

TeleWeb Application Profile 1
Reference Decoder

Withdrawn

PUBLICLY AVAILABLE SPECIFICATION



INTERNATIONAL
ELECTROTECHNICAL
COMMISSION



Reference number
IEC/PAS 62298

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REFERENCE DECODER

FOREWORD

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IEC-PAS 62298 was submitted by the EACEM (European Association of Consumer Electronics Manufacturers) and has been processed by IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document:

Draft PAS	Report on voting
100/407/PAS	100/438/RVD

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EACEM Technical Report

TR-045-r01

Title:
TeleWeb Application Profile 1 Reference Decoder

Date: 23 April 2001

Version History

Version	Date	Author	Description
1.0	21 Dec 2000	Alexander Wass	First released version.
1.1	31 Jan 2001	Jan van Lier	Add relation between logo and certification.
2.0	5 Feb 2001	Jo Vandale	Adapting to the new EACEM references codes.
2.1 / r00	15 Feb 2001	Jo Vandale	Adding the new EACEM template (Cover, Header, Footer, ...)
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Withdrawn

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1 Introduction

TARA Systems developed on request of the TeleWeb Project a Reference Decoder (Receiver & Browser) for TeleWeb profile 1. With the PC based GDI Display Simulator TeleWeb content can be displayed. This Profile 1 Reference Decoder is the basis for further porting activities to specific embedded hardware platforms. Further information can be found in reference [4]

2 References

- [1] EACEM TR-046: "TeleWeb Application Part 1, General Description".
- [2] EACEM TR-047: "TeleWeb Application Part 2, Profile 1, Enhanced".
- [3] EACEM TR-048: "TeleWeb Application Part 3, Delivery Methods".
- [4] TARA Systems GMBH: "Available Documentation": Software Specifications for GDI, HTML-DOM Implementation, Receiver, Memory Management, HTML Viewer, Application, Content Generation Guidelines

3 Profile 1 Reference Decoder

The TeleWeb Profile 1 Reference Decoder consists of a Reference Receiver and a Reference Browser. This Reference Decoder is platform independent and is the basis for further porting activities to specific embedded hardware platforms. A PC based Graphical Device Interface Display Simulator is available for displaying TeleWeb content. A TeleWeb Logo as pictured in section 4 is connected to this Reference Decoder. More information is given in references [1], [2], [3] and [4]. Documentation can be achieved via the contact addresses in section 5. A schematic overview of the Profile 1 Reference Decoder and GDI Display Simulator is given in section 6.

3.1 TeleWeb Reference Receiver

- Data transmission using IDL format B.
- Based on DVB Data Carousels
- FEC and CRC
- Prioritised File Database
- Pre-Filtering of pages

3.2 TeleWeb Reference Browser

- Implements a browser based on the requirements as specified in [2]
- Easy Navigation with left, right, up, down, select, colour and number keys
- Bookmark Management
- History Support

Software Design

- Object Oriented ANSI C Design
- Platform independent
- Prepared for easy porting to embedded 16/32-bit platforms
- PC based development with slicer and display simulator
- Automatic test system

3.3 Hardware Requirements

- 16 or 32-bit controller
- 640x480 display for content
- min. 188 colours
- ~ 500 Kbytes for code (including GDI and fonts)
- >5 Mbytes RAM for database
- 1 Mbytes RAM workspace

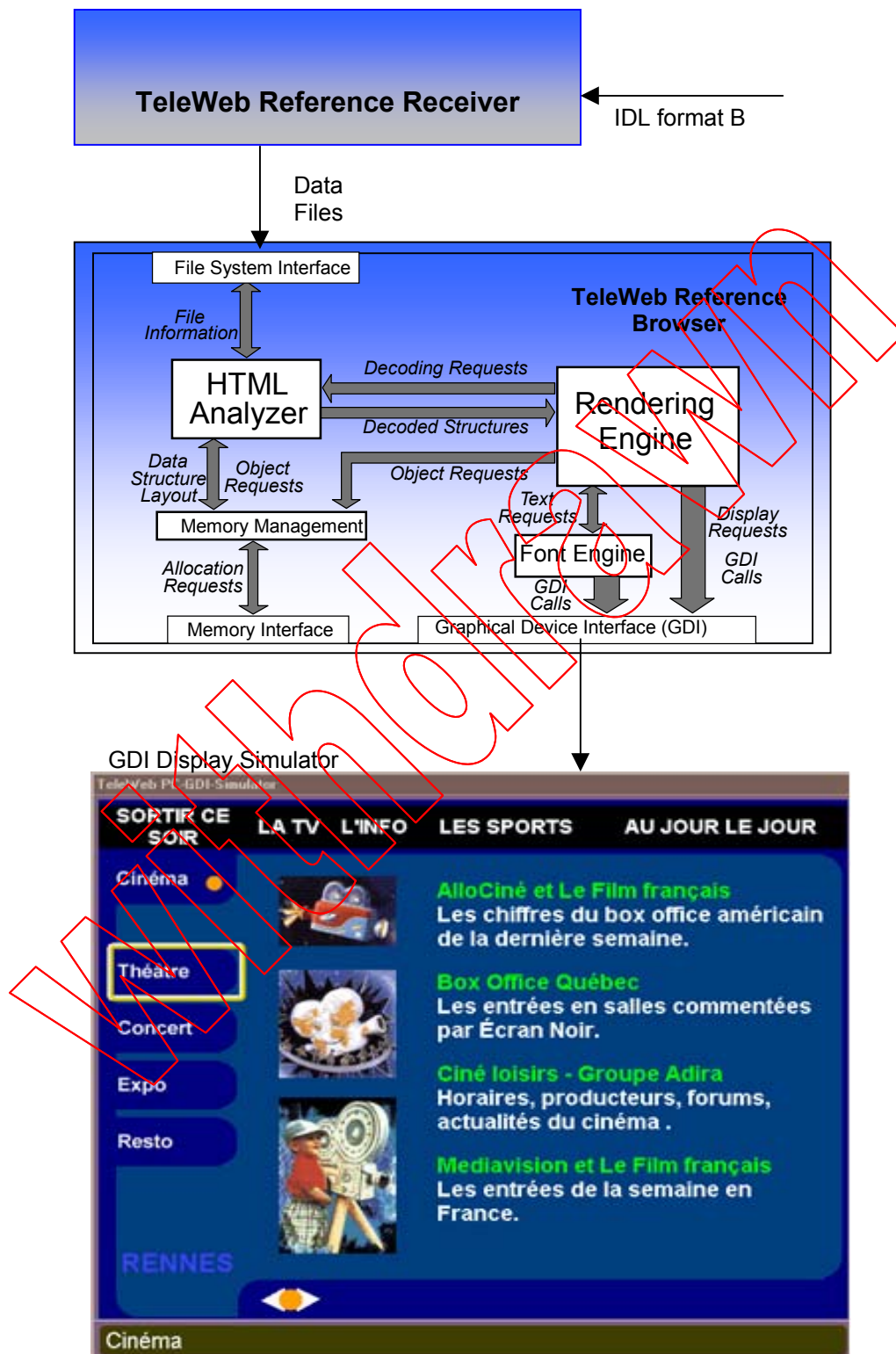
4 Logo connected to Profile 1 Reference Decoder



