

Connectors for analogue telecommunication interfaces

Part 1. Specification for plugs

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee TCT/2, Analogue telecommunication networks, upon which the following bodies were represented:

- British Approvals Board for Telecommunications
- British Broadcasting Corporation
- British Facsimile Industry Consultative Committee
- British Micro Computer Manufacturers' Group (BMMG)
- British Telecommunications plc
- Cable Communications Association
- Department of Trade and Industry
(Telecommunications and Posts Division)
- Electrical Installation Equipment Manufacturers' Association
(BEAMA Ltd.)
- Electricity Association
- Federation of the Electronics Industry
- Institution of Electrical Engineers
- Kingston Communications (Hull) plc
- Mercury Communications Ltd.
- National Communications Union
- National Transcommunications Ltd.
- OFTEL (Office of Telecommunications)
- Society of Cable Television Engineers
- Society of Telecom Executives
- Telecommunications Industry Association
- Telecommunications Users' Association (TUA)

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Foreword

This Part of BS 6312 has been prepared by Technical Committee TCT/2. It forms one of a series of British Standards that are being produced following the commencement of liberalization in October 1981 of the supply of certain telecommunications apparatus within the United Kingdom.

The series of standards includes product and facility specifications giving particular requirements for individual items of apparatus and facilities, together with standards covering general requirements for the connection of apparatus to the various public telecommunication systems (i.e. any telecommunication system designated as a public telecommunication system by an order made under Section 9 of the Telecommunications Act 1984).

The requirements specified in the standards are intended to ensure that apparatus conforming to them, when connected to public telecommunication systems, will neither adversely affect any such system, nor interfere with the service available to other users of the systems.

The standards include certain safety requirements that are only for the protection of personnel operating a public telecommunication system, and others that are for the protection of users from hazards that may arise from the connection of the apparatus to that system.

BS 6312 : 1985 has been revised and re-numbered as BS 6312 : Part 1 : 1994 and is published with a new Part 2 which comprises two separate Sections.

BS 6312 covers the generic subject of connectors for analogue telecommunication interface purposes.

BS 6312 : Part 1 specifies the requirements for plugs.

BS 6312 : Part 2 specifies the requirements for sockets for use with plugs specified in BS 6312 : Part 1.

There are two Sections of Part 2:

Section 2.1 Specification for sockets — general requirements

Section 2.2 Specification for particular requirements for fixed socket-outlets used in permanent wiring installations

This standard may be presented for designation under Section 22 of the Telecommunications Act 1984.

It is stipulated in the Telecommunications Act 1984 that apparatus within the scope of a designated standard may only be approved for connection to a telecommunication system if it conforms to that standard. Exceptions may be determined by or under the designation, which may stipulate variations of, or additions to, the requirements of the standard. The designation may also set conditions regarding the apparatus, its connection, or its use.

A copy of any designation will be included when available with all copies of this standard. Any further information on, or details of, the designation may be obtained from the Office of Telecommunications (OFTEL), 50 Ludgate Hill, London EC4M 7JJ.

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

Specification

1 Scope

This Part of BS 6312 specifies requirements for dimensions, mechanical and electrical performance and tests for plugs suitable for connecting telecommunication apparatus to telecommunication systems through a socket having the mating characteristics shown in figure 1.

The requirements are specified to ensure mechanical compatibility and reliable electrical contact between the plug and the socket, and to ensure that access by hand to the electrical connections is prevented when the plug and socket have made electrical contact.

This standard applies to external dimensions and to electrical contacts. This standard does not limit the method by which cordage may be attached to a plug. The requirements specified for the plug, with the exception of those in clause 6, do not extend beyond the plane 21 mm from the front face (see figure 2). As the plug is not specified beyond this point, and although any reasonably sized plug will mate with all standard front entry sockets, the entry into sockets of special purpose plugs that are enlarged in the undefined area may be inhibited by the juxtaposition of the apparatus, furniture or surfaces in, on or beside which these special sockets are mounted.

This standard applies to plugs with 2, 3, 4, 5 or 6 contacts and with a latch adjacent to the position for contact number 6 (see figure 2).

Requirements for electromagnetic compatibility are not given as plugs do not in themselves produce extraneous emissions, nor is their functioning affected by external emissions. Therefore no emission or immunity tests are necessary.

NOTE. The plug specified in this Part of BS 6312 is subject to intellectual property rights. See annex A for information on licensing of these rights.

2 References

2.1 Normative references

This Part of BS 6312 incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies: any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This Part of BS 6312 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this British Standard, the definitions given in BS 9520 : 1983 apply, together with the following.

3.1 plug

A device solely for the purpose of connecting apparatus to a socket by means of a lead that is or may be directly attached to it, i.e. not by an ancillary plug and socket.

3.2 termination resistance

The contact resistance of one contact of a plug and socket combination, including the inherent resistance of the socket.

