

CEA Standard

Joint EIA/CVCC Recommended
Practice for Teletext: North American
Basic Teletext Specification (NABTS)

CEA-516 R-2008

May 1988



CEA[®]
Consumer Electronics Association

www.CE.org

NOTICE

Consumer Electronics Association (CEA®) Standards, Bulletins and other technical publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards, Bulletins and other technical publications shall not in any respect preclude any member or nonmember of CEA from manufacturing or selling products not conforming to such Standards, Bulletins or other technical publications, nor shall the existence of such Standards, Bulletins and other technical publications preclude their voluntary use by those other than CEA members, whether the standard is to be used either domestically or internationally.

Standards, Bulletins and other technical publications are adopted by CEA in accordance with the American National Standards Institute (ANSI) patent policy. By such action, CEA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the Standard, Bulletin or other technical publication.

This CEA Standard is considered to have International Standardization implication, but the International Electrotechnical Commission activity has not progressed to the point where a valid comparison between the CEA Standard and the IEC document can be made.

This Standard does not purport to address all safety problems associated with its use or all applicable regulatory requirements. It is the responsibility of the user of this Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

This document is copyrighted by the Consumer Electronics Association (CEA®) and may not be reproduced, in whole or part, without written permission. Federal copyright law prohibits unauthorized reproduction of this document by any means. Organizations may obtain permission to reproduce a limited number of copies by entering into a license agreement. Requests to reproduce text, data, charts, figures or other material should be made to CEA.

(Formulated under the cognizance of the CEA's **R4 Video Systems Committee.**)

Published by
©CONSUMER ELECTRONICS ASSOCIATION 2011
Technology & Standards Department
www.CE.org

All rights reserved

This is a preview of "CEA 516-1988 (R2008)". [Click here to purchase the full version from the ANSI store.](#)

JOINT EIA/CVCC/RECOMMENDED PRACTICE FOR
TELETEXT:NORTH AMERICAN BASIC TELETEXT SPECIFICATION

(NABTS)

TABLE OF CONTENTS

Introduction

1.	DATA TRANSMISSION & WAVEFORMS	1
1.1	VERTICAL BLANKING INTERVAL DATA TRANSMISSION	2
1.1.1	NTSC	3
1.1.2	VBI Utilization in North America	3
1.2	FULL-FIELD DATA TRANSMISSION	3
1.3	TRANSMISSION BIT RATE AND TIMING	3
1.4	DATD MODULATION TYPE	3
1.5	DATA-PULSE SHAPE	3
1.6	DATA AMPLITUDE	4
2.	DATA LINE	4
2.1	STRUCTURE OF THE DATA LINE	4
2.2	SYNCHRONIZATION SEQUENCE	4
2.2.1	Structure of the Packet Prefix	4
2.2.2	Clock Synchronization Sequence (CS)	5
2.2.3	Byte Synchronization Sequence (BS)	5
3.	DATA PACKET	5
3.1	STRUCTURE OF THE DATA PACKET	6
3.2	PACKET PREFIX	6
3.2.1	Structure of the Packet Prefix	6
3.2.2	Coding of the Packet Prefix Bytes	6
3.2.3	Packet Address (P)	7
3.2.4	Continuity Index (CI)	7
3.2.5	Packet Structure Byte (PS)	7
3.3	DATA BLOCK	7
3.4	SUFFIX	7
4.	DATA GROUP	9
4.1	STRUCTURE OF THE DATA GROUP	9
4.2	DATA GROUP HEADER	9
4.2.1	Structure of the Data Group Header	9
4.2.2	Data Group Type (GT)	9
4.2.3	Data Group Continuity (GC)	9
4.2.4	Data Group Repetition (GR)	9
4.2.5	Data Group Size (S1, S2)	10
4.2.6	Final Non-Zero Block Size (F1, F2)	10
4.2.7	Data Group Network Routing (GN)	10
4.3	DATA GROUP DATA	10