5 Contacts

<i>EACEM</i>	Brussels / Belgium	Internet address: http://www.eacem.be
<i>TARA Systems GmbH</i>	Munich / Germany	Internet address: http://www.tara-systems.de
<i>TeleWeb Project</i>		Internet address: http://www.superteletext.tv

6 Schematic Overview



EACEM Technical Report

TR-046-r02

Title:
TeleWeb Application Part 1, General Description

Proposed ETSI Title:
“TeleWeb Application Part 1, General Description”

Proposed ETSI keywords:
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Date: 18 May 2001

History

Ver.	Date	Author	Description
0.1	15 Feb 2000	David Tarrant	Initial split up from the original TeleWeb specification v1.6 in the TP1.4 meeting in Brussels
0.2	20 Juli 2000	Jo Vandale	Adaptations during the EACEM TP1.4 and TeleWeb meeting in Rennes
0.21	8 Aug 2000	Jo Vandale	Adaptations during the EACEM TP1.4 meeting in Brugge
0.22	31 Aug 2000	Jo Vandale	Minor adaptations during the TeleWeb meeting in Rousset
0.3	24 Oct 2000	Jo Vandale	Combining the requirement tables of profile 1.
0.4	2 Nov 2000	Jo Vandale	Adding the review remarks on version 0.3 by David Tarrant.
1.0	3 Nov 2000	Jo Vandale	Released version after review in the TeleWeb group.
1.9	4 Dec 2000	Jo Vandale	Rework after specification changes of the steering board.
2.0	11 Dec 2000	Jo Vandale	Released version after review in the Technical TeleWeb group.
2.1	31 Jan 2001	Jo Vandale	Released version after minor changes during the TM of January.
3.0	5 Feb 2001	Jo Vandale	Adapting to the new EACEM reference codes.
3.1 / r00	15 Feb 2001	Jo Vandale	Adding the new EACEM template (Cover, Header, Footer, ...)
4.0 / r01	23 April 2001	Jo Vandale	Adaptations resulting from the last Technical Meeting EACEM Project Team 1.4 approved.
4.1 / r02	5 May 2001	Jo Vandale	Making nextView links optional as a result of the EACEM TC support group meeting.

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Intellectual Property Rights

The application described here is intended to be an open standard, free of licensing and royalty restrictions for all parties.

Apart from the Unisys patent on the LZW compression scheme used in the GIF [4] graphics format and the licensing of the "Tiresias Screen" font from BITSTREAM [5], EACEM has not been informed of the existence of any Intellectual Property Rights (IPR) that could be, or could become essential to the present document. However, no investigation, including IPR searches, has been carried out. No guarantee can be given as to the existence of any IPRs that are, or may be, or may become, essential to the present document.

The licensing options to use the Tiresias font should be discussed with BITSTREAM [5] for each individual TeleWeb application. On a company level this licence requirement can be already covered due to other projects like DVB, MHP, ...

1 Scope

This document 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, e.g. VBI, DVB, DAB, etc., and to a variety of decoder types, e.g. TVs, portable decoders, PCs, etc. These transmission protocols are described in separate documents.

2 References

- [4] CompuServe Incorporated: "Graphics Interchange Format, version GIF89a", July 1990.
- [5] BITSTREAM is the leading developer of font technology, digital fonts, and custom typeface designs for a wide variety of markets. Setting the standard of excellence in font technology, BITSTREAM holds key patents covering the creation of portable fonts for the Internet. www.bitstream.com
- [6] JPEG File Interchange Format Version 1.02 September 1, 1992
- [7] Digital Compression and Coding of Continuous Still Images
Part 1, Requirements and Guidelines
ISO/IEC JTC1 Draft International Standard 10918-1, Nov 1991
- [8] Digital Compression and Coding of Continuous Still Images
Part 2, Compliance Testing
ISO/IEC JTC1 Draft International Standard 10918-2, Dec 1991
- [9] ETSI, ETS 300 472: "Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bitstreams".
- [10] ETSI, EN 301 192: "Digital Video Broadcasting (DVB); DVB specification for data broadcasting", V1.2.1 (1999-011)
- [11] ETSI, TR 101 202: "Implementation guidelines for data broadcasting", V1.1.1 (1999-02).
- [12] EACEM TR-045: "TeleWeb Application Profile 1 Reference Decoder".
- [13] ETSI, EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".
- [14] EACEM TR-037: Proposal for introducing a trigger mechanism into TV transmissions.
- [15] IETF RFC 1950 (1996): "ZLIB Compressed Data Format Specification version 3.3".

- [16] ETSI TS 102 812: "Digital Video Broadcasting Multimedia Home Platform (MHP) Specification 1.1".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

Button: A 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.

Independent Data Line (IDL): A standalone Teletext packet containing both control and application data. It does not form part of a Teletext page. The packet address is either 30 or 31.

Semi-standby: A standby mode, currently known in the TV world, where 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

For the purpose of the present document, the following abbreviations apply.

COP	Code Of Practice
DAB	Digital Audio Broadcasting
DARC	DAta Radio Channel
DSM-CC	Digital Storage Media Command and Control
DVB	Digital Video Broadcasting
EPG	Electronic Program Guide
ETSI	European Telecommunication Standard Institute
FM	Frequency Modulation
GIF	Graphics Interchange Format
HTML	Hyper Text Mark-up Language
IDL	Independent Data Line
IPR	Intellectual Property Rights
JPEG	Joint Picture Experts Group [6][7][8]
LZW	Lempel-Zif Welsh
MOT	Multimedia Object Transfer (DAB Protocol)
MPEG	Motion Picture Expert Group
OSI	Open System Interconnection
PPP	Point to Point Protocol
RGB	Red Green Blue
TCP/IP	Transmission Control Protocol / Internet Protocol
URL	Uniform Resource Locator
VBI	Vertical Blanking Interval
WAP	Wireless Application Protocol
WWW	World Wide Web
XHTML	Extensible Hyper Text Mark-up Language

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 without the inherent costs of connecting to the Internet via a modem and telephone line. 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, Teletext service. Hooks are left for future expansion and enhancement.

It is the intention that TV-based decoders can 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 customise 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.

