many instances, it will be possible to recover otherwise wasted Teletext transmission capacity, and the effect on existing services will be negligible.

It is possible to carry multiple services from different service providers on the same television channel. The fast transmission of services on analogue TV channels where there is no accompanying video component is also possible.

Two TeleWeb profiles are defined:

a) a first profile for Superteletext;

b) a second profile for Interactive applications.

Second-profile decoders shall provide backward compatibility with Superteletext decoders.

4.2 Overview

A database of files is broadcast, some or all of which are captured and stored by a decoder. Certain files may be broadcast repetitively; others may be transmitted only once when they contain real-time updates or are linked to events in the accompanying TV programme. Each file has a set of attributes to define the file name, file type and other parameters as required. One of these is the theme or content description. This allows a decoder to be programmed to receive only specific information or to exclude certain categories. This is useful where the volume of data transmitted exceeds the storage capacity available in the decoder.

On selecting a TeleWeb service, the viewer is first presented with the home page of the service. Navigation to other pages is via embedded links. It is possible that there may be more than one TeleWeb service on a given channel. Therefore, each service includes additional information to allow a menu of available services to be presented to the user. The user interface is at the discretion of the decoder manufacturer, as is the provision of "bookmark" and "history" browser features.

4.3 OSI seven-layer model

Figure 1 shows an OSI-style seven-layer model for TeleWeb when broadcast via different delivery systems.

<table>
<tr><td>Layer 7: Application</td><td colspan="5">Superteletext service</td></tr>
<tr><td>Layer 6: Presentation</td><td colspan="5">HTML, Text, graphics and data files</td></tr>
<tr><td>Layer 5: Session</td><td colspan="5">File attributes</td></tr>
<tr><td>Layer 4: Transport</td><td>DSM-CC</td><td>DSM-CC</td><td>DSM-CC</td><td rowspan="4">Delivery methods for radio</td><td rowspan="4">Delivery methods for IP</td></tr>
<tr><td>Layer 3: Network</td><td>IDL</td><td>IDL</td><td>DSM-CC</td></tr>
<tr><td>Layer 2: Link</td><td>Teletext</td><td>MPEG</td><td>MPEG</td></tr>
<tr><td>Layer 1: Physical</td><td>VBI</td><td>DVB</td><td>DVB</td></tr>
</table>

IEC 674/05

Figure 1 – OSI-style seven-layer model for different delivery systems

5 Documentation structure

IEC 62298-1 describes the general principles and application profiles of TeleWeb and outlines the display and control models on which the other parts are based. Services can be delivered via a variety of methods as described in IEC 62298-2. IEC 62298-3 specifies the TeleWeb Superteletext profile and IEC 62298-4 describes the TeleWeb Hyperteletext profile.

A graphical overview of the documentation structure is given in Figure 2.

