

ISO/IEC 11801

ISO 11801 is the principle design standard for structured cabling systems for all countries of the world that do not have more specific standards, such as ISO 11801 (European Union), TIA 568-A (United States), AS 3300 (Australia) and CSA T529 (Canada).

ISO (International Organisation for Standardisation) and the IEC (International Electrotechnical Commission) have formed Joint Technical Committee JTC1/SC 25 (interconnection of information technology equipment) to write:

ISO/IEC 11801	Information Technology - Generic cabling for customer premises, July 1995
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Technical changes to ISO/IEC 11801 (1995) have been processed via 2 separate amendments. Both amendments have been approved and jointly published as ISO/IEC 11801: Edition 2 (Jan 2000). The main changes are:

- Classes A, B, C and D channel values are introduced.
- Permanent Link (PL) replaces the existing Link.
- Characteristic impedance of cabling links is characterised by Return Loss
- PS-NEXT, ELFEXT, PS-ELFEXT, Propagation Delay and Delay Skew requirements have been introduced to accommodate the requirements of 1000BASE-T.
- Cable fire rating to be in accordance with IEC 61156 unless otherwise stated by local regulation.

This 'Edition 2' is not to be confused with ISO 11801 2nd Edition, due in early 2001. The second edition will detail Class E (Cat 6) and Class F (Cat 7) channels as well as raising the (Edition 2) new values for Class D channel to coincide with the American TIA 568B values, which are presently slightly higher than Class D.

An important test standard will be:

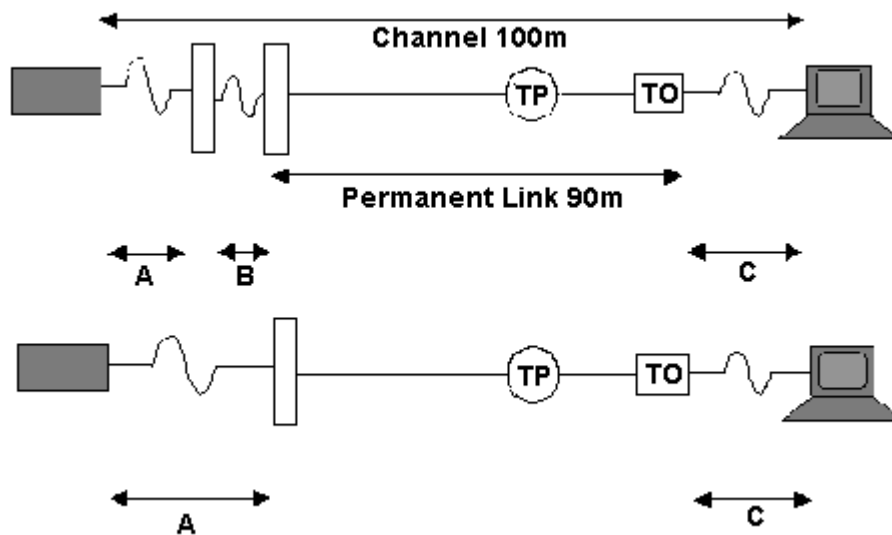
IEC 61935	Generic specification for the testing of balanced generic cabling in accordance with ISO/IEC 11801
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ISO 11801 describes an hierarchical star cabling system with 90 m horizontal cabling and up to 2000 m of backbone cabling, split into 500 m of building backbone and 1500 m of campus backbone cabling.

ISO 11801 describes channels and permanent links.

The **Permanent Link** is the Telecommunications Outlet, TO (the wall or floor outlet), the (up to 90 m) of horizontal cabling and the Floor Distributor, FD (the patch panel). An optional Transition Point, TP, is allowed within the 90 m of horizontal cable.

The **Channel** is the work area cable (patchlead) form the terminal equipment into the TO, the permanent link as already described, a patchcord linking two patchpanels and a final equipment cable into the LAN equipment. It is not compulsory to have two patchpanels (a cross connect), indeed most users use only one patchpanel (an interconnect).



