

Private branch exchanges for connection to public switched telephone networks run by certain public telecommunication operators —

Part 5: Facilities on private branch exchanges —

Section 5.1 Specification for facilities on private branch exchanges with terminating stations treated as an entirety

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Telecommunications Standards Policy Committee (TCT/-) to Technical Committee TCT/8, upon which the following bodies were represented:

- Association of British Telephone Attachment Suppliers Ltd.
- Association of Manufacturers Allied to the Electrical and Electronic Industry (BEAMA Ltd.)
- British Approvals Board for Telecommunications
- British Radio and Electronic Equipment Manufacturers' Association
- British Security Industry Association
- British Telecommunications
- Business Equipment Trade Association
- Cable and Wireless Limited
- City of Kingston upon Hull Telephone Department
- Committee of London Clearing Bankers on behalf of the Committee of Scottish Clearing Bankers, Co-operative Bank, Trustee Savings Banks and Yorkshire Bank
- Communications Marketing and Servicing Association
- Computing Services Association
- Department of Trade and Industry
- Electronic Engineering Association
- Engineering Equipment and Materials Users' Association
- Independent Broadcasting Authority
- Independent Telecommunications Suppliers' Association
- Mobile Radio Users' Association
- OFTEL (Office of Telecommunications)
- Post Office Engineering Union
- Society of Telecom Executives
- Telecommunications Managers' Association
- Telecommunications Users' Association (TUA)
- UK Offshore Operators' Association Ltd.

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Gas Corporation
- Central Computer and Telecommunications Agency
- Electricity Supply Industry in England and Wales
- Royal National Institute of the Blind

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Foreword

BS 6450 has been prepared under the direction of the Telecommunications Standards Policy Committee. It forms one of a series of British Standards that is being produced following the commencement of liberalization in October 1981 of the supply of certain telecommunications apparatus within the United Kingdom.

Attention is drawn to the foreword of BS 6450-1:1993.

This section of BS 6450 has been presented for designation under Section 22(6) of the Telecommunications Act, 1984.

This edition of BS 6450-5.1 replaces BS 6450-5.1:1984 which is superseded and withdrawn.

This edition introduces technical changes but it does not reflect a full review or revision of the standard, which will be undertaken in due course. The following are the more important changes.

- a) Requirements for call barring have been added.
- b) Requirements for multi PSTN line calls have been added.
- c) Annex C has been added.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to the Telecommunications Act, 1984.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 26, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Subsection 1. General requirements

1 Scope

BS 6450 specifies requirements for private branch exchanges that are necessary for their connection to public networks run by certain public telecommunications operators.

The Section of BS 6450 specifies requirements for facilities incorporated in private branch exchanges within the scope of BS 6450-2:1993.

NOTE 1 Recommended user control protocols for PBX facilities are given in the CEPT Services and Facilities Handbook, Section 3.

NOTE 2 Where reference is made in this Section of BS 6450 to a particular clause in another publication, the requirements are applicable irrespective of the scope of that publication. Any clauses of another publication not specifically invoked do not apply.

NOTE 3 The titles of the publications referred to in this Section of BS 6450 are listed on the inside back cover.

NOTE 4 Unless otherwise stated, all clause references refer to this Section of BS 6450.

NOTE 5 Compliance with this Section of BS 6450 will not necessarily ensure that the apparatus is satisfactory for the user's purposes.

2 Method of application

As PBXs may contain a large variety of facilities many of which are only distinguished by the use of a marketing title, this Section of BS 6450 does not attempt to specify requirements for individually named facilities, but rather to specify requirements for the particular elements and phases of incoming and outgoing PSTN calls that the supplier has declared to be affected by the invocation, operation or cancellation for each of the facilities provided with the PBX. The relationship between these elements and phases at the corresponding states of the PBX and the PSTN is shown in Figure 1.

This Section of BS 6450 considers those actions and states that constitute the fully automatic process of receiving or making a PSTN call, and the elements and phases shown in Figure 1 form sequences that specify these complete processes. Facilities having an effect on one or more of these elements and phases of a PSTN call [such facilities being defined as PSTN-interacting facilities (see 3.1.1)] will fall within the scope of this Section of BS 6450, and the requirements for a given facility therefore comprise the requirements for those elements or phases during which the facility affects the PSTN call process.