Three TeleWeb profiles are defined:

- Profile 1 - Enhanced Broadcast TeleWeb service without a return channel.
- Profile 2 - Interactive TeleWeb, extended from profile 1 with the addition of a return channel
- Profile 3 - Internet TeleWeb, extended from profile 2 offering full Internet access

Profiles 2 and 3 are designed to provide substantial backward compatibility with lower profile 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.

Layer 7: Application	The TeleWeb Application						
Layer 6: Presentation	HTML, Text, graphics, and data files						
Layer 5: Session	File attributes						
Layer 4: Transport	DSM-CC	DSM-CC	DSM-CC	TCP/IP	WAP	MOT	DARC
Layer 3: Network	IDL	IDL	DSM-CC	PPP			
Layer 2: Link	Teletext	MPEG	MPEG	Serial			
Layer 1: Physical	VBI (1)	DVB (2)	DVB (3)	Internet	Mobile	DAB	FM Swift

Note 1: Any physical layer capable of carrying Teletext.

Note 2: DVB method according to reference [9].

Note 3: DVB method according to references [10] and [11].

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

5 Documentation structure

Part I (this document) describes in general principles of TeleWeb and outlines the display and control models on which the other parts are based. Part II specifies the 'Enhanced' profile and covers the format of the baseband data sent from a headend database to decoders. Services can be delivered via a variety of methods as described in Part III. Part IV describes the 'Interactive' profile and Part V the 'Internet' profile.

TeleWeb Documentation Structure

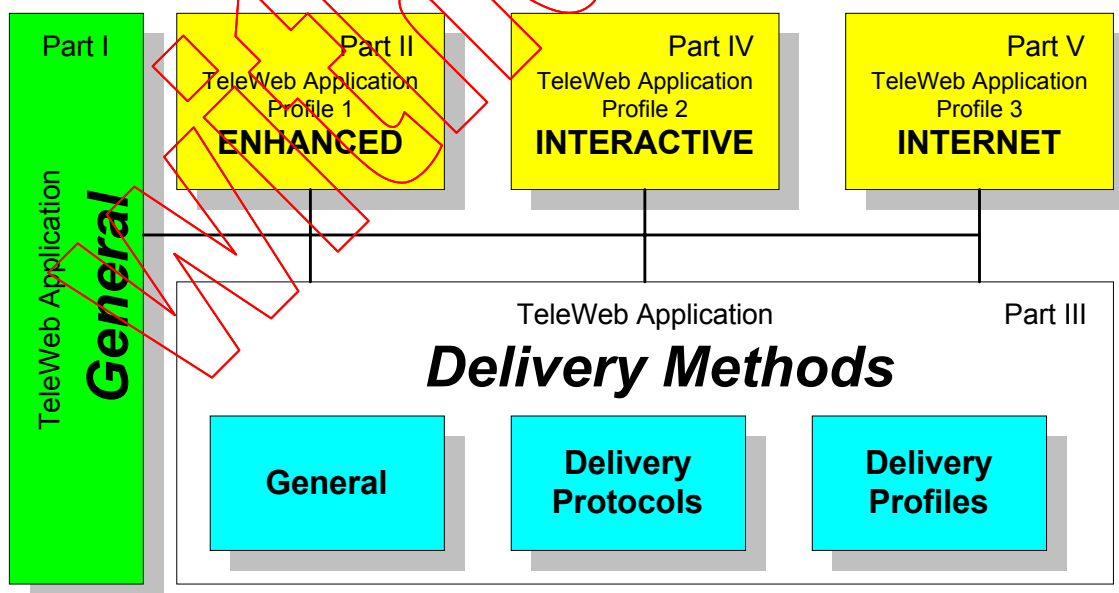


Figure 2: Documentation structure

6 Application Profiles

6.1 Profile 1 – Enhanced

This sub-clause lists the features of a TeleWeb Profile I service and a corresponding decoder. Each feature forms part of a minimum specification for a service and/or decoder, unless marked as optional.

- Fixed content width and height (640 x 480 pixels).
- One proportional font, 5 sizes, 4 styles. The styles 'normal' is mandatory, the styles 'bold', 'italics' and 'bold & italics' are optional.
- The “Tiresias Screen” font is used for the proportional font.
- One fixed font, 5 sizes, 4 styles. The styles 'normal' is mandatory, the styles 'bold', 'italics' and 'bold & italics' are optional.
- Defined fixed font character cells (Height x 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 are defined in a colour palette (same as used by MHP [16]).
- Bit-mapped graphics using the GIF and JPEG formats [4][6][7][8].
- 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 a TeleWeb HTML.
- Additional navigation possibilities via coloured (Fastext, TOP, ...) and numbered keys.
- Home page indication.
- Service identification.
- Content identification via themes.
- Age rating system based on the DVB-SI [13].
- 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 (Optional).
- 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 broadcasted. This broadcast capacity is divided over 2 services, a ‘Short TeleWeb Service’ (100Kbytes) and a ‘Full TeleWeb Service’ (4.9Mbytes).

- Decoder must support one 'Preferred' Full TeleWeb Service.
- Decoder must support the Short TeleWeb Service on the currently tuned channel.
- Cross-linking between several services is supported through absolute TeleWeb URL's (Optional).
- Supporting multiple Full TeleWeb Services is optional.
- Decoder support for internal links within the same TeleWeb service.
- Decoders supporting Teletext should also support links from TeleWeb to Teletext, for all other decoders this is optional.
- Support of nexTView links from TeleWeb to nexTView (optional).
- Support of file compression based on ZLIB [15].
- Support of the trigger specification [14]
Restriction on the number of trigger streams and used transport layers will be defined in a COP
- 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 Profile 2 - Interactive TeleWeb

Decoder profile as for profile 1 adding a back channel for registration, voting, etc.

- Support of the Document Object Model and ECMAScript
- Support of HTML Frames.
- Encryption possibilities
- HTML Forms

6.3 Profile 3 – Internet TeleWeb

As profile 2 and offering full Internet access including limited browser plug-in capabilities.

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 realisation is implied.

The behaviour of a Profile 1 display should conform to the TeleWeb reference decoder as described in [12]. The latter should be used as a guideline to ensure conformity of all decoders in the market.

7.1 Display planes

7.1.1 Types

The conceptual TeleWeb "Display Model" consists of up to five aligned planes, 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.

