

UWE Estates Design Specification

Chapter 8: IT & AV



IT & Audio-Visual Infrastructure

Contents

Change Control.....	1
UWE IT Infrastructure	2
UWE AV Infrastructure.....	2
Design Requirements	2
Cable Network.....	2
Wi-Fi Network.....	3
Comms Rooms	7
Switch Design	7
Cabinet Design	7
Ducts & Chambers.....	9
Audio Visual Installations	9
Cabling Standards	9
Labelling Standards	9
Outlet and Patch Panels.....	9
Chambers and Ducting.....	11
Loose Fibre & Blow Fibre	11
Post Installation.....	11
Test & Trace (Copper).....	11
Fibre Cable Testing	12

Change Control

Version Number	Date of Issue	Chapter Ref	Brief Description of Change(s)
1.5	01/05/19	ALL	All sections have changes, all separately itemised in 2019 version.
1.6	NOV2019	ALL	Various updates all itemised in 2019 version.
2021	JAN2021	ALL	Various updates all itemised in 2021 version.
2022	JAN2022	ALL	Various updates all itemised in 2022 version.
2023	JAN2023	None	NO CHANGES
2024	FEB2024	ALL	Chapter 10 AV incorporated into Chapter 8 IT. ALL sections updated, moved, and amended.

UWE IT Infrastructure

The university has deployed a fibre ring around the Frenchay campus with access via the use of feeder pillars. This will allow any new builds / refurbishments to break into ducts that feed into the fibre ring.

Therefore:

1. Connections to new builds / refurbishments to break out of buildings into ducts connected to the fibre ring
2. Connections to new builds / refurbishments will use 4 conduit fibre tube with 12 fibres occupying one of the tubes. Variations need to be approved by IT Services.
3. Each of the two new connections from the comms room using diverse routes will terminate in two different feeder pillars which form the fibre ring. Here they can be patched back to the main core routers in 2B0011 and 2D086.
(Please check with IT Services with regards to which feeder pillars to use)

The university is going through a process of mapping all duct routes, capacities and fibre routes using BIM and a product called Patch Manager. For this to be effective it is imperative that all cables are clearly labelled.

UWE AV Infrastructure

Design Requirements

Cable Network

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
CommScope (Systemax) - Copper	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770
Fibre	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770

All new cabling must be CAT 6a U/FTP – Unshielded outer shell/Foil Shielded Twisted Pair as a minimum with terminations and installation carried out in accordance with the manufacturer’s guidelines by a certified installer and covered by a 25 year manufacturer warranty.

Cables and SCS components must be easily identifiable with manufacturing batch information printed directly on to the cable jacket or component surface.

Cable lengths for installed permanent link should be no greater than 90m.

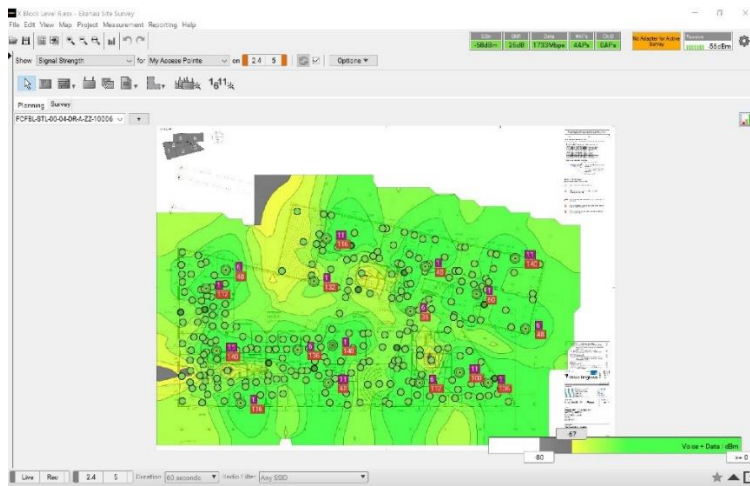
No intermediate splices or patch panels should be used in the cable runs. The minimum bend radius should not be exceeded during installation and when the cables are in their final operating position.

Wi-Fi Network

All buildings should have a Wi-Fi network installed.

