INTERNATIONAL TELECOMMUNICATION UNION

CCITT H.230

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

LINE TRANSMISSION OF NON-TELEPHONE SIGNALS

FRAME-SYNCHRONOUS CONTROL AND INDICATION SIGNALS FOR AUDIOVISUAL SYSTEMS

Recommendation H.230

Geneva, 1990

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is the permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation H.230 was prepared by Study Group XV and was approved under the Resolution No. 2 procedure on the 14 of December 1990.

CCITT NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication Administration and a recognized private operating agency.

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FRAME-SYNCHRONOUS CONTROL AND INDICATION SIGNALS FOR AUDIOVISUAL SYSTEMS

1 Introduction

Digital audiovisual services are provided by a transmission system in which the relevant signals are multiplexed onto a digital path. In addition to the audio, video, user data and telematic information, these signals include information for the proper functioning of the system. The additional information has been named control and indication (C&I) to reflect the fact that while some bits are genuinely for "control", causing a state change somewhere else in the system, others provide for indications to the users as to the functioning of the system.

The C&I may be categorized into three groups:

a) call control — these are treated in Recommendations of the Q-Series;

b) transmission frame-synchronous, or otherwise requiring rapid response;

c) conference, data, and Telematic control not requiring frame synchronism, governed by the multilayer protocol (MLP) of Recommendation H.200/AV.270.

This Recommendation concerns only those C&I coming in category b) which includes a simplified set of conference C&I for multipoint connections of simple terminals.

2 Procedures

There are two procedures: some frame-synchronous C&I are provided for directly as a bit-rate allocation signal (BAS) codes in Recommendation H.221, while the remainder require the use of an escape code.

2.1 *C&I codes provided in Recommendation H.221*

The following codes, whose functions are defined in section 3, are provided in Recommendation H.221:

— VCF, VCU (procedures for use in multipoint calls according to Recommendation H.200/AV.243);

— LCV, LCD, LCA, LCO (for maintenance — no standardized procedures).

In each case the code is transmitted in the BAS position at an appropriate time.

2.2 *Other C&I codes*

All frame-synchronous C&I codes not listed in section 2.1 are transmitted by a sequence involving the BAS positions in two consecutive sub-multiframes. In the first, the code (111)[10001] is transmitted. In the second, the code defined in Table 1/H.230 is transmitted.

It should be noted that only one symbol is transmitted by this method — the code in the subsequent sub-multiframe is again treated as a normal BAS code.

3 Definitions of C&I symbols

The full definitions of these symbols are set out below and code values in Table 1/H.230. (The first letter of the alphabetic code-name indicates the type; the second is C for command, I for indication; the third is for the specific function.)

3.1 *C&I related to video*

VIS Video Indicate Suppressed: this symbol is used to indicate that the content of the video channel does not represent a normal camera image. The video encoder may be without video input or an electronically-generated pattern may have been substituted.

VIA Video Indicate Active: complementary to VIS. The video source is the only one, or, in the case that more video sources are to be distinguished, it is that designated “video No. 1”.

VIA2 Equivalent to VIA, but designating “video No. 2” as the source.

VIA3 Equivalent to VIA, but designating “video No. 3” as the source.

VIR Video Indicate Ready-to-Activate: this symbol is transmitted by a terminal whose user has decided not to send video unless he will also receive video from the other end.

VCF Video Command “Freeze-Picture Request”: this symbol may be transmitted prior to the “video-off” mode switch, to prepare the video decoder for this event. This symbol is also transmitted by a multipoint control unit (MCU) prior to video switching. On receipt, a terminal video decoder should complete updating of the current video frame but subsequently display the frozen picture until receipt of the freeze-picture release control which is embedded in the video.

VCU Video Command “Fast Update Request”: this symbol is transmitted by an MCU after performing a video switch. It may also be transmitted by a terminal at the start of communication when the video decoder is first ready to receive. On receipt, the terminal video encoder should enter the fast-update mode at its earliest opportunity.

3.2 *C&I related to audio*

AIM Audio Indicate Muted: this symbol is used to indicate that the content of the audio channel does not represent a normal audio signal. The audio encoder may be without audio input or an electronically-generated tone may have been substituted.

AIA Audio Indicate Active: complementary to AIM.

3.3 *C&I for maintenance purposes*

LCV Loopback Command, “Video Loop Request": on receipt of this symbol, a terminal must connect the output of the video decoder to the input of the video encoder.

LCD Loopback Command, “Digital Loop Request”: on receipt of this symbol, the terminal must disconnect the output of the multiplexer from the outgoing path, replacing it with the input to the demultiplexer. In the case of multiple B or H_0 connections, loopback is activated in each connection.

LCA Loopback Command, “Audio Loop Request”: on receipt of this symbol, the terminal should if possible connect the output of the audio decoder to the input of the audio encoder.

LCO Loopback Command Off: on receipt of this symbol, the terminal must disconnect all loops and restore audio and data paths to their normal condition.

3.4 *C&I related to simple multipoint conferences not using MLP*

Note — Some of the following codes may be cancelled by transmission of appropriate codes as listed in Table 1/H.230 but not separately defined here.

MCV Multipoint Command Visualization-Forcing: transmitted by a terminal to force an associated MCU to broadcast its video signal. (Used to transmit the picture of a chairman or VIP, alternatively to hold a picture source during the transmission of graphics.)

