

# CEA Bulletin

PSIP Recommended Practice

CEA-CEB12-A

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## FOREWORD

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

CEA-CEB12-A supersedes EIA/CEA-CEB12.

NOTE—In 2003, CEA redesignated EIA/CEA standards and bulletins, and those EIA standards under CEA auspices, as CEA standards or bulletins, respectively. Please see <http://global.ihs.com> for the most recent designation.

## CONTENTS

<b>1 Scope</b> .....	<b>1</b>
<b>2 References</b> .....	<b>1</b>
<b>2.1 Informative References</b> .....	<b>1</b>
<b>2.1.1 Informative Reference List</b> .....	<b>1</b>
<b>2.1.2 Informative Reference Acquisition</b> .....	<b>2</b>
<b>3 Acronyms</b> .....	<b>2</b>
<b>4 Overview</b> .....	<b>3</b>
<b>5 Data Organization</b> .....	<b>4</b>
<b>5.1 Master Channel Map</b> .....	<b>4</b>
<b>5.2 User Channel Map</b> .....	<b>6</b>
<b>5.3 Favorites Channel Map</b> .....	<b>7</b>
<b>6 Receiver Start-up Issues</b> .....	<b>7</b>
<b>6.1 Basic Receiver Configuration Tuning</b> .....	<b>7</b>
<b>6.2 User Set-Up Scenarios—Basic Receiver Configuration</b> .....	<b>7</b>
<b>6.2.1 Scenario 1--Receiver Connected to an Antenna</b> .....	<b>7</b>
<b>6.2.2 Scenario 2—Receiver Directly Connected to Cable, and Receiver is “Cable-Ready”</b> .....	<b>8</b>
<b>7 Maintenance</b> .....	<b>9</b>
<b>8 Operations Section</b> .....	<b>11</b>
<b>8.1 Outline of Receiver Daily Operation in the Presence of PSIP Information</b> .....	<b>11</b>
<b>8.2 Daily Operation</b> .....	<b>11</b>
<b>8.3 PSIP Data Processing and Detailed Daily Operation</b> .....	<b>11</b>
<b>8.3.1 Device Inactive</b> .....	<b>11</b>
<b>8.3.2 Device Active</b> .....	<b>12</b>
<b>8.3.2.1 Calendar/Clock</b> .....	<b>12</b>
<b>8.3.3 Channel Selection</b> .....	<b>12</b>
<b>8.3.4 Device Tune</b> .....	<b>14</b>
<b>8.3.4.1 Program Guide</b> .....	<b>14</b>
<b>8.3.5 Closed Captioning</b> .....	<b>15</b>
<b>8.3.6 Content Advisory / Action</b> .....	<b>15</b>
<b>8.3.7 Directed Channel Change</b> .....	<b>16</b>
<b>8.3.8 Audio Handling</b> .....	<b>16</b>
<b>8.3.9 Emergency Audio Handling</b> .....	<b>17</b>
<b>8.3.10 Others</b> .....	<b>17</b>
<b>8.3.10.1 Table Update</b> .....	<b>17</b>
<b>9 Initial and Subsequent Discovery of New Services</b> .....	<b>21</b>
<b>9.1 Retained and Skipped Channels</b> .....	<b>21</b>
<b>9.2 Channel set-up by scanning</b> .....	<b>21</b>
<b>9.2.1 From-scratch scan</b> .....	<b>21</b>
<b>9.2.2 Add-on scan</b> .....	<b>21</b>
<b>9.3 Individual Channel Set-up</b> .....	<b>22</b>
<b>10 Use of ‘Hide Guide’ bits</b> .....	<b>22</b>
<b>11 DTV Channel Reception Scenarios</b> .....	<b>23</b>

