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LINE TRANSMISSION OF NON-TELEPHONE SIGNALS

FRAME STRUCTURES FOR USE IN THE INTERNATIONAL INTERCONNECTION OF DIGITAL CODECS FOR VIDEOCONFERENCING OR VISUAL TELEPHONY

ITU-T Recommendation H.130

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation H.130 was published in Fascicle III.6 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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FRAME STRUCTURES FOR USE IN THE INTERNATIONAL INTERCONNECTION OF DIGITAL CODECS FOR VIDEOCONFERENCING OR VISUAL TELEPHONY

(Malaga-Torremolinos, 1984; amended at Melbourne, 1988)

Introduction

Videoconferencing and visual telephony are new services which require greater bit rates than telephony. In the studies in CCITT on the ISDN and on international interworking, 384 kbit/s is emerging as an important channel capacity for wideband services. On this basis it is recommended that the videoconferencing and visual telephone services should be based on multiples of 384 kbit/s.

It is noted that both the 2048 kbit/s and 1544 kbit/s primary digital levels can be expressed by the formula $y + (n \times 384)$ kbit/s, where $n = 5$ or 4 and $y = 128$ or 8 kbit/s, respectively.

While this Recommendation covers only frame structures for transmission at the primary digital rates, it is not intended to suggest that transmissions using other frame structures or formats at primary rates or lower are precluded. In the future, frame structure based on other multiples and/or sub-multiples of 384 kbit/s may also be considered.

1 Characteristics of a 2048 kbit/s ($n = 5$) frame structure for use in codecs described in § 1 of Recommendation H.120

1.1 General characteristics

The multiplex structure described under § 1 is suitable for use on digital paths and connections which interconnect video codecs for videoconferencing or visual telephony using 2048 kbit/s transmission. The connections may either be direct or via higher-order digital multiplex equipment compatible with the primary PCM multiplex equipment defined in Recommendation G.732.

Some of the characteristics of this multiplex structure are identical to those in Recommendation G.704 and are covered by cross-references to that Recommendation.

The main features of the multiplex structure are that it provides:

- one 64 kbit/s channel for frame alignment, alarm signals and other signals as required;
- one 64 kbit/s channel reserved for the transmission of the sound signal;
- one 32 kbit/s channel for codec-to-codec information;
- the option of one or two 64 kbit/s channels and/or one 32 kbit/s channel for stereophonic sound, facsimile, data, etc.;
- the possibility of end-to-end and subscriber-to-network signalling;
- the remaining capacity (between 1664 and 1888 kbit/s) is used for the encoded video signal.

1.1.1 Fundamental characteristics

The multiplex structure contains 32 time slots, each of 64 kbit/s.

1.1.2 Bit rate

The nominal bit rate is 2048 kbit/s. The tolerance on this rate is ± 50 parts per million (ppm).

1.1.3 Timing signal

The timing signal is a 2048-kHz signal from which the bit rate is derived. It should be possible to derive the timing signal from an internal source or from the network.

1.1.4 Interfaces

The interfaces should comply with Recommendation G.703.

1.2 Frame structure and time slot allocations

The frame structure is in accordance with Recommendation G.704, § 3.3. The time slot (TS) allocations within the frame are given in Table 1/H.130, two options are shown according to whether or not the network is switched (under control of signals within the frame structure).

1.3 Codec-to-codec information

This information is transmitted in the 32 kbit/s channel corresponding to odd frames of TS2 (frame parity is gained from the multiframe alignment in the 8th bit of alternate TS2, the frames are consecutively numbered 0 to 15, forming a multiframe).

The 32 kbit/s channel is structured in a multiframe and supermultiframe derived from 128 consecutive 256 bit frames. The multiframe is composed of 8 octets numbered 1, 3, 5, ..., 15, each from TS2 in an odd numbered 256 bit frame. The supermultiframe corresponds to 8 consecutive multiframes which are numbered 0, 1, 2, ..., 7.

