AUDIOVISUAL INSTALLATION PROJECTS GUIDELINES

Learning and Teaching Spaces Technology Section (LTSTS)
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1.0 INTRODUCTION

1.01 LEARNING AND TEACHING SPACES TECHNOLOGY SECTION

LTSTS provides the University with a combined Audio Visual and IT technology service, which includes AV and IT equipment and systems installed in Learning and Teaching Spaces across the University from formal teaching and presentation spaces: Lecture Theatres, Seminar Rooms and Meeting Rooms together with informal learning spaces: library study spaces, cafes and incidental spaces in foyers and circulation spaces. LTSTS works with other groups in Information Services in addition to Estates & Buildings, Edinburgh First and the Festival Office etc to provide a comprehensive service to the University. LTSTS responds to requests from academic colleagues and students and provides training and familiarisation sessions in AV equipment and systems for Uniformed Staff and other colleagues.

LTSTS is made up of three teams, namely…

The Service Team, who provide a loan equipment service, maintain centrally resourced teaching spaces and open access computer areas, setting-up and supporting special events and conferences, special needs exams and providing support for academic staff and students in the use of technology in learning and teaching spaces.

The Maintenance Team, who carry out routine maintenance, PAT testing and repair of AV and IT equipment and systems.

The Projects and Development Team, who design, procure, project manage, install and commission AV and IT equipment and systems across a wide range of projects from small scale equipment upgrade to large new build and refurbishment projects. They are based in 55 George Square and consist of a Team Manager, a Project Manager who is responsible for large-scale projects and a Senior Projects Technician, who supervises a team of three Technicians. The Project Team in particular work closely with E&B and have established this set of Guidelines for projects.

Detailed information on the range of services provided by LTSTS together with full contact details, staff lists and section organisation chart are available at the following link:

http://www.ed.ac.uk/schools-departments/information-services/about/organisation/iti/division-iti-who/division-iti-units/section-ltsts

1.02 DEVELOPMENT

The technology deployed in learning and teaching spaces continues to develop at an increasing pace and this, along with changes in pedagogy, have made an impact on overall room and system design: e.g. the development of the "Teaching Studio", which is a new style of technology intensive, teaching facility. While historically, audio-visual technology could be "bolted on" to a facility nearing completion, its increasing importance to the success of the facility, together with its complexity, requires the technology, equipment and systems to be "designed in" and fully integrated with the overall space.

LTSTS works with the users of learning and teaching facilities, academic colleagues and students to ensure that each new installation best reflects the developments in both technology and pedagogy. Whilst there are common scenarios and principles for room layout, screen size, lighting control, system design, equipment wiring etc, much of the detail will inevitably be individual to a particular installation.

2.0 THE DESIGN PROCESS

The Design Process involves three distinct stages, namely…

2.01 PRE-INSTALLATION & PLANNING

2.02 INSTALLATION

2.03 COMPLETION

2.01 PRE-INSTALLATION & PLANNING

To ensure the effective delivery of all projects, early engagement of LTSTS with the users of the facility and the design team is essential. This early engagement will allow time for user group visits to existing locations, research into new or untried technology and systems, development of system and furniture design options and indicative budgets. The time required to undertake these tasks and the follow on user discussions on system options should not be underestimated. LTSTS would expect to meet with the design team at the earliest opportunity so that our advice can influence design decisions that can impact on the performance and effectiveness of the AV system such as ceiling height, lighting, furniture, access, facilities for the disabled, etc.

Design Process

- Develop AV system requirements with users
- System design and cost estimate
- APUC tender procedure
- Appoint AV contractor
- Refine and develop final system
- Place order
- AV contractor produces final system drawings, cable schedules and power/network requirements

The process above can create conflict where information is required on cable routes, power and network requirements etc before the AV contractor is appointed, and requiring changes to be made to the M&E design after the main contractor appointment. In order to minimise such changes early engagement in the design process is essential.

At this pre-installation and planning stage, the guidelines we would note are as follows…

1. That LTSTS Projects Team is introduced to all projects as early as possible in the design process, for large projects, at Stage C or earlier.

2. LTSTS can create models or standard scenarios for wiring schedules that will be adequate for use by E&B in appointing main construction contractors.

3. LTSTS promote a common language in terms of describing equipment, types of files or drawings and that both LTSTS and E&B provide access to relevant files so that information can be stored and collated in a shared drive.

4. LTSTS copy all relevant information to the E&B Project Manager.

5. E&B will supply access to updated, comprehensive sets of drawings to reflect elevations, ceiling plans including lighting grids, floor plans etc. to include ceiling heights and room dimensions.

6. LTSTS is able to liaise with architects, consultants, users and E&B personnel on a project as required.

7. LTSTS, in collaboration with users and the design team, will provide AV system design options including estimated costs for equipment and installation for agreement and sign off following consultations and site visits where appropriate.

8. LTSTS and E&B liaise with other relevant University specialists in considering the location of welcome / information screens in circulation spaces.

9. LTSTS will provide an estimated installation programme highlighting those items with long lead times, in particular, the specification, manufacture and installation of any AV specific furniture and column board systems.

10. LTSTS will provide full contact details of the AV contractors within the APUC Framework Agreements to ensure that their details are up to date on the E&B financial systems.

11. LTSTS will manage the procurement process using the current APUC framework agreements and make detailed recommendations on AV contractor appointment.

12. LTSTS and E&B agree an agreed payment plan in relation to AV contractors involved in large-scale projects i.e. 80% on receipt of the equipment, 10% on completion of the installation and 10% on completion of any snagging.

13. E&B will process the order generation in a timely manner to enable the AV contractor to proceed with the detailed design process.

2.02 INSTALLATION

LTSTS and the appointed AV contractor will liaise with E&B Project Manager in order to ensure all network, control and power cabling is in place as specified within the design and that all AV cables have been installed.

The AV contractor will supply the cable schedule and free issue the AV specific cable to E&B for issue to the main contractor for installation by the electrical contractor. The AV contractor will terminate all AV cables. Drawings indicating where any power, control or network cables relating to the AV system installation are also required. Elevation drawings can be a great help in this respect and LTSTS frequently provide a graphic image of the location showing the AV equipment in situ as this is a straightforward method of disseminating the information.

At this installation stage, the guidelines we would recommend are as follows…

1. All relevant LTSTS Technicians and AV contractor's staff are required to have the appropriate, up to date and valid CSCS H&S cards.
2. LTSTS and the AV contractors will provide suitable method statements and risk assessment documentation to be available to the relevant E&B Project Manager.
3. LTSTS and E&B will ensure that programme critical installation items such as the installation of Induction Loops, ceiling-mounted loudspeakers, column board systems, AV furniture, etc are fully understood by the main contractor and detailed in the final programme of works. Any changes to the construction programme that affect these areas will be communicated to LTSTS as soon as possible.
4. The LTSTS Projects Team meets regularly with E&B personnel to monitor each individual project and to resolve any issues raised by the main or AV contractor.

2.03 COMPLETION

On completion of the installation process, a period is required to carry out system commissioning, snagging, user training and familiarisation. Every effort should be made to protect this period from erosion, e.g. due to the late running of the overall programme, in order to ensure user satisfaction on final occupation. If the contractor has to leave site due to enforced early occupation the snagging period may be significantly extended with serious impact on user satisfaction.

1. LTSTS will recommend the required timescale for system testing, commissioning, snagging and user training and familiarisation on each project. LTSTS will manage this timetable in collaboration with the AV contractor and the users of the facility.

2. LTSTS will ensure that, within projects requiring staged payments, the AV contractor completes all necessary programmes of works before making a recommendation to E&B that invoices are passed for payment.

3. LTSTS and E&B will liaise in terms of site security and equipment installation timetables. Restricted access to protect high value equipment may affect other trades ability to carry out their programme of works.

4. LTSTS will participate in any Lessons Learned and Post Occupancy Survey meetings on completion of a project.

3.00 TECHNICAL APPENDIX

The Technical Appendix is intended to provide a source of relevant information, both Reference and Dynamic, in order to provide background information and to demonstrate current designs. Each heading includes a brief overview, which incorporates some basic guidelines or points to note. We would ask that E&B personnel, Architects, Contractors and Consultants are made aware of this document and that it should be acknowledged (perhaps as part of the tender process) whenever there is a project that involves AV.