Note that in the interconnect version, i.e. just one patch panel, the combined length of the patchcords A & C is 10 m. In the cross connect model, i.e. two patch panels, the combined length of the patchcords A, B & C is 9 m. ISO 11801 and EN 50173 allow for 50% more attenuation in patchcords (flexible cables) than for the fixed, solid core cable. This is one major difference between ISO and EN standards and the American standard TIA 568A. 568A only allows for 20% more attenuation in flexible cables. The 20% attenuation generally means that a 24 AWG patchcord is required. For ISO 11801 and ISO 11801 standards a patchcord can be implemented in 26 or 24 AWG, with 26 AWG being the cheaper of the two.

For horizontal cabling, the following cables are recommended:

- 100 ohm balanced copper cable
- 62.5/125 multimode optical fibre

- Recognised alternatives are 120 and 150 ohm balanced cables and 50/125 multimode optical fibre.

For backbone cabling, the following cables are allowed:

- 100, 120 or 150 ohm balanced copper cable
- 50/125, 62.5/125 or singlemode optical fibre

The end user must decide whether screened or unscreened cable is required and what level of fire performance is required, e.g. IEC 332-1, IEC 332-3-c etc.

Other 'rules' are:

- No more than two levels of cross-connect in the backbone. This allows a Floor Distributor between the horizontal and building backbone cable, and a Building Distributor between the building and campus backbone cables, with all campus cables terminating in the Campus Distributor.
- A minimum of one Floor Distributor for every 1000 square metres of office space. A minimum of one Floor Distributor for every floor should be provided. For a sparsely populated floor then it is permissible to serve this floor from an adjacent floor.
- A minimum of one Telecommunication Outlet shall be provided at each work area. A minimum of two TOs per ten square metres of floor space is advised.

The following Permanent Link/Channel Classes are described:

- Class A specified up to 100 kHz
- Class B specified up to 1 MHz
- Class C specified up to 16 MHz
- Class D specified up to 100 MHz

Different channel lengths are achievable with different classes of cabling:

Class of Application	Class A	Class B	Class C	Class D
Frequency range	100 kHz	1 MHz	16 MHz	100 MHz
Max distance with Cat3 Cable	2000m	200m	100m	-
Max distance with Cat4 Cable	3000m	260m	150m	-

Max distance with Cat5 Cable	3000m	260m	160m	100m
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The Standard describes the following technical parameters:

- Return Loss
- Attenuation (now referred to as Insertion loss)
- NEXT
- Power Sum NEXT*
- Attenuation to Crosstalk Ratio, ACR
- Power Sum ACR*
- Equal Level Far End Crosstalk, ELFEXT*
- Power Sum ELFEXT*
- DC Loop Resistance
- Propagation Delay
- Delay Skew*
- Longitudinal to differential conversion loss

figures marked with * are new and added by Amendment 2.

For the most part, all parameters are given values for both Permanent Link and Channel requirements, over the frequency range of interest. For example, ACR:

Frequency MHz	Minimum ACR	
	Permanent Link Class D	Channel Class D
1.0	59.1	57.8
4.0	47.7	46.1
10.0	39.4	37.0
16.0	34.5	31.4
20.0	32.0	28.7
31.25	26.6	22.9

62.5	16.7	12.1
100	8.7	3.1

Optical fibre grades have already been mentioned. The multimode fibre performance is:

Wavelength nm	Max attenuation dB/km at 20°C	Min modal bandwidth MHz.km at 20°C
850	3.5	200
1300	1.0	500

Singlemode fibre is specified as having an attenuation of 1 dB/km or less at 1310 and 1550 nm.

The SC duplex connector is specified for new installations although the STII connector (referred to in the Standard as BFOC/2.5) is allowed.

Additional Information: The new test standard referred to is IEC 61935. The following tests are required as on-site acceptance tests. Either the channel or permanent link may be tested. Remember the permanent link is also called the Basic Link when two 2-metre patch cords are added to connect the test instrument.

	IEC 61935
Wire Map	X
Attenuation	X
NEXT pair to pair	X
NEXT Powersum	X
ELFEXT pair to pair	X
ELFEXT Powersum	X
Return Loss	X
Propagation Delay	X
Delay Skew	X
Delay Skew	X

The above information is offered as a summary of ISO 11801 and Amendment 2. It is not a definitive design guide and does not replace study and implementation of the Standard itself. The publisher accepts no responsibility for inaccuracies or omissions. To purchase the full Standard

go to your national standards body, e.g. British Standards Institution, Nederlands Normalisatie Instituut etc. or ISO.