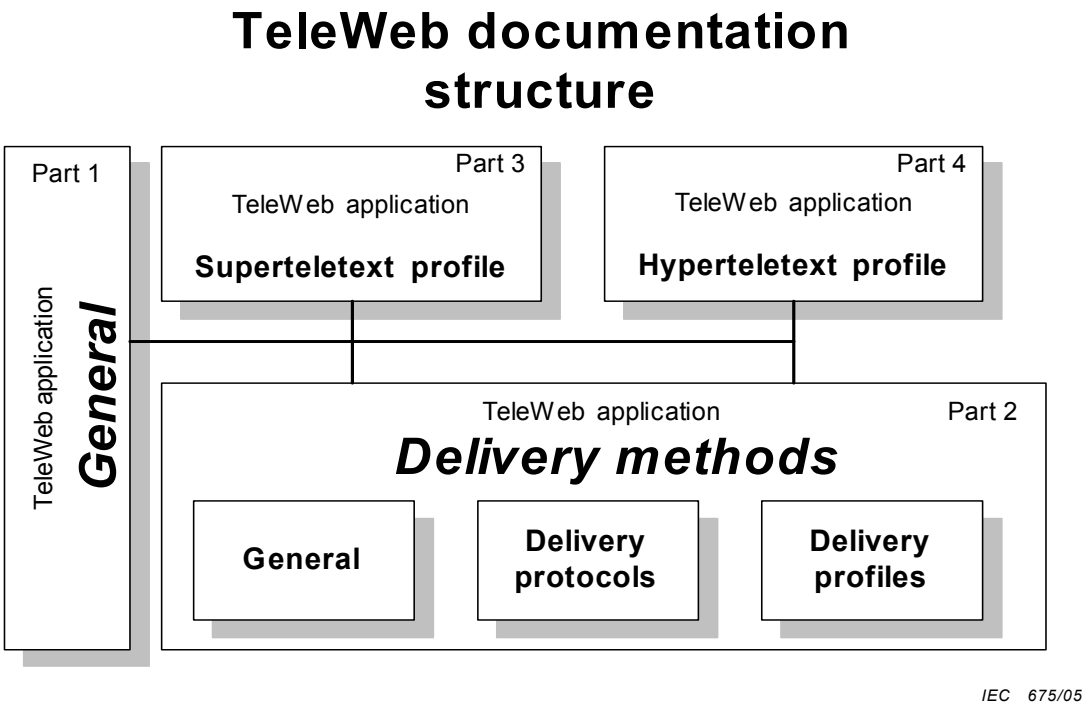

Figure 2 – Documentation structure

6 TeleWeb application profiles

6.1 General

The TeleWeb application profiles are twofold as depicted in Figure 2:

- the basic functionality Superteletext profile specified in IEC 62298-3;
- the higher functionality Hyperteletext profile specified in IEC 62298-4.

The following subclauses are general requirements of these profiles.

6.2 Superteletext profile

6.2.1 General

The Superteletext profile consists of the Superteletext broadcast features with optional return channel features.

6.2.2 Superteletext broadcast features

This subclause lists the main features of the TeleWeb Superteletext profile. The Superteletext profile is fully specified in IEC 62298-3.

- Fixed content width and height (640 × 480 pixels).
- One proportional font, 5 sizes, 4 styles. The style “normal” is mandatory, the styles “bold”, “italics” and “bold and italics” are optional.

- One fixed font, 5 sizes, 4 styles. The style “normal” is mandatory, the styles “bold”, “italics” and “bold and italics” are optional.
- Defined fixed-font character cells (height × width in pixels).
- Support for all East and West European Latin-1 based languages.
- Minimum colour resolution of 12 bit (RGB = 444), 24 bit recommended (RGB 888).
- A minimum of 188 colours in a colour palette.
- Bit-mapped graphics using the GIF and JPEG formats ([GIF], Annex A, [JPEG1], [JPEG2]).
- Dithering to achieve best colour matching (optional).
- Support for full and partial transparency.
- Animation using animated GIF and marquee
- Accentuation using blink (optional).
- Display of text and graphics over video.
- The content is authored using TeleWeb HTML.
- Additional navigation possibilities via coloured (PDC, see EN 300 231) and numbered keys.
- Direct access to pages through page numbers.
- Home page indication.
- Service identification.
- Content identification via themes.
- Age rating system based on EN 300 468.
- Indication of a priority level (filtering possibilities in case of decoder memory restrictions).
- Control of primary link selection in the decoder.
- Decoder acquisition in semi-standby mode.
- 5 Mbytes of database broadcast capacity. If the broadcaster applies compression to the HTML pages and uses the most appropriate encoding for images, more pages can be broadcast. This broadcast capacity is divided over two services, a “short TeleWeb service” (100 Kbytes) and a “full TeleWeb service” (4.9 Mbytes).
- Decoder shall support one “preferred” full TeleWeb service.
- Decoder shall support the short TeleWeb service on the currently tuned channel.
- Cross-linking between several services is supported through absolute TeleWeb URLs (optional).
- Supporting multiple Full TeleWeb Services is optional.
- Decoder support for internal links within the same TeleWeb service.
- Decoders supporting Teletext should at least support links from a short TeleWeb service to Teletext. For all other decoders this is optional.
- Support of nexTView (EPG, see EN 300 707) links from TeleWeb to nexTView (optional).
- Support of file compression based on ZLIB [ZLIB].
- Support of IEC 62297.
- Decoder support for the processing of programme-related information to build a TeleWeb EPG application (optional).
- Support for group and individual decoder addressing.

