

Technical requirements for in-house installation of wired analogue and digital interfaces

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1 Introduction

1.1 Background

The basis for this document is the Decree on Telecommunications Services (DTS) [3], specifically Arts. 16 and 17.

1.2 Aim and purpose

Swisscom's scope of responsibility for the provision of telecommunications equipment (in this case, the physical BSP line) ends at the building entry point and/or the network separation point (NSP). Swisscom is not under any obligation to provide the in-house installations. Nonetheless, the in-house installations do affect the transmission quality and thus also the services available at the network termination point (NTP), which Swisscom offers as part of its BSP. The in-house installations must therefore comply with these requirements in order to ensure correct functioning of the Universal services (BSP) available at the NTP.

1.3 Scope of application

These requirements concern the wired analogue access (EconomyLINE) already included in the Basic Service Provision (BSP), the wired digital access via an ISDN basic access (MultiLINE^{ISDN}) and also, as of 1 January 2008, the broadband (DSL) access for Internet access.

Electromagnetic compatibility and electrical safety do not come under the scope of this document.

1.4 Terminology, abbreviations

ADSL	Asymmetric Digital Subscriber Line
DSL	Digital Subscriber Line
TE	Terminal Equipment (EG / Endgerät)
EMC	Electromagnetic Compatibility
DTS	Decree on Telecommunications Services (FDV / Verordnung über Fernmeldedienste)
NT1	Network Termination Type 1
NTP	Network Termination Point (Netzabschlusspunkt)
NSP	Network Separation Point (NTS / Netz-Trennstelle)
NTU	Network Termination Unit (NAG / Netzabschlussgerät)
BSP	Basic Service Provision (Universal service / Grundversorgung)

1.5 Referenced documents

- [1] 6PHENCE_0157C00E_1 Interface of the Public Network; Version 1, 20.12.2002
- [2] 6PHENCE_0161C00D_1 Analogue Subscriber Line; Version 1, 20.12.2002
- [3] OFCOM - SR 784.101.1 Verordnung vom 9. März 2007 über Fernmeldedienste (FDV); 1 April 2007 version
- [4] OFCOM - SR 784.101.113 / 1.6 Technische und administrative Vorschriften betreffend die Eigenschaften von Schnittstellen der Grundversorgung; Version of 2 October 2006

2 In-house installation requirements

2.1 Definition of the installation areas of the three access types

The network separation point (NSP) is the transfer point from the access network to the customer's in-house installations. The access network and the NSP are the property and responsibility of Swisscom.

The network separation point (NSP) corresponds to the building entry point referred to in the DTS (see Art. 17 [3]).

The network termination point (NTP) corresponds to the access point referred to in the DTS (see Art. 16 [3]).

For a digital access, the network termination point is the jack on the NT1 (interface I_b ref. point S/T). The NT1, at the end of the in-house installation, is the property of Swisscom.

In the case of an analogue access, the network termination point is the telephone jack connected to the Broadband Internet (DSL) socket or, if no such socket is installed, the closest jack to the NSP in terms of cable length.

For broadband Internet access, the network termination point is the Ethernet 100Base-T [4] interface at the output of the network termination unit (NTU). The NTU can be purchased either direct from Swisscom or on the open market.

The in-house installation begins at the NSP and ends at the NTP in the case of an analogue access, on the NT1 (interface I_a reference point U) in the case of a digital access and at the NTU in the case of a broadband Internet access. This is always a point-to-point connection.

