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Note:

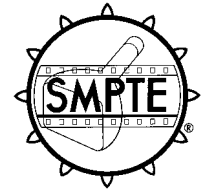
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SMPTE RECOMMENDED PRACTICE**RP 165-1994**

Revision of RP 165-1993

Error Detection Checkwords and Status Flags for Use in Bit-Serial Digital Interfaces for Television



Page 1 of 6 pages

1 Scope

1.1 This practice, also known as the error detection and handling (EDH) system, describes the generation of error detection checkwords and related status flags to be used optionally in conjunction with the serial digital interface for system M (525/59.94) and systems B, G, H, and I (625/50) digital television equipment operating with either 13.5-MHz or 18-MHz sampled 4:2:2 component digital signals or 4fsc composite digital signals. Although it is preferred that this error-checking method be used in all serial transmitters and receivers, it is recognized that some equipment must minimize complexity. Additionally, there is nothing in this practice which should preclude its use in a parallel digital interface for 4:2:2 component digital signals.

1.2 Two checkwords are defined: one based on a field of active picture samples and the other on a full field of samples. This two-word approach provides continuing error detection for the active picture when the digital signal has passed through processing equipment that has changed data outside the active picture area without recalculating the full-field checkword.

1.3 Three sets of flags are provided to feed forward information regarding detected errors to help facilitate identification of faulty equipment and the type of fault. One set of flags is associated with each of the two field related checkwords. A third set of flags is used to provide similar information based on evaluating all of the ancillary data checksums within a field. Implementation of these flags is not a requirement of this practice.

1.4 The checkwords and flags are combined in an error detection data packet which is included as ancillary data in the serial digital signal. At the receiver, a recalculation of checkwords may be compared to the error detection data packet information to determine if a transmission error occurred.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

SMPTE RP 168-1993, Definition of Vertical Interval Switching Point for Synchronous Video Switching

3 Location of checkwords, flags, identification number, and included samples

3.1 Location of checkwords, flags, and identification number

Digital data packets containing the calculated checkwords, error information flags, and identification number are located in the ancillary data area of the vertical interval in a manner to complement the recommended practice of source switching. Locations are shown graphically in figure 1 and specified in table 1 for 525/59.94 systems and table 2 for 625/50 systems. For composite signals, the error detection data packet is located in the ancillary data area of the first horizontal pulse occurring in the line prior to the recommended vertical interval switching point of each field. For component signals, the error

detection data packet is located just prior to SAV (start of video) in the same lines. To enable proper operation of equipment implementing this practice, signal switching must take place in the vertical interval and conform to SMPTE RP 168.

3.2 Samples included in checkword calculations

Starting and ending samples for active picture and full-field checkword calculations are shown in table 3. For the active picture checkword, only the samples in

the active picture area of each line are included in the calculation. As used in this practice, the active picture includes only those lines which, in composite systems, are full lines (that is, half-lines are not included). Full-field checkwords include all the samples in all lines except the line containing the error detection data packet and the two following lines. The line following the error detection data packet is normally used for vertical interval switching and the next line is excluded to ensure that word framing and TRS propagation are restored after a switch.

ccc	Vertical Blanking Interval	
fff	(Line n with last full-field sample) eef	
	(Line n+1 with error detection data packet)	
	(Line n+2 used for switching)	
	(Line n+3 not included in full-field sample)	
	(Line n+4 first full-field sample)	
	aaa	(Line with first active picture sample)
H-interval	Active Picture Area	
samples not contained in active picture checkword		
		(Line with last active picture sample) eea

- NOTES
- 1 See tables 1 and 2 for exact sample locations in both fields.
 - 2 ccc = location of checkwords and status flags.
 - 3 fff = first sample included in the full-field checkword.
 - 4 aaa = first sample included in the active picture checkword.
 - 5 eea = last sample included in the active picture checkword.
 - 6 eef = last sample included in the full-field checkword.

Figure 1 – Location of checkwords and included samples