6.2.3 Superteletext return channel features

A return channel is optional in Superteletext.

This subclause describes the optional interaction features included in the Superteletext profile:

- URL substitution;
- HTTP protocol version 1.1;
- domain name translation (DNS);
- transport layers (TCP/UDP);
- network layer (IPv4);
- user control of the interaction channel connection.

6.3 Hyperteletext profile

A return channel is mandatory in the Hyperteletext profile.

This profile supports the following features on top of the Superteletext profile:

- persistent storage of personal and connection data;
- interaction channel security;
- style sheets;
- ECMAScript;
- document object model (DOM);
- HTML frames.

7 Display model

This section defines the features of a TeleWeb display. They are applicable to both editing stations and decoders. The information is presented as a set of concepts to convey the general requirements. No particular method of realization is implied.

The behaviour of a Superteletext display should conform to the TeleWeb reference decoder, which should be used as a guideline to ensure the conformity of all decoders in the market. The reference decoder is conformant with IEC 62298-3.

7.1 Display planes

7.1.1 Types

The conceptual TeleWeb "display model" consists of up to five aligned planes (see Figure 3).

The cursor plane does not form part of this specification. It is an option for the decoder manufacturer and might be included as part of the user interface. If present, it is assumed to have the highest display priority.

The text/graphics plane is used to display all visible foreground elements of a TeleWeb service. This includes the text and image data defined and invoked within the body section of an HTML file.

The background image plane displays an image behind the foreground elements.

The background colour plane displays a single uniform colour.

The video plane contains the video of any accompanying TV signal. This plane has the lowest display priority.

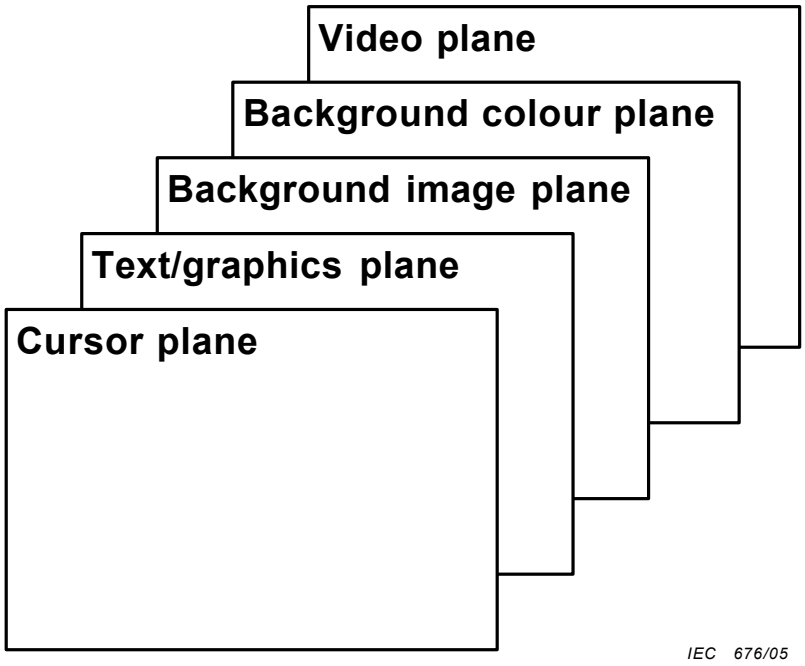

Figure 3 – Display planes and their priority order

7.1.2 Overall sizes

All planes are considered to be the same physical size. The text/graphics and background image planes are modelled as 720 × 576 pixels (horizontal × vertical) for reasons of compatibility with digital TV. The background colour plane can be treated in the same way.

The video plane is capable of displaying the TV picture in full, regardless of the screen aspect ratio of the equipment.

7.1.3 Usable areas

The display area contains the TeleWeb content and the elements of the user interface. It is divided into application, content and user interface areas.

An example of how the screen might be configured is shown in Figure 4. The design and contents of the user interface areas marked as “manufacturer-defined” are not specified by the current document. They can differ depending on the aspect ratio supported by the screen.

