



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.421

**SPECIFICATIONS OF SIGNALLING SYSTEM R2
LINE SIGNALLING, DIGITAL VERSION**

DIGITAL LINE SIGNALLING CODE

ITU-T Recommendation Q.421

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.421 was published in Fascicle VI.4 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 Q.421

3.1 DIGITAL LINE SIGNALLING CODE

3.1.1 *General*

Primary PCM multiplexes (see Recommendations G.732 and G.734) economically provide more than one signalling channel per speech circuit in each direction of transmission. By making use of the increased signalling capacity, simplification of the outgoing and incoming switching equipment can be achieved since the timing conditions necessary for the System R2 line signalling, analogue version, are not required. For this reason the digital version of System R2 line signalling is recommended for use on PCM systems in national and international public switched networks and is specified below.

Note - The continuous line signalling scheme specified for FDM systems may also be used on PCM systems by utilizing one signalling channel only in each direction. In this case relay sets designed for the continuous line signalling system on FDM channels can be used provided that the functions specified for the interruption control on FDM circuits (see Recommendation Q.416) are performed by use of the local alarm facility provided by PCM equipment. This method of line signalling on PCM systems is not recommended for use on international circuits.

The digital version of System R2 line signalling uses two signalling channels in each direction of transmission per speech circuit. These signalling channels are referred to as a_f and b_f for the forward direction (i.e. the direction of call set-up) and a_b and b_b for the backward direction.

Under normal conditions:

- The a_f channel identifies the operating condition of the outgoing switching equipment and reflects the condition of the calling subscriber's line.
- The b_f channel provides a means for indicating a failure in the forward direction to the incoming switching equipment.
- The a_b channel reflects the condition of the called subscriber's line (on hook or off hook).
- The b_b channel indicates the idle or seized state of the incoming switching equipment.

The line signals are transmitted link-by-link.

The digital version of System R2 line signalling also specifies a means for appropriate action in the case of faulty transmission conditions on the PCM multiplex, see Recommendation Q.424.

The signalling system is specified for one-way operation, but both-way operation is also possible (see § 3.2.7 below).

3.1.2 *Signalling code*

Table 2/Q.421, shows the signalling code on the PCM line under normal conditions.

TABLE 2/Q.421

State of the circuit	Signalling code			
	Forward		Backward	
	a_f	b_f	a_b	b_b
Idle/Released	1	0	1	0
Seized	0	0	1	0
Seizure acknowledged	0	0	1	1
Answered	0	0	0	1
Clear-back	0	0	1	1
Clear-forward	1	0	0	1
			or	
			1	1
Blocked	1	0	1	1