3.01 Programme of Works (including service co-ordination)

3.02 Small Teaching Room (design scenario)

3.03 Seminar Room (design scenario)

3.04 Lecture Theatre (design scenario)

3.05 Teaching Studio (design scenario)

3.06 Videoconferencing Suite (design scenario)

3.07 Screens (including screen size, height, maximum & minimum viewing distances and viewing angles)

3.08 Lighting (including design and control)

3.09 AV Furniture

3.10 Disability (including Induction Loops)

3.11 Interactive Boards

3.12 Teaching Walls and writing surfaces

3.13 Control Systems

3.14 Floor boxes

3.15 Power

3.16 Network

3.17 Brackets

3.18 Welcome / Information Screens

3.19 Signage and User Guides

3.20 Signal & Control

3.01 PROGRAMME OF WORKS

In terms of room layout, the AV facilities obviously need to be considered alongside things like power and network requirements, containment, ceiling heights, lighting grids, raised floor height, proposed furniture layouts etc. However, almost everything can have an impact upon the AV facilities in a location and vice versa. For instance, the location of a door can often determine which wall would naturally be designated the teaching wall, likewise windows and seating layouts or other furniture are also obvious influences. There are many factors that can affect the projected image or the acoustics and we should avoid designing in elements that would adversely impact on the performance of the AV equipment. For instance, the ventilation system's location and type has occasionally been detrimental to the AV facilities in some learning and teaching spaces. An integrated approach is required towards security, disabled facilities (including induction loops or hearing helpers) and fire alarm systems as they can all relate to the AV. Similarly, room booking display monitors or welcome screens need to be considered. The trend towards more flexible learning and teaching spaces has led to solutions that include social and formal areas, with fixed, serviced furniture alongside soft, social furnishing and services. The trend is also towards providing network, writing surfaces and AV facilities in social spaces. All of which makes it more vital that we take a co-ordinated approach and that LTSTS are introduced into a project at the earliest possible stage.

Please see the documents relating to small teaching locations, Seminar Rooms, Lecture Theatres and Teaching Studios etc for relevant advice on these issues.

In terms of most projects, the programme of works is obviously vital and the days when AV facilities were considered a bolt on at the end of the project have long gone. It is difficult to give exact timescales but as a rough guide to some of the key elements in terms of the AV, here is a note of some of the most significant issues…

At the earliest possible stage, we would want to know what was planned for the space. This will dictate many subsequent decisions. This would generally mean meeting with the users and other stakeholders. We in LTSTS tend to ask for some basic information in establishing a project i.e. what do you want to do in the space? What is the timescale? What is the AV budget?

Based on these discussions we create a specification that can then be put out to tender. This process can take several weeks or longer, depending on the project, but some general information such as generic power and network requirements and room layout including AV furniture can often be provided by LTSTS to ensure that this information does not delay the project. A large new-build multi-location project may require a month or more for quotes to be returned and this may be after several months of creating and refining the specification with the users and other stakeholders. A smaller project may only require a few weeks for the same process.

Once appointed, the AV contractor can provide specific information in terms of the wiring, power and network requirements and they are expected to provide drawings in support. As

stated earlier, they will generally provide the AV specific cable to the main electrical contractor in order that the cables are run with other cabling to avoid retro fitting and to minimise disruption to the building fabric and services etc. This process can take several weeks but is often effectively shortened by the AV contractor using suitably modified wiring drawings created by LTSTS.

If an induction loop is required, the AV contractor will oversee its installation and ensure its protection at the appropriate point in the project i.e. generally when the floor has been screeded and before the carpet is laid.

After agreeing the design of the AV furniture, it will be ordered with a run-in time of six weeks. Installation to be co-ordinated between the AV contractor, the main contractor, the cabinet makers, the electrical contractor, E&B and LTSTS to allow for access, wiring, security etc.

The column board system will be ordered with a run-in time of six weeks with the installation to be co-ordinated between the AV contractor, the main contractor, the column-board system installers and manufacturers, the electrical contractor, E&B and LTSTS to allow for access etc.

The AV wiring to be terminated and any fixings for brackets etc to be completed ahead of the AV installation as first stage fit-out.

The final AV installation to take place generally when the site is secure and clean. In most cases, the AV install can be completed in the last few weeks running up to completion of the project.

On completion, there should be time to test, snag, handover and commission the AV facilities with time allocated for familiarisation sessions for uniformed staff, academic staff and other users.

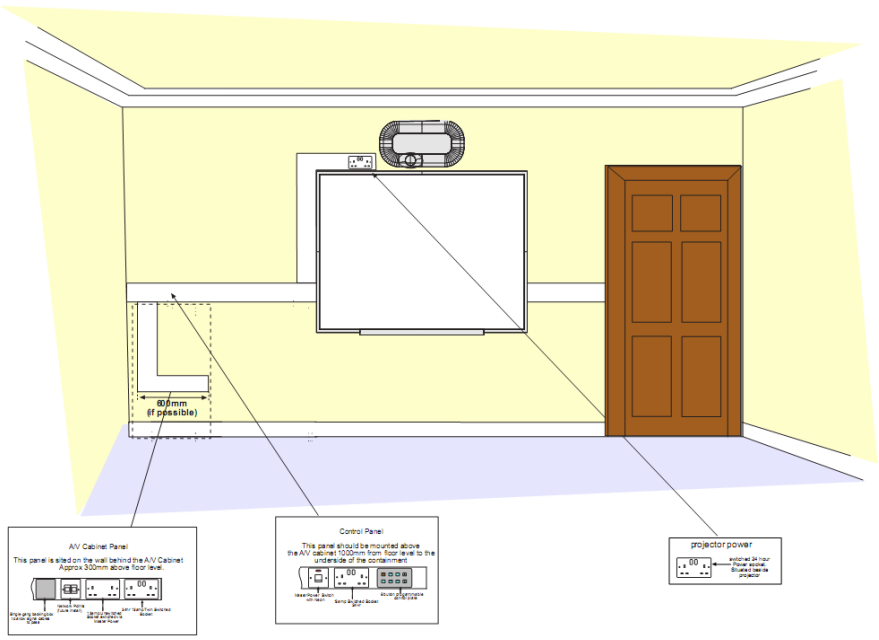
3.02 SMALL TEACHING ROOM

We might regard a small teaching room as any location with a capacity of up to approximately 30, with most small teaching rooms being around about the 20 or less in terms of capacity. These rooms often have ceiling heights of less than 3m and limited floor space. We would probably install an Interactive Board (see relevant document where minimum and maximum heights are indicated as a guide), an LCD monitor, or a pull-down screen and ceiling-mounted data projector. We might also install an AV cabinet (see AV Furniture document) and a control panel (see relevant document). We would normally seek to install something like the Interactive Board or screen at the opposite end of the room to the door to avoid disruption to any lecture or presentation by latecomers etc. We would require containment, which needs to be considered in relation to the height of the board or screen and in terms of access, power and network. In small rooms, things like lighting, ambient noise, furniture and the room shape and features can all impact on the design. There may also be a requirement for a vitreous enamel writing surface and this can be particularly important where wall space is limited.

The following typical design scenario is provided for general information and guidance, a detailed specification would be developed in consultation with users for each individual project.

We may also specify a portable “Data Replay Unit”, which incorporates an LCD screen, a DVD player, a control panel and a cabinet suitable for holding a laptop.

A typical AV equipment set-up showing an Interactive Board and control panel with wiring to allow for an AV cabinet.