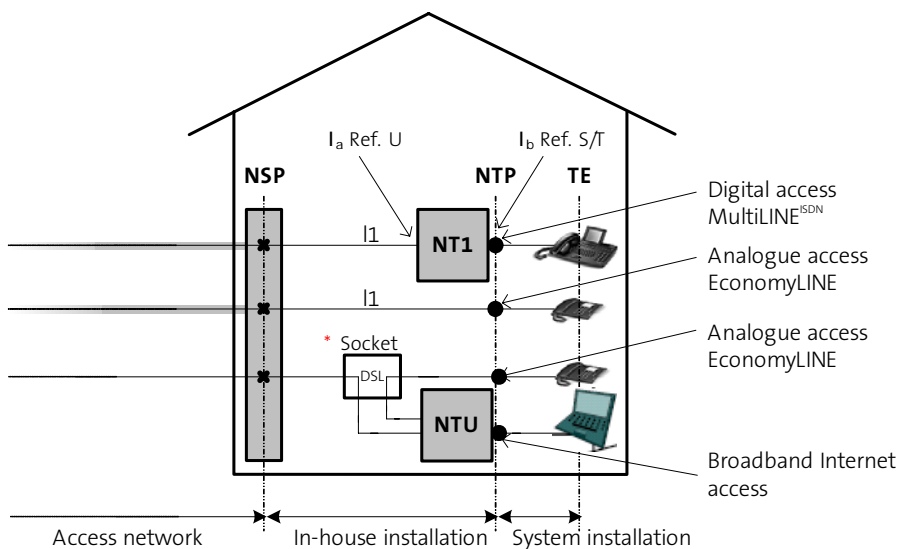


Figure 1: Definition of the installation areas of the three access types (* see Section 2.6)

2.2 General

It is possible to switch from EconomyLINE to MultiLINE^{ISDN} or from MultiLINE^{ISDN} to EconomyLINE. In the basic service provision, broadband Internet is only available/assured in conjunction with EconomyLINE.

The lines must be exclusively available for the access concerned (i.e. no other frequency bands may be used on the same line). Exceptions are made for other accesses/services from Swisscom.

2.3 Key values for in-house installations

The values applicable to in-house installations with respect to EconomyLINE and MultiLINE^{ISDN} are as follows:

DC resistance of wires $\leq 10 \Omega/100$ at 20°C

Wave attenuation $\leq 1 \text{ dB}/100 \text{ m}$ at 40 kHz

2.4 Requirements with respect to cables

Per access line twisted cable with a conductor diameter of at least 0.5 mm is stipulated for in-house installations. The line must not exceed 100 m in length (cf. Figure 1, $l_1 \leq 100 \text{ m}$). U 72 type cable or Cat5 type cable pairs with an electr. wave impedance of 100-135 (+/- 15%) ohms are recommended. I83 does not need to be replaced but is no longer recommended for new installations.

Larger diameters and/or better cable types (twisted and shielded) are advantageous (also with respect to broadband technology).

2.5 Telephone jacks

The most common telephone sockets are types TT87 (or TT83), RJ45 and RJ11.

For an analogue access, the TT87 or RJ45 jack (with cover/adaptor for RJ11) is recommended (cf. Tables 1 & 3, or 2). If shielded installation cables are used in conjunction with a TT87 jack, the shield should be connected with low impedance to the b2 pin.

For a digital access (reference point U), the RJ45 jack is recommended (cf. Table 3). If shielded installation cables are used, the shield should be connected with low impedance to the jack casing by means of the protection sleeve provided. The RJ45 jack can also be used for an analogue access.

NT1 (I_b ref. S/T and I_a ref. U) currently uses RJ45 jacks (cf. Table 4).

Interface	Pin number					
	1a	2a	3a	1b	2b	3b
a/b	a	-	-	b	(Earth)	-

Table 1: Pin configuration for TT87 telephone socket

Interface	Pin number					
	1	2	3	4	5	6
a/b	-	-	a	b	-	-

Table 2: Pin configuration for RJ11 (6P2C) telephone socket

Interface	Pin number								Sheath
	1	2	3	4	5	6	7	8	
U	-	-	-	a	b	-	-	-	(Earth)
a/b	-	-	-	a	b	-	-	-	(Earth)

Table 3: Pin configuration for RJ45 telephone socket

Interface	Pin number							
	1	2	3	4	5	6	7	8
U	-	-	-	a	b	-	-	-
S/T	-	-	Rx+	Tx+	Tx-	Rx-	-	-

Table 4: RJ45 pin configuration for NT1

2.6 Broadband Internet (DSL) socket

To enable the basic service to be provided with broadband Internet in the required quality on every wired analogue network interface, the in-house installation must be designed in such a way (cf. Figure 1) that the DSL signal is routed direct from the NSP to the NTU without being influenced by branch lines (branches for other sockets, bad contacts, etc., bridge taps). Optimal signal routing within the in-house installation is assured with installation of the RJ45 socket for broadband Internet (DSL).