MIV Multipoint Indication Visualization: transmitted by an MCU to indicate to a terminal that its video signal is being seen by other terminals (otherwise known as "On-air" indication).

MCC Multipoint Command Conference: transmitted by an MCU to a terminal. The terminal receiving MCC must make its outgoing transfer rate equal to its incoming transfer rate, and its outgoing audio rate equal to its incoming audio rate.

Note — The command could also be used to invoke an on-screen user indication.

MCS Multipoint Command Symmetrical Data-transmission: transmitted by an MCU when setting up data broadcasting. On receipt, a terminal must prepare itself for data reception and ensure, by mode change if necessary, that its outgoing data channel occupies the same capacity as its incoming data channel. A terminal in receipt of MCS cannot initiate data broadcasting.

MCN Multipoint Command Negating MCS: transmitted by an MCU at the completion of data broadcasting. On receipt, a terminal must close any outgoing data channel which it has opened as a result of the previous reception of MCS. Following the end of data reception and the receipt of MCN, a terminal is permitted to initiate data broadcasting.

MIL Multipoint Indication Loop: an MCU has had its ports externally looped. The topic is for further study.

MIZ Multipoint Indication Zero-communication: transmitted by an MCU to a terminal for information, with the meaning that no other terminals are yet connected to the MCU.

MIS Multipoint Indication Secondary-status: transmitted by an MCU to a terminal for information, with the meaning that since other terminals of higher capability are participating in the conference-call, this terminal will not necessarily receive all the signals that are sent to those other terminals (see Recommendation H.200/AV.243).

MCA Multipoint Command Assign-token: possession of the token gives the holding terminal the right to give the MCU certain commands (see Recommendation H.200/AV.243).

MCT Multipoint Command Token-claim: sent by a terminal to the MCU. The MCU accedes to this claim if the token is unassigned or has been released.

MCR Multipoint Command Release-token: sent to the MCU by the terminal holding the token to give the MCU the authority to reassign the token to another terminal when/if it receives MCT.

4 Requirements for C&I

The C&I functions are defined such that, under various appropriate circumstances, the audiovisual system will operate in a fault-free manner and also such that sympathetic presentation to users is possible. Some functions must therefore be mandatory, others optional. This section, together with the categorization in Table 1/H.230, clarifies the circumstances under which C&I functions are mandatory.

CM denotes "conditionally mandatory": if the terminal (or MCU) is capable of entering the given state, then it must transmit the given code and, when leaving that state, the complementary code. If it has no such capability it can ignore both.

M denotes "mandatory" for all equipments of either terminal or MCU type.

X denotes "non-mandatory": on receipt of such a code, it may be unrecognized, or recognized but not acted upon, or recognized and acted upon, entirely at the discretion of the manufacturer or user.

NA denotes that the code is not applicable in that case.

It will be noted that there are only a few mandatory requirements on most terminals. All audiovisual terminals must recognize and obey the command to make or break the digital loopback, and video loopback if they have video capability. All terminals having a video capability must also obey fast-update, freeze-picture, and MCS/MCN, otherwise there will be system misoperation on a multipoint call.

TABLE 1/H.230

Code		Value	Transmit		Receive		Reference for procedures
First 3 bits	Last 5 bits in decimal form		Terminal	MCU	Terminal	MCU	
(000)	[0,1]	Reserved					
	[2]	AIM	CM	CM	X	X	Section 3.2
	[3]	AIA	CM	CM	X	X	
	[4-15]	Reserved					
	[16]	VIS	CM	CM	X	X	Section 3.1
	[17]	VIA	CM	CM	X	X	Section 3.1
	[18]	VIA2	X	NA	X	X	H.320/AV.312
	[19]	VIA3	X	NA	X	X	H.320/AV.312
	[20-30]	Reserved					
	[31]	VIR	X	NA	X	NA	H.320
(001)	[0]	MCC	NA	M	M	NA	H.200/AV.243
	[1]	Cancel-MCC	NA	M	M	NA	H.200/AV.243
	[2]	MIZ	NA	M	X	NA	H.200/AV.243
	[3]	Cancel-MIZ	NA	M	X	NA	H.200/AV.243
	[4]	MIS	NA	M	X	NA	H.200/AV.243
	[5]	Cancel-MIS	NA	M	X	NA	H.200/AV.243
	[6,7]	Reserved					
	[8]	MCT	X	NA	NA	M	H.200/AV.243
	[9]	MCR	X	NA	NA	M	H.200/AV.243
	[10]	MCA	X	NA	NA	M	H.200/AV.243
	[11-15]	Reserved					
	[16]	MCV	X	NA	NA	M	H.200/AV.243
	[17]	Cancel-MCV	X	NA	NA	M	H.200/AV.243
	[18]	MIV	NA	M	X	NA	H.200/AV.243
	[19]	Cancel-MIV	NA	M	X	NA	H.200/AV.243
	[20]	MCS	NA	M	M	NA	H.200/AV.243
	[21]	MCN	NA	M	M	NA	H.200/AV.243
	[22-30]	Reserved					
	[31]	MIL	NA	NA	NA	M	
(111)	All codes forbidden						
Code values listed in Recommendation H.221, Annex A		VCF	X	M	M	NA	H.221
		VCU	X	M	M	NA	H.221
		LCV	NA	NA	CM	NA	H.221
		LCA	NA	NA	X	X	H.221
		LCD	NA	NA	M	X	H.221
		LCO	NA	NA	M	X	H.221

Printed in Switzerland