INTERNATIONAL TELECOMMUNICATION UNION

ITU-T H.100

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

LINE TRANSMISSION OF NON-TELEPHONE SIGNALS

VISUAL TELEPHONE SYSTEMS

ITU-T Recommendation H.100

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation H.100 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.

Recommendation H.100

VISUAL TELEPHONE SYSTEMS

(former Recommendation H.61, Geneva, 1980;
amended at Malaga- Torremolinos, 1984
and at Melbourne, 1988)

1 Definition

The **visual telephone service** is generally a two-way telecommunication service which uses a switched network of broadband analogue and/or digital circuits to establish connections among subscriber terminals, primarily for the purpose of transmitting live or static pictures.

Special application one-way systems, e.g. surveillance and some information retrieval systems, or a non-switched videoconference service, can be regarded as degenerate cases of the visual telephone service.

The visual telephone service also includes the associated speech.

2 Facilities to be offered

The design of the visual telephone service shall be such as to offer at least the following basic facilities:

a) Transmission of live pictures such as head and shoulders of one person or a small group of persons, with moderate definition.

b) Transmission of the associated speech.

c) Transmission of graphics information such as drawings and documents with high definition (e.g. 625 lines or 525 lines).

d) Video conference service, with or without the use of split-screen techniques.

The above-mentioned services shall, in general, be bi-directional, although uni-directional operation should be possible. Also, some of the facilities can be omitted, if not required, in order to minimize costs.

Note – At the subscriber terminal, the use of ancillary equipments, e.g. for document reproduction, video tape recordings, etc., shall be possible.

3 System parameters

3.1 *Picture standards*

3.1.1 The video standards of the subscriber sets shall be compatible with, readily convertible to, or identical to, the local broadcast television standards.

3.1.2 Two classes of picture standards are recommended for the visual telephone system. They are given in Table 1/H.100.

TABLE 1/H.100

Picture standards

Class	Items	The region to which the figures should be applied	
		Regions where TV broadcasting uses 25 pictures per second	Regions where TV broadcasting uses 30 pictures per second
a	Number of horizontal scanning lines	625	525
	Pictures per second	25 (2:1 interleaved)	30 (2:1 interleaved)
	Aspect ratio	4:3	4:3
	Video bandwidth.	5 MHz	4 MHz
b	Number of horizontal scanning lines	313	263
	Pictures per second	25 (2:1 interleaved)	30 (2:1 interleaved)
	Aspect ratio	4:3	4:3
	Video bandwidth	1 MHz	1 MHz

Class *a* standards are identical to the local broadcast video standards and will, in most cases, give sufficient definition for real-time picture transmission of a group of people (e.g. for conferencing) and of graphics material.

Class *b* standards give sufficient definition for real-time transmission of a head and shoulder picture of one person or a small group. For the transmission of graphics information or other still pictures with high definition, a slow-scan technique has to be applied. For instance, a system using 625 or 525 horizontal scanning lines and 5, or less, pictures per second which gives a Class *a* definition in the 1 MHz bandwidth.

Further study is required to define slow scanning parameters.

4 Characteristics relating to split-screen techniques for Class *a* television conference systems[1)]

In television conference systems which use split-screen techniques to make more effective use of the picture area, the following features for the terminals and transmitted signals are recommended. Preferred seating arrangement for such systems are given in Annex A.

4.1 *Picture format*

The transmitted picture should be 4 : 3 aspect ratio, split into upper and lower halves corresponding to the groups of seats. Viewed from the camera system, the left-hand group should be in the upper half and the right-hand group in the lower half.

The split should occur at the end of lines 166 and 479 for 625-line television systems and at the end of line 142 in Field 1 and line 141 in Field 2 for 525-line television systems, as shown in Figure 1/H.100.

Before display, the receive equipment may discard half lines and first and last lines which are liable to be averaged during standards conversion or vertical aperture correction of mixed signals.

4.2 *Identification signal for split-screen system*

4.2.1 *Analogue video signals*

The identification signal for split-screen system should be inserted in the vertical blanking period, because the control is required for each television frame or field.

1) Split-screen techniques for systems using Class *b* standards require future study.

The line where the identification signal is inserted and its signal format are under study.

4.2.2 *Digital video signals*

An identification signal for split-screen system should be provided. In the case of codecs in Recommendations H.120 and H.130 the format shall be that specified in Recommendation H.130.

4.3 *Compatibility with non-split-screen systems*

The simplest kind of a video telephone terminal is composed of a single camera and other equipments. These terminals may be interconnected with split-screen system terminals. In that case, mechanical masks (if used) for the two split-screen displays (aspect ratio = 4 : 1.5) need to be removed, or if a display with 4 : 3 aspect ratio needs to be installed additionally.