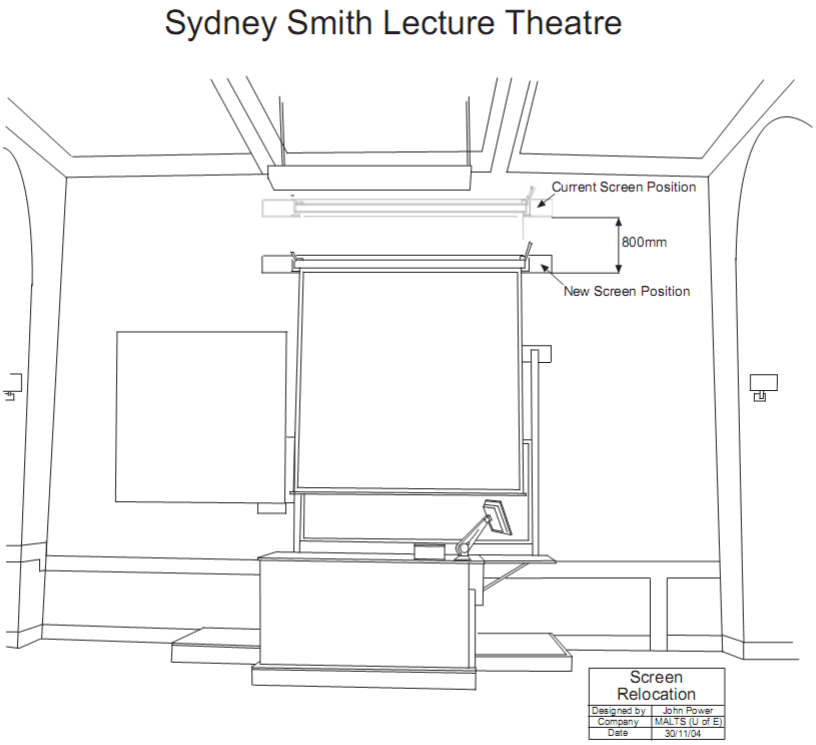


3.03 SEMINAR ROOM

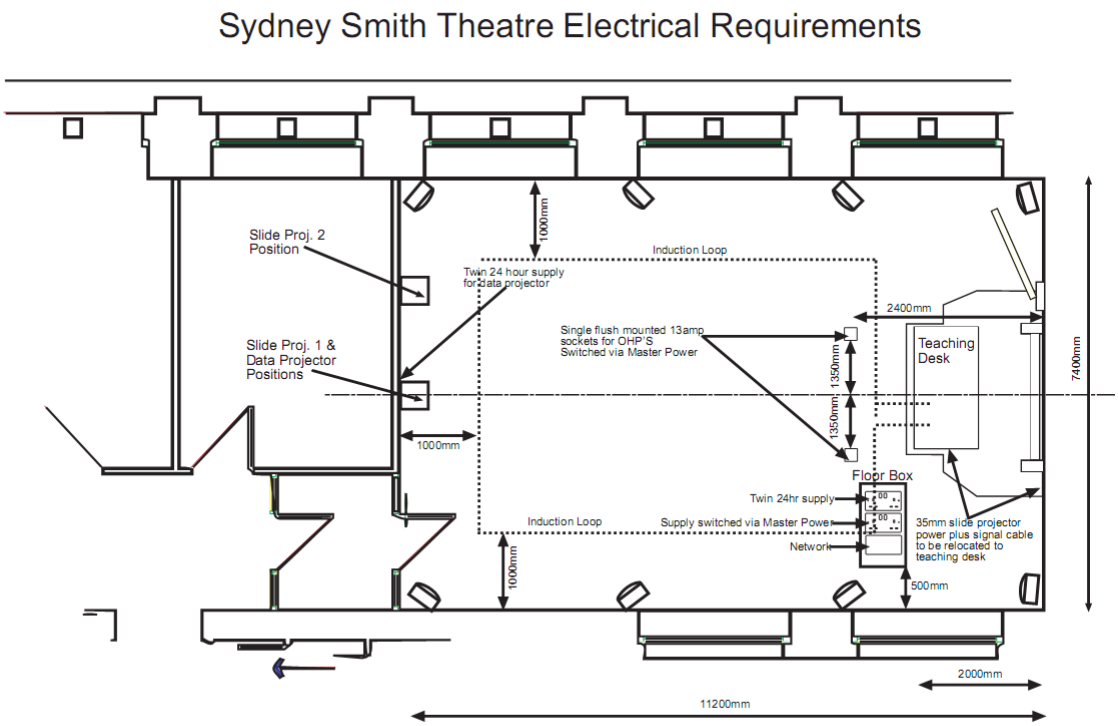
We might regard a Seminar Room as any location with a capacity up to approximately 100, with most Seminar Rooms being around about the 60 or less in terms of capacity. These rooms can vary dramatically but can often have similar ceiling heights to small teaching rooms i.e. less than 3m. They are occasionally tiered but more often not. This gives line of sight issues. Our rule of thumb is to install the largest screen possible with a minimum height off the floor of approximately 1.2m to the bottom of the screen. Any lower than this and many of the audience will be unable to see the bottom of the screen. We can often install an Interactive Board (see relevant document where minimum and maximum heights are indicated as a guide) but it is more likely to be a pull-down, or electrically operated, screen approximately in the range 1.8m to 2.4m wide. Consideration has to be made for different aspect ratios, some of it in 4 x 3, some of it 16 x 9, and the fact that users can often come with a variety of source content, which itself, can be anything from a website, a PowerPoint presentation or electronic writing so issues about visibility can be critical. We might also install an AV cabinet (see AV Furniture document) and a control panel (see relevant document) but we are more likely to install a presentation desk or even a teaching desk. We would normally consider the teaching wall as being at the opposite end of the room to any doors to avoid disruption to any lecture or presentation by latecomers etc. We would require containment, which needs to be considered in relation to the position of the desk or AV cabinet, the height of the board or screen and in terms of access, power and network. As in small rooms, things like lighting, ambient noise, furniture and the room shape and features can all impact on the design. There will almost certainly be a requirement for a writing surface and this can be particularly important where wall space is limited. Things like viewing distances and how they relate to screen sizes and the seating layout are critical but there are no absolute guidelines, only general rules of thumb. For instance, we would suggest a maximum viewing distance of no more than 5 times the screen diagonal i.e. around about 12m for a 2m wide screen but this is often seen as too optimistic as the content can include details and as screen resolutions have moved towards high definition. Using the screen height as the multiplier is often considered safer. This would give a maximum viewing distance of 7m or 8m for a 2m wide screen. The minimum viewing distance is generally 2 x the screen height, making it about 3m from the screen in the case of this example. The viewing angle of the screen also needs to be considered and we would generally specify screens that limit any distortion or reduction in reflectivity of the image and with the optimum viewing angle. Normally no less than 60deg. All of these calculations should be viewed as rough guidelines as every location would require to be assessed individually.

A typical wiring schedule for a Seminar Room

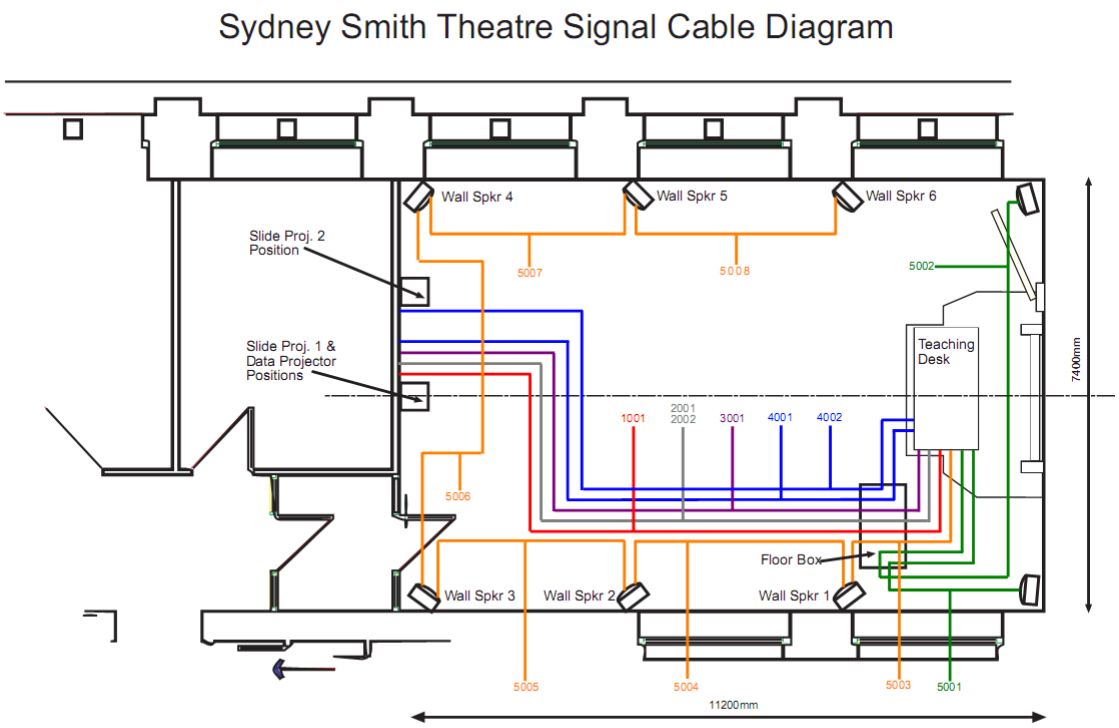
Cable No.	From	Via	To	Cable Type	Description
	VIDEO				
1001	Teaching Desk	Floor Box	LCD Projector Location	RG59	Video Feed to LCD Projector
	RGBHV				
2001	Teaching Desk	Floor Box	LCD Projector Location	5 Core Video	RGBHV Feed to Projector
2002	Teaching Desk	Floor Box	LCD Projector Location	5 Core Video	RGBHV Feed to Projector
	CONTROL				
3001	Teaching Desk	Floor Box	LCD Projector Location	Belden 9504	LCD Projector Control
	REMOTE CONTROL				
4001	Teaching Desk	Floor Box	Slide Projector 1 Position	multi core cable	Remote Control Cable
4002	Teaching Desk	Floor Box	Slide Projector 2 Position	multi core cable	Remote Control Cable
	SPEAKERS				
5001	Teaching Desk	Floor Box	Speaker Front Right	2 Core 1mm	Stereo Speaker System
5002	Teaching Desk	Floor Box	Speaker Front Left	2 Core 1mm	Stereo Speaker System
5003	Teaching Desk	Floor Box	Wall Speaker 1	2 Core 1mm	Mono Speaker System
5004	Wall Speaker 1	Floor Box	Wall Speaker 2	2 Core 1mm	Mono Speaker System
5005	Wall Speaker 2	Floor Box	Wall Speaker 3	2 Core 1mm	Mono Speaker System
5006	Wall Speaker 3	Floor Box	Wall Speaker 4	2 Core 1mm	Mono Speaker System
5007	Wall Speaker 4	Floor Box	Wall Speaker 5	2 Core 1mm	Mono Speaker System
5008	Wall Speaker 5	Floor Box	Wall Speaker 6	2 Core 1mm	Mono Speaker System