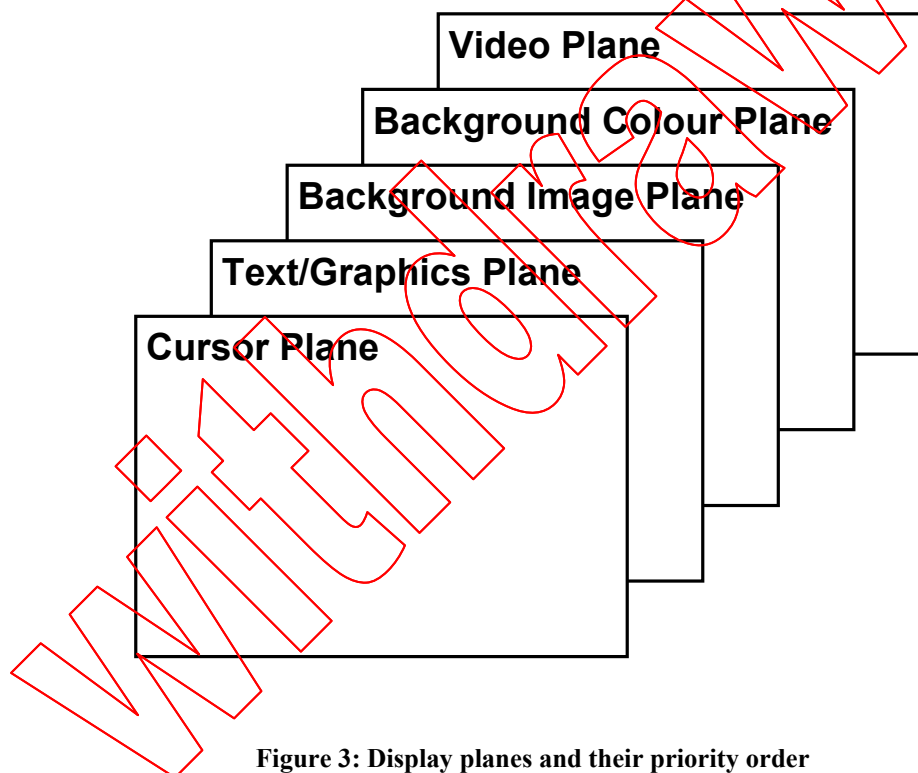


Figure 3: Display planes and their priority order

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 x 576 pixels (Horizontal x 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.

7.2 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.

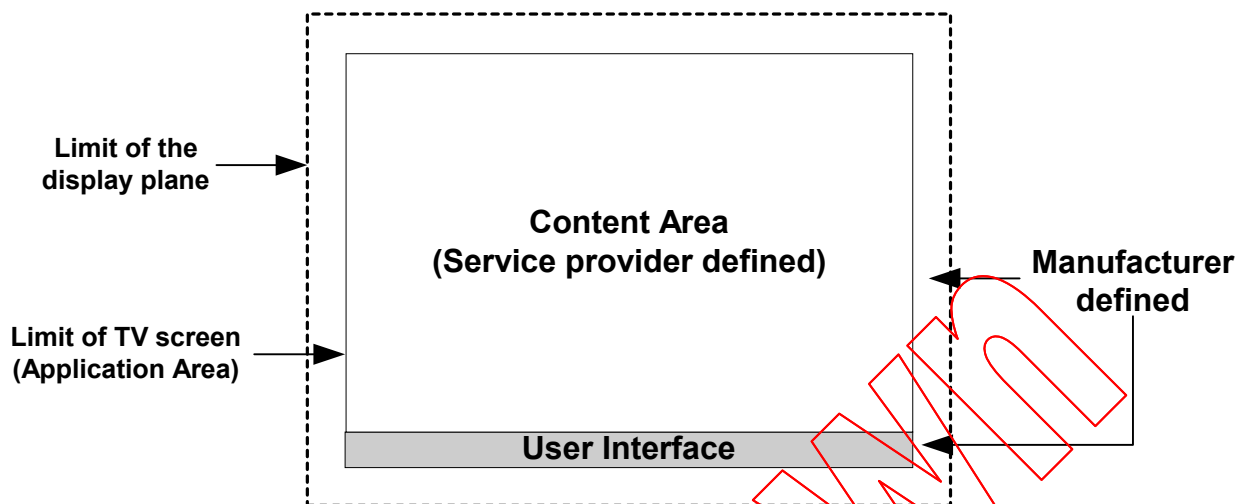


Figure 4: Screen layout example.

7.2.1 Application Area

For information purposes only: The overscan found on most consumer TV receiving equipment has to 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 x 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.

7.2.2 Content Area

The **Content Area** is used for the display of the TeleWeb service. Its size is fixed at 640 x 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 which 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 section 7.3.

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.

7.2.3 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.

7.3 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 TeleWeb Application Part 2. 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 is 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 (e.g. jumping highlights).

8.2.2 Primary link selection control

To provide better support for interactive applications an 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, nexTVView, Internet services, ... will be provided using the standard TeleWeb URL mechanism defined in TeleWeb Application Part 2.

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 a TV-based Enhanced (P1) TeleWeb decoder architecture.

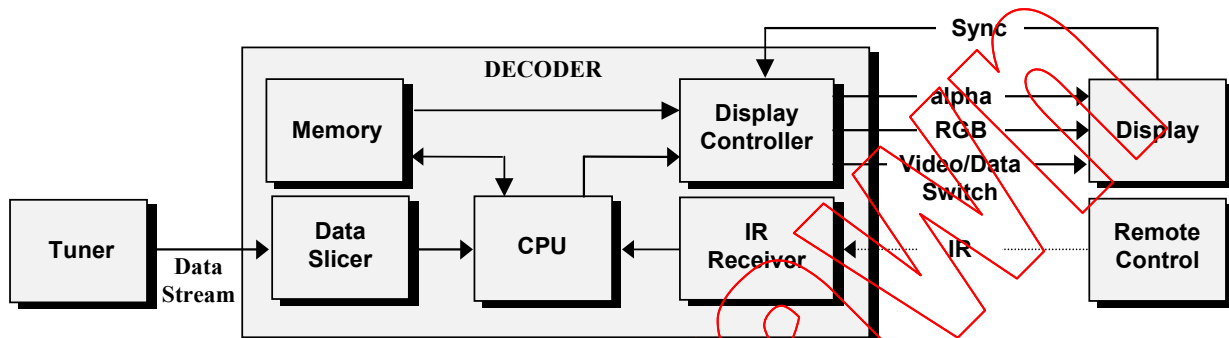


Figure 5: Block diagram of a TV-based Enhanced TeleWeb Decoder

EACEM Technical Report

TR-047-r01

Title:

TeleWeb Application Part 2 Profile 1 Enhanced

Proposed ETSI Title:

“TeleWeb Application Part 2 Profile 1 Enhanced”

Proposed ETSI keywords:

“TeleWeb, Enhanced, Superteletext, Teletext, HTML, Browser, Profile”

Date: 23 April 2001

History

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V0.0 - V0.4	Jan. – June 1998	First drafts. Very incomplete.
V1.0	June 1998	First full draft containing HTML description and display model.
V1.1	October 1998	Updated following Brussels meeting, 13/10/98
V1.2	January 1999	Updated following Hamburg (25/11/98) and Fellbach (15/12/98) meetings
V1.3	March 1999	Updated following Southampton meeting (11/2/99)
V1.4	July 1999	Updated following Paris (23/3/99) and Fellbach (20/5/99) meetings, and subsequent teleconferences up to 9/7/99.
V1.4.1	July 1999	Updated following Rousset meeting (19/7/99)
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Withdrawn

Intellectual Property Rights

The application described here is intended to be an open standard, free of licensing and royalty restrictions for all parties.

