University of Oxford IT Services
Infrastructure Specification Project

ISP-02-001:
University of Oxford IT Services Intermediate cabling (INTI-ENTI) - Product and design specification

1 INTRODUCTION

1.1 Scope

This document specifies the products and associated design criteria used in the provision of the University of Oxford IT Services Intermediate Cabling installed in each of the premises served by the University of Oxford IT Services external cabling infrastructure.

1.2 Responsibilities

Figure 1 shows a schematic of the elements used to create the University of Oxford IT Services Intermediate Cabling and how they relate to the other cabling-related functional elements within the premises served. Figure 1 uses the definitions and abbreviations of clause 1.3 of ISP-00-001.

While the elements of the University of Oxford IT Services Entrance Facilities are the property of University of Oxford IT Services they are accommodated within the customers' premises served and the ownership of that accommodation lies with the customer.

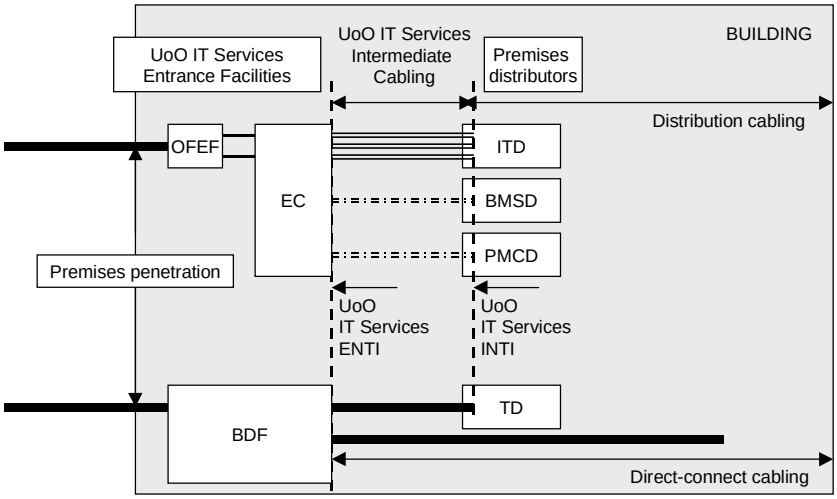


Figure 1 - Schematic of premises infrastructure served by University of Oxford IT Services

2 THE ELEMENTS OF THE INTERMEDIATE CABLING

The function of the University of Oxford IT Services Intermediate Cabling is to present the services delivered:

- at the BDF to the TD panels (the BDF Intermediate Cabling);
- at the active equipment in the EC to the ITD panels (the BDF Intermediate Cabling).

The University of Oxford IT Services Intermediate BDF Cabling comprises the following elements:

- balanced intermediate cables;
- jumper wire at the BDF;
- 237A terminal strips at the BDF;
- functional earth jumper wire;
- the TD panel;
- the pathway for, and the pathway system(s) accommodating, the balanced intermediate cables.

The University of Oxford IT Services Intermediate EC Cabling comprises the following elements:

- balanced intermediate cables (Category 6_A of BS EN 50173-1);
- balanced intermediate cable termination panel at the EC;
- the ITD panel;
- the pathway for, and the pathway system(s) accommodating, the balanced intermediate cables..

3 THE SPECIFICATION OF OUT INTERMEDIATE CABLING

3.1 Intermediate BDF Cabling

3.1.1 Balanced BDF cables

3.1.1.1 Mechanical and electrical performance

The cables shall be in accordance with BT specification CW1308 (see Figure 2) which features the following:

- internal grade construction;
- insulated 0.5 mm diameter conductors in pairs;
- outer sheath colour: white.

A functional earth conductor (1.38 mm diameter) is optional as it not terminated at the BDF or the TD.

The physical characteristics are:

- 30 pairs (only 28 are used), outer sheath diameter: 12,9 mm (typical):
- 100 pairs (only 84 are used), outer sheath diameter: 27 mm (typical).

Such cables are available from a wide range of manufacturer/distributors and no specific part numbers are mandated.

3.1.1.2 Fire performance

BS 6701:2016 Amendment 1:2017 requires certain cables inside buildings to meet EuroClass C_{ca}-s1b,d2,a2 of BS EN 13501-6. As a result, cables that do not meet the requirements of BS 6701:2016 Amendment 1:2017 shall not be installed inside buildings and other structures without the express authority of the Network Operations Manager.

3.1.2 Jumper wires

Cables comprising the jumpers shall comply with the minimum recommended performance requirements of BS EN 60332-1-2 or EuroClass E_{ca} of BS EN 13501-6.

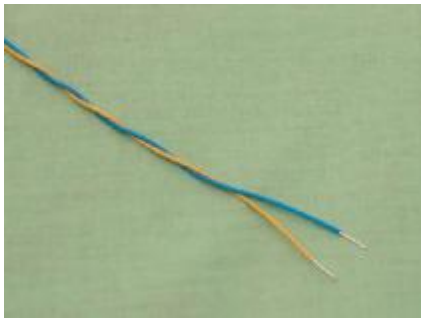
NOTE: Cables designed to be used in jumpers do not automatically fall within the scope of the Construction Products Regulation and therefore there is no reference to EuroClass in this clause.