A further category of facilities within the scope of this Section of BS 6450 are those that can be invoked, operated or cancelled by terminating stations or other apparatus only when not involved in a PSTN call. In such circumstances the requirements refer to the non-interference with any PSTN call process. Such a facility is defined as a non PSTN-interacting facility (see 3.1.2).

In completing the declaration specified in clause 5, the supplier determines the particular requirements for his stated facilities, and thereby determines the conditions of use for which approval is sought.

3 Definitions and notation

3.1 Definitions

For the purpose of this Section of BS 6450, the definitions given in BS 6450-1:1993 and BS 6789-2:1984 and the standards referred to by BS 6450-1:1993 apply, together with the following.

3.1.1

PSTN-interacting facility

a facility that can be invoked, operated or cancelled during any element or phase of an incoming or outgoing PSTN call by a terminating station or other apparatus involved in the call

3.1.2

non PSTN-interacting facility

a facility that can be invoked, operated and cancelled by a terminating station or other apparatus only when not involved in an incoming or outgoing PSTN call

3.1.3

multi-party call

a call providing a common transmission path between more than two parties

NOTE 1 A call involving n parties is known as an " n -party call".

NOTE 2 This facility permits a series of calls to be placed to other parties while holding each call in a suspended state. In the example of a 3-party call, when the third party answers, any of the following service options can be made at the terminating station:

- a) transmit to a third party and then revert to the original call, releasing the third party;
- b) transmit to a third party and transfer the call to the other two parties;
- c) switch from one call to the other as required, secrecy being provided between the two calls;
- d) introduce a common (3-way) transmission path.

3.1.4

intrusion (on a PSTN call)

uninvited addition of another party to a PSTN call

NOTE 1 Intrusion is considered not to have occurred if a terminating station is added to an established call due to an action of a terminating station user included in the call.

NOTE 2 Establishment of multi-party calls using "add-on" procedures where the initiating party makes an enquiry call to each additional party before coopting them into the multi-party call, is considered not to be intrusion.

3.1.5

call-barring function

restriction of access to a PSTN by automatic termination of a PSTN call attempt during the dialling phase

3.1.6 supplier's declaration

declaration based on evidence held by the supplier, that an apparatus complies with those stated requirements that need the declaration

NOTE Such evidence should consist of actual test information or other substantiating material relating to the design of the apparatus.

3.1.7 PSTN exchange line to PSTN exchange line call diversion

facility that enables an incoming call on a PSTN exchange line to be forwarded to an alternative number, designated by the PBX user, via an outgoing call on a PSTN exchange line

3.1.8 naïve caller

caller with no special knowledge of the characteristics of the private branch exchange or with no special equipment to assist the transfer of information across the established connection

NOTE Generally a caller is unlikely to be naïve if the telephone number is not made public or if the telephone number is published with a suitable warning, or if other special call set-up procedures are required.

3.1.9 type test

test or series of tests directed towards approval of a design, conducted to determine whether an item is capable of meeting the requirements of the product specification

3.2 Notation

3.2.1 dBm

absolute power level with respect to 1 mW, expressed in decibels

3.2.2 dBPa

absolute sound pressure level with respect to 1 Pa, expressed in decibels

3.2.3 dBV

absolute voltage level with respect to 1 V, expressed in decibels

NOTE to 3.2 Further information on all expressions for power levels used in this standard is given in CCITT Recommendation B.12 (1981).

4 Compliance principles

4.1 Requirements

4.1.1 Unless otherwise stated in this Section of BS 6450, the requirements of this Section of BS 6450 shall apply to a PBX in all operating states (but not overload conditions) under all combinations of terminating stations, switching paths and connections to PSTN lines and with all the possible combinations of PBX facilities in use, under the full range of installation-dependent parameters as defined by the supplier (see clause 24 of BS 6450-1:1993, clause 7 of BS 6450-2:1993, and clause 5).

4.1.2 For the requirements of BS 6450-1:1993 specified in this Section of BS 6450, the requirements of 3.1.2 of BS 6450-1:1993 shall apply. For the requirements of BS 6450-2:1993 specified in this Section of BS 6450, the requirements of 3.1.2 and 3.1.3 of BS 6450-2:1993 shall apply.

