

ANSI/CEA Standard

Other VBI Waveforms

ANSI/CEA-2020 R-2014

December 2007



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.

Note: The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of this claim or of any patent rights in connection therewith. The patent holder has, however, filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license. Details may be obtained from the publisher.

This document 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 document 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 **R4.3 Television Data Systems Subcommittee**.)

Published by
©CONSUMER ELECTRONICS ASSOCIATION 2014
Technology & Standards Department
www.CE.org

All rights reserved

CONTENTS

1 Scope	1
2 References	1
2.1 Normative References	1
2.1.1 Normative Reference List	1
2.1.2 Normative Reference Acquisition	1
2.2 Informative References	1
2.2.1 Informative Reference List.....	1
2.2.2 Informative Reference Acquisition	1
3 Definitions	1
3.1 Acronyms and Abbreviations	2
4 Waveform Summary	2
5 Automated Measurement of Lineups (AMOL) Waveforms	2
5.1 AMOL Signal Overview	2
5.1.1 Signal Locations	2
5.1.2 Data Modulation.....	3
5.2 AMOL 48-bit Encode Bit Timing Specifications	3
5.2.1 Starting Time	4
5.2.2 Bit Interval	4
5.2.3 Cumulative Error.....	4
5.2.4 Data Bit Amplitude Level	4
5.2.5 Spurious Signals.....	4
5.3 AMOL 48-bit Decode Bit Timing Specifications	5
5.3.1 Starting Time	5
5.3.2 Bit Interval	5
5.3.3 Cumulative Error.....	5
5.3.4 Spurious Signals.....	5
5.4 AMOL 96-bit Encode Bit Timing Specifications	6
5.4.1 Starting Time	6
5.4.2 Bit Interval	6
5.4.3 Cumulative Error.....	6
5.4.4 Data Bit Amplitude Level	6
5.4.5 Spurious Signals.....	7
5.5 AMOL 96-bit Decode Bit Timing Specifications	7
5.5.1 Starting Time	7
5.5.2 Bit Interval	7
5.5.3 Cumulative Error.....	8
5.5.4 Data Bit Amplitude Level	8
5.5.5 Spurious Signals.....	8
5.6 System Considerations	8
5.6.1 Synchronization of AMOL and Video.....	8
5.6.2 Shifted AMOL signals.....	8
6 TVG1x and TVG2x Waveforms	8
6.1 TVG1x Waveform	8
6.1.1 Signal Characteristics for Encoding.....	8
6.1.2 Data Bit Amplitude Level During Decoding	9
6.1.3 System Considerations - Synchronization of TVG1x and Video	10

6.2 TVG2x Waveform	10
6.2.1 Signal Locations	10
6.2.2 TVG2x Waveform	10
6.2.3 Data Modulation	12
6.2.4 TVG2x 51-bit Encode Bit Timing Specifications.....	12
6.2.4.1 Starting Time	12
6.2.4.2 Bit Interval.....	13
6.2.4.3 Cumulative Error	13
6.2.4.4 Data Bit Amplitude Level.....	13
6.2.4.5 Spurious Signals.....	13
6.2.5 TVG2x 51-bit Decode Bit Timing Specifications.....	13
6.2.5.1 Starting Time	13
6.2.5.2 Bit Interval.....	13
6.2.5.3 Cumulative Error	14
6.2.5.4 Data Bit Amplitude Level.....	14
6.2.6 Frame Code Detection.....	14
6.2.7 System Considerations.....	14
6.2.7.1 Synchronization of TVG2x and Video	14

Figures

Figure 1 NRZ Encoding Technique	3
Figure 2 Bit Encoding Tolerances – 48 bit	4
Figure 3 Bit Decoding Tolerances – 48 bit	5
Figure 4 Bit Encoding Tolerances – 96 bit	6
Figure 5 Bit Decoding Tolerances – 96 bit	7
Figure 6 Data Format of TVG2x Waveform.....	11

Tables

Table 1 Locations and Possible Bitrates	3
Table 2 SOM and Bits per Line	3
Table 3 IRE Level of Logic 1 for Encoding TVG1x.....	9
Table 4 IRE Level of Logic 1 for Decoding TVG1x.....	10
Table 5 TVG2x Waveform Specifications	12
Table 6 IRE Level of Logic 1 for Encoding TVG2x.....	13
Table 7 IRE Level of Logic 1 for Decoding TVG2x.....	14

FOREWORD

This standard, CEA-2020, defines four VBI waveforms in commercial use and defined by Nielsen and Gemstar TV Guide.

This standard was developed under the auspices of the Consumer Electronics Association (CEA) R4.3 Data Systems Subcommittee.

This page intentionally left blank.

Other VBI Waveforms

1 Scope

This standard, CEA-2020, specifies four Vertical Blanking Interval (VBI) waveforms in commercial use. The electrical properties of the waveforms are covered, but the meaning of the payload data is not.

The waveforms apply to 525-line, interlaced (i.e. 480i) analog television signals.

The waveforms may be present on analog inputs and analog outputs, but no conformance requirements about the actual presence of the waveforms are defined in CEA-2020.

2 References

2.1 Normative References

The following standards contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Section 2.1.1.

2.1.1 Normative Reference List

CEA-608-C, Line 21 Data Services, August 2005

SMPTE 170M, SMPTE Standard for Television—Composite Analog Video Signal—NTSC for Studio Applications, 2004

2.1.2 Normative Reference Acquisition

CEA Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

SMPTE Standards:

- Society of Motion Picture and Television Engineers (SMPTE), 3 Barker Ave, White Plains, NY 10601; Phone 914-761-1100; Fax 914-761-3115; Internet <http://www.smpte.org>

2.2 Informative References

2.2.1 Informative Reference List

CEA-805-C, Data on the Component Video Interfaces, April 2006

CEA-516, Joint EIA/CVCC Recommended Practice for Teletext: North American Basic Teletext Specification (NABTS), 1988

IEC 61880 (1998-01), Video systems (525/60) – Video and accompanied data using the vertical blanking interval – Analogue interface

2.2.2 Informative Reference Acquisition

CEA Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

IEC Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com
- IEC Central Office, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland; Phone +41 22 919 02 11; Fax +41 22 919 03 00; Internet <http://www.iec.ch>; Email pubinfor@iec.ch

3 Definitions