The cables shall be in accordance with BT specification CW1109 (see Figure 3) which features the following:

- PVC insulated 0,5 mm diameter conductors in pairs;
- 1 pairs;
- blue/yellow.

Such cables are available from a wide range of manufacturer/distributors and no specific part numbers are mandated.

BT specification 1308



CW 1109 jumper wire

237A strip

Figure 2 - BDF products with the intermediate cabling

3.1.3 237A terminal strips

These panels are available from a wide range of manufacturer/distributors and no specific part numbers are mandated.

3.1.4 TD panels

The physical implementation of a TD is a 24-port (RJ45 interface) voice circuit presentation panel as shown in Figure 3.

TD panels shall:

- be 19 inch rack compatible;
- be green (preferred) or black;
- contain an insulated connection point for the functional earth of the intermediate cable;
- have appropriate space for labelling to indicate the relevant BDF strip data for the ports.

These panels are available from a wide range of manufacturer/distributors and no specific part numbers are mandated.

Figure 3 - TD panel (24 port, 1U construction)

3.1.5 Pathways

See ISP-02-002.

3.2 Cables

3.2.1 Balanced EC cables

3.2.1.1 Mechanical and electrical performance

The cables shall be in accordance with Category 6_A of BS EN 50173-1 (or Category 6A of ANSI/TIA-568-2.D) and shall feature:

- unscreened pairs;

- outer sheath colour: orange;
- 4 pairs;
- outer sheath diameter: 5,5 mm (typical).

3.2.1.2 Fire performance

BS 6701:2016 Amendment 1:2017 requires certain cables inside buildings to meet EuroClass C_{ca}-s1b,d2,a2 of BS EN 13501-6. As a result, cables that do not meet the requirements of BS 6701:2016 Amendment 1:2017 shall not be installed inside buildings and other structures without the express authority of the Network Operations Manager.

3.2.2 EC panel

EC panels shall:

- be of 19 inch rack compatible, 1U construction;
- be black;
- contain 24 RJ-45 ports via unscreened connecting hardware in accordance with Category 6_A of BS EN 50173-1 (or Category 6A of ANSI/TIA-568-2.D);
- have appropriate space for identification of the ports.

These panels are available from a wide range of manufacturer/distributors and no specific part numbers are mandated.

3.2.3 ITD panel

See 3.2.2.

3.2.4 Pathways

The length of cables between the connections at the EC panel and the corresponding ones on the ITD panel shall not exceed 90 metres.

See ISP-02-002 for other requirements.

4 THE CONNECTIVITY OF OUT INTERMEDIATE CABLING

4.1.1 BDF-TD panel

Each TD panel is fed by a single BDF balanced cable from 3 No. 237A terminal strips in the BDF.

Ports 1-20 on the TD panel are fed with one pair to each RJ45 socket presentation. Ports 21-24 are fed with two pairs to each RJ45 socket presentation.

The pair-presentation at the BDF and on the TD panel is shown in Table 1.

4.1.2 Multiple BDF-TD panels

Where three TD panels are installed in the same cabinet, a 100 pair balanced BDF cable may be used.

Ports 1-20 on the TD panel are fed with one pair to each RJ45 socket presentation. Ports 21-24 are fed with two pairs to each RJ45 socket presentation.

The pair-presentation at the BDF and on the TD panel is shown in Table 2.

164 **Table 1 - Termination of 30 pair intermediate BDF cables**

Krone Strip	Pair	Intermediate BDF Cable Pair	TD panel port	Port Pin
A	1	01	1	4, 5
	2	02	2	4, 5
	..	..	..	..
	10	10	10	4, 5
B	1	11	11	4, 5
	2	12	12	4, 5
	..	..	..	..
	10	20	20	4, 5
C	1	21	21	4, 5
	2	22	21	3, 6
	3	23	22	4, 5
	4	24	22	3, 6
	5	25	23	4, 5
	6	26	23	3, 6
	7	27	24	4, 5
	8	28	24	3, 6

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Table 2 - Termination of 100 pair intermediate BDF cables

Krone Strip	Pair	Intermediate BDF Cable Pair	TD panel	TD panel port	Port Pin
A	1	01	1	1	4, 5
	2	02		2	4, 5
	..	..		..	..
	10	10		10	4, 5
B	1	11		11	4, 5
	2	12		12	4, 5
	..	..		..	..
	10	20		20	4, 5
C	1	21		21	4, 5
	2	22		21	3, 6
	3	23		22	4, 5
	4	24		22	3, 6
	5	25		23	4, 5
	6	26		23	3, 6
	7	27		24	4, 5
	8	28		24	3, 6
A	1	31	2	1	4, 5
	2	32		2	4, 5
	..	..		..	..
	10	40		10	4, 5
B	1	41		11	4, 5
	2	42		12	4, 5
	..	..		..	..
	10	50		20	4, 5
C	1	51		21	4, 5
	2	52		21	3, 6
	3	53		22	4, 5
	4	54		22	3, 6
	5	55		23	4, 5
	6	56		23	3, 6
	7	57		24	4, 5
	8	58		24	3, 6
A	1	61	3	1	4, 5
	2	62		2	4, 5
	..	..		..	..
	10	70		10	4, 5
B	1	71		11	4, 5
	2	72		12	4, 5
	..	..		..	..
	10	80		20	4, 5
C	1	81		21	4, 5
	2	82		21	3, 6
	3	83		22	4, 5
	4	84		22	3, 6
	5	85		23	4, 5
	6	26		23	3, 6
	7	27		24	4, 5
	8	28		24	3, 6