4.2 Tests

4.2.1 Unless otherwise stated in this Section of BS 6450, the tests of this Section of BS 6450 shall be applied to a PBX in all operating states (but not overload conditions) under all combinations of terminating stations, switching paths and connections to PSTN lines and with all the possible combinations of PBX facilities in use, under the full range of installation-dependent parameters as defined by the supplier (see clause 24 of BS 6450-1:1993, clause 7 of BS 6450-2:1993, and clause 5).

NOTE Tests may be performed in any order.

4.2.2 The tests described in this Section of BS 6450 shall be type tests (see 3.1.9).

4.2.3 Tests shall be performed following the information provided by the supplier for the selection of the appropriate adjustments and/or options at the PSTN line interface. Where the requirements of 6.1 of BS 6450-2:1993 are applicable, compliance shall be checked for each type of PSTN line interface circuit offered, including all PSTN line-dependent and/or software options.

4.2.4 Unless otherwise stated in a particular test, the tests shall be performed under the normal operating conditions specified in A.1.1 of BS 6305:1992.

4.2.5 Unless otherwise stated in a particular test, the tests shall be performed under d.c. conditions over the range in which the d.c. characteristics of the apparatus lie within the acceptable area shown in Figure 4 of BS 6305:1992 and described in Table 2 of BS 6305:1992.

Call progression	Call element or phase	PBX state/signal	Direction of signals (see note 1)	PSTN state/signal	BS 6450 reference
1	—	Idle		Idle	Part 1:1993 clause 10
2	Incoming line seizure		←	PBX seize signal	Part 1:1993 B.3, B.4 7.1
3	Answering	PBX seized signal	→		7.2, 7.3
4	Conversational phase	Conversation (on-line)	→	Conversation	Clauses 9 and 10
5	Call clearing (see note 2)	Clear	→		Clause 11
6	—	Idle	←	Clear	
				Idle	Part 1:1993 clause 10
					Part 1:1993 B.3, B.4
a) Incoming PSTN call attempts					
Call progression	Call element or phase	PBX state/signal	Direction of signals (see note 1)	PSTN state/signal	BS 6450 reference
1	—	Idle		Idle	Part 1:1993 clause 10
2	Outgoing line seizure	PSTN seize signal	→		Part 1:1993 B.3, B.4 8.1
			←	PSTN seized signal	
3	Dialling and restoration	On-line (loop-disconnect or MF signals)	→		8.2
4	Determination of call status	On-line	→		8.3
			←	Tones	
5	Conversational phase	Conversation (on-line)	→	Conversation	Clauses 9 and 10
			←		
6	Call clearing (see note 2)	Clear	→		Clause 11
			←	Clear	
7	—	Idle		Idle	Part 1:1993 clause 10
					Part 1:1993 B.3, B.4
b) Outgoing PSTN call attempts					
NOTE 1 The arrow indicates the direction of signal i.e. → signifies the direction PBX to PSTN, and ← signifies the direction PSTN to PBX.					
NOTE 2 Clearing can occur at any point in the call.					

Figure 1 — PSTN call attempt elements and phases

4.2.6 When tests require the use of artificial lines, the PBX shall be adjusted (if necessary) for the appropriate PSTN line length.

4.2.7 Unless otherwise specified in a particular test, tests on apparatus fitted with user-controlled receiving volume control shall be made at the maximum (i.e. the loudest) setting of the volume control.

4.2.8 For the purposes of this Section of BS 6450, references to “apparatus” in BS 6305:1992 and BS 6317:1992 shall be assumed, when relevant, to refer to the PBX under the test conditions specified in 4.2.1.

4.2.9 The facility under test shall be invoked, operated and cancelled in accordance with the supplier’s instructions (see 5.1.1.2).

4.2.10 Where figures show an earth, this earth shall be connected to the PBX earth reference point.

NOTE 1 Where figures do not show an earth, and where for signalling purposes the line potential(s) need to be referenced to earth, the PBX may need to be artificially set in the appropriate signalling state for the test.

NOTE 2 If the design of the PBX is such that a particular characteristic is not affected by the invocation, operation or cancellation of a facility, the compliance test for that characteristic need not be repeated if it has been previously tested in accordance with another Part or Section of BS 6450.