This socket should be installed within the communications cabinet in residential units with structured cabling infrastructure. An analogue access as described in Section 2.5 that is wired as shown in Figure 1 should always be installed in the same communications cabinet, at least for test purposes (cf. Figure 3).

With additional installations, or in new buildings without structured cabling infrastructure, the socket should normally be installed in the study or otherwise in the living room.

Block diagram:

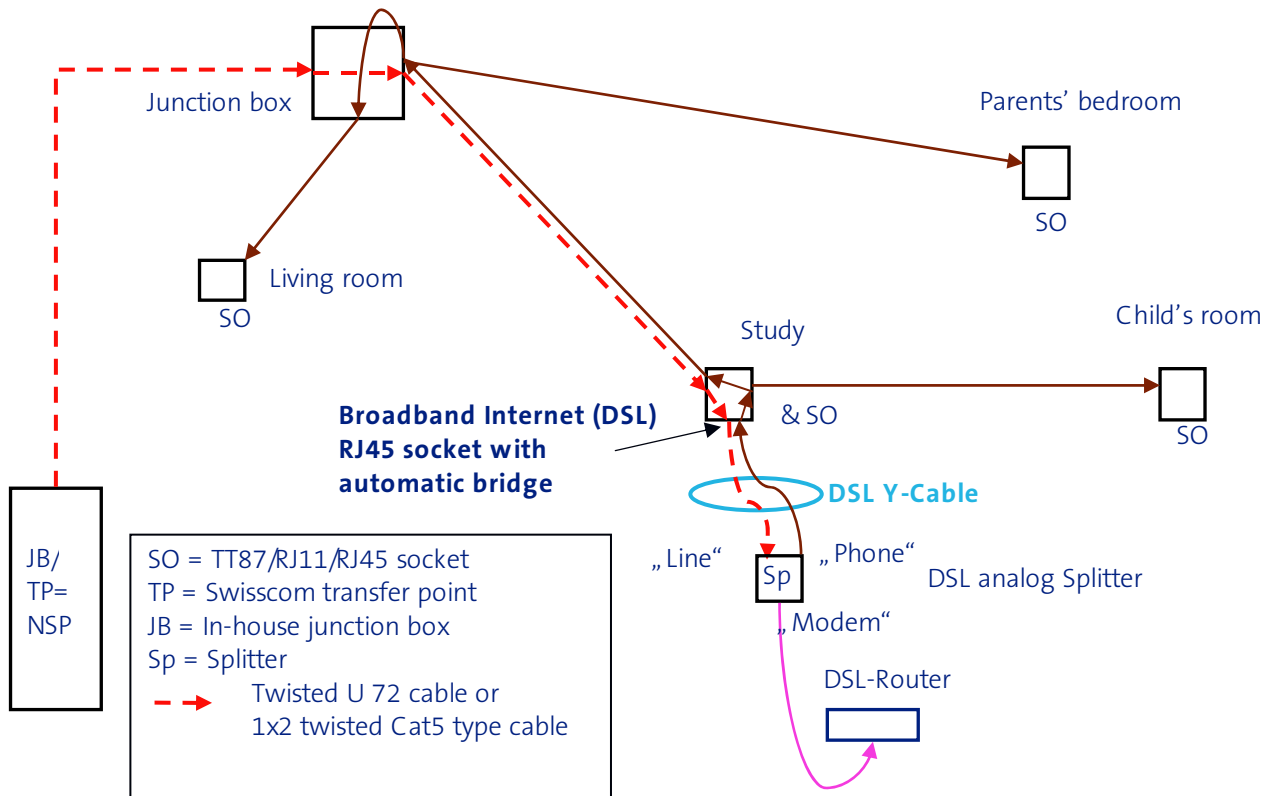


Figure 2: Block diagram of an RJ45 broadband Internet (DSL) socket

Interface	Pin number							
	1	2	3	4	5	6	7	8
U from TP	-	-	-	a	b	-	-	-
In-house a/b	-	-	a	-	-	b	-	-

Table 5: Pin configuration for the RJ45 broadband Internet (DSL) socket

The broadband Internet (DSL) socket (RJ45 jack) contains an automatic bridge from pin 3 to pin 4 and from pin 5 to pin 6. This bridge takes effect in the absence of a splitter/modem RJ45 connector. At least the front of the RJ45 jack should be coloured blue (**Pantone blue 285C**) to enable its function to be clearly recognised.