11.1 Simple Reception: One or More Channels with Unique TSIDs on Different DTV PTCs, with Different Pairs of Major and Minor Channel Numbers.....	24
11.2 Multiple Major Channels: One or More Channels with Single TSID, but with Multiple Major Channel Numbers .....	25
11.3 Aggregated Channel Guide: Two or More DTV PTCs Aggregated in one Channel Guide....	25
11.4 Distributed Channels: Two or More Virtual Channels Distributed Across Physical Channels .....	26
11.5 Channel Retransmission: Channels with the same TSID may be received on multiple DTV Physical Channels .....	27
11.6 Virtual Channel Overlap: Multiple stations, with different TSIDs, may be received on different DTV physical channels with identical major and minor channels.....	28
11.7 RF Co-Channel Signals: Multiple stations, with different TSIDs, may be received on the same DTV PTC with different or identical major and minor channels.....	29

## Tables

Table 1 Example Master Channel Map.....	5
Table 2 Example User Channel Map .....	6
Table 3 Example Favorites Channel Map .....	7
Table 4 Cable Channel Numbering Options.....	13
Table 5 PSIP Data Referenced During Daily Operation.....	18
Table 6 Receiver Behavior with hidden and hide_guide Attributes.....	23

## Figures

Figure 1 PIDs & Tuning.....	3
Figure 2 Electronic Program Guide Example.....	4
Figure 3 Simple Reception of Two DTV Stations.....	24
Figure 4 DTV Reception of Multiple Major Channels from Single Station .....	25
Figure 5 DTV Reception of Aggregated Channel Guides .....	26
Figure 6 DTV Reception of Distributed Channels.....	27
Figure 7 DTV Reception of Channel Retransmission.....	28
Figure 8 DTV Reception of Identical Virtual Channel Numbers from Different Stations.....	29
Figure 9 DTV Reception of RF Co-Channel Signals .....	30

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## PSIP Recommended Practice

### 1 Scope

This bulletin, CEA-CEB12-A, provides guidance for the development and implementation of Advanced Television Systems Committee (ATSC) Program and System Information Protocol (PSIP)-compliant receivers, cable-ready DTV receivers, personal recorders and other consumer electronics devices. It includes recommendations and suggestions for device functionality. CEA-CEB12-A should in no way prohibit consumer device manufacturers from including additional features, and CEA-CEB12-A should not be interpreted as recommending an upper limit to device performance.

Numerous possible PSIP implementation scenarios could be considered. However, CEA-CEB12-A does not include an exhaustive classification of the possibilities; rather, some simpler scenarios are addressed.

CEA-CEB12-A assumes that the user sets up the receiver without professional assistance, and that setup is menu-driven, simple, and mostly automatic. It is possible, however, that receivers may be professionally installed and set up by trained technicians.

CEA-CEB12-A does not currently address receivers that have built-in satellite receiving capability, nor receivers that can access EPG databases using phone lines. Nor does it address cable set-top boxes, satellite boxes, VCRs, DVD players, or other auxiliary devices or connections.

CEA-CEB12-A uses the terminology defined in ATSC A/65B, and should be read in conjunction with ATSC A/65B.

NOTE—Designers should be aware that there are FCC regulations that may apply to functions described in this CEA-CEB12-A; and while every reasonable attempt was made to have this CEA-CEB12-A conform to those regulations in place as of the date of publication, implementers are cautioned to read and understand all applicable regulations.

### 2 References

#### 2.1 Informative References

##### 2.1.1 Informative Reference List

ATSC A/53B with Amendments 1 and 2, Digital Television Standard, August 7, 2001(Amendments May, 2003)

ATSC A/65B, Program and System Information for Terrestrial Broadcast and Cable, March 18, 2003

CEA-608-B, Line 21 Data Services, October, 2000

CEA-708-B, Digital Television (DTV) Closed Captioning, December, 1999

CEA-766-A, U.S. and Canadian Rating Region Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC A/65-A Program and System Information Protocol (PSIP), April, 2001

CEA-CEB10-A, CEA-708-B Implementation Guidance, September, 2002

ATSC A/69, Recommended Practice: Program and System Information Protocol Implementation Guidelines for Broadcasters, 25 June 2002