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
??	UWE IT Services	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770

1. Where refurbishment works are planned in an area that already contains Wi-Fi Access Points, the units must be removed by UWE's incumbent cabling contractor and given to UWE ITS for safe keeping before any building works start. Following completion of works, the process steps 7 and onwards apply. Unless extensive changes to fabric design.
2. UWE IT Services should be provided with each iteration of building drawings in .dwg format as soon as they are available. The .dwg drawings should include occupancy numbers for each room and the room number designations (if known).
3. UWE IT Services staff need to meet with the UWE Estates PM, Architect and UWE's incumbent cabling contractor to further understand the design. In particular...
 - Planned usage of each room – Social, GPT (General Purpose Teaching), etc.
 - Footfall figures in each area
 - Materials used in building fabric – walls, floors, windows
 - Type of ceiling – suspended, raft, open/industrial
 - Any other potential interference sources, i.e. microwave ovens, PIR Sensors
 - Any design anomalies or aspirations
4. UWE IT Services will create a predictive Wi-Fi coverage survey (see screenshot below) using Ekahau modelling software, based on the building drawings and requirements. The predictive survey determines the type of Wi-Fi access points required and their optimum location. UWE IT Services will always provide Wi-Fi Access point that meet the latest IEEE ratified standard.



5. UWE IT Services will provide a building drawing marked with the Wi-Fi access point locations. It is then the responsibility of the project team to determine the most appropriate containment routes, cable runs, etc. to the Access Point locations, ensuring that cable lengths are within specifications. *Any deviation from the planned location must be agreed in writing with the ITS Network Team before installation and final locations should be marked in the BIM model.*
6. The installation options on Wi-Fi access points are as follows:
 - a. Option 1 – Ceiling Mounted (1st preference)
 - i. Beneath suspended ceiling tiles



- ii. Structural Beams



iii. Building Fabric



b. Option 2 – Semi exposed ceiling
APs should be mounted on ceiling tile “rafters” or “Islands”



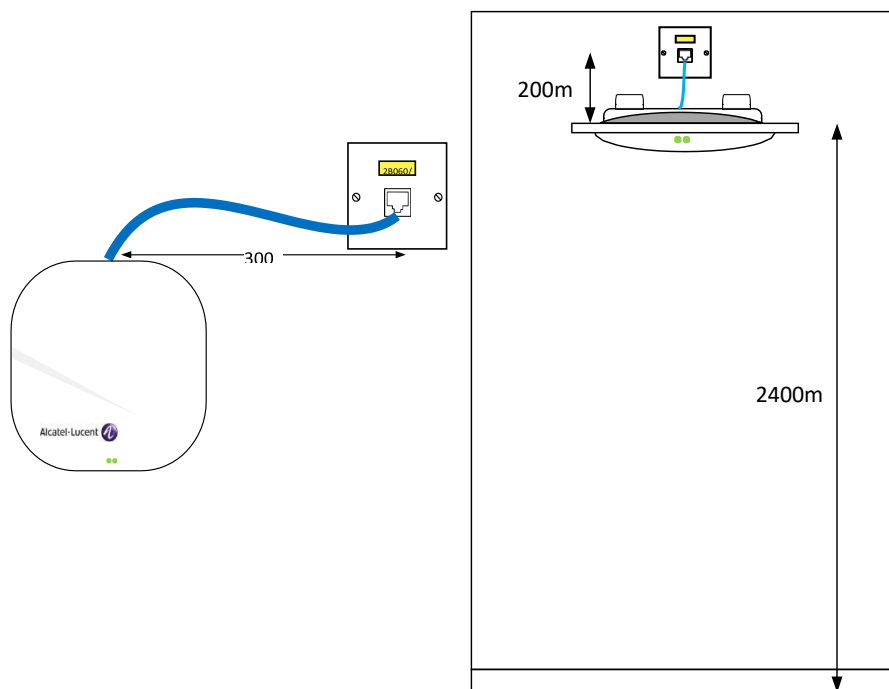
c. Option 3 – Mount to containment



d. Option 4 – Wall Mounted (to only be considered if all others are not possible)
This is the least effective solution of AP mounting.



7. Cabling between outlets and access points should be as follows:



8. All Wi-Fi Access Points are purchased via UWE IT Services. A project cost-code should be provided for these works.
9. Following a successful trace and test by the cabling contractor of the network outlets designated for the Access Points, UWE IT Services will configure the outlets, and prepare the Access Points. Each Access Point is labelled with a location and outlet identifier.
10. Access Points will be installed by the cabling contractor. It is imperative that the cabling contractor install the correct Access Point in its associated location.
 - a. The incumbent cabling contractor will install the Access Points once the building is dust free and network outlets / Access Points are configured and labelled. Following successful installation, the cabling contractor must inform UWE IT Services, who will bring the units into service.

- b. UWE IT Services will carry out a post installation survey using Ekahau modelling software. This survey verifies that the Wi-Fi installation delivers the required service and coverage detailed in the predictive survey. To perform the survey UWE IT Services will require access to all rooms within the new building/refurbishment project. Therefore the post installation survey should take place after building handover from the principal contractor but before occupation

11. If all Wi-Fi coverage is as required, the coverage maps are published internally. If there are areas of limited or no coverage, UWE IT Services will work with the Estate PM to retro fit additional Access Points.