5 Information to be provided by the supplier

5.1 Information required for testing purposes

5.1.1 General

5.1.1.1 The supplier shall list the facilities provided by the PBX, both PSTN-interacting and non PSTN-interacting, in a format equivalent to that shown in Table 1. For each PSTN-interacting facility, the supplier shall indicate on the form the applicable elements and phases specified in clauses 7 to 11 involved in the automatic application of the facility.

NOTE An example of a completed form is shown in Table 2.

5.1.1.2 The supplier shall give a detailed operational guide to the invocation, operation and cancellation of each PSTN-interacting facility and each non PSTN-interacting facility.

The supplier shall state whether there are any limitations on the use of a facility.

The supplier shall state whether there are any restrictions to the combinations of facilities that can be invoked, operated or cancelled at one time.

5.1.2 Answering incoming PSTN calls

5.1.2.1 For a facility involving the automatic answering of an incoming PSTN call, the supplier shall state whether a terminating station using that facility is capable of automatically receiving and acting upon non-speech information only (see 7.3).

5.1.2.2 For a facility involving the automatic answering of an incoming PSTN speech call, the supplier shall state:

- a) whether the automatic facility can operate additionally to the manual answering of the PSTN call by the terminating station user; and
- b) whether the terminating station user has the ability to cancel the automatic answering facility.

NOTE See 7.3.1.

5.1.3 Outgoing PSTN call attempt elements and phases

5.1.3.1 Selection and seizure

5.1.3.1.1 Repeat attempts

Where the PBX or the terminating station is capable of making an automatic repeat attempt sequence (see 8.1.4.1), the supplier shall state which call pattern (patterns) from Table 3 (are) applicable.

NOTE 1 The PBX or terminating station may be capable of being configured to operate in more than one of the call patterns given in Table 3.

NOTE 2 The actual durations between call attempts of a repeat attempt sequence or sequences configured into the type of PBX submitted for approval need not be stated.

5.1.3.1.2 Termination of selection and seizure

The supplier shall state, for the appropriate facility, whether control of dialling can be returned to the user at the completion of the selection and seizure phase (see 8.1.5).

5.1.3.2 Dialling and restoration

The supplier shall state, for the appropriate facility, whether control of an outgoing automatic PSTN call can be returned to the user after completion of the dialling phase (see 8.2.3).

If, for the appropriate facility, control of the call is returned to the user after completion of the dialling phase, the supplier shall state which of 8.2.3.1 a), b), c) or d) is being complied with, and if 8.2.3.1 d), what kind of indication is provided at the terminating station.

5.1.3.3 Determination of call status

5.1.3.3.1 The supplier shall state:

- a) whether the PBX is capable of recognizing PSTN tones; and
- b) whether the PBX is capable of discriminating between PSTN tones.

NOTE See 8.1.4.1, 8.3.2, 8.3.3 and 8.3.4.

5.1.3.3.2 For a PBX capable of recognizing and discriminating between PSTN tones, the supplier shall state whether the PBX, on receipt of special information tone, complies with:

- a) 8.3.2.2 a); or
- b) 8.3.2.2 b); or
- c) 8.3.2.2 a) and b) and, if so, how the PBX may be configured for each option.

5.1.3.3.3 The supplier shall state the specification of the answer signal for those facilities requiring the receipt of such a signal before commencement of the conversational phase
[see 8.3.2.1.2 b) 1), 8.3.3.1.2 b) 1), 8.3.4 a) 2) and 8.3.4 b) 2)].

5.1.3.3.4 The supplier shall state, for the appropriate facility, whether control of an outgoing automatic PSTN call can be returned to the user after completion of the determination of call status phase.

5.1.4 Conversational phase: PSTN calls under user control

5.1.4.1 The supplier shall state whether a facility declared to affect the call element specified in clause 9 is used to provide music/speech/tones under hold conditions (see 9.3.2).

5.1.4.2 The supplier shall state whether the facilities referred to in 9.4 and 9.5 are under the control of a PSTN user who may be considered to be a naive caller [see 9.4.1.1 b)].

5.1.4.3 If applicable the supplier shall state and define which of the electrical or acoustic terminations specified in 9.4.2 is to be used.