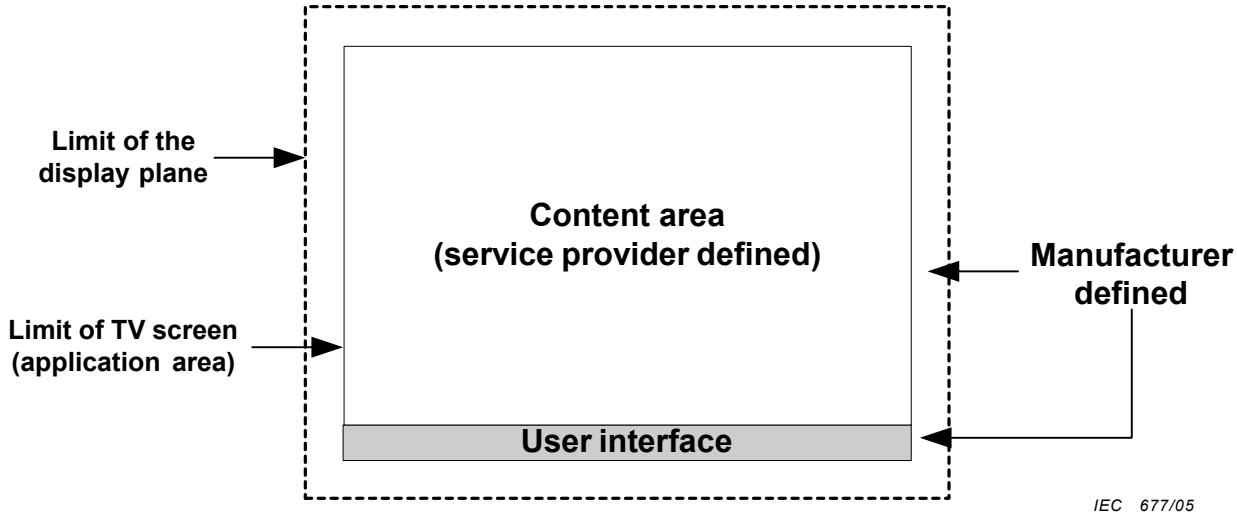

Figure 4 – Screen layout example

7.1.4 Application area

For information purposes only: the overscan found on most consumer TV-receiving equipment shall be taken into account. Typically this is 5 % at each border. This reduces the effective area of the text/graphics and background planes to 648 × 518 pixels. This "safe" area is referred to in this document as the application area. The application area will normally be available unless the equipment is configured in a non-standard way, perhaps when the underlying and visible 4:3 format video has been manipulated to fill a 16:9 display.

For safe areas, refer to ITU-R BT 1379-1.

7.1.5 Content area

The content area is used for the display of the TeleWeb service. Its size is fixed at 640 × 480 pixels regardless of the screen aspect ratio of the equipment. Content should be authored to take account of these limits if uniformity of display across all decoders is considered to be essential. A decoder shall ensure that the content area is always visible in full within the application area unless the equipment is configured in a non-standard way. Its exact position relative to the boundaries of the application area is a manufacturer's option.

If a decoder is required to display content that exceeds the available space, then the decoder may discard part of that content and should initially display the upper left part.

A background image that is smaller than the background image plane should be tiled to fill the available area.

The content area is under the control of the TeleWeb service provider, although a decoder manufacturer may choose to superimpose a cursor, or similar, within this area as part of the user interface. The contents of the text/graphics plane are determined by the data in the text and image files. This shall be regarded as "foreground" information for the purposes of determining display priorities. The background of an HTML table cell is also regarded as "foreground" information. The "background" to the content area can consist of elements from the background image, background colour and video planes in any combination. The contents of the background image and background colour planes are determined by HTML attributes. Video is displayed if the transparent colour is selected on both planes. The priority mechanism is described in 7.2.

Decoders with a screen aspect ratio of 16:9 can choose to render the TeleWeb content so that its 4:3 aspect ratio is maintained. Thus, a circle in an image should still appear as a circle.

Alternatively, a decoder may choose to expand the TeleWeb content to fill the available space, thus distorting the page to some extent.