Apart from the Unisys patent on the LZW compression scheme used in the GIF graphics format and the licensing of the "Tiresias Screen" font from BITSTREAM [46], EACEM has not been informed of the existence of any Intellectual Property Rights (IPR) that could be, or could become essential to the present specification. However, no investigation, including IPR searches, has been carried out. No guarantee can be given as to the existence of any IPRs that are, or may be, or may become, essential to the present specification.

The licensing options to use the Tiresias font should be discussed with BITSTREAM [46] for each individual TeleWeb application. On a company level this licence requirement can be already covered due to other projects like DVB, MHP, ...

1 Scope

This document specifies the TeleWeb Profile 1 application that allows Web-style text and graphics to be displayed on suitable decoders. A "TeleWeb" service comprises multimedia data files whose format and attributes are defined by this specification. This specification focuses on the presentation layer especially the implementation of TeleWeb HTML. It further defines the graphical requirements like colours and fonts and the used content formats. For information regarding general information and the transport layer refer to [17] and [18].

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- [46] BITSTREAM is the leading developer of font technology, digital fonts, and custom typeface designs for a wide variety of markets. Setting the standard of excellence in font technology, BITSTREAM holds key patents covering the creation of portable fonts for the Internet. www.bitstream.com

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present specification, the following definitions apply:

button: A 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.

CDATA: Character data in an HTML document. Character entities and HTML mark-up is not recognised.

Conditional Access (CA): A mechanism by which user access to service components can be restricted.

PCDATA: Parsed character data in an HTML document. Character entities (numeric and named entities) as well as HTML mark-up is recognised in the data.

signed_integer: A positive or negative integer value, in decimal notation. The first digit is preceded by a mandatory plus (+) or minus (-) symbol. There shall be no white space between the symbol and the first digit.

text_string: A sequence of displayable Latin-1 characters.

unsigned_integer: An integer value, in decimal notation, without a preceding plus (+) or minus (-) symbol.

3.2 Abbreviations

For the purpose of the present specification, the following abbreviations apply:

ASCII	American Standard Code for Information Interchange
CA	Conditional Access
CDATA	Character Data
CRC	Cyclic Redundancy Check
DTD	Document Type Definition
DVB	Digital Video Broadcasting
ETS	European Telecommunication Standard
GIF	Graphics Interchange Format
HTML	Hyper Text Mark-up Language
JPEG	Joint Picture Experts Group
LSB	Least significant bit
LZW	Lempel-Zif-Welsh
MJD	Modified Julian Date
MSB	Most significant bit
PCDATA	Parsed Character Data between tags
RFC	Internet Request for Comments
URL	Uniform Resource Locator
UTC	Universal Time Co-ordinated
WWW	World Wide Web

4 Display

This section defines the minimum requirements of a TeleWeb display. They are applicable to both editing stations and decoders.

4.1 Colour representation

4.1.1 General requirements

A decoder shall be able to display each pixel on the Text/Graphics, Background Image and Background Colour planes in a different colour from a palette of at least 188 colours. Full transparency and one level semi-transparency to video shall also be supported.

A decoder may be implemented with either a true-colour store or an indexed colour system. To accommodate the latter type of decoder and to define a palette for GIF images that do not specify a palette themselves, a single 188 colour palette is defined in section 4.1.5. As a minimum, the Text/Graphics, Background Image and Background Colour planes shall be able to support colours subjectively equivalent to these colours. Content can be authored using other colours but authors should be aware that some decoders may not be able to reproduce them exactly and may map such a colour to the closest match in the pre-defined colour palette.

For authoring purposes the Text/Graphics, Background Image and Background Colour planes shall support at least 188 colours on the screen at any one time. In practical terms, a decoder is likely to be able to display at least 256 colours, giving the equipment manufacturers at least 68 colours for their user interface.

To get an optimal display, the content should be authored using the TeleWeb default colour palette. The response of a decoder is not defined by this specification if the colours used are not all taken from the pre-defined colour palette. Under these circumstances colour dithering or matching techniques may need to be applied and the response of decoders may differ.

4.1.2 Colour resolution

Each colour shall be defined by Red, Green and Blue (RGB) components or by a colour constant, see section 6.2.5.1. The authored content shall define colours as 24 bit values, i.e. 8 bits for each component in the order R, G, B. A decoder is required to have a colour resolution of at least 4 bits per component (12 bits minimum overall).

4.1.3 Gamma

Decoders shall assume that all RGB values defined and invoked by authored content have been gamma pre-corrected for the eye.

4.1.4 Transparency

Decoders are required to implement a minimum of three levels of transparency – opaque, semi transparency and completely transparent.

The colour palette is optimised for 30% semi transparency. Where the decoder cannot implement the value of 30% semi-transparency it shall replace it with the nearest value of semi-transparency it can implement. If the encoded value of transparency is in the range 10%-90% it shall not be approximated as either 0% or 100% transparency. So, 9% may be approximated as 0% but 10% shall be represented with a value in the range 10% to 90% such as 30%. Similarly, 91% may be approximated as 100%.

4.1.5 Colour palette

The predefined set of 188 colours is shown in Table 1 and in Annex B. The colours chosen have a perceptually uniform distribution over the colour space. A service provider may choose to author content using only this set of colours. A decoder shall adopt this set of colours when rendering a GIF image if colour palette data is omitted from the file.

As a minimum, a decoder shall support these colours up to its resolution limit. It is then the responsibility of the decoder to map the colours defined within the authored content to their closest approximation within the predefined set.

Table 1 Default colour palette

Transparency level	Total number of entries	Quantisation levels for Red	Quantisation levels for Green	Quantisation levels for Blue
0% (fully opaque)	135	5 levels: 0, 63, 127, 191, 255	9 levels: 0, 31, 63, 95, 127, 159, 191, 223, 255	3 levels: 0, 127, 255
0% (fully opaque)	4	4 additional grey scale colours: R = G = B = 42, 85, 170, 212		
30%	48	4 levels 0, 85, 170, 255	6 levels: 0, 51, 102, 153, 204, 255	2 levels: 0, 255
100% (fully transparent)	1	-	-	-
decoder definable	68			

Note: Levels are quoted as decimal values in the range 0 to 255.