2.7 NTU for Broadband Internet (DSL)

A list of NTUs tested by Swisscom can be viewed at www.swisscom.com -> Wholesale -> "Broadband Connectivity Service". In case of problems with the connection, the operational readiness of the broadband Internet service at the NTP is demonstrated using a Swisscom NTU.

2.8 Access scenarios

For MultiLINE^{ISDN}, please refer to the document "Interface of the Public Network" [1].

A terminal is supported with EconomyLINE. The document "Analogue subscriber line" [2] serves as a basis.

3 Annex: Broadband Internet (DSL) socket (examples)

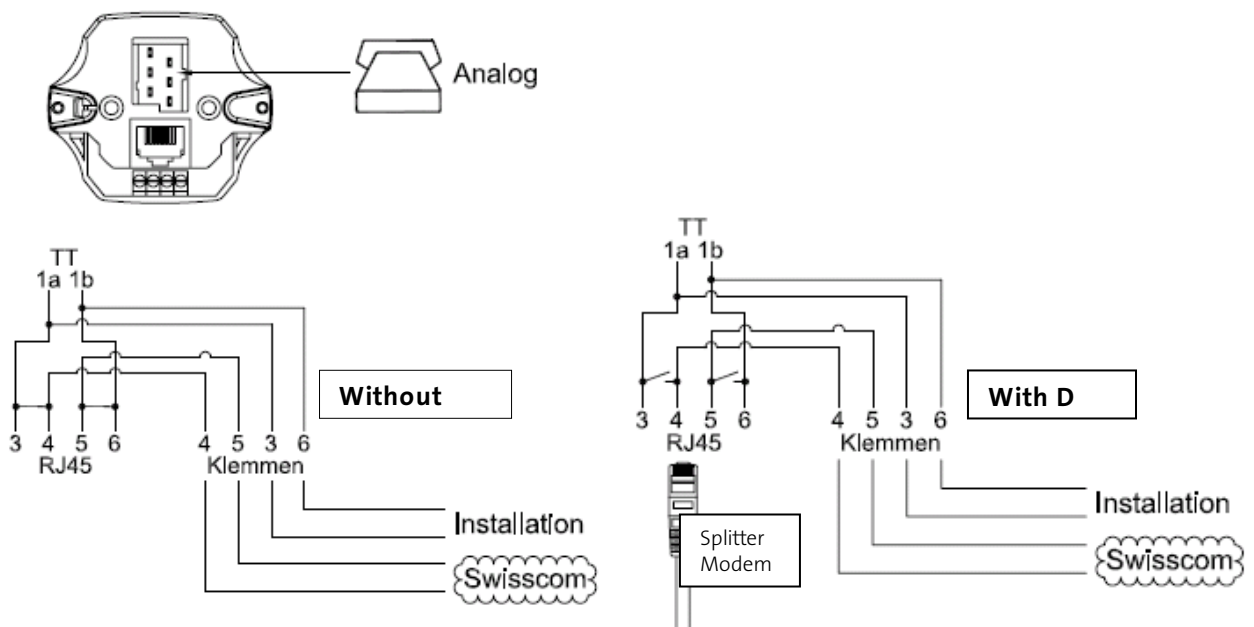
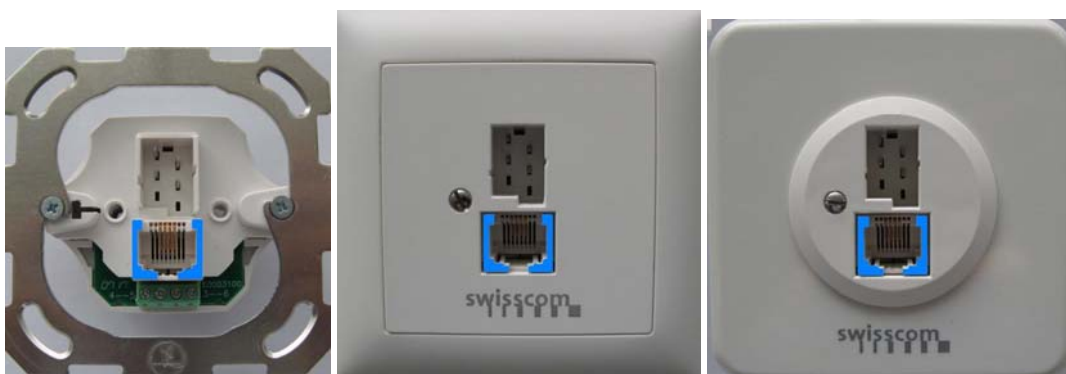