5.1.4.4 Where a PBX is capable of intrusion (see 9.6.1) or loss of privacy (see 9.6.2) on PSTN calls, the supplier shall state:

- a) which of the absolute signalling power level requirements in 9.6.1.2.3 a) or b) is applicable; and
- b) if 9.6.1.2.3 a) is applicable, the supplier shall state which type of termination specified in Table 6 is to be used.

5.1.4.5 When the PBX provides the facility of loudspeaking, the supplier shall state the information required in 4.1 a), d), e), f) and g) of BS 6789-2:1984.

5.1.5 Conversational phase: PSTN calls under automatic control

For a facility declared to affect the call element specified in clause 10, the supplier shall state whether the facility is used for the transmission and/or reception of:

- a) speech information; or
- b) non-speech information; or

c) speech and non-speech information; or

d) neither speech nor non-speech information.

NOTE 1 See 7.3, 8.3.2.1.2, 8.3.3.1.2 and 8.3.4.

NOTE 2 Music is considered to be non-speech.

5.1.6 Call barring function

The supplier shall provide a supplier's declaration that apparatus containing a call barring function complies with 8.4.3.

5.1.7 Access to an indirectly connected PSTN

The supplier shall provide details of the method for setting the address digits that may be used to bar or permit access to an indirectly connected PSTN.

5.2 Instructions for use

5.2.1 General

The instructions for use shall be supplied with the apparatus, and shall be written in English.

NOTE The information may also be provided in other languages.

5.2.2 Loudspeaking

Where a socket is provided for associated handset telephony, the instructions for use shall state that a terminating station connected to that socket has to be of a type approved for use with the PBX.

NOTE See 7.1.1 c) of BS 6450-2:1993.

5.2.3 Facility for intrusion authorized by the user

If a facility for the intrusion authorized by the user is provided, the fact shall be included in the instructions for use.

NOTE Such authorization may be subject to approval by OFTEL.

5.2.4 Multiple exchange line connections to one or more terminating stations

5.2.4.1 The instructions for use shall state that multiple exchange line calls should not be established via a PSTN with other multiple exchange line calls.

5.2.4.2 The instructions for use shall include the statement that the transmission performance for some parties in a multiple exchange line conference may suffer loss of quality.

5.2.4.3 If the facility is not intended to be used by naive callers, the instructions for use shall provide details of its use so that callers are unlikely to be naive.

Table 1 — Format of statement to be provided by supplier

Facility	Element or phase for PSTN-interacting facility (see 6.1)								Non PSTN-interacting facility (see 6.2)
	Elements peculiar to incoming PSTN calls		Elements peculiar to outgoing PSTN calls				Conversational phase		
	Answering (see clause 7)	Call clearing (see clause 11)	Selection and seizure (see 8.1)	Dialling and restoration (see 8.2)	Determination of call status (see 8.3)	Call clearing (see clause 11)	Calls under user control (see clause 9)	Calls under automatic control (see clause 10)	
(as listed by the supplier)									
NOTE 1 To complete the table, it is intended that the supplier ticks the appropriate column or columns for each facility (see 5.1.1.1).									
NOTE 2 The supplier may provide additional information to complement the entries given in the table.									
NOTE 3 The call clearing phase is indicated separately for incoming and outgoing calls in order to identify the appropriate tests for compliance with clause 11, which are similarly separated.									

Table 2 — Example of statement completed by supplier, listing facilities provided by a PBX

Facility	Element or phase for PSTN-interacting facility (see 6.1)								Non PSTN-interacting facility (see 6.2)
	Elements peculiar to incoming PSTN calls		Elements peculiar to outgoing PSTN calls				Conversational phase		
	Answering (see clause 7)	Call clearing (see clause 11)	Selection and seizure (see 8.1)	Dialling and restoration (see 8.2)	Determination of call status (see 8.3)	Call clearing (see clause 11)	Calls under user control (see clause 9)	Calls under automatic control (see clause 10)	
Auto-calling modem	—	—	✓	✓	✓	✓	—	✓	—
Calender	—	—	—	—	—	—	—	—	✓
3-party call	—	—	—	—	—	—	✓	✓	—
Out-of-hours answering machine	✓	✓	—	—	—	—	—	—	—
Auto-dialler	—	—	✓	✓	—	—	—	—	—