A typical sketch of a Seminar Room to show the room layout.



A typical electrical wiring diagram for a Seminar Room.



A typical AV signal and control cable wiring diagram for a Seminar Room.

3.04 LECTURE THEATRE

We might regard a Lecture Theatre as any location with a capacity over approximately 150, with many theatres having a capacity around the 200 figure. These locations can vary dramatically in shape and size but can often include tiered seating, suspended ceilings, column board systems etc. Dual data projection is often installed as standard in lecture theatres to allow the audience to view presentations that include material from more than one source. This provides less line of sight issues but creates more complex systems and control.

As in smaller rooms, our rule of thumb is to install the largest screens possible with the issue of height off the floor being less of an issue than ensuring those seated nearest to the screen are not viewing the projected image at an uncomfortable angle. The column board systems in lecture theatres can often incorporate wall-mounted screens and column-mounted whiteboards or chalkboards. The boards and screens can often be electrically operated and therefore require power and signal wiring.

Screen sizes present real problems as we move to high definition, widescreen presentations and many teaching walls will need to be re-designed to accommodate this trend as well as the need to display electronic writing. As was mentioned in relation to Seminar Rooms the issue of screen size is complicated by standards for resolution, the different sources and the material displayed.

We generally install a suitable teaching desk, which can often be considered as an AV equipment cabinet. This makes for easier wiring but can cause complications if the desk needs to be removable. The teaching desk is designed in such a way as to allow the users access to certain, appropriate equipment, such as the DVD player or the dedicated pc but not to control equipment etc. This leads to the systems being much more reliable but does require the desks to be well designed to incorporate issues such as access to equipment for maintenance or repair, ventilation, disability access, etc. The control systems we use in lecture theatres allow the user to control pre-set audio levels, select equipment and sources as well as setting the lighting.

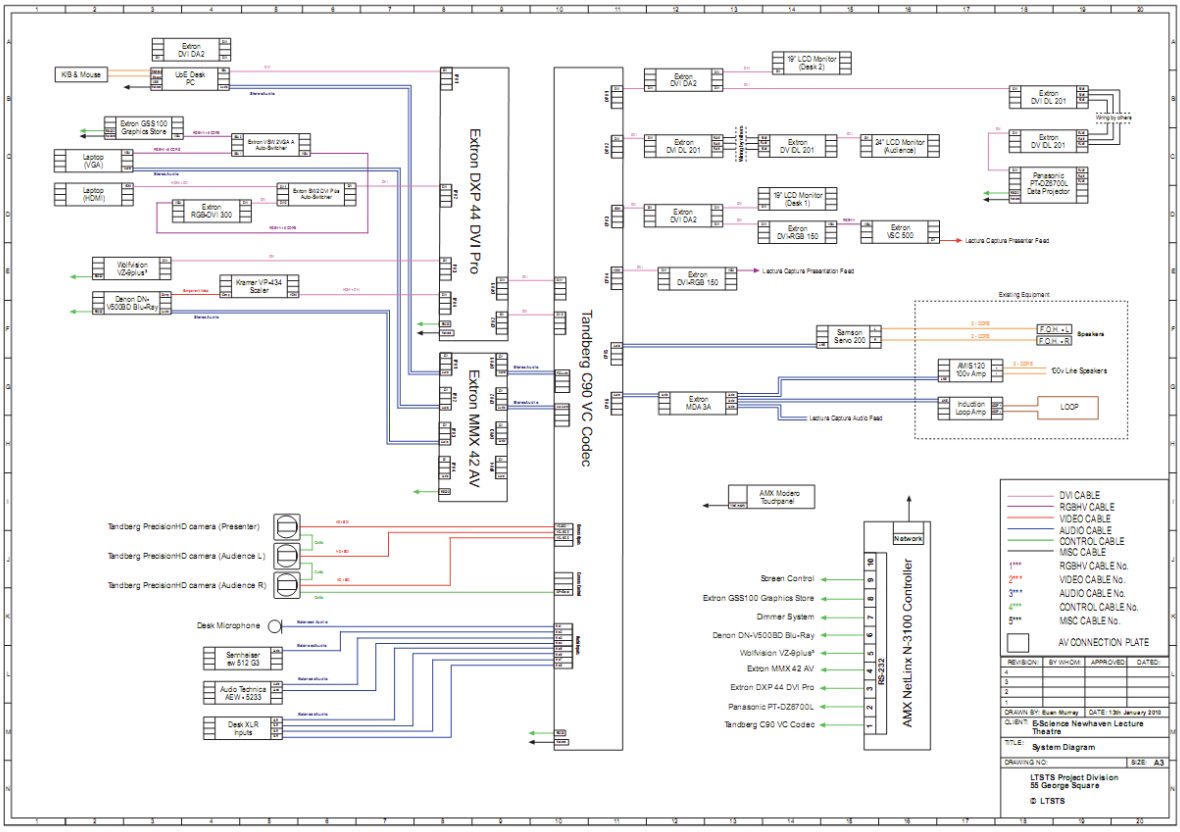
As in previous examples, we would normally consider the teaching wall as being at the opposite end of the room to any doors to avoid disruption to any lecture or presentation by latecomers etc. We would require containment, which needs to be considered in relation to the position of the desk and to the equipment external to the desk such as the data projectors, the induction loop and the loudspeakers etc. As in other rooms, things like lighting, ambient noise, furniture and the room shape and features can all impact on the design.

There will almost certainly be a requirement for a writing surface and this can be a difficult issue with many academic colleagues still favouring chalk as a writing medium and the issues of maintaining whiteboards as well as the trend towards electronic writing mediums.

Once again, viewing distances and how they relate to screen sizes and the seating layout are critical (ref the previous notes on screen size). We generally use front projection but there are a few instances where rear projection has been specified for reasons such as the lack of a suitable location to wall or ceiling-mount a data projector. The screen surface itself can be an important consideration with the drive towards ever-brighter data projectors and ever-higher resolution images making demands on screen surfaces, which previously would have been fit for purpose.

Lecture theatre AV installations have to be seen as an integral part of the infrastructure and the related wiring and network all need to be allowed for on any project. There are some lecture theatres that feature overspill facilities of Video Conferencing facilities and these will increase the complexity of the wiring. Other features such as audience response systems, related welcome / information screens, panel discussions, conference or event use etc all go to making lecture theatre design one of the most challenging parts of many AV projects.

A typical schematic diagram of the AV system in a Lecture Theatre.



A typical equipment list for a Lecture Theatre (in this case including VC provision).