CEA 516

5.	TELETEXT RECORD	10
5.1	STRUCTURE OF THE TELETEXT RECORD	10
5.2	RECORD HEADER	11
5.2.1	Structure of the Record Header	
5.2.2	Record Type (RT)	11
5.2.2.1	Number of Record Types	11
5.2.2.2	Record Type 0	12
5.2.2.3	Record Type 1	12
5.2.2.4	Record Type 2	12
5.2.2.5	Record Type 3	12
5.2.2.6	Other Record Types	12
5.2.3	Record Header Designator (RD)	12
5.2.4	Record Address Bytes (A1,A2,A3)	13
5.2.5	Record Address Extension (A4,A5,A6,A7,A8,A9)	13
5.2.6	Record Link (L1,L2)	13
5.2.7	Classification Sequence (Y...)	14
5.2.7.1	Structure of the Classification Sequence	14
5.2.7.2	Meaning of the Flag Bytes	14
5.2.7.3	Caption Flag	15
5.2.7.4	Delay Flag	15
5.2.7.5	Index Flag	15
5.2.7.6	More Flag	15
5.2.7.7	Cyclic Marker Flag	15
5.2.7.8	Auto Acquire Flag	16
5.2.7.9	Support-Needed Flag	16
5.2.7.10	Alarm and Priority Flags	16
5.2.7.11	Update Flag	17
5.2.7.12	Support-Record Flag	17
5.2.7.13	Version Number	18
5.2.8	Header Extension Field (HE)	18
5.2.8.1	Structure of the Header Extension Field	18
5.2.8.2	Header Extension Introducer Byte (EI)	18
5.2.8.3	Header Extension Size Byte (ES)	19
5.2.8.4	Header Extension Data (E1..En)	19
5.2.9	Record Header End	19
5.3	RECORD DATA	19
6.	CODING OF THE TELETEXT RECORD	20
6.1	CODING OF PRESENTATION RECORDS	20
6.2	CODING OF APPLICATION RECORDS	20
7.	APPLICATIONS	20
7.1	ORGANIZATION OF BROADCAST TELETEXT	20
7.1.1	Pages and Magazines	20
7.1.2	Cyclic Teletext	21
7.1.3	Noncyclic Teletext	21
7.1.4	Support Record	22
7.1.5	Allocation of Data Channels and Record Addresses	22
7.2	APPLICATION RECORD	22
7.2.1	Function of the Application Record	22
7.2.2	Structure of the Application Record	23
7.2.3	Operation of Application Records	24
7.2.3.1	Operation of Control Function Descriptors	24
7.2.3.2	Operation of Information Function Descriptors	24
7.2.4	Application Function Descriptors	24
7.2.4.1	Control Function Descriptors	24
7.2.4.2	Information Function Descriptors	27
7.3	FUNCTIONS PROVIDED BY THE TELETEXT SERVICE	28

7.3.1	List of Functions Provided or Available	28
7.3.2	Magazine and Page Access	29
7.3.3	The NEXT Function	30
7.3.4	The MORE Function	32
7.3.5	The BACK Function	32
7.3.6	The INDEX Function	32
7.3.7	The Option Function	32
7.3.8	The Pause and Resume Functions	32
7.3.9	Program-Related Functions	32
7.3.10	Teletext Captioning	32
	7.3.10.1 Description of Teletext Captioning	32
	7.3.10.2 Real-Time Captioning	33
	7.3.10.3 Delayed Captioning	33
7.3.11	Video Program Enhancement (VPE)	33
7.3.12	The Flash Function	34
7.3.13	The Update Function	34
7.3.14	The Alarm Function	34
7.4	INITIALIZATION	35
	7.4.1 Action Upon Power-Up or TV-Channel Change	35
	7.4.2 Action Upon Entering Teletext Mode	35
	7.4.3 Action Upon Invoking Captioning	35
	7.4.4 Action Upon Entering Television Mode from Teletext Mode	35
	7.4.5 Action Upon Changing Data Channel	35
7.5	USER INTERFACE	36
	7.5.1 User Input Functions	36
	7.5.2 User Access to Magazines and Pages	36
	7.5.3 User Access to Program-Related Records	36
	7.5.4 Precedence of Events in Receivers	37
7.6	TRANSMIT MACROS	37
	7.6.1 Functions Provided by Transmit Macros	37
	7.6.2 Record- Access Transmit Descriptors	37
	7.6.3 Option -Link Transmit Descriptors	38
	7.6.4 Coding and Operation of Transmit Macros	39
8.	Fundamental Service Specification (FSS)	40
	8.0 Introduction	40
	8.1 DATA TRANSMISSION AND WAVEFORMS FSS	40
	8.2 DATA LINE FSS	40

TABLE OF CONTENTS (con't)