3.3 type tests

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

3.4 ambient temperature

The temperature in the room in which a type test is conducted, measured in the same horizontal plane as the plug under test, and at a distance of approximately 1 m from the plug, and in a position not adversely affected by other heat sources nor by cooling air currents.

4 Testing

4.1 General

The tests described in this Part of BS 6312 shall be performed as type tests, as defined in 3.3. Conformity to the standard shall only be claimed after satisfactory performance of these tests, in order to ensure that the respective requirements are met. Where no test method is specified, conformity shall be checked by inspection and, where appropriate, by measurement.

4.2 Conditions for tests

4.2.1 The sockets used for these tests shall, in respect of all details that affect the test results, conform to figure 1.

The plugs used for these tests shall be identical with normal production items in respect of all details that affect the test results. A particular implementation of the plug is illustrated in figure 2.

4.2.2 Three new plug/socket specimens shall be used for each test sequence except for the test specified in 6.7.2, in which two new plug/socket specimens shall be used.

Once selected, the nominated plug/socket combination shall be retained throughout the test sequence.

4.2.3 Unless otherwise specified, tests shall be made under normal operating conditions, as follows:

- a) ambient temperature: 20 ± 5 °C;
- b) relative humidity: 45 % to 75 %;
- c) air pressure: 86 kPa to 106 kPa.

4.2.4 Test sequences shall be performed in the order set out in each test method.

5 Dimensions

The dimensions of the plug shall conform to the values shown in figure 2, except for the dimension identified by note 1 to figure 2.

6 Performance

6.1 Insertion force (latch inoperative)

6.1.1 Requirement

When tested in accordance with **6.1.2**, the plug, with the latch inoperative, shall fully engage with a socket when subjected to an axial force not exceeding $(2.5n + 5)$ N, where n equals the number of contacts on the plug.

6.1.2 Test

A socket is mounted on suitable apparatus. The plug under test, with the latch inoperative, is partially inserted into the socket aperture, care being taken to ensure that the respective contacts are not engaged.

Apply an axial force to the plug, and measure and record the axial force required to ensure full engagement of the plug and socket.

6.2 Withdrawal force (latch inoperative)

6.2.1 Requirement

When tested in accordance with **6.2.2**, the axial force necessary to withdraw the plug, with the latch inoperative, from a socket shall not exceed $(2.5n + 5)$ N, where n equals the number of contacts on the plug.

6.2.2 Test

A socket is mounted on suitable apparatus. The plug under test, with the latch inoperative, is fully engaged with the socket.

Subject the plug to an axial force applied in a direction away from the socket. Measure and record the axial force required to ensure complete withdrawal of the plug from the socket.

6.3 Plug retention and damage caused by forced withdrawal

6.3.1 Requirement

The latch shall prevent withdrawal of a plug from the socket when the plug is subjected to an axial withdrawal force less than or equal to 30 N.

When tested in accordance with **6.3.2**, the plug and socket combination, when subjected to an axial withdrawal force sufficient to enable the plug, with the latch operative, to be withdrawn from the socket, shall suffer no damage such that the requirements of **6.1.1** and **6.2.1** cannot be met.

6.3.2 Test

Insert the plug, with the latch operative, into the socket.

Subject the plug to an axial withdrawal force of 30 N for 1 min and then check that the plug remains latched.

Increase the withdrawal force until the plug pulls out from the socket. Inspect the plug and socket combination for damage occurring as a result of this action.

Perform the insertion force test as specified in **6.1.2** to ensure that the requirements of **6.1.1** are still met. With the latch operative, subject the plug to an axial withdrawal force of 30 N for 1 min. Check that the plug remains latched. Perform the test specified in **6.2.2** to ensure that the requirements of **6.2.1** are still met.

6.4 Termination resistance

6.4.1 Requirement

When tested in accordance with **6.4.2**, the initial termination resistance of each contact of the plug and socket combination shall be not greater than 25 mΩ.

NOTE 1. The initial value of the resistance is the value before the plug and socket combination is subjected to normal use or to an industrial atmosphere environment (see **6.6.2**), and in particular, for the purpose of establishing conformity, before the tests specified in **6.6.2** and **6.7.2** are undertaken.

NOTE 2. The contacts of BT jacks in the 600 series are currently plated with 98 % minimum acid hard gold with a hardness in the range 120 to 200 on the Vickers hardness scale (see BS 4292 : Part 1 : 1989). If incompatible plating is used on the plug this could cause failure of the mating surfaces.

6.4.2 Test

With the latch inoperative, measure the resistance R_1 of each contact of the mated plug and socket combination, as shown in figure 3a. Subtract the resistance R_2 of the corresponding contact of the plug when unmated, as shown in figure 3b. The current and voltage levels shall be in accordance with **1.2.4.2a** of BS 9520 : 1983.