The use of the bits in each octet in the odd frames is as follows:

- Bit 1 for clock justification,
- Bit 2 for buffer state,
- Bit 3 for coding mode identification; the 8 consecutive bits 3 of TS2 in a multiframe will carry the following information:

Bit 3.1 ¹⁾	Codec facilities	(see below)
Bit 3.3	Colour transmission	(1 if provided)
Bit 3.5	split-screen indicator	(if required)
Bit 3.7	Fast update request	(1 if required)
Bit 3.9	Advance warning of interruption	(1 if required)
Bit 3.11	Sound power signal, for use with encrypted multipoint	(under study)
Bit 3.13	Data distribution	(1 if required)
Bit 3.15	Detection of looped ports	(set to 1)

Bit 3.1 is used to signal the availability of certain facilities in the decoder at supermultiframe rate, as follows:

Bit 3.1.0	Graphics (mode 1)	(1 if provided)
Bit 3.1.1	High-quality speech	(1 if provided)
Bit 3.1.2	4 x 384 kbit/s capability (see Note 1)	(1 if provided)
Bit 3.1.3	Encryption	(1 if provided)
Bit 3.1.4	System M	(1 if 525-line signal being coded)
Bit 3.1.5	Graphics (mode 2)	(1 if provided)
Bit 3.1.6	Spare	(set to 0)
Bit 3.1.7	2 x 384 kbit/s capability (see Note 1)	(1 if provided)

¹⁾ The notation used here should be interpreted as in the following examples: Bit 3.1 means Bit 3 (in TS2) of frame No. 1 in each multiframe; Bit 3.1.0 means Bit 3 (in TS2) of frame No. 1 in multiframe No. 0 of each supermultiframe.

TABLE 1/H.130

Timeslot allocation in 32 Timeslot frame structure of Recommendation G.704

	Bit rate (kbit/s)	Timeslot allocation (within the 256-bit frame)	
		Non switched (i)	Switched (ii)
Frame alignment, network alarms, etc.	as in G.704	0	0
Speech information	64	1	1
Codec-to-codec information	32	2	2
Signalling information (subscriber-network)	64	-	16
Fax, data, etc. (optional)	up to 2×64	17 and/or 18	17 and/or 18
Encoded video information (minimum)	(i) 27×64 (ii) 26×64	3 to 16 + 19 to 31	3 to 15 + 19 to 31

Note 1 – Frame alignment, network alarms, etc.

This information is transmitted in TSO with the same rules and characteristics as recommended in Recommendation G.704. Additionally, bit 8 in odd frames is used as a synchronization bit which is required when the codec is used with synchronous digital networks. On receipt of this bit set to zero, the transmission clock for the encoder will be derived from the incoming data stream. This bit is always set to one in the encoder.

Note 2 – Speech

Speech is transmitted at 64 kbit/s in TS1. The coding law is the A-law of Recommendation G.711 or, for future applications, the law that will be recommended by CCITT for higher quality speech. In the case of stereophonic transmission, the second speech channel will be transmitted in TS17.

Note 3 – Codec-to-codec information

This information requires a capacity of 32 kbit/s and is transmitted on odd frames of TS2. The remaining 32 kbit/s capacity on the even frames of TS2 will be used for encoded video or data transmission. The detailed use and structure of the 32 kbit/s channel for codec-to-codec information is described in § 1.3.

Note 4 – Signalling (subscriber-to-network)

A capacity of 16 kbit/s is considered adequate for videoconference as for basic access. The methods of switched access to the ISDN at 2048 kbit/s have not yet been formulated. Option (ii) avoids any problems in this respect, by leaving the whole of TS16 (64 kbit/s) clear of video information and available for subscriber signalling and call set-up information when switched access is required. For non-switched access, option (i) should be used.

Note 5 – Facsimile, data, etc.

When required, this information will be transmitted in TS17 and/or 18.

Note 6 – Encoded video

A minimum of 26×64 kbit/s capacity is reserved for encoded video in TS3 to 15 and 19 to 31. In addition, depending on applications, TS2 (even frames), TS16, 17 and 18 may also be used for video, providing a maximum of 29.5×64 kbit/s capacity; the available video bit-rate therefore lies between 1664 and 1888 kbit/s.

- Bit 4 to identify the use of time slots; the 8 consecutive bits 4 of TS2 in a multiframe will carry the following information:

Bit 4.1	TS2 (even) is used for video (0) or other (1)
Bit 4.3	TS16 is used for video (0) or other (1)
Bit 4.5	TS17 is used for video (0) or other (1)
Bit 4.7	TS18 is used for video (0) or other (1)
Bit 4.9	TS16, 26 to 31 are not used for video
Bit 4.11	Graphics transmission

(see Note 2)

(1 if required)

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