To allow these colours to be used to render a GIF image from which the colour palette information has been omitted, it is necessary to assign a unique value to each colour as defined in Annex B.

4.2 Text representation

Text is rendered using one proportionally spaced font and one monospaced font, each in five sizes and in two styles - Plain and Bold. Italics and Bold Italics styles are optional. The proportional font is Tiresias [28]. The non-proportional font is not defined by this specification. Instead, and to ensure compatibility between equipment, the height and width of a character cell is defined for all sizes.

A service provider who wishes to ensure consistent displays must author content using the same metrics as implemented in decoders. Content shall be authored with kerning disabled.

4.2.1 Required sizes

Table 2 shows the supported font sizes for the proportional and monospaced font and the assignment to the size attribute of the HTML font tag. The font and character metrics including the width (advance) of all character cells for the proportional and the monospaced font for the different font sizes are specified in Annex F.

Table 2: Font sizes

Size [pixels]	HTML Font tag
22	SIZE = 1 or 2
24	SIZE = 3
27	SIZE = 4
31	SIZE = 5
36	SIZE = 6 or 7

4.2.2 Bold and Italic styles

The Tiresias font does not support the Bold style. A Bold version can be emulated by writing a second instance of the required character with an offset by one pixel to the right of the normal position. The Bold style should be restricted to small parts of the text e.g. headings. It should not be used as a the standard for the whole text. The emulated Bold style may not be acceptable for certain characters especially for the small font sizes (e.g. the double quote character or the characters with umlaut may be critical). In this case the Bold style should be avoided for these characters.

For the proportional font the width (advance) of a character cell containing a Bold character may be increased by a maximum of one pixel per character, as shown in Figure 1. Content shall be authored with this extra pixel space in mind. For the monospaced font the width of all characters of a given font size is the same for all styles.

The implementation of the optional Italic and Bold Italic style is left open. However, the corresponding character cell width shall always be the same as for the Plain resp. Bold style.

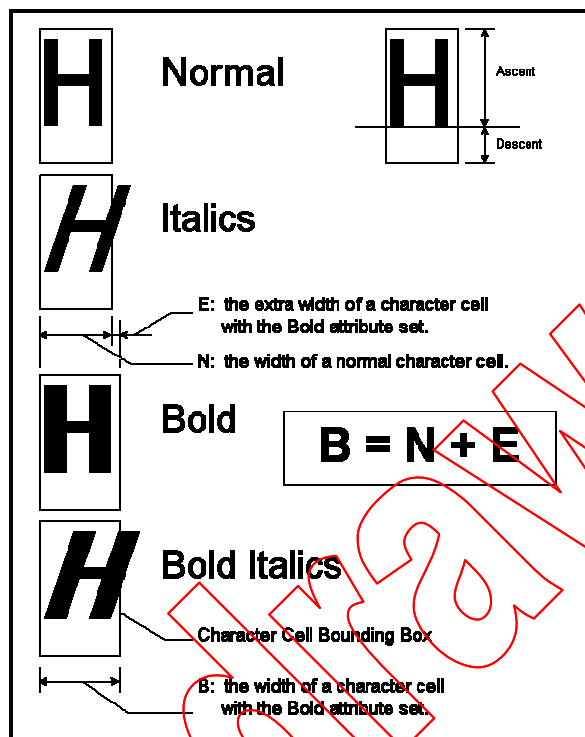


Figure 6: Character metrics

4.2.3 Character repertoire

Decoders shall support the full ISO Latin-1 character set [21] and the EURO sign character (Unicode 0x20AC). The EURO sign can be used by the name character entity (&euro) or the numerical representations (#&X20AC or #&8364). If the character encoding of the HTML file is different from ISO Latin-1 or the character is not defined in ISO Latin-1 and is not the EURO sign the decoder must display a replacement character represented by an empty square with the size of a capital 'V'.

Note: The characters 0x00 to 0x1F and 0x7F to 0x9F are not defined by ISO Latin-1 thus a replacement character will be shown instead.

4.2.4 Default attributes

In the absence of any font, size, foreground colour or background information within the authored content, a decoder is free to set its own default conditions. It is recommended that the decoder follow the default style defined in Annex E.

4.3 Text placement

4.3.1 Text width

To ensure that text will flow identically on different decoders and authoring equipment regardless of the quality of the character rendering, simple algorithms are defined to determine vertical placement and when to wrap lines of text. The flow is considered identical if lines and words break at the same character position. The calculations allow content creators to provide sufficient space for their strings at authoring time. They make no demands of the particular rendering system employed. The characters can be bit-map or vector fonts, aliased or anti-aliased, etc. The calculations shall be applied in both authoring equipment and decoders.

4.3.2 Text-width calculation

The width calculation is defined in terms of the bounding rectangle of each character as defined within the font metrics shown in Figure 6. Any extra width due to bolding shall be taken into account for the proportional font. The width of a text string is the sum of the character widths. This calculation is carried out at pixel-resolution.

4.3.3 Line breaks

Once the text-width calculation defined in 4.3.1 produces a result that exceeds the space available, the first word after white space (but not a non-breaking space (0xA0)), a hyphen (0x2D) or a soft hyphen (0xAD) that will not fit completely on the line shall be rendered on the line below. This implies the equipment does not have to know or apply word hyphenation rules.

4.3.4 Vertical line spacing

The baseline of a font is determined by its ascent and descent metrics, see Figure 1. All characters are vertically aligned to their baseline. The vertical space required for a line is the sum of the largest ascent and the largest decent in that line plus the gap (external leading). The gap (external leading) between lines is set to -1 for all fonts and all sizes.

4.4 Image representation

4.4.1 Format

A decoder is required to implement the full GIF specification [4], apart from the "plain text" extension. A transmitted file may include "plain text". If the GIF file does not define a colour palette the TeleWeb default colour palette will be used. In addition the sequential baseline JPEG image format is supported [6][7][8].

4.4.2 Animation

Animation and looping of GIF images are supported as described in [4] and [27] respectively.

Note: There is no minimum time specified for the display of one frame when animating or looping. This will depend upon the processing power in the decoder and the complexity and size of the images. Different decoders may show different response speeds. The size of an animated GIF image may be restricted by a code of practice.

4.4.3 Use on the background image plane

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

A decoder is not required to reproduce animation on the background image plane. If multiple frames are present in the designated file, the first frame should be displayed continuously.

4.5 4:3 and 16:9 aspect ratio displays

Content should be authored for a 4:3 display. 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.

5 URLs

A uniform resource locator (URL) is a compact textual notation for accessing information within the TeleWeb system. The URLs within the TeleWeb system shall conform, except where otherwise noted, to the syntax for Internet URLs as specified in [40][43] and [44]. Note that the URL character set is limited to the lower-half of the ISO Latin-1 character set [21]. To ensure compatibility with other browsers, URLs must encode character codes in the upper half.