Figure 3: Connection diagram for broadband Internet (DSL) socket (example)



Figures 4-6: Market products, options (examples)

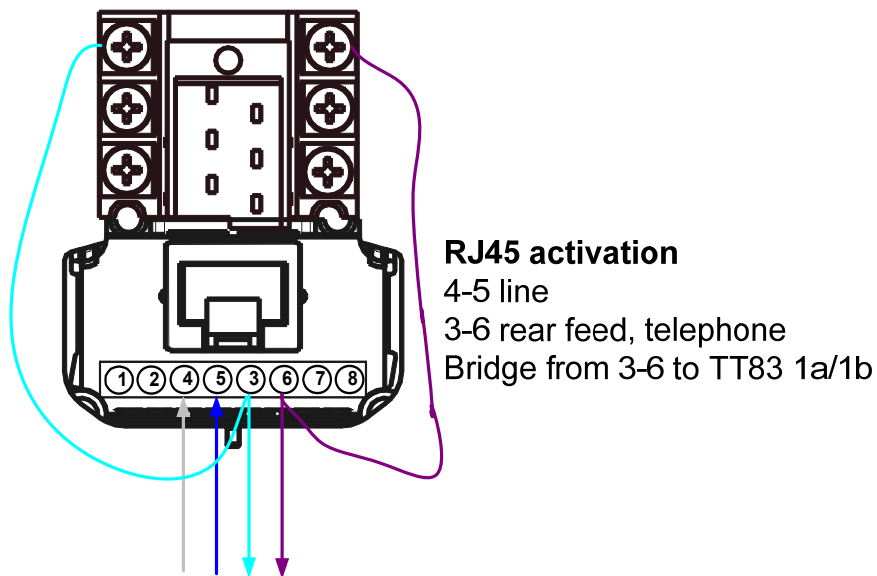
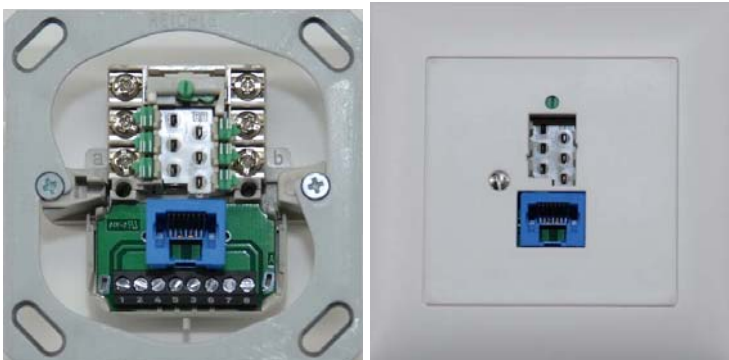
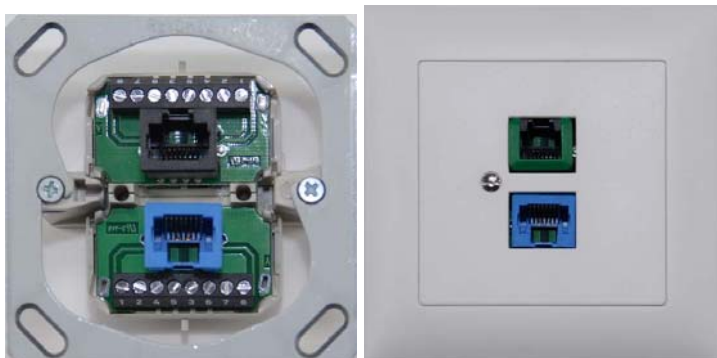