4.4 *Cameras and displays arrangement*

The entrance pupils of the TV camera optical system should be as near as possible to the centre of the TV display showing remote conferees, in order to minimize errors in eye contact angle.

Unless means are employed to place these pupils in line with the display, e.g. by use of half-silvered mirrors, the camera system should be sited above the display and central to it.

In order to keep the maximum horizontal errors as small as possible, the cameras used had better be in a cross-fire system, as for example in Figure A-1/H.100, and the camera/display assembly should be sited on the central axis of the terminal. However, in some cases, adoption of parallel-fire system as shown also in Figure A-1/H.100 is necessary due to a restriction in equipment arrangement.

Whether the two cameras are arranged in cross-fire or parallel-fire is left open to each Administration since the selection does not affect the interconnection of different systems.

4.5 *Picture processing methods at transmitting terminals*

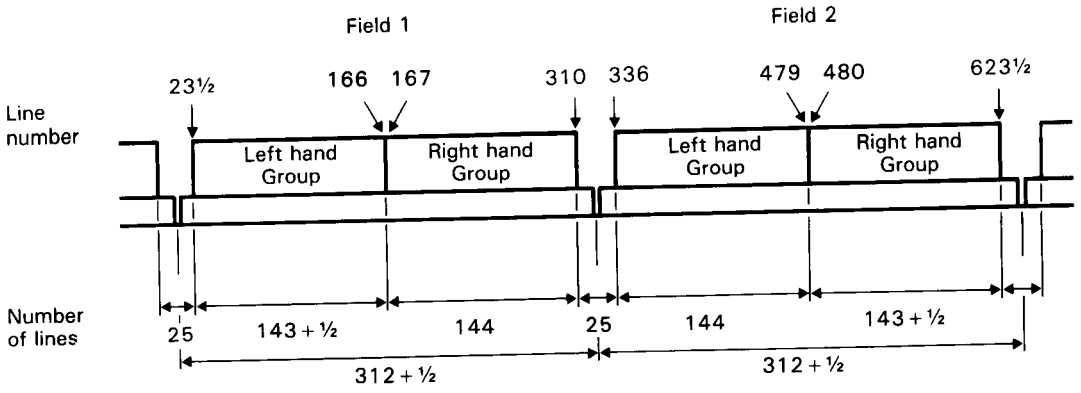
In order to obtain the correct relationship between the signals from the two cameras for split-screen working, the cameras should be synchronized but the vertical drive pulses should be rephased. The drive to one should be advanced by one quarter of the vertical period while the drive to the other should be retarded by the same amount. This causes a central strip of the target of each camera tube to be used and so minimizes the effects of distortions in the corners of the targets. Figure B-1*a)*/H.100 illustrates the preferred method.

Alternative methods which are not recommended although they do not give rise to problems of end-to-end compatibility are compared in Annex B.

4.6 *Receiving equipment*

The receiving equipment should be capable of working with discontinuities in the received signal that may be caused by switching between non-synchronous video sources.

Note – A split-screen device should be capable of working with a codec with the input and output frequency tolerances as specified in Recommendation H.120.

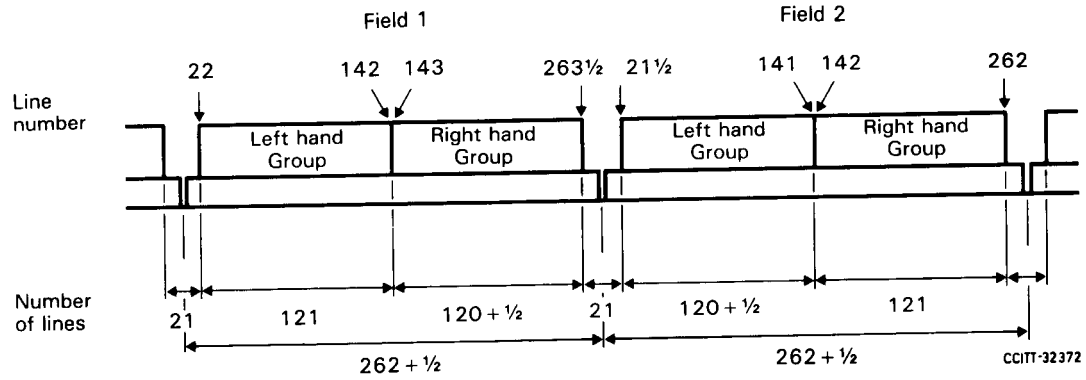


Left hand group: first complete lines 24 and 336
last complete lines 166 and 479

Right hand group: first complete lines 167 and 480
last complete lines 310 and 622