Learning and Teaching Spaces Technology Projects

Job: E-Science VC Installation

Item Description

AV Installation Cost
Project Management Fee
Misc Cables and Connectors
Equipment Delivery Cost

100m Coax (for HD-SDI, to be specified)
305m box of Cat5e Cable

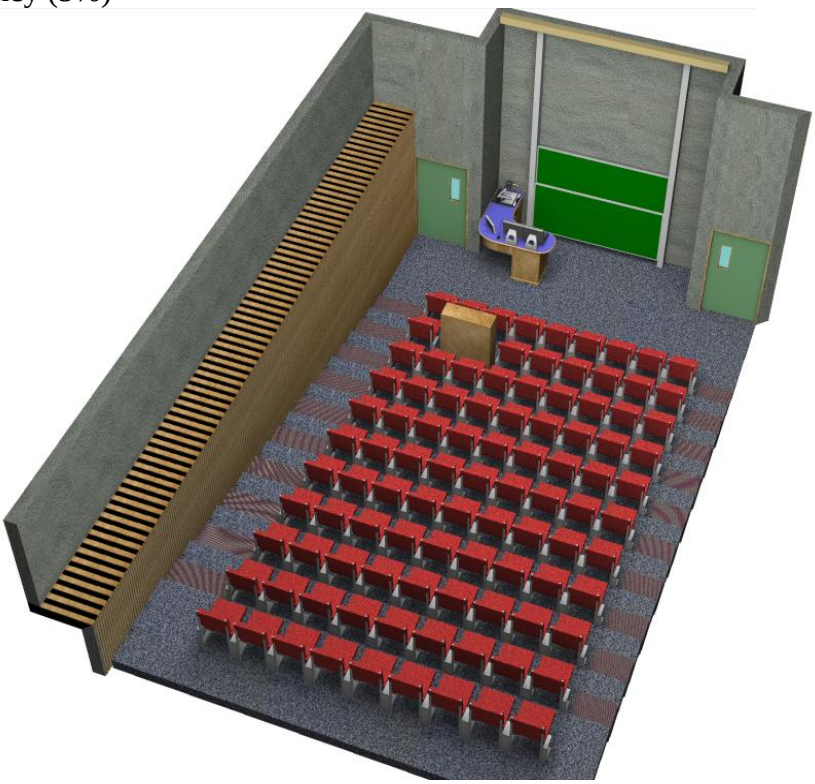
Custom-made Teaching Desk
Tandberg C90 HD Integrator Package
Tandberg Precision HD 1080p Camera
Tandberg C90 Natural Presenter Package
Tandberg C90 Premium Resolution Option
Panasonic PT-DZ6700L Data Projector
Spare lamp for above
Unicol ceiling mount plate for above
Unicol projector mount kit (PSU/CP1/2m pole)
Panasonic ET-DLE250 Long Throw Zoom Lens
Da-Lite Large Cosmopolitan Electrol 312cm x 417cm 4:3 Electric Projection Screen
Da-Lite Contour Electrol SCB-100 RS232 Control Module
AMX Netlinx NI-3100 Controller
AMX Modero NXT-1200VG RGB Kit
AMX PSN4.4 Power Supply

Wolfvision VZ-9Plus3 Visualiser
Smart Podium ID422w
Denon DN-V500BD Blu-Ray Player
Extron DXP 44 DVI Pro (DVI Matrix, Part Number 60-875-01)
Extron MMX 42 AV (CV & Audio Matrix, Part Number 60-556-21)
Extron DVI DA2 DVI DA(Part Number 60-886-01)
Extron MDA 3A (Audio DA, Part Number 60-440-01)
Extron GSS100 (Graphics Store, Part Number 60-684-01)
Extron VSW 2VGA A (VGA Switcher, Part Number 60-758-01)
Extron SW2 DVI A Plus (DVI Switcher, Part Number 60-964-21)
Extron RGB-DVI 300 (VGA to DVI Scaler, Part Number 60-906-01)
Extron DVI-RGB 150 (DVI to VGA Scaler, Part Number 60-808-01)
Extron VSC 500 (VGA to Video Scan Converter, Part Number 60-476-01)

Extron DVI DL 201 Tx/Rx (DVI Cat5e Extenders, Part Number 60-957-01)
Extron RSB 129 (19" Rack Adaptor, Part Number 60-604-02)
Kramer VP-434 (Component to HDMI Scaler)
Kramer RK-1 (19" Rack Adapter)

19" LCD Monitor (DVI input, 16:9, 1080p capable)
24" LCD Monitor (DVI input, 16:9, 1080p capable)
Sennheiser EW 512 G3 Radio Mic
Sennheiser L2015 Charger
Sennheiser NT 50-UK Power Supply
Sennheiser BA2015 Battery Pack
Audio Technica AEW-5233
Samson Servo 200 Amplifier
Kensington Presenter
Axis 210A Webcam
Beyerdynamic SHM 803 A Condenser Gooseneck Shotgun Microphone
Beyerdynamic ZSH 20 Flexible Shockmount Fixture for SHM Gooseneck
Littlite Lectern Light & PSU

Project Contingency (5%)



A typical graphic representation of a Lecture Theatre to show the AV furniture, column board system etc. Note that this image will be to scale, created from CAD drawings, using equipment specifications and design information.

3.05 TEACHING STUDIO

The University of Edinburgh currently has several teaching studios, the original one being based in Appleton Tower and a further two in the JCMB at Kings Buildings. A site visit to these locations is advisable to give you an insight into how these learning and teaching spaces differ from the conventional lecture theatre, seminar room models.

Although the cabling infrastructure is similar in all of the locations the technical capabilities will differ between the various studios. We would generally specify cabling and containment infrastructure that allowed for full facilities and the capacity to expand even if the system specifications were more limited than other designs.

The original concept was based on a more interactive approach than normal as well as the furniture being designed to allow for more flexible student group work. In some designs, the teaching studios have been created to enable the tutor to take information from any of the student desks and send the selected presentation to the remaining student desks. The tutor can also share his or her own information from the presentation tutor desk to the student desks. This is a two-way operation, which is controlled via an AMX system, which is generally housed within the tutor desk.

Each student desks can work independently via an 8-button control panel. These desks incorporate a dedicated pc and include connectivity for 2 laptops. A large format LCD screen normally provides a local display. In a recent designs, the screen is coupled with a white board/flipchart holder mounted on a column, which is slightly detached from the student desk to allow for more flexible working.

The p.a. systems incorporated in a Teaching Studio are similar to a Seminar Room or Lecture Theatre and utilise radio microphones to enable the tutor to move freely among the student tables. As the design of these spaces does not permit ranks of front facing seats and a conventional teaching wall, the tutor will often use an Interactive Board as their main means of presentation.

The most significant issues about teaching studios are their use of customised furniture to incorporate the required AV equipment, their use of space in terms of the room layout, their lack of a conventional front-facing teaching environment, their use of hard and soft / formal and social furniture and their interactivity.

3.06 VIDEOCONFERENCING SUITE

There are two basic display types available for video conferencing, projectors or flat screens. There are, however, several issues to consider. Glare from windows, or overhead lighting may reduce the quality of the image being projected. In a room where the lights are too bright, the only solution for a projector is to use a model with very high lumens. Lumens are the ratio of lamp brightness against the ambient light in the room. Projectors with high lumens are expensive and may not be an economical solution. In addition, some high-powered projectors have loud fans. While it is possible to reduce this type of noise the fan raises the ambient noise-level for your in-room participants.

The alternative to projectors is a flat screen, which can be either LCD or plasma. Both of these flat screen options operate in varied light conditions, and the impact of ambient light on image quality is minimal. They typically work well in any evenly lit rooms and provide a clarity that is not possible with mid-grade projectors. In most relatively recent VC installations LCD screens are generally the preferred solution.

Regardless of the display you select, the minimum screen size might typically be around 52", although larger screens of 60-72" are preferable in many situations, especially for larger rooms. Most video conferences done today are still displayed in standard resolution, but HD (high definition) screens are becoming more common.

Dual monitors are generally required as standard for most VC Suites because they allow for shared presentations and one or more video sources on separate monitors. In addition, the use of multiple monitors can also mimic an in-person meeting, or put more emphasis (e.g., full-screen) on the primary speaker.

In terms of the audio, reverberation and echo can distort audio signals. This is the main reason professional recording studios are designed with sound absorbing materials. Material such as carpet, draperies, fabric covered vertical blinds, and fabric wall coverings work best for video conference rooms. In addition, ceilings with soundproofing tiles will lessen reverberation or acoustic echo effect. Microphones specifically designed for video conferencing are highly sensitive. As long as the conference room microphones are centrally located, most microphones will capture sound around a standard boardroom type table.

The décor in a VC Suite needs to be considered and neutral shades such as beige, tan, pale grey or a pale slate blue work best. These colours provide the best ergonomic background and reduce eyestrain when viewing the video images. You should avoid stark whites and the darker palettes, which do not provide optimum background for viewing. Vibrant colours need to be avoided as they can reflect light and cast a hued pallor onto the individual's video image. Painted, papered or fabric walls, using drapes can be acceptable but often painted walls are best in a flat or semi-flat finish. Avoid gloss or enamel finishes as they reflect light. Avoid tight, intricate patterns, such as striping, checks or tight swirls. Paper or fabric wall finishes in a muted, pale colours with no texture or minimal tone-on-tone texture are optimum. In addition to problematic reflection effects, large glassed-in paintings, glass tabletops, and windows also create acoustic reverberation and echo. These may degrade the audio quality and might even require higher-end echo cancellation hardware to mitigate.

