

RECOMMENDATION ITU-R BT.656-5

**Interface for digital component video signals in 525-line
and 625-line television systems operating at the 4:2:2
level of Recommendation ITU-R BT.601***

(Question ITU-R 42/6)

(1986-1992-1994-1995-1998-2007)

Scope

This Recommendation covers the data structure of the parallel signal representation and serial interface for 525/625-line digital signals as defined in Recommendation ITU-R BT.601.

The ITU Radiocommunication Assembly,

considering

- a) that there are clear advantages for television broadcasting organizations and programme producers in digital studio standards which have the greatest number of significant parameter values common to 525-line and 625-line systems;
- b) that a worldwide compatible digital approach will permit the development of equipment with many common features, permit operating economies and facilitate the international exchange of programmes;
- c) that to implement the above objectives, agreement has been reached on the fundamental encoding parameters of digital television for studios in the form of Recommendation ITU-R BT.601;
- d) that the practical implementation of Recommendation ITU-R BT.601 requires definition of details of interfaces and the data streams traversing them;
- e) that such an interface should have a maximum of commonality between 525-line and 625-line versions;
- f) that in the practical implementation of Recommendation ITU-R BT.601 it is desirable that a bit-serial interface be defined,

recommends

- 1** that where an interface is required for component-coded digital video signals described in Recommendation ITU-R BT.601 in television studios, the interface and the data streams that will traverse them should be in accordance with Annex 1, defining the bit-serial implementation.

* Recommendation ITU-R BT.601-6 – Studio encoding parameters of digital television for standard 4:3 and wide-screen 16:9 aspect ratios.

Annex 1

1 Introduction

This Recommendation describes the means of interconnecting digital television equipment operating on the 525-line or 625-line standards and complying with the 4:2:2 encoding parameters as defined in Recommendation ITU-R BT.601.

Part 1 describes the digital signal format of the interface.

Part 2 describes the particular characteristics of the bit-serial interface.

The particular characteristics of the bit-parallel interface are to be found in Appendix 1.

PART 1

Digital signal format of the interface

1 General description of the interface

The interface provides a unidirectional interconnection between a single source and a single destination. (NOTE – With the use of signal routers the destination may be multiple destinations.)

A digital signal format of the interface is described in § 2.

The data signals are in the form of binary information coded in 8- or 10-bit words (see Note 1). These signals are:

- video signals,
- digital blanking data,
- timing reference signals,
- ancillary signals.

NOTE 1 – Within this Recommendation, the contents of digital words are expressed in hexadecimal form of 10-bit representation.

For example, the bit pattern 1001000101 is expressed as 245_h.

Eight-bit words occupy the left most significant bits of a 10-bit word, i.e. bit 9 to bit 2, where bit 9 is the most significant bit.

2 Video data

2.1 Coding characteristics

The video data is in compliance with Recommendation ITU-R BT.601, and with the field-blanking definition shown in Table 1.

TABLE 1
Field interval definitions

			625	525	
V-digital field blanking	Field 1	Start (V = 1)	Line 624	Line 1	
		Finish (V = 0)	Line 23	Line 20	
	Field 2	Start (V = 1)	Line 311	Line 264	
		Finish (V = 0)	Line 336	Line 283	
	F-digital field identification				
	Field 1	F = 0	Line 1	Line 4	
Field 2	F = 1	Line 313	Line 266		

NOTE 1 – Signals F and V change state synchronously with the end of active video timing reference code at the beginning of the digital line.

NOTE 2 – Definition of line numbers is to be found in Recommendation ITU-R BT.1700. Note that digital line number changes state prior to O_H as described in Recommendation ITU-R BT.601.

NOTE 3 – Designers should be aware that the “1” to “0” transition of the V-bit may not necessarily occur on line 20 (283) in some equipment conforming to previous versions of this Recommendation for 525-line signals.

2.2 Video data format

The data words in which the eight most significant bits are all set to 1 or are all set to 0 are reserved for data identification purposes and consequently only 254 of the possible 256 8-bit words or 1 016 of the possible 1 024 10-bit words may be used to express a signal value.

The video data words are conveyed as a 27 Mword/s multiplex in the following order:

$$C_B, Y, C_R, Y, C_B, Y, C_R, \text{ etc.}$$

where the word sequence C_B, Y, C_R , refers to co-sited luminance and colour-difference samples and the following word, Y, corresponds to the next luminance sample.