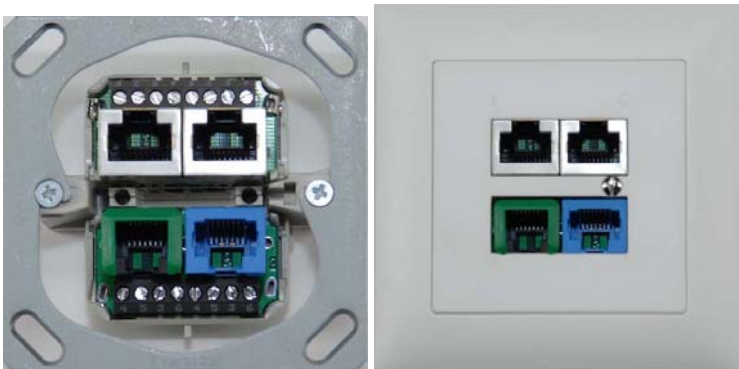
Figure 7: Connection diagram for broadband Internet (DSL) socket (example)



RJ45 jack for broadband Internet (DSL) and TT83 for analogue telephone access

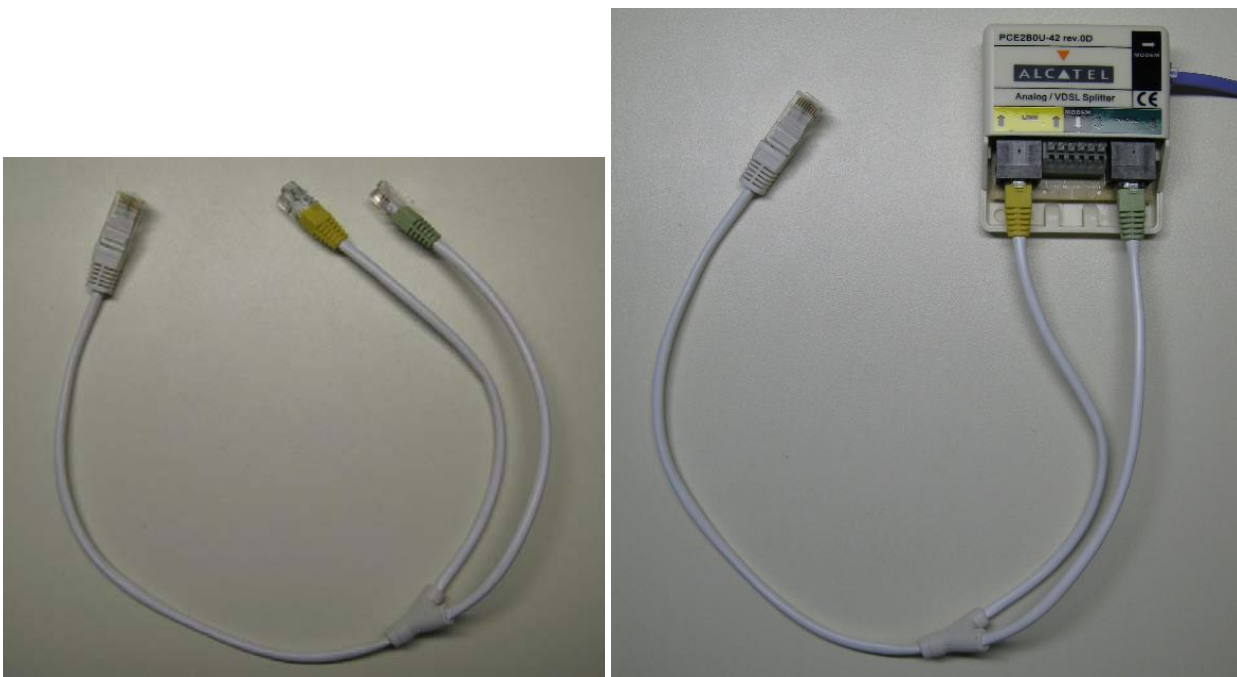


RJ45 jack for broadband Internet (DSL) and RJ45 (with RJ11 adapter) for analogue telephone access



RJ45 jack broadband Internet (DSL) and RJ45 (with RJ11 adapter) for analogue telephone access plus 2xRJ45 for Fast Ethernet

Figures 8-13: Market products, options (examples)



Figures 14-17: DSL Y-Cable & Splitter, Market products, options (examples)