Lines 16-20 inclusive and 329-333 inclusive may contain identification, control or test signals.

a) 625-line television system



Left hand group: first complete lines 22 (Field 1, 2)
last complete lines 142 (Field 1), 141 (Field 2)

Right hand group: first complete lines 143 (Field 1), 142 (Field 2)
last complete lines 262 (Field 1, 2)

Lines 10-21 inclusive in Field 1 and 9½-21½ inclusive in Field 2 may contain identification, control or test signals.

b) 525-line television system

Note 1 – **The method of defining the line number is following Fig. 2-1 of CCIR Report 624 for 625 system, and Fig. 2-3 for 525 system.**

Note 2 – The notation which is used for line numbers is as follows. Line 23½ means that the picture starts (or finishes) half-way along line number 23. When totalling lines, a half-line is shown separately, e.g. 143 + ½.

FIGURE 1/H.100

Vertical format of split-screen video signal

ANNEX A

(to Recommendation H.100)

Seating arrangements when applying split-screen techniques for class *a* system

Preferred arrangements for video conferences using split-screen techniques are:

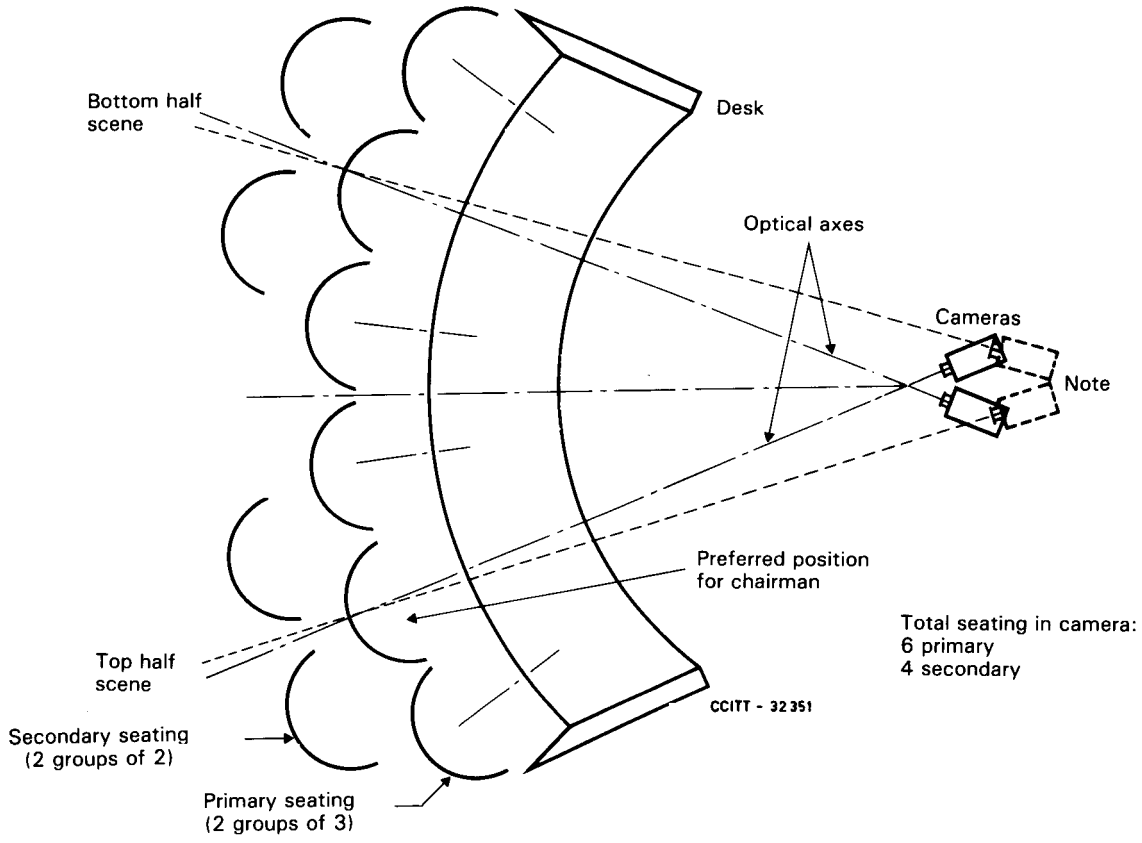
A.1 The conference terminal accommodation should be for 6 primary seats in two adjacent groups of 3 as shown in Figure A.1/H.100.