8.3	DATA PACKET FSS		40
	8.3.2.2	Decoding of the Packet Prefix Bytes	40
	8.3.2.3	Interleaving of Data Packets in Full Field Teletext	40
	8.3.2.4	Continuity Index (CI)	41
	8.3.3	Data Block	41
	8.3.4	Suffix	41
8.4	DATA GROUP FSS		42
	8.4.2.2	Data Group Type (GT)	42
	8.4.2.3	Data Group Continuity (GC)	42
	8.4.2.4	Data Group Repetition	
	8.4.2.5	Data Group Size (S1, S2)	
	8.4.2.6	Final Non-Zero Block Size (F1, F2)	42
	8.4.2.7	Data Group Network Routing (GN)	42
8.5	TELETEXT RECORD FSS		43
	8.5.2	Record Header	42
	8.5.2.1	Structure of the Record Header	42
	8.5.2.2	Record Type (RT)	42
		8.5.2.2.2 Recommended Error Recovery for Record Types 0 and 142	42
		8.5.2.2.5 Record Type 3	43
		8.5.2.2.6 Other Record Types	44
	8.5.2.3	Record Header Designator (RD)	44
	8.5.2.4	Record Address Bytes (A1, A2, A3)	44
	8.5.2.5	Record Address Extension (A4, A5, A6, A7, A8, A9)	44
	8.5.2.6	Record Link (L1, L2)	45
	8.5.2.7	Classification Sequence (Y...)	45
		8.5.2.7.1 Structure of the Classification Sequence	45
		8.5.2.7.2 Meaning of the Flag Bytes	45
		8.5.2.7.3 Caption Flag	45
		8.5.2.7.4 Delay Flag	45
		8.5.2.7.5 Index Flag	45
		8.5.2.7.6 More Flag	46
		8.5.2.7.7 Cyclic Marker Flag	46
		8.5.2.7.8 Auto Acquire Flag	46
		8.5.2.7.9 Support-Needed Flag	46
		8.5.2.7.10 Alarm Priority Flag	46
		8.5.2.7.11 Update Flag	46
		8.5.2.7.12 Support Record Flag	46
		8.5.2.7.13 Version Number	46
	8.5.2.8	Header Extension Field	46
		8.5.2.8.1 Structure of the Header Extension Field	46
		8.5.2.8.2 Header Extension Introducer Byte (EI)	47
		TABLE OF CONTENTS (con't)	
		8.5.2.8.3 Header Extension Size Byte (ES)	47
		8.5.2.8.4 Header Extension Data (E1..EN)	47
8.6	PRESENTATION LAYER FSS		47
	8.6.1	Service Reference Model	47
	8.6.2	Resolution	48
	8.6.3	Color Palette	48

8.7	APPLICATION FSS	48
8.7.1	Organization of Broadcast Teletext	48
8.7.1.1	Pages and Magazines	48
8.7.1.2	Cyclic Teletext	49
8.7.1.3	Non-Cyclic Teletext	49
8.7.1.4	Support Record	49
8.7.1.5	Allocation of Data Channels and Record Addresses	50
8.7.2	Application Record	50
8.7.2.1	Functions of the Application Record	50
8.7.2.2	Structure of the Application Record	50
8.7.2.3	Operation of Application Records	50
	8.7.2.3.1 Service Provider Practices	50
	8.7.2.3.2 Receiver Manufacturer Practices	51
8.7.2.4	Application Function Descriptors	51
	8.7.2.4.1 Control Function Descriptors	51
	8.7.2.4.2 Information Function Descriptors	52
8.7.3	FUNCTIONS OF FSS RECIEVERS	52
8.7.3.1	Function Requirements	52
8.7.3.2	Magazine and Page Access	53
8.7.3.3	The NEXT Function	54
8.7.3.4	The MORE Function	54
8.7.3.5	The Back Function	54
8.7.3.6	The Index Function	55
8.7.3.7	The Option Function	55
8.7.3.8	The PAUSE and RESUME Function	55
8.7.3.9	Program-Related Teletext	55
8.7.3.10	FSS Captioning	55
	8.7.3.10.1 Description of FSS Captioning	55
	8.7.3.10.2 Real-Time Captioning	55
	8.7.3.10.3 Delayed Captioning	56
8.7.3.11	Video Program Enhancement (VPE)	
8.7.3.12	The Flash function	56
8.7.3.13	The Update function	56
8.7.3.14	The Alarm function	56

8.7.4	INITIALIZATION	56
8.7.4.1	Action Upon Power Up or TV Channel Change	56
8.7.4.2	Action Upon Entering Teletext Mode	56
8.7.4.3	Action Upon Invoking Captioning	56
8.7.4.4	Action Upon Entering Television Mode from Teletext mode	56
8.7.4.5	Action Upon Changing Data Channel	56
8.7.5	USER INTERFACE	57
8.7.5.1	Function Requirements	57
8.7.5.2	User Access to Magazines and Pages	57
8.7.5.3	User Access to Program-Related Pages	57
8.7.5.4	Precedence of Events in Receivers	57
8.7.5.5	Service Provider Prompts for User Access to Records	59
8.7.5.6	Local Service Row	60
8.7.6	TRANSMIT MACROS	60
8.7.6.1	Function Provided by Transmit Macros	60
8.7.6.2	Record-Access Transmit Descriptors	60
8.7.6.3	Option-Link Transmit Descriptors	61
8.7.6.4	Coding and Operation of Transmit Macros	61

