

Telecommunications equipment - Private Branch Exchanges (PBXs) - Signaling requirements in digital interface for incoming exchange line

Telekommunikation – Abonentväxlar - Signaleringskrav i digitalt gränssnitt för ankommande huvudledning

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0 Introduction

This edition results from a general review of Swedish Standards for attachment to a PSTN in order to align their mandatory content with the requirements of the teleterminal directive (91/263/EEC) and from the withdrawal of SS 63 63 27 as a standard for regulative requirements. A number of provisions have been deleted, some provisions have been transferred to informative parts of the standard and some other modifications have been made.

By this edition the Swedish language version of SS 63 63 32 is withdrawn.

1 Scope

This standard covers the requirements for signaling for incoming calls according to the national signaling system P7 in a digital interface towards a public switched telephone network on a one-way or both-way exchange line.

2 Normative references

The following standards contain requirements, which through reference, constitute requirements of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

- | | |
|-------------|--|
| SS 63 63 25 | Telecommunications equipment – Private Branch Exchanges (PBXs) – Signaling requirements in analogue interface for incoming exchange line |
| SS 63 63 29 | Telecommunications equipment – Private Branch Exchanges (PBXs) – Transmission requirements for digital interfaces |
| SS 63 63 31 | Telecommunications equipment – Private Branch Exchanges (PBXs) – Signaling requirements in digital interface for outgoing exchange line |

3 Signaling diagram

The signaling diagram will be found in annex A. This signaling diagram provides a description of the performance and characteristics of a public switched telephone network with respect to signaling according to signaling system P7 for different connection cases and call processes in incoming traffic to the PBX.

Signaling system P7 is a national signaling system for channel-associated signaling with a digital PBX connected to a digital local exchange. In the case of PBXs with a digital interface, signaling system P7 may also be used for connection to an electromechanical local exchange via signal converter equipment, see SS 63 63 25.

The attached signaling diagram covers variations in the performance and characteristics of the public switched telephone network between different types, or variants, of public exchange systems and between different connection forms.

The signaling diagram is intended to serve as information on the performance and characteristics of the telephone network. In this context, the parameter values specified in the signaling diagram with respect to the performance of the PBX are to be regarded as typical values, etc. Thus the parameter values, etc., specified in the signaling diagram do not constitute any mandatory requirements imposed on the PBX in excess of what is explicitly specified as requirements in clause 4 below. The object of those requirements is to secure basic functions of vital importance under normal circumstances and in normal connection cases.

This means that compliance with the requirements set forth in this standard does not provide any guarantee of correct performance of the equipment when connected to the telephone network.

4 Requirements

4.1 General

4.1.1 Traffic direction

NOTE: The line may have a one-way traffic configuration, i.e. only for calls from the telephone network to the PBX, or a both-way traffic configuration. In the latter case, the PBX shall, when idle, enter the state defined in this standard.

4.1.2 Interface

This standard refers to signalling in a digital interface with a frame and multiframe structure and associated functions in accordance with standard SS 63 63 29. Two signaling channels are used, a and b; in the multiframe, they are used in both directions.

NOTE: Signaling channel as used here refers to one of the four signaling bits contained in time slot 16 in each transmission direction for each circuit concerned.

The signaling process also includes certain tone messages in the voice frequency channel.

4.1.3 *Idle state*

When in the idle state, the PBX shall send signaling states having the value of 1 in signaling channel *a_b* and the value of 0 in signaling channel *b_a*.

4.1.4 *Recognition time*

NOTE: Recognition refers to the detection of signaling states in the signaling channels in the receive direction (*a_r* and *b_r*, respectively) in the digital interface towards the PBX.

It is recommended that switchover to signaling state with the duration of < 10 ms should not be recognized and switchover to a signaling state with the duration of > 15 ms should be recognized.

4.2 Set-up and disconnection of calls

4.2.1 *Call request*

A call request transmitted from the telephone network shall in the PBX result in an alert signal (ringing signal) to the operator's console, another telephone set or a telephone answering device. At the same time, the PBX shall send ringing tone in the voice frequency channel.