Furniture and decorating accessories should be kept to a minimum. Wall hangings within range of the camera should not have reflective surfaces. Materials such as mirrors or glass fronted framed prints reflect light and may cause the camera to overcompensate the brightness in the room. This also holds true for credenzas with glass or mirror-fronted hutches, and glass-topped tables. Keeping things simple and muted avoids any additional burden on the AV facilities. When selecting tables and chairs for the room, be sure to consider the functionality of each piece. A case in point would be if the room were used solely for video conferencing, setting the tables and chairs in a horseshoe or semi-circle configuration allows remote sites to view all your participants more easily. Alternatively, you can arrange the tables and chairs in a rowed design, making the room appropriate for training, presentation, and discussion formats.

Sunlight can disrupt the camera's ability to capture a good image, and it can make viewing a conference difficult as glare may overcome the brightness on many display screens and monitors. Interior rooms without windows for a video conferencing room are generally best so, where possible, use an interior room. For rooms with exterior windows, the window treatments such as vertical blinds or drapes should contain a solar-blocking or blackout to prevent glare. As with wall finishes, refrain from window treatments and fabrics that have patterns, and opt for finishes and fabrics in solid, muted pale tones.

Regardless of lighting fixtures selected, the goal is to use an evenly lit space with minimal shadowing. Diffused fluorescent fixtures work well, as do indirect candescent fixtures, which allow for a dimming feature. Stark, direct lighting, such as indoor spotlights, which cause heavy shadowing, do not work well in a video conferencing environment. Often a combination of indirect candescent and diffused fluorescent will offer the most lighting flexibility.

3.07 SCREENS

As a rule, the screen should be appropriate for the audience rather than the projector and must be able to be viewed from all reasonable positions in the room.

There are standard screen sizes based on the aspect ration of the projected image historically OHP, 35m slides and video were viewed on a 4 x 3 ratio screen but 16 x 9 (also 16 x 10) is now the more common aspect ratio to allow for widescreen presentations. However, in order to determine the optimum screen size and position it is necessary to take note of the room dimensions, the ceiling height, the seating layout and the content of the presentation. It is worth pointing out that there are some useful rule-of-thumb guidelines, for instance…

1. It is usual to install the largest screen possible.
2. The bottom of the screen should be at least 1.2m above the finished floor level.
3. In many locations, the top of the screen will be as high as practically possible (see Ceiling height note below).
4. The maximum viewing angle is generally considered to be 45degrees (see Viewing Wedge note and chart below).
5. The minimum distance for the first row of the audience is twice the screen height.
6. There is a standard rule-of-thumb for establishing the screen size, which is the 4-6-8 rule (see note below).

The 4-6-8 rule: The minimum screen size must allow viewers at the back to clearly read information presented on the screen and the furthest the audience should be from the screen is no more than four, six or eight times the screen height. This depends on the following…

1. Four times is for content like CAD or Photoshop files.
2. Six times is for detailed reading (spreadsheets or text with images).
3. Eight times is for watching a video or photos.

However, there is an alternative rule-of-thumb that can be used to determine the screen size and / or the maximum viewing distance, which is that the furthest away row of seats should be six time the diagonal of the screen. This rough calculation has served us (LTSTS) well over the years and is a reasonable starting point. I would use the six times rule as a general guide.

There is yet another view; that the maximum viewing distance of six times the *width* of screen. This rule is based loosely around 720 x 576 video information, a calculation based on the maximum distance that the eye can discern pixels from each other.

It is worth pointing out that because of things like restricted ceiling heights and other practical limitations it is not always possible to install the optimum sized screen.

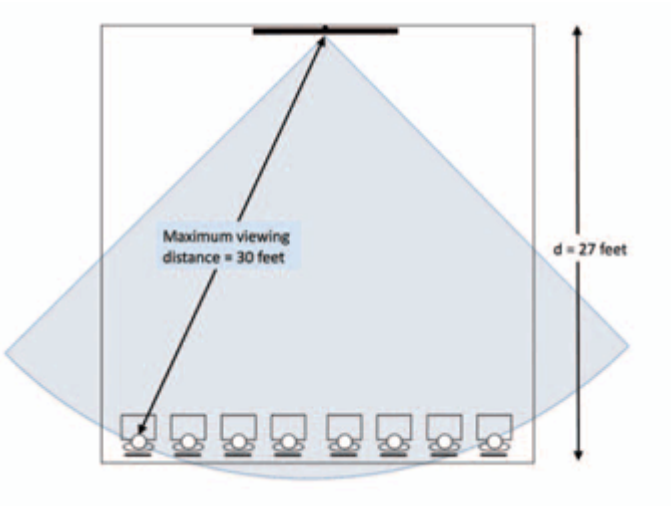
Screen size: One of the most fundamental decisions to be made in any location using AV is the screen size, which is influenced by the size, shape and ceiling height of the location, the seating arrangement and capacity and the viewing distance as well as the content and format of the material being viewed. The screen itself may typically be specified as either wall-mounted, ceiling-mounted, rail-mounted or as part of a column board system etc. Screens can also be either manual or designed to be electrically operated. Issues such as the height from the floor, surface material and whether it is front or rear projection need to be considered. Then there is the issue of the format of any projected material i.e. video or data and the screen ratio i.e. 1:1, 4:3, 16:10 etc. It is effectively impossible to specify an all-purpose screen. Without referring to complicated calculations for establishing the correct screen size for any given function we have used a few general rules-of-thumb. For all practical purposes the screen should be as large as possible. The bottom of the screen should be no lower that 1.2m from the floor and the distance from the teaching wall to the furthest away seat should not be more than five or six times the diagonal size of the screen. For instance, a 1.8m wide screen will have a diagonal size of 2.25m so the maximum viewing distance would be just over 11m. There are no universally recognised standards for screen sizes, only guidelines, all of which ultimately depend on the content of the presentation. With the move toward the widescreen high-definition output from laptops this has made it difficult to accommodate older standards as well as the most demanding formats. Some people use the 4-6-8 rule when the distance is four times when viewing CAD content, six times for spreadsheets and eight times for video. However, rooms are rarely booked out with that kind of flexibility in mind. A typical screen aspect and dimension calculator can be seen at…

http://www.silisoftware.com/tools/screen.php

Ceiling height: In general the minimum floor to ceiling height required to accommodate a standard 1.8m wide screen is 3m. As a rough guide 1.6m plus the screen height is about right. This is usually achievable in new buildings if it is included in the planning process along with building systems that share the space between the suspended ceiling and the underside of the floor above. A possible solution is to raise the ceiling at the teaching wall end of the room but to leave enough space above it to install the screen housing. If you absolutely cannot raise the ceiling, at least try to mount the screen housing above it.

Viewing Wedge: The area where students can see the image with little loss of legibility or distortion is called the “viewing wedge.” It is a 90-degree arc drawn from the centre point of the screen and extending 45 degrees to each side of the perpendicular triangle. It should extend to the maximum viewing distance (see previous note).

Seats can sometimes be arranged in a series of concentric arcs whereby students can see each other more easily. In this arrangement, eye contact increases significantly, leading to improved interaction and engagement.



The viewing wedge narrows towards the front of the room, resulting in visually suboptimal space on either side. This space may be recovered by angling the walls inward. The result is a room shaped like the viewing wedge, a bit larger, and with the tip sliced off. The area outside the wedge is available for other purposes. The wedge shapes fit neatly together in a circle or side by side, alternating in direction. Any odd shaped leftovers might be used for demonstration equipment storage, seating, and so forth. Rooms, which follow these rules, are quite space efficient, as well as superior pedagogically.