A URL consists of a scheme and a scheme specific part. All characters in a URL belong to the ISO Latin 1 character set [21].

scheme : scheme-specific-part

In a complete URL the scheme is followed by a colon (':') and the string for the scheme specific part. Profile 1 decoders shall ignore schemes not listed in this section when such schemes appear in TeleWeb documents.

The scheme name is a string of characters. The only characters permitted in a scheme name are the lowercase characters 'a' through 'z', the digits '0' through '9', and the characters plus, hyphen, and full-stop, i.e. '+', '-', '!'. For robustness, software that interprets URLs (e.g. the TeleWeb Decoder) must map uppercase alphabetic characters to their corresponding lowercase characters.

The scheme-specific-part is a string of safe characters. Safe characters have a printable graphic representations in ISO Latin-1 [21]. Furthermore the set of safe characters is restricted to respect the reserved use of some punctuation characters. The alphabetic characters are at positions 41 hex through 5A hex, 61 hex through 7A hex, C0 hex through D6 hex, D8 hex through F6 hex, and F8 through FF hex. Thus only alphanumeric characters, characters in the string "\$-._+!*'(),", and scheme-specific key characters from the string ";/?:@=&" may be used unencoded within a URL. Any data character, on the other hand, may be encoded. Encoded characters must be recognised and decoded by software that interprets URLs. A data character is one not used as punctuation by a scheme.

Data character encoding is a mapping of an 8-bit value to a 3-character sequence. The percent character, '%', indicates a start of the code. The next two characters are the hexadecimal value of the encoded character. For example, a space is encoded as **%20** since a space has the code 32 decimal, which is 20 hexadecimal. A percent data character is encoded as **%25** since the percent sign is at position 37 decimal (or 25 hex). An incomplete encoding sequence, e.g. %F=, has no specified meaning.

5.1 File naming

A Name attribute (section 12.1.2) shall be associated with each file. This attribute, a text string, must include both name and type (extension) elements, e.g. "file1.html", where "file1" is the name element and "html" is the type element. This name should be used to reference the corresponding file in any hypertext links. The file type element for HTML (text) files shall be either "htm" or "html". Table 3: File naming specifies naming conventions for the file types processed by TeleWeb.

Table 3: File naming

Content type	Filename extension	MIME type
HTML	.htm or .html	text/html
GIF	.gif	image/gif
JPEG	.jpg or .jpeg	image/jpeg
ZLIB Dictionary	.dic	application/x-zlib-dic

A Type attribute (section 12.1.1) shall be included with the file and shall indicate the type of the file e.g. for HTML "text/html". If a Type attribute is omitted or missing, a decoder should attempt to determine the file type by inspecting the Name attribute. In the event of a conflict, the Type attribute shall have priority.

File names are not case sensitive.

5.2 TeleWeb file reference scheme

TeleWeb file reference URLs may be absolute or relative. An absolute URL specifies the service name of the content provider, while a relative URL cannot. An absolute URL must specify a complete path to a resource, while a relative URL can specify a partial path.

5.2.1 Absolute URLs

An absolute TeleWeb URL has the form:

tw : // *service-name* / *path-name* [?*query*] [#*fragment*]

where all uppercase characters are considered equivalent to their lowercase forms, and where portions within brackets may be omitted.

The components are specified below:

- tw** : is the scheme name, which identifies the scheme specific part as a TeleWeb URL.
- // *service-name*** : identifies the name of the service. See Section 11.1.
- / *path-name*** : The path to the information, i.e. loosely the name of the file. Slashes within the path-name identify hierarchical sections of the name, but do not require a specific data structure within TeleWeb components, though an analogy to a file system is possible. The slash ('/') is thus a reserved character, and a data slash must be encoded as **%2F** if needed. Furthermore, the hierarchical section names **.** and **..** ("dot" and "dot-dot") are reserved, and data with these names may be specified with **%2E** and **%2E%2E** if needed.

The dot-separator preceding the file type element is clearly data, since it is not itself a hierarchical element. Therefore, a dot-separator does not have to be encoded, though it may, since it is considered data when specifying a URL.

Once the hierarchical sections have been identified, all **.** sections are discarded, then all section-.. section pairs are discarded. Finally all remaining sections are recombined, separated by slashes to give the resource name (file name). See also 5.2.4
- # *fragment*** : The fragment indicates the anchor within the accessed document to be focused when displaying the linked document. The anchor in the linked document is defined by the corresponding name (for <A> elements) or id attribute (for image maps). The indicated anchor shall be appropriately highlighted.

If the fragment is empty or invalid (not present in the target document, for example), the first available anchor in the upper left corner shall be highlighted.
- ?*query*** : The query defines additional parameters for the URL, see section 5.2.3.

5.2.2 Relative URLs

A relative TeleWeb file reference URL has the form:

[/] path-name [?query] [#fragment]

Where the meaning of the components is as was specified in the section on absolute URLs (5.2.1).

If the relative URL begins with a slash, then the path name is taken as absolute within the service used in the context where the link is found. If the relative URL does not begin with a slash then the service and the path is inherited from the link's context. If it is not empty, the URL's path name then replaces the last hierarchical section in the inherited path name. The resulting path name is evaluated as in the section on absolute URLs.

Anchor names and query parts are never inherited.

5.2.3 URL Query

The query part of a TeleWeb URL specifies additional parameters for the URL. Parameters are either keywords or keyword value pairs. Parameters are separated by semicolons. Keywords are separated from values by equal-signs. Thus ';' and '=' are reserved in the query part. The order and presence of keyword value pairs is arbitrary. The keyword value pairs that must be recognised are defined in the following sections. Any two parameters in a query must have different types.

5.2.3.1 The EPG parameters

These parameters can be used to realise a TeleWeb EPG.

Table 4: EPG Parameters

Parameter	Syntax	Format	Example
Network Operator	<i>cni=CNI_code</i>	4-digit hexadecimal value. The country and network identification (CNI) code for the broadcaster of the enclosed programme. If a three character VPS code has to be used, it shall be preceded with 0.	<i>cni=C380</i>
PIL	<i>pil=PIL_code</i>	5-digit hexadecimal value (20 bits). The PDC PIL for the programme. If the network conforms to VPS then this field contains the VPS label for the programme. If neither VPS nor PDC is supported, this field shall contain timer control codes as specified in ETS 300 231 [32].	<i>pil=FFFFE</i>
Start Time	<i>sta=start_time</i>	Defines the start date/time of the enclosed programme. The <i>time</i> format conforms to the ISO-8601 standard, except that it is assumed to be UTC. A recommended usage is the form <i>yyyymmddThhmmss</i> , where the capital letter "T" separates the date from the time. It is possible to shorten the time string by reducing the resolution. For example <i>yyyymmddThhmm</i> (no seconds specified) is valid.	<i>sta=20001103T2030</i>
Duration	<i>dur=time</i>	Defines the duration in number of minutes of the enclosed programme.	<i>dur=90</i>

If only the CNI parameter is defined the decoder should go to the channel broadcasting the CNI and stay there even if the TeleWeb application is closed.