NOTE: A call request from the public network is transmitted to the PBX by means of setting signaling bit *a_r* to 0 and *b_r* to 1.

4.2.2 *Answer*

An answer signal is transmitted by assigning the value of 0 to the signaling state in signaling channel *a_b*.

4.2.3 *Periodic clearing signal*

When in the conversation state (after receiving an answer) with ringing signals being sent to an extension or with the exchange line put on hold, the PBX shall send periodic clearing signals on the exchange line. When a periodic clearing signal is sent, the signaling state in signaling channel *a_b* shall be assigned the value of 1 for $1 \pm 0,15$ s, with an interval (pause) of 8–10 s.

If, after reception of an answer, call transfer, etc., the switchover to an extension of a call in such a condition occurs at the same time as a periodic clearing signal is sent, this clearing signal shall not be interrupted if by that its duration should become < 500 ms.

If the public network sends the signal 1 in the bit *a_r* during the time *a_b* is set to 1, the waiting A-subscriber has cleared the connection. In this case the exchange line shall be put in idle condition.

4.2.4 *Register recall*

NOTE: With signaling system P7, the transmission of register recall signals is possible in the conversation state. The register recall signal should, if implemented, consist of a signalling state in signalling channel *a_b*, having a value of 1 lasting for 90 ± 40 ms. There are, however, no approval requirements for this supplementary service.

4.2.5 *Clear-back signal*

The clear-back signal is transmitted by assigning the value of 1 to the signaling state in signaling channel *a_b*.

4.2.6 Repeated call request by operator

After transmission of a clearing signal, it shall be possible to detect, provided that disconnection in accordance with clause 4.2.7 has not yet occurred, a repeated call request (by an operator in the telephone network) in the form of a signaling state in signaling channel b_f , having the value of 1 and resulting in an alert signal (ringing signal) to the operator's console, another telephone set or a telephone answering device.

4.2.7 Disconnection after clear-back signal

When a signaling state having the value of 1 is detected in signaling channel a_f from the public network following a clear-back signal, the call shall be disconnected by the PBX. Both-way lines shall be blocked for outgoing calls for > 1 s after the reception of signaling state having the value of 1 in the signaling channel a_f . (If the A-subscriber does not clear the line, the transmission of $a=1$ from the telephone network can be delayed up to 3 minutes after the clear-back signal.)

4.2.8 Forced release in the public network

When a signaling state having the value of 1 in the signaling channel a_f from the public network has been detected during conversation state, the call shall be disconnected and the PBX shall go to idle state. Both-way lines shall be blocked for outgoing calls > 1 s after the reception of the signaling state having the value of 1 in the signaling channel a_f .

4.2.9 Signaling requirements for external call transfer

External call transfer may be performed in a PBX or in a PBX network if the incoming (analogue or digital) exchange line is connected to a digital public exchange, and if clearing signals from the incoming to the outgoing exchange line, or vice versa, are forwarded within 3 s.

4.3 Blocking and unblocking

4.3.1 The PBX may block the line for new calls from the telephone network by assigning the value of 1 to the signaling state in signaling channel b_b .

4.3.2 A line blocked by the PBX is unblocked by assigning the value of 0 to the signaling state in signaling channel b_b .

Annex A
(informative)

Exchange line P7 signaling, Local exchange -> PBX/B-subscriber

This annex is a specification of the national signaling system P7 for signaling in a digital interface towards an exchange line between a public exchange and a PBX.

Signaling system P7 is used with digital PBXS connected to a digital public exchange.

With signal converters the signaling system may also be used for connection of a digital exchange line to an analogue exchange as well as to an analogue PBX.