Provision for additional seating behind may be made, so long as allowance is made for the central gap between the two halves. For example, 4 additional persons may be seated on a second row as in the Figure.

A.2 The chairman's position should be in the centre of the left-hand group of seats (viewed from the camera) with user controls accessible from both this position and the one of the chairman's left.

Consequently, when split-screen pictures are displayed, stacked as received (i.e. shown as 3 over 3), the chairman's position is standardized as top centre.

The suite of 3 chairs containing the chairman's position should also be regarded as the primary position for occasions when only half of a studio is in use. Such standardization is necessary for connection of 3 studios in conference using time-division multiplex of pairs of TV signals to share a common trunk between two studios.



Note – Solid line cameras are for cross-fire. Dashed line cameras are for parallel-fire.

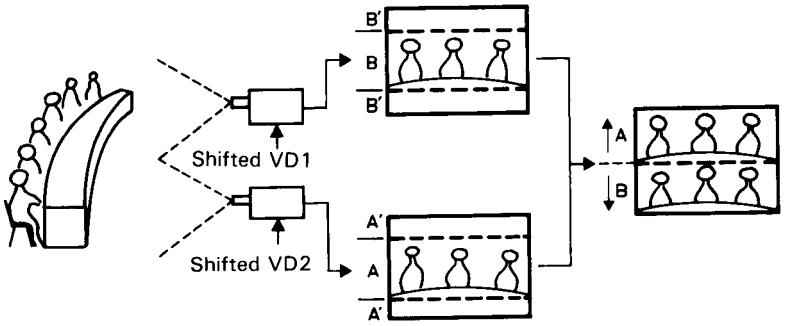
FIGURE A-1/H.100
Studio plan view

ANNEX B

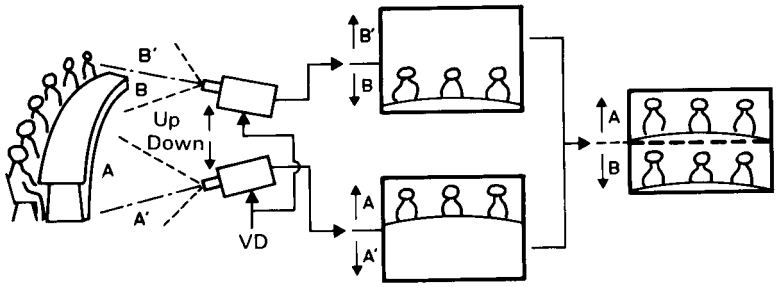
(to Recommendation H.100)

Picture processing methods in transmitting terminals

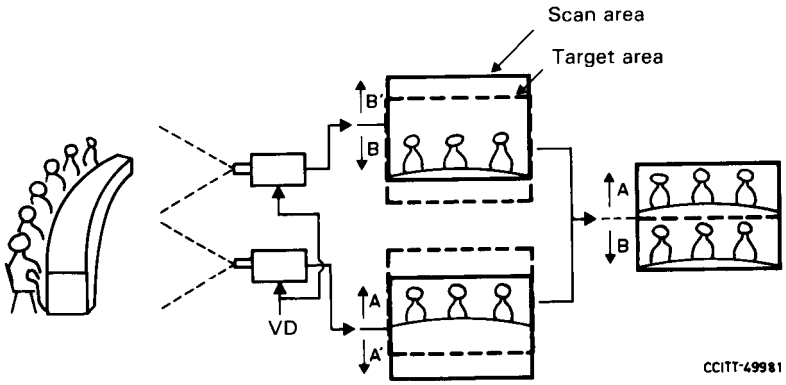
Alternative methods of obtaining the split-screen signal which are compatible with the recommended method and which might be useful for experiments and demonstrations are shown in *b)* and *c)* of Figure B-1/H.100. In method *b)*, the two cameras are directed upward and downward to pick up right and left halves of the conferencing room, respectively. Since circumferences of target and scanning areas are used, geometric and brightness distortions tend to occur. In method *c)*, vertical deflection currents are biased by the quantity corresponding to ± 1/4 of target height. Vertical deflection bias adjustement is needed every time cameras are exchanged. In method *a)*, the vertical driving pulses are phase-shifted by ± 1/4 V. The recommended method, *a)*, avoids the problems of methods *b)* and *c)*.



a) Vertical driving pulses are phase shifted



b) Cameras are directed upward and downward



c) Vertical deflection currents are biased

VD = vertical deflection

FIGURE B-1/H.100

Picture processing method at transmitting terminals