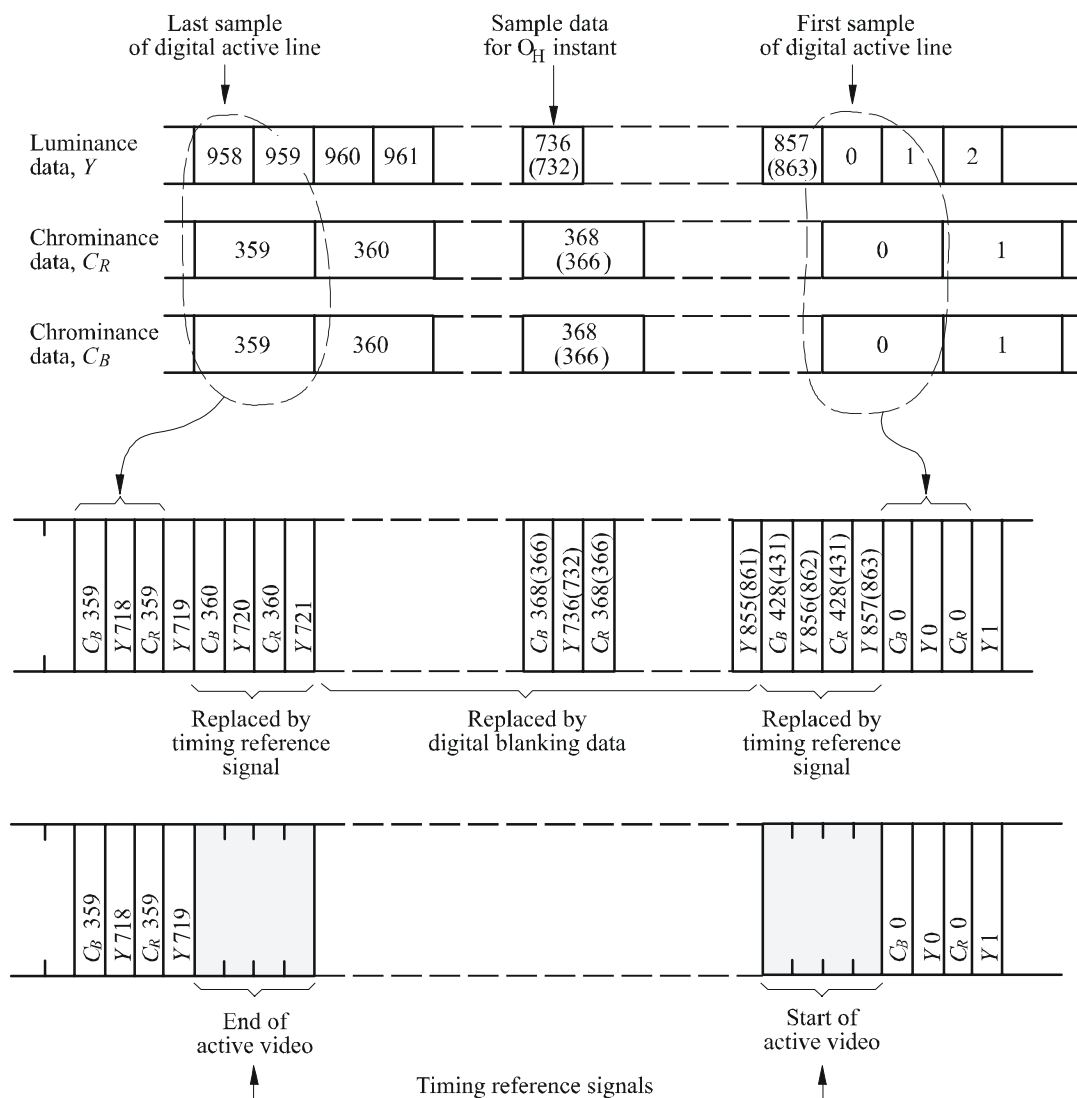
2.3 Interface signal structure

Figure 1 shows the ways in which the video sample data is incorporated in the interface data stream. Sample identification in Fig. 1 is in accordance with the identification in Recommendation ITU-R BT.601.

2.4 Video timing reference codes (SAV, EAV)

There are two timing reference signals, one at the beginning of each video data block (start of active video, SAV) and one at the end of each video data block (end of active video, EAV) as shown in Fig. 1.

FIGURE 1
Composition of interface data stream



Note 1 – Sample identification numbers in parentheses are for 625-line systems where these differ from those for 525-line systems. (See also Recommendation ITU-R BT.803.)

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Each timing reference signal consists of a four word sequence in the following format: 3FF 000 000 XYZ. (Values are expressed in hexadecimal notation. 3FF 000 values are reserved for use in timing reference signals.) The first three words are a fixed preamble. The fourth word contains information defining field 2 identification, the state of field blanking, and the state of line blanking. The assignment of bits within the timing reference signal is shown in Table 2.