

CEA Bulletin

Active Format Description (AFD) &
Bar Data Recommended Practice

CEA-CEB16

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FOREWORD

This bulletin was developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee. This bulletin was developed after consideration of similar work by the Digital TV Group and Intellect in the U.K. titled, *Recommended Receiver Reaction to Aspect Ratio Signaling in Digital Video Broadcasting*, parts of which were used where appropriate.

CONTENTS

1 Scope.....	1
2 Informative References	1
2.1 Informative Reference List	1
2.2 Informative Reference Acquisition	1
3 Acronyms.....	2
4 Definition of Terms	2
5 Background and Overview.....	3
6 Standard Interface Signaling Methods	5
6.1 NTSC and 480i Component Analog	5
6.1.1 Uncompressed Digital and Other Component Analog	5
6.2 AFD Data.....	6
6.2.1 Bar Data	6
7 AFD Processing	6
7.1 480i Formats.....	7
7.2 Illustrated AFD Recommendations.....	7
7.2.1 Transmissions with MPEG = 4:3	8
7.2.2 Transmissions with MPEG = 16:9	20
8 Bar Data Processing.....	31
Annex A Active Format Description Illustrations	32
Annex B Geometric Relationships in AFD Diagrams.....	34
Annex C Use of Wide-Screen Signaling for the DVD Application.....	36

Tables

Table 1 IEC-61880 Aspect Ratio Coding	5
Table 2 MPEG 4:3 AFD Value '0100'	9
Table 3 MPEG 4:3 AFD Value '1000'	10
Table 4 MPEG 4:3 AFD '1001'	11
Table 5 MPEG 4:3 AFD '1010'	12
Table 6 MPEG 4:3 AFD '1011'	13
Table 7 MPEG 4:3 AFD '1101'	14
Table 8 MPEG 4:3 AFD '1110'	15
Table 9 MPEG 4:3 AFD '1111' (part 1, 4:3 Display Aspect Ratio).....	16
Table 10 MPEG 4:3 AFD '1111' (part 2, 16:9 Display Aspect Ratio).....	17
Table 11 MPEG 4:3 No AFD (part 1, 4:3 Display Aspect Ratio	18
Table 12 MPEG 4:3 No AFD (part 2, 16:9 Display Aspect Ratio)	19
Table 13 MPEG 16:9 AFD '0100'	21
Table 14 MPEG 16:9 AFD '1000'	22
Table 15 MPEG 16:9 AFD '1001'	23
Table 16 MPEG 16:9 AFD '1010'	24

Table 17 MPEG 16:9 AFD '1011'	25
Table 18 MPEG 16:9 AFD '1101'	26
Table 19 MPEG 16:9 AFD '1110'	27
Table 20 MPEG 16:9 AFD '1111'	28
Table 21 MPEG 16:9 No AFD (part 1, 4:3 Display Aspect Ratio)	29
Table 22 MPEG 16:9 No AFD (part 2, 16:9 Display Aspect Ratio)	30

Figures

Figure 1 NTSC Interface to 4:3 Display	4
Figure 2 NTSC Interface to 16:9 Display	4
Figure 3 Digital or Component Analog Interface to 4:3 Display	4
Figure 4 Digital or Component Analog Interface to 16:9 Display	4
Figure 5 Active Format Illustration	32
Figure 6 Illustrated AFD Coding	33
Figure 7 Enclosed Rectangles Within 4:3 Coded Frame	34
Figure 8 Enclosed Rectangles Within 16:9 Coded Frame	35
Figure 9 Anamorphic and Letterbox Display Processing for DVD	36

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Active Format Description (AFD) & Bar Data Recommended Practice

1 Scope

This bulletin, CEA-CEB16, provides guidance for the development and implementation of consumer devices that process information related to aspect ratio signaling, Active Format Description (AFD) and bar data. Such devices may respond to this signaling by creating an optimum (or more desirable) display, by passing this signaling through to an analog or digital output, or in preparation of a digital recording. CEA-CEB16 reviews the standardized methods for representing AFD, aspect ratio information, and bar data on various analog and digital Standard Definition (SD) and High Definition (HD) interfaces. For each of various transmitted display formats, CEA-CEB16 provides recommendations for output signaling and display appearance, taking into account possible decoder capabilities, scaling options and user preferences regarding display format.

2 Informative References

2.1 Informative Reference List

1. ATSC Digital Television Standard (A/53), Revision E, December, 2005
2. CEA-608-C Line 21 Data Services, August 2005
3. CEA-770.2-C, Standard Definition TV Analog Component Video Interface, November, 2001
4. CEA-770.3-C, High Definition TV Analog Component Video Interface, November, 2001
5. CEA-805-C Data on the Component Video Interfaces, July, 2006
6. CEA-861-D A DTV Profile for Uncompressed High Speed Digital Interfaces, July, 2006
7. High-Definition Multimedia Interface (HDMI) Specification, Version 1.1, May 20, 2004
8. EIA-J CPR-1204 Transfer Method of Video Identification Information (525 line system), 1997
9. ETSI TS 101 154 v1.7.1, Digital Video Broadcasting (DVB); Implementation guidelines for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream, 2005
10. IEC 61880 Video Systems (525/60) – video and accompanied data using the vertical blanking interval—Analogue interface, 1998
11. ISO/IEC 13818-2:2000 (E) International Standard, Information technology—Generic coding of moving pictures and associated audio information: video
12. ISO/IEC 13818-2:2000/Amd 1:2001 Content description data
13. SMPTE RP 202-2000, Video Alignment for MPEG-2 Coding

2.2 Informative Reference Acquisition

ATSC Standards:

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