5 LABELLING

Label on front of Strips Des. 51A

DP"XX" Pairs 1 - 10

Label on rear of Strips Des. 51A

1	2	3	4	5	6	7	8	9	10

Line Jack numbers to be inserted in appropriate boxes 1 - 10

DP and Line Jack numbers to be specified by OUTN

Label on front of Strips Des. 51A

TD panel "XX" Pairs 1-10

TD panel "XX" Pairs 11-20

TD panel "XX" Pairs 21-30

Label on rear of Strips Des. 51A

1 *01*	2 *02*	3 *03*	4 *04*	5 *05*	6 *06*	7 *07*	8 *08*	9 *09*	10 *10*
11 *11*	12 *12*	13 *13*	14 *14*	15 *15*	16 *16*	17 *17*	18 *18*	19 *19*	20 *20*
21 *21*	22 *21*	23 *22*	24 *22*	25 *23*	26 *23*	27 *24*	28 *24*	29 -	30 -

TD panel numbers to be inserted in appropriate boxes 1 - 10

TD numbers to be specified by OUTN

Figure 4 - BDF labelling

6 TESTING AT THE INTI

6.1 Intermediate BDF Cabling

The University of Oxford IT Services maintainer will perform a Maintenance Acceptance Test (MAT) between each INTI and the appropriate ENTI (BDF) to ensure that the:

- cabling products meet the requirements of this document;
- accommodation of the cabling meets the requirements of ISP-02-001;
- connection meets the requirements of this document.

Only upon successful completion of the MAT will University of Oxford IT Services:

- accept responsibility for the Intermediate BDF Cabling;
- allow a connection of the customers' premises to University of Oxford IT Services.

The MAT is free, but should an installation fail the MAT, then subsequent visits may be charged for.

Telephone outlets will not be enlivened if the installation should fail the MAT.

6.2 Intermediate EC Cabling

The University of Oxford IT Services maintainer will perform a Maintenance Acceptance Test (MAT) between each INTI and the appropriate ENTI (EC) to ensure that the:

- cabling products meet the requirements of this document;
- accommodation of the cabling meets the requirements of ISP-02-001;
- transmission performance of the intermediate EC cabling meets the requirements of this document.

The transmission performance test shall confirm that permanent link requirements in accordance with BS EN 50173-1 are met as a minimum. Document IISS-01-001 provides further information on assessment of test results.

The test result shall be provided as part of the documentation covering the installation and shall include the characterisation traces against the relevant Class limits.

7 SERVICE DELIVERY

On successful completion of an installation, the OUTN will, at the written request of the customer, provide telephone service to the INTIs on the TD and ITD panels as required. It then becomes the responsibility of the college or the University of Oxford IT Services to patch those services to the appropriate outlets.

8 OTHER DOCUMENTS IN THIS SERIES

IISS-00-001: Infrastructure Installation Specification Strategy: Overview
IISS-00-002: Infrastructure Installation Specification Strategy: Distributed building services
IISS-01-001: Assessment of balanced cabling test results
IISS-01-002: Installation and acceptance testing of singlemode optical fibre cabling

ISP-00-001: Infrastructure Specification Project: Overview
ISP-00-002: Access to University of Oxford IT Services facilities (later)
ISP-01-001: University of Oxford IT Services Entrance Facilities - Product and design specification
ISP-01-002: University of Oxford IT Services Entrance Facilities - Accommodation requirements
ISP-02-002: University of Oxford IT Services Intermediate cabling (INTI-ENTI) - Accommodation requirements
ISP-03-001: Distribution cabling - Recommendations: Overview
ISP-03-002: Direct-connect cabling - Recommendations: Telecommunications infrastructure
ISP-03-003: Distribution cabling - Recommendations: IT infrastructure
ISP-03-004: Distribution cabling - Recommendations: Distributed building services infrastructure

NORMATIVE REFERENCES

The following documents shall be applied in a normative manner (i.e. mandated) by the users of this document.

BS 6701:2016 + Amendment 1:2017	Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance
BS EN 13501-6	Fire classification of construction products and building elements. Classification using data from reaction to fire tests on electric cables
BS EN 50173-1:2018	Information technology - Generic cabling systems - General requirements
BS EN 60332-1-2	Tests on electric and optical fibre cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable. Procedure for 1 kW pre-mixed flame
CW1109	
CW1308	

BIBLIOGRAPHY

The following documents are considered useful reference sources for the users of this document.

ANSI/TIA-568-2.D	Balanced Twisted-Pair Telecommunications Cabling and Components Standards
IISS-01-001	Assessment of balanced cabling test results