FIGURES

FIGURE 1	COMPOSITE VIDEO SIGNAL	62
FIGURE 2	DATA SPECTRUM AFTER ROLL-OFF AND LOW PASS FILTER	63
FIGURE 3	IMPULSE RESPONSES	64
FIGURE 4	DATA TIMING	65
FIGURE 5	DATA AMPLITUDE	66
FIGURE 6	DATA LINE STRUCTURE	67
FIGURE 7	HAMMING CODE	68
FIGURE 8	DATA GROUP	69
FIGURE 9	DATA GROUP HEADER	70
FIGURE 10	RECORD HEADER	71
FIGURE 11	EXAMPLE OF CLASSIFICATION SEQUENCE	72
FIGURE 12	FUNDAMENTAL SERVICE CLASSIFICATION	73
FIGURE 13	APPLICATION RECORD STRUCTURE	74

APPENDIX A: GLOSSARY

CEA 516

PREFACE

This preface is not part of the standard

This standard for the North American Basic Teletext Specification (NABTS) is published jointly by the Electronic Industries Association (EIA) and the Canadian Videotext Consultative Committee (CVCC). This specification represents one of three major teletext systems in use today. The publication of this standard is to document the NABTS to assist those desiring to implement the service and is not an endorsement of NABTS over any other system/service.

The NABTS is based on the following documents:

- [1] "North American Broadcast Teletext Specification" published by CBS, June 22,1981
- [2] Provisional "Broadcast Specification 14" Government of Canada, Department of Communication, June 19,1981.
- [3] Joint ANSI (BSR X3. 110)/CSA (T500) Standard "Video/Teletext Presentation Level Protocol Syntax (North American PLPS)", 1983 (NALPS).
- [4] " Characteristics of Teletext Systems" CCIR Report 957, Vol. XI, Part 1, Broadcast Service(Television), XVth Plenary Assembly, Geneva 198

This is a preview of "CEA 516-1988 (R2008)". [Click here to purchase the full version from the ANSI store.](#)

JOINT EIA/CVCC RECOMMENDED PRACTICE
FOR
TELETEXT:
NORTH AMERICAN BASIC TELETEXT SPECIFICATION
(NABTS)

(From EIA/ IS-14 and Standards Proposal No. 1966, formulated under the cognizance of the EIA Broadcast Television Systems (BTS) Teletext Steering Committee and the Canadian Videotex Consultative Committee (CVCC) Teletext Subcommittee.)

Introduction

This document contains the technical description of the transmission technique, coding language, and user interface for one-way broadcast teletext-service applications in North America.

The first seven chapters in this specification generally correspond to the seven layers in the Open Systems Interconnection (OSI) basic reference model (chapter 1 corresponds to layer 1, etc.), however not all parts of each chapter necessarily correspond to the appropriate layer.

For reference the seven layers, and a summary of their most important functions, are:

- | | |
|------------------|---|
| 1 - Physical | Provides the mechanical and electrical provisions for the physical interconnection |
| 2 - Link | Provides the means for establishing and maintaining data links between network entities |
| 3 - Network | Provides the means for exchange of network service data units over a network |
| 4 - Transport | Provides a universal transport mechanism for lower level protocol |
| 5 - Session | Provides for the binding and unbinding of two presentation entities |
| 6 - Presentation | Provides the method of coding and presenting the information |
| 7 - Application | Invokes the protocol directly serving the user |

For a full specification of the OSI model see ISO 7498-1983, and CCIT X.200.

A fundamental concept embodied in this teletext standard is that of maintaining the distinction between the means of transporting the data and the coding of the teletext message. The data transmission system does not impose any restriction on the data which can be transmitted. Similarly, the coding language is independent of the transmission technique. For example, the presentation technique of this coding language may be used with conventional modems on a switched telephone network.

Because of this careful separation of functions, similar to the convention recommended by International Radio Consultative Committee (CCIR) and the International Telegraph and Telephone Consultative committee (CCITT), the present standard allows advances in technology without making basic level equipment obsolete.

The transmission system is defined in chapters 1, 2, 3 and 4. That part of the standard dealing with the coding and utilization of the teletext message is defined in chapters 5, 6 and 7. Chapter 6