3.08 LIGHTING

There is a detailed Chartered Institute of Building Services Engineers (CIBSE) lighting guide available at the following link http://www.cibse.org/pdfs/lg5addendum.pdf

However, we have created some lighting settings as a guide for use on projects. We generally ask that the dimmer unit can be RS232 or network controlled and that a specified control cable is run between the AV control system (generally on the teaching desk) and the dimmer unit. We have specified iLight dimmer units as historically we have developed some in-house programming skills. Here are some typical settings but please note that these require to be up-dated and that lighting settings vary depending on the specific location and function…

5 & 2 BUTTON iLIGHT / DYNALITE SYSTEMS (SCHO410S DIMMER CONTROL UNIT)

2 BUTTON PANEL AT THE DOOR

1: HALL LIGHTS 100% BOARD LIGHTS ON

0: ALL OFF (Note: After a few seconds delay)

5 BUTTON PANEL ON THE TEACHING DESK

1. HALL LIGHTS 100% BOARD LIGHTS ON (FULL)

2. HALL LIGHTS ON 100% BOARD LIGHTS OFF (DIMMED HIGH)

3. HALL LIGHTS ON 50% BOARD LIGHTS OFF (DIMMED MEDIUM)

4. HALL LIGHTS ON 20% BOARD LIGHTS OFF (DIMMED LOW)

5. ALL OFF (OFF) (Note: after 10 seconds delay)

NOTE: The 50% and 20% stages above are not absolute. It only requires that they should be clearly defined steps. The percentages could be 60% and 10% for instance. The 5-button panel also incorporates UP and DOWN buttons.

CORRESPONDING BUTTONS ON AMX TOUCHSCREEN

1. AS PER BUTTON 1 / FULL

2. AS PER BUTTON 2 / HIGH

3. AS PER BUTTON 3 / MEDIUM

4. AS PER BUTTON 4 / LOW

8 & 12 BUTTON PROLOGIC SYSTEMS (AS PER QMRI, LITTLE FRANCE)

2 WAY PANEL AT THE DOOR

1. ON: HALL LIGHTS 100% / BOARD LIGHTS ON

2. OFF: HALL LIGHTS OFF

8 BUTTON PANEL ON THE TEACHING DESK

1. HIGH: HOUSE LIGHTS 100% / BOARD LIGHTS OFF

2. MED: HOUSE LIGHTS MEDIUM / BOARD LIGHTS OFF

3. LOW: HOUSE LIGHTS LOW/ BOARD LIGHTS OFF

4. OFF: HOUSE LIGHTS OFF / BOARD LIGHTS OFF

5. HIGH: HOUSE LIGHTS 100% / BOARD LIGHTS ON

6. MED: HOUSE LIGHTS MEDIUM / BOARD LIGHTS ON

7. LOW: HOUSE LIGHTS LOW/ BOARD LIGHTS ON

8. OFF: HOUSE LIGHTS OFF / BOARD LIGHTS ON

CORRESPONDING BUTTONS ON TOUCH-SCREEN CONTROL PANEL

BUTTONS 1 T0 8 AS PER DESK & WALL PANELS

09. DESK: DESK LIGHTS ON / STAGE SPOTLIGHTS DIM / STAGE STRIPLIGHTS OFF

10. STAGE: DESK LIGHTS OFF / STAGE SPOTLIGHTS ON / STAGE STRIPLIGHTS ON

11. DESK & STAGE: DESK LIGHTS ON / STAGE SPOTLIGHTS ON / STAGE STRIPLIGHTS ON

12. Q&A: DESK LIGHTS ON / STAGE SPOTLIGHTS ON / STRIPLIGHTS ON / HOUSE LIGHTS UP

NOTE: This location includes VC facilities and the lighting allows for illuminating the whiteboards on one side of the column board system while allowing a presentation on the other part of the column board system, which is a typical demand from academic colleagues in more recent projects.

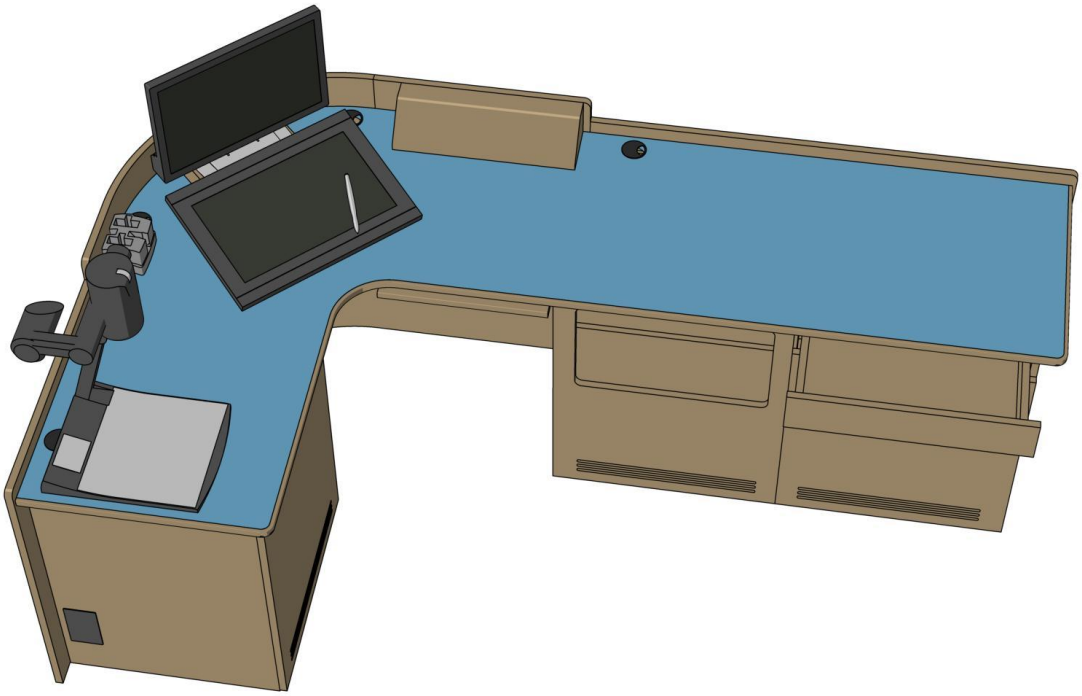
3.09 AV FURNITURE

Audio Visual furniture includes things like teaching desks, presentation desks, floor-standing lecterns, desktop lecterns, teaching studio tables, study pods, AV cabinets and a variety of bespoke items.

We often consider the AV furniture as essentially being a unit to house the AV equipment, which can sometimes be two racks of equipment (as in the case of a lecture theatre) as well as the unit for housing the control panel or touch-screen. It is very much the working area for many lecturers and requires space for a laptop and notes. It needs to be well ventilated and supplied with power and network as well as signal and control cabling. It should be accessible and designed with wheelchair users in mind as well as being comfortable for keyboard use whilst standing.

We normally incorporate a desk microphone and a desk light as well as a pull-out tray to house the pc keyboard. Designs for AV furniture are constantly revised as demands change, usage develops and technology changes.

We try as much as possible to match AV furniture to the same finish as the surroundings. We try to make it as ergonomic as possible although we would always put function before form, as users would regard the AV systems as critical although we can often expect to get a reasonable balance between function and aesthetics.



A large teaching desk, designed by LTSTS, for use in The Swann LT.

3.10 DISABILITY

Audio Visual facilities for the disabled can cover a wide range of issues and equipment from the induction loop for the hard of hearing to teaching desks designed to allow for wheelchair access etc. The list also includes…

Projection screens designed to maximise the viewing angles and contrast to improve presentations for the visually impaired or dyslexic etc.

Tie-clip radio microphones and Kensington presenters to allow users to be less restricted by presentation areas.

Vocal reinforcement, infra-red hearing helpers and induction loops.

Lecture capture and streaming including audio capture.

Touch-screen control systems with layouts that include graphics and text.

Welcome / Information screens that permit the display of text etc.

Interactive Boards and electronic writing tablets that permit text to be displayed in better contrast etc.

Motorised screens and writing boards.

3.11 INTERACTIVE BOARDS

An interactive whiteboard is an electronic whiteboard, which looks like a standard whiteboard but it connects to a computer and a projector in the classroom so that when connected, the interactive whiteboard becomes a large, touch-sensitive version of the computer screen.