Nr	Signal or state	G1 at ET		G2 at DXL	
		a f b f	a b b b	a b b b	a b b b
		t			t
1	Idle	↓			↓
2	Seizure ¹⁾	00			50
3	Answer	01			51
4	Through connection	02			52
5	Conv. state				
6	Periodic clearing signal	03			53
		04			54
7	Clear-back	05			55
8	Clear-forward or forced release	06			56
9	Clear-back after Nos. 2 and 12				57
10	Clear forward after No. 5	08			
11	Clear-back	09			59
		10			60
12	Repeat call request to operator after No. 7	11			61
13	Re-answer ²⁾ after No. 7	12			62
14	Forced release after No. 10	13			63
		14			64

Nr	Signal or state	G1 at ET		G2 at DXL	
		a f b f	a b b b	a b b b	a b b b
		t			t
15	New A off-hook after No. 10	↓			↓
16	Block. from PBX	15			65
17	Unblock. from PBX	16			66
18	Reg. recall signal after No. 5	17			67
		18			68

- 1) Ringing tone is sent from PBX/ signal converter
- 2) Does not apply to calls to an extension

Time limits

Time of recognition of approved bit modification at reception in the interface:

$$G1 = 10 - 15 \text{ ms}$$

$$G2 = 10 - 15 \text{ ms}$$

$$t00 \rightarrow t01 < 180 \pm 0 \text{ s}$$

$$t01 \rightarrow t02 < 25 \text{ ms}$$

$$\left. \begin{array}{l} t06 \\ t10 \\ t14 \end{array} \right\} \rightarrow t00 > 1 \text{ s}$$

$$t08 \rightarrow t13 = 2 - 3 \text{ s}$$

t13 → t64 Line lockout pending clear-back signal

$$t51 \rightarrow t02 < 25 \text{ ms}$$

$$1) \quad t53 \rightarrow t54 = 1 \pm 0,1 \text{ s every } 8 - 10 \text{ s}$$

$$t55 \rightarrow t06 \text{ nom } 90 \text{ s}$$

$$t55 \rightarrow t62 = < 90 \text{ s}$$

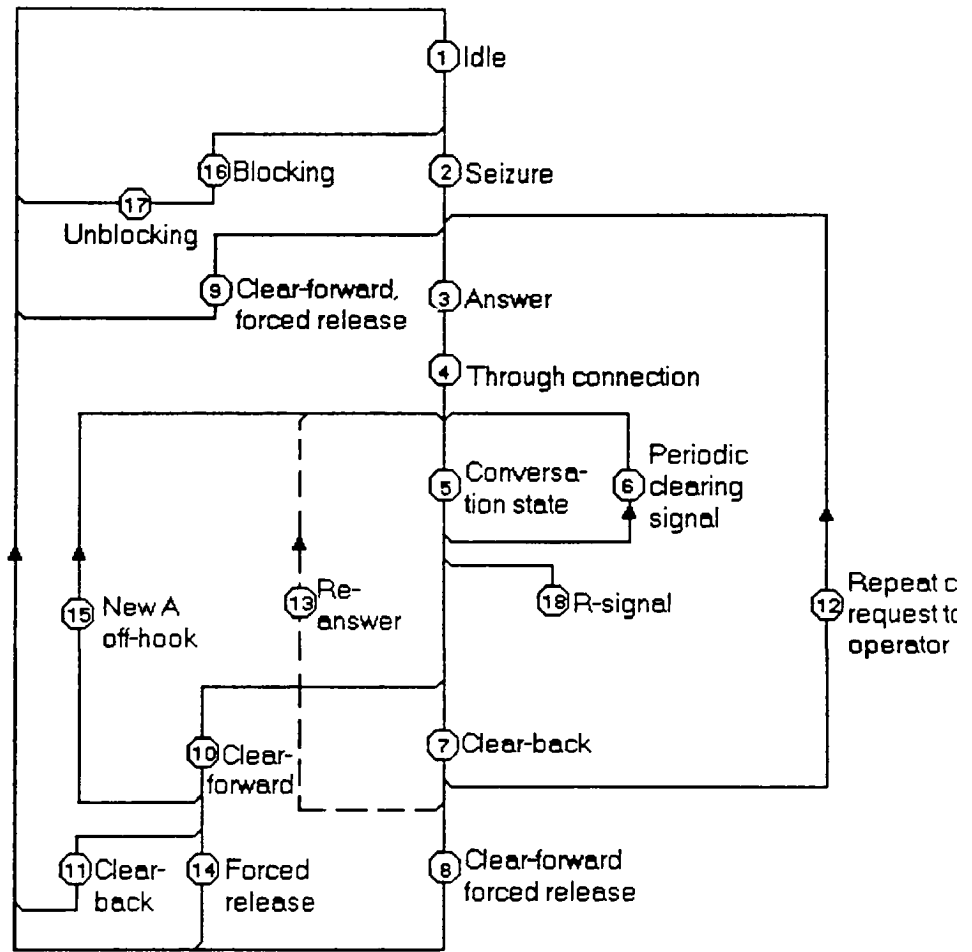
$$\left. \begin{array}{l} t56 \\ t57 \\ t60 \end{array} \right\} \rightarrow t50 \geq 200 \text{ ms}$$