Comms Rooms

Switch Design

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
??	IT Services Telephone:	IT Services Telephone:

Cabinet Design

Named Manufacturer	Incumbent Maintenance Provider	Incumbent Installer
??	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770	Sceptre Networking Limited 16 Canvin Court, Somerton Business Park, Somerton, Somerset, TA11 6SB Telephone: 01458 273770

A suitable data cabinet should be installed as per requirements.
The two standard data cabinet are as follows:



Single compartment / user

- Used in most instances across all University campuses
- 800mm width x 1000mm depth
- 42U (27U may be used for certain applications but must be agreed with the ITS Infrastructure Team)
- Lockable Mesh doors front and rear
- Horizontal metal cable management
- Adjustable vertical mounting rails to enable equipment to be set back to give clearance of at least 100mm between equipment and inside of the door.

Image^: Single Compartment / User Cabinet



Co-Location / multiple users

- Used where multiple users exist, such as UWE and the Accommodation Network provider.
- 800mm width x 1000mm depth
- 42U (the number of compartments to be agreed with the ITS Infrastructure Team).
- Lockable Mesh doors front and rear
- Patch Panels delivered to relevant compartment
- Horizontal metal cable management
- Adjustable vertical mounting rails to enable equipment to be set back to give clearance of at least 100mm between equipment and inside of the door.

Image^: Co-location / Multiple Users cabinet

Cabinet Layout:

Typical Layout for a cabinet is as follows:

U	Nox - Front		Nox - Rear
42	Empty		
41	Modular Patch Panel with 2 * 6 LC Duplex Modules		
40	Cable Mgt		
39	Empty		
38	Cat6a 24 Port Patch Panel		
37	Switch - 0		
36	Cat6a 24 Port Patch Panel		
35	Cat6a 24 Port Patch Panel		
34	Switch - 1		
33	Cat6a 24 Port Patch Panel		
32	Cat6a 24 Port Patch Panel		
31	Switch - 2		
30	Cat6a 24 Port Patch Panel		
29	Cat6a 24 Port Patch Panel		
28	Switch - 3		
27	Cat6a 24 Port Patch Panel		
26	Cat6a 24 Port Patch Panel		
25	Switch - 4		
24	Cat6a 24 Port Patch Panel		
23	EMPTY - Temp Shelf when needed		EMPTY - Temp Shelf when needed
22	Cat6a 24 Port Patch Panel		
21	Switch - 5		
20	Cat6a 24 Port Patch Panel		HORIZONTAL Monitored PDU Where required
19	Cat6a 24 Port Patch Panel		
18	Switch - 6		
17	Cat6a 24 Port Patch Panel		
16	Cat6a 24 Port Patch Panel		
15	Switch - 7		
14	Cat6a 24 Port Patch Panel		
13	Cat6a 24 Port Patch Panel		
12	Switch - 8		
11	Cat6a 24 Port Patch Panel		
10	Cat6a 24 Port Patch Panel		
9	Switch - 9		
8	Cat6a 24 Port Patch Panel		
7			
6			
5			
4			
3	Analogue Telephony Patch		
2	Empty		
1	Empty		