5.2.3.2 The Profile parameter

This parameter insures the upgrade compatibility to future higher profile services.

Table 5: The Profile parameter

Parameter	Syntax	Format	Example
Profile	<i>pro=profile</i>	The profile parameter indicates the profile of the referenced page. This parameter should not be defined if the link is referencing a profile 1 page. For a Profile 1 decoder, the presence of the profile parameter indicates that the link is referencing a higher profile page. As a result the decoder displays the profile upgrade page 10.4. The format of the parameter value will be defined in the specification documents for future profiles. Be aware that this parameter is only needed when the profile domain border is crossed from a lower to a higher profile.	<i>pro=...</i>

Note: The parameter value of the example can be any text excluding “;”.

5.2.4 Examples

This section is merely informative and does not specify required service names, path names or query parts.

```
<BASE HREF="tw://base/today/news/local">
  <A NAME=top></A>
```

a lot of text ...

```
<A NAME=ex-1 HREF="tw://sport/football.htm">Latest Football News</A>
<A NAME=ex-2 HREF="sport/football.htm"> Today's Football Programme</A>
<A NAME=ex-3a HREF="/tomorrow/programme.htm#football"> Tomorrow's Football Programme
</A>
<A NAME=ex-3b HREF=".../tomorrow/programme.htm#football"> Tomorrow's Soccer Programme
</A>
<A NAME=ex-4 HREF="#top"> Return to the top of the document </A>
```

Note that the document context is set by the BASE element to `tw://base/today/news/local`. Anchor EX-1 is an absolute reference to the service "sport", page "football.htm". Anchor EX-2 is a relative reference equivalent to `tw://base/today/news/sport/football.htm`. Anchors EX-3a and EX-3b are both equivalent to `tw://base/tomorrow/programme.htm#football`, the football anchor on the programme.htm page. Anchor EX-4 is a reference to the TOP anchor in the current document.

5.3 Teletext page reference scheme

A page in a Teletext service can be referenced by a hyperlink using the URL syntax:

ttx : // cni / page_number [/ page_subcode]

where the sequence is not case sensitive and:

- ttx** : Identifies the scheme specific part as a Teletext page URL.
- // cni** : The country and network identification (CNI) code for the broadcaster as defined in [32]. If a three character VPS CNI code has to be used, it shall be preceded with 0. The value 0000 shall be interpreted as the TV channel of the TeleWeb service the URL is used in.
- / page_number** : A three hexadecimal character value in the range 100 to 8FF representing the magazine, page tens and page units values respectively of a Teletext page as defined in [31].
- / page_subcode** : A four hexadecimal character value in the range 0000 to 3F7F representing the S4, S3, S2 and S1 values respectively of a Teletext page subcode as defined in [31]. The value 3F7F shall indicate that no particular subcode value is being defined. S2 has a valid range of 0 to 7, and S4 a valid range of 0 to 3. The inclusion of a page_subcode element is optional.

On processing a link to a Teletext page, a decoder should display the most recent version of the page available. Handling of rolling sequences of pages is at the discretion of the decoder manufacturer.

5.4 NexTView reference scheme

A nexTView Listing can be invoked by a hyperlink using the URL syntax:

nextview : // cni ? filter-criteria

Where the sequence is not case sensitive and:

- nextview** : Identifies the following sequence as a nexTView URL.
- // cni** : The country and network identification (CNI) code for the broadcaster as defined in [32]. If a three character VPS CNI code has to be used, it shall be preceded by 0. The value 0000 shall be interpreted as the TV channel of the TeleWeb service the URL is used in.

The CNI code uniquely identifies the nexTView service because there may be at most one nexTView service per channel.
- ? filter-criteria** : A list of keyword-value pairs. The pairs are separated by semicolons. A keyword is separated from a value by an equals-sign. The order and presence of keyword-value pairs is arbitrary. The keyword-value pairs that must be recognised are listed in Table 6. The interpretation of keyword value pairs is specified in [34].

The decoder shall generate a listing according to the defined filter criteria. If no filter criteria are defined it is up to the decoder where to enter the nexTView Application.

TeleWeb decoders are not required to support nexTView. In this case nexTView links are ignored by the decoder.

Table 6: Filter Attributes for nexTView References

Item	Syntax	Format	Example
Relative date	<i>rd=date_offset</i>	decimal value from 0 to 255 0 = today 1 = tomorrow :	<i>rd=0</i>
First programme	<i>fp=prog_offset</i>	decimal value from 0 to 255	<i>fp=0</i>

Item	Syntax	Format	Example
		0 = this programme 1 = next programme :	
last program	<i>lp=prog_offset</i>	decimal value from 0 to 255 0 = this programme 1 = next programme :	lp=1
Network operator	<i>nw=netwop_no</i>	decimal value from 0 to 79	nw=0
Theme	<i>th=theme</i>	hexadecimal value from 0 to FF conforming [34]	th=1F
Sorting criterion	<i>sc=sortcrit</i>	hexadecimal value between 0 and FF	sc=2A
Editorial rating	<i>er=editorial_rating</i>	decimal value from 0 to 15 conforming [34]	er=1
Parental rating	<i>pr=parental_rating</i>	decimal value from 0 to 15 conforming [34]	pr=4
start time	<i>sta=time_code</i>	4-digit hexadecimal value	sta=1230
stop time	<i>sto=time_code</i>	4-digit hexadecimal value	sto=1300
Features	<i>ff=feature_flags</i>	6-digit hexadecimal value with bits specified by [34]	ff=001001
Language	<i>la=language</i>	3-character language code defined in [38]	la=eng
subtitle language	<i>sl=subtitle_language</i>	3-character language code defined in [38]	sl=ger

Note: Each single type of filter must not be defined more than once in a query. If more than one different filter type are defined an AND operation is applied to the filters. An OR operation on filters is not supported. (for more information see [18]).

5.5 Special function URLs

To accommodate embedded browser control, three special function URLs are defined.

Table 7: Special function URLs

URL	Description
function:forward	Displays the next page in the history.
function:back	Displays the previous page in the history.
function:home	Displays the home page.

If one of the pages is not available no display action is executed.

6 Text and hypertext

The text content of a TeleWeb service is based on HTML [22][23]. The HTML tags and their attributes that are supported are described in this section.