7.1.6 User interface area

In principle, the entire display area outside of the content area is under the control of the decoder manufacturer and can accommodate elements of the user interface. However, to ensure visibility, the manufacturer is likely to restrict the foreground elements of the user interface to the area lying within the application area.

The service provider is able to indicate when the data is best displayed without any user interface text or graphics. If this condition is indicated (Suppress User Interface flag set), the screen areas under the control of the decoder manufacturer should be set to display video. However, it shall be permitted to display user interface information temporarily, for example, in response to a command from the user or to indicate navigation options.

7.2 Display priority

The display priority order of the planes shown in Figure 3 is in the order "cursor" down to "video". This order is important as the use of the 100 % transparent colour feature at a given position makes visible the plane immediately below.

In general, 100 % transparency should be assumed when there is no explicit definition for the colour of a particular pixel within the content area. For example, in the absence of a background image file but in the presence of <body bgcolor=blue>, the background of the content area should be coloured blue overall.

It is possible to set an intermediate level of transparency (see IEC 62298-3). This semi-transparency only takes effect when the lower plane is the video plane. If an intermediate level is selected elsewhere, the response of a decoder is not defined.

8 Control model

8.1 User control device

The physical appearance of the control device and the method of interaction are not covered by this specification.

8.2 Control functions

8.2.1 Selecting hypertext links

The apparatus through which the user controls the decoder shall provide a means for choosing hypertext links displayed within the content area. Conceptually, this may involve moving a cursor between the links and providing a method of selection but other methods are not precluded (for example, jumping highlights).

8.2.2 Primary link selection control

To provide better support for interactive applications, a URL can hold extra selection information in the URL's fragment defining the primary selected anchor in the page referenced by the URL.

8.2.3 Mandatory functions

Dedicated buttons (or their equivalent) numbered 0 to 9 shall be provided on the user control device, as shall four other buttons (or their equivalent) coloured red, green, yellow and blue. The coloured buttons shall be grouped in that order from left to right or top to bottom.

The function of all these buttons shall be under the control of the service provider while a TeleWeb page is displayed in the content area.

Conceptually, hypertext links can be mapped to any of these buttons.

9 Referencing

Referencing to other services, like Teletext, nexTView, Internet services, will be provided using the standard TeleWeb URL mechanism defined in IEC 62298-3.

These references provide a way to reuse data, which is already being transmitted (or is otherwise available) within the context of the TeleWeb application.

10 General decoder architecture

The following drawing is an example of Superteletext TeleWeb decoder architecture.

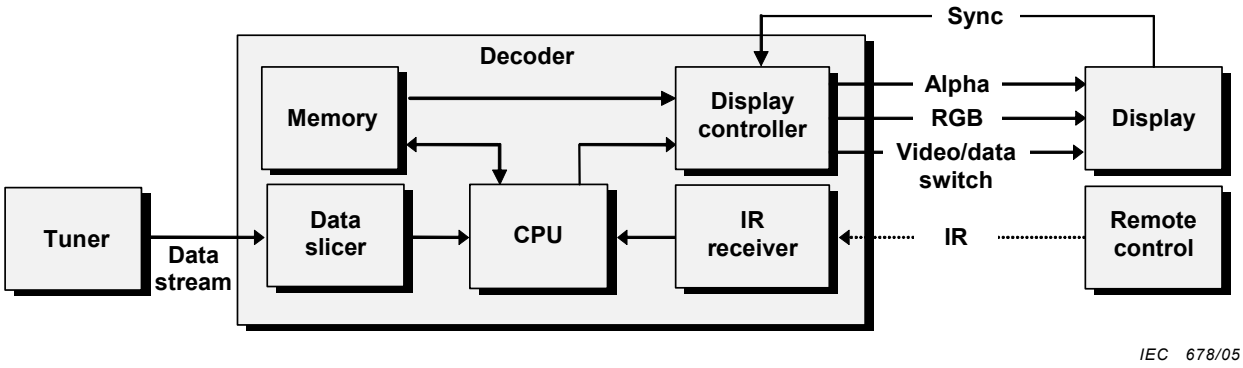

Figure 5 – Block diagram of an example of a Superteletext TeleWeb decoder

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