Ducts & Chambers

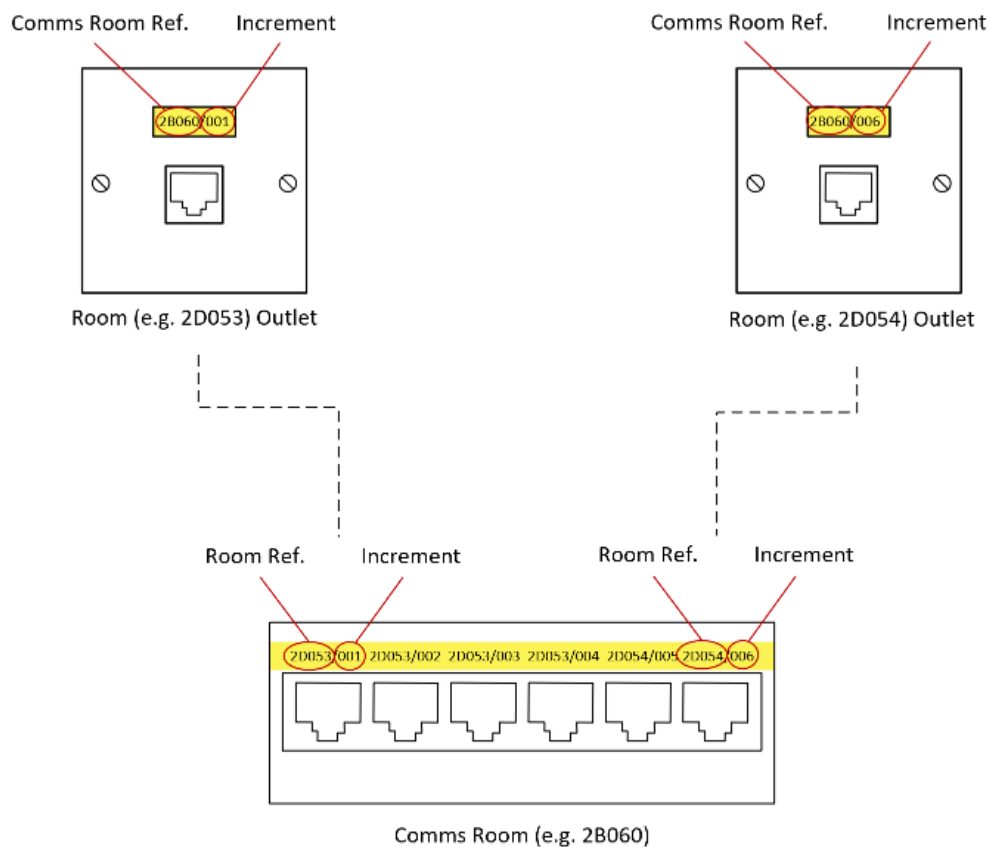
Audio Visual Installations

Cabling Standards

Labelling Standards

Outlet and Patch Panels

Each network and patch panel outlet must be labelled (black text on yellow label) with a unique reference, as illustrated below:



- The label should be clearly legible and be suitable for use in comms rooms that have air conditioning.
- At the Comms Room end, the unique reference should be the name of the room containing the outlet, and the increment number. The increment number is a three- digit number with leading zeroes, assigned by the cable installer and identifying the actual outlet within the room.
- At the outlet end, the unique reference should be the name of the Comms Room where the cable to the outlet is patched, and the same increment.
- for the 6th network connection in Comms Room 2B060, where the outlet is positioned in room 2D054, at the outlet end the label will read 2B060/006 and at the Comms Room end the label will read 2D054/006
- for each comms room within a building the suffix label can begin with '/001' as it is unique when combined with the comms room ID

Note: there is no difference between the labelling of data outlets and telephone outlets. Data and telephone cables are patched to different locations within the Comms Room, but labels should still fit in with, and remain unique to, the data outlet labelling. For example, if an outlet in room 2D054 designated for telephone use is the 71st outlet in comms room 2D060, it will still be labelled 2D060/071 at the outlet end and 2D054/071 at the comms room end.

It should also be noted that, for each comms room within a building, the labelling can start with other end/001 since the uniqueness comes at the outlet end where the comms room is specified as part of the label.

Chambers and Ducting

- All chambers are marked/labelled as per requirements from estates and in turn added to BIM and Patch Manager with location.
- All new ducts are uniquely numbered at either end for easy identification.

Loose Fibre & Blow Fibre

- All loose tube fibre and blown fibre tubes labelled with source and destination at each chamber location using Brady Polyurethane Tags (BM71-10X75-7643-YL) or equivalent.
- The labelling convention for the fibre tubes is as follows
 - <SOURCE ROOM><CAB NOx> to <DESTINATION ROOM / Pillar><CAB NOx / Panel Ref>

For e.g.

FR-2B01/NO1 to W-Block Pillar/1a

Or

FR-2D086/NO3 to FR-1D008/NO1

Post Installation

Test & Trace (Copper)

Once the network switches have been installed, the cabling contractor is required to trace and test each copper ethernet cable to confirm it meets the requirements of ISO/IEC 11801 for Category 6A cable (link/channel up 500MHz). A complete set of test results shall be provided in a format agreed with the ITS Infrastructure Team within 5 days of completing the testing.

The trace and test information must detail what each outlet is to be used for in order for ITS Network Team to configure the outlet for the correct network e.g., staff network, student network, printer network, building management system network, etc. With this in mind, the client must have specified what each and every outlet will be used for and communicated that to the cabling contractor via the UWE Estates PM.

All switch ports must be configured with description information and the VLAN appropriate for the equipment being connected to that outlet, i.e. a BMS device is connected to the BMS VLAN, a Staff PC is connected to the staff VLAN and a student PC is connected to the student VLAN.

In order to configure the switch port, it is necessary to know which network outlet is connected to which switch port, and in turn what will be plugged into the network outlet. The standard Trace and Test should contain the information in the following format:

