FOREWORD

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.

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Recommendation H.230

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

VIA

   VIA2

VIA3

VIR

VCF

         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

   AIA

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 H0
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

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

MIZ

MIS   Multipoint Indication Secondary-status: transmitted by an MCU to a terminal for information, w 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

  M

X

  NA

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.

μTABLE 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]

[2]
[3]

[4-15]

[16]
[17]

[18]
[19]

[20-30]

[31]

Reserved

AIM
AIA

Reserved

VIS
VIA

VIA2
VIA3

Reserved

VIR

CM
CM

CM
CM

X
X

X

CM
CM

CM
CM

NA

NA

NA

X
X

X
X

X
X

X

X
X

X
X

X
X

NA

Section 3.2

Section 3.1
Section 3.1

H.320/AV.312
H.320/AV.312

H.320

(001)

[0]
[1]
[2]
[3]
[4]
[5]

[6,7]

[8]
[9]
[10]

[11-15]

[16]
[17]
[18]
[19]
[20]
[21]

[22-30]

[31]

MCC
Cancel-MCC
MIZ
Cancel-MIZ
MIS
Cancel-MIS

Reserved

MCT
MCR
MCA

Reserved

MCV

Cancel-MCV
MIV
Cancel-MIV
MCS
MCN

Reserved

MIL

NA
NA
NA
NA
NA
NA

X
X
X

X
X
NA
NA
NA
NA

NA

M
M
M
M
M
M

NA
NA
NA

NA
NA
M
M
M
M

NA

M
M
X
X
X
X

NA
NA
NA

NA
NA
X
X
M
M

NA

NA
NA
NA
NA
NA
NA

M
M
M

M
M
NA
NA
NA
NA

M

H.200/AV.243
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H.200/AV.243

(111)   All codes forbidden

Code values listed
in Recommendation H.221,
Annex A

VCF
VCU
LCV
LCA
LCD
LCO

X
X
NA
NA
NA
NA

M
M
NA
NA
NA
NA

M
M
CM
X
M
M

NA
NA
NA
X
X
X

H.221
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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

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Geneva, 1990