$$t67 \rightarrow t68 = 90 \pm 40 \text{ ms}$$

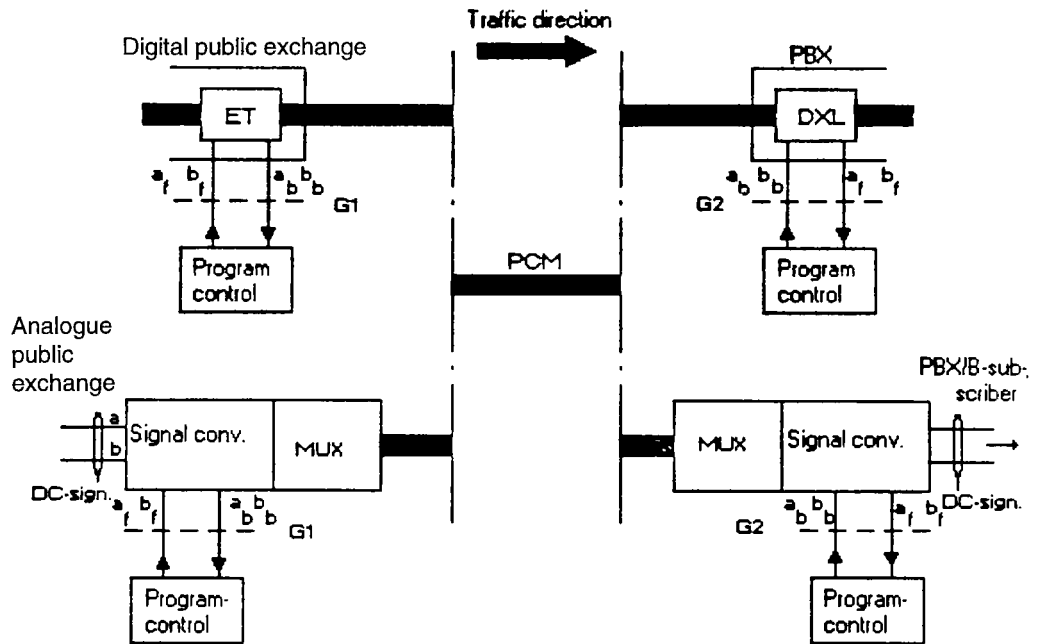
- 1) If the sending of a periodic clearing signal has started, the duration of this signal shall not be less than 500 ms in order not to be misinterpreted as an register recall signal.

Note: Time limits and parameter values indicated for PABX equipment are typical values.

Sequence chart



Interface



Legend

- a_f, b_f Signaling bits in the forward direction (T16)
- a_b, b_b Signaling bits in the backward direction (T16)
- █ Bit value "1"
- Bitvalue "1" or "0"
- G1, G2 Interface designations
- ET Exchange Terminal
- DXL Digital Exchange Line
- T16 Time slot 16