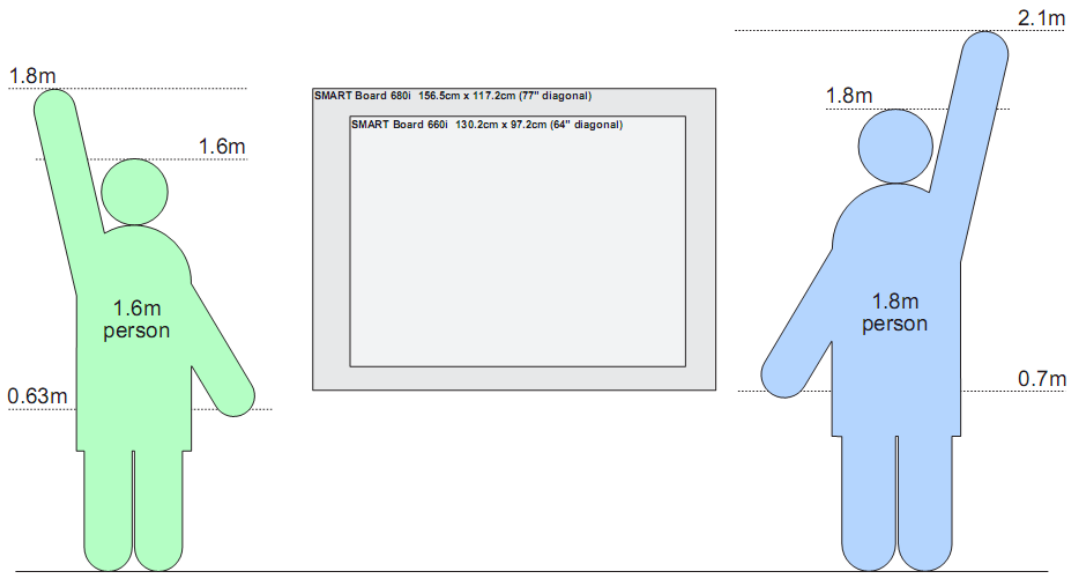
Instead of using the mouse, you can control your computer through the interactive whiteboard screen just by touching it with a special pen or even, in some cases, with your finger. Anything that can be accessed from your computer can be accessed and displayed on the interactive whiteboard, for example Word documents, PowerPoint presentations, photographs, websites or online materials.

Using special software included with the interactive whiteboard, you can also interact with images and text projected on the board: rearranging them, changing their size, colour, etc. This offers a much more interactive experience than using a standard whiteboard or using a data projector alone.

It is important that when considering installing something like a 70” LCD Interactive Board that you take into account the brackets and the structure required to support a screen that can weigh almost 120kg.

The rule of thumb for locating an interactive board is to consider that a person 1.6m in height has a nominal upper reach limit of perhaps 1.8m and a person whose height is 1.8m would have a limit of 2.1m. As it is vital that all parts of the board can be comfortably reached by an average person. It is important to bear these measurements in mind. It is also important not to obstruct the location of a wall-mounted board with dado rails or containment. The bottom of an Interactive Board should be set around about 1.2m from the floor to enable the audience to see the presentation. There are boards available with height adjustable mounts to allow for different users, including disabled users.

SMARTboard ergonomics



Here is an example of an Interactive Board including the data projector and loudspeakers.

Here is another example of an Interactive LCD screen, where no data projector is required.

3.12 TEACHING WALLS AND WRITING SURFACES

A teaching wall can be considered as the logical wall where a presentation might be displayed, where a lecturer might naturally stand to face the audience and where there is likely to be the least disruption to a presentation by latecomers, traffic, ambient light, etc.

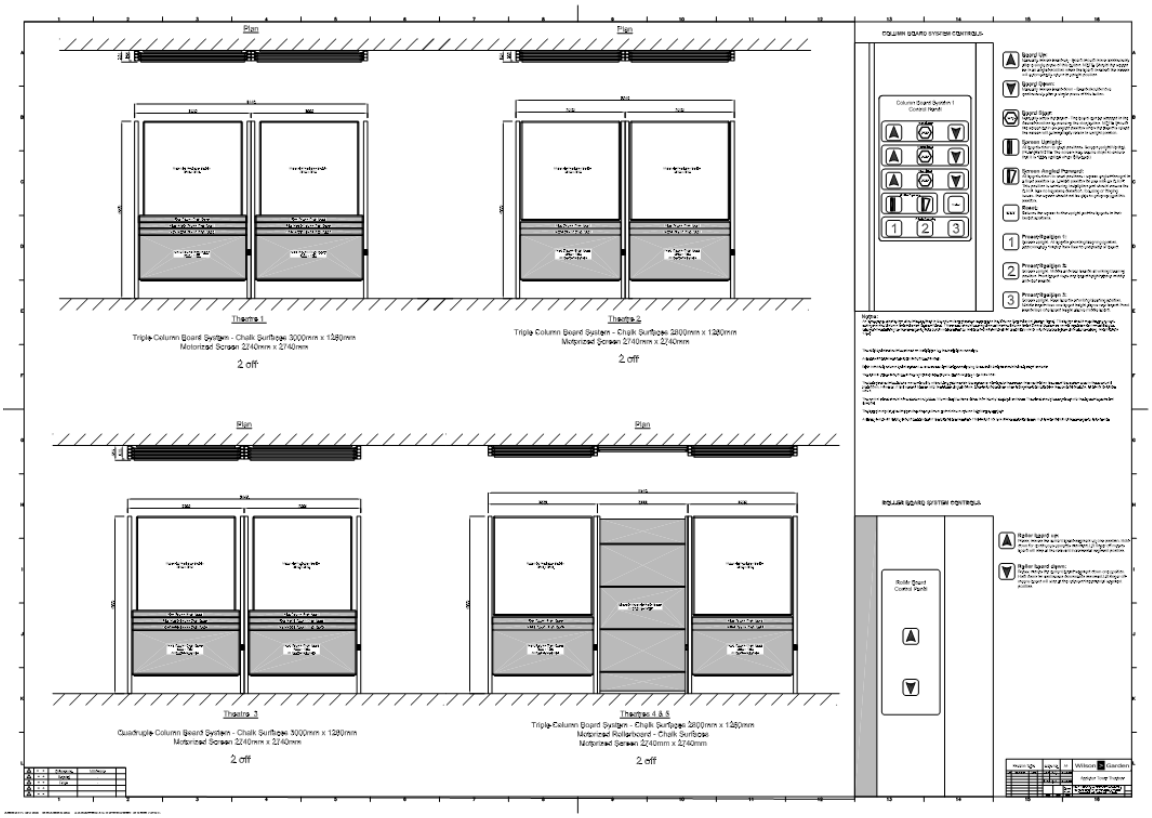
In a lecture theatre a teaching wall might reasonably include one or two screens for single or dual projection, writing boards, which could be either vitreous enamel whiteboards or the more traditional chalkboards.

In smaller locations there might be a pull-down screen (sometimes motorised), a flipchart holder and a whiteboard. These facilities can sometimes be accommodated on a rail system to allow for some degree of flexibility.

It can often be advisable to consider the teaching desk or presentation desk / cabinet alongside the teaching wall as it will be related in terms of the lecturer's view of their presentation as well as allowing for space to interact with the audience and wheelchair access etc.

Ceilings can often be raked up at the teaching wall end of a room in order to maximise the space allowed for the screens and boards etc. The walls will often include a pair of wall-mounted loudspeakers for source audio i.e. to enable the sound of a video to come from the same point as the image.

Lighting above a teaching wall is often required to be dimmed or, more commonly, separately switched in order to improve the contrast on any presentation.



A large lecture theatre teaching wall to include an electrically operated column board system

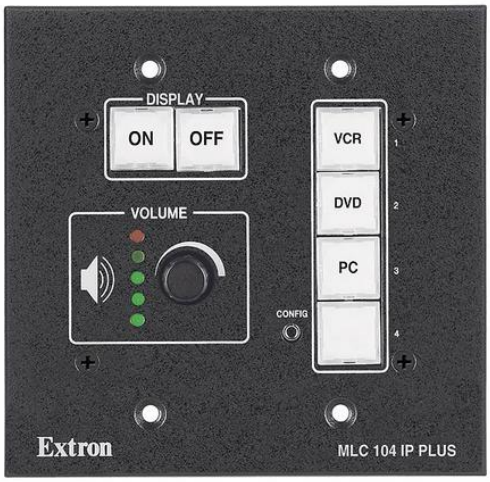
3.13 CONTROL SYSTEMS

A control system can be considered as replacing all the remote controls in a system by effectively allowing communication between equipment. This does not mean that a control panel can replace all the functionality of a remote control but it can replace enough basic functions to allow the users to utilise the equipment under the vast majority of circumstances. It uses a touch button pad (see below left) or a touch screen (below right) in order to carry out functions such as powering a data projector, selecting sources or controlling the audio levels. It can provide the ability to monitor and remotely control equipment in the system as well as providing maintenance and security alerts.

Control systems are an essential part of the infrastructure of any teaching and learning space and normally require power and network as well as control cabling. We generally use AMX http://www.amx.com/ or Extron http://www.extron.com/index.aspx control panels.

Control systems have allowed for less support by providing the same user interface regardless of the different equipment in a location. Essentially, the user no longer needs to become familiar with a host of remote controls; they merely need to spend a few minutes familiarising themselves with a touch screen or button pad that they will find repeated throughout the University's teaching and learning spaces.

Control systems can also be used to control lighting, blinds, curtains, screens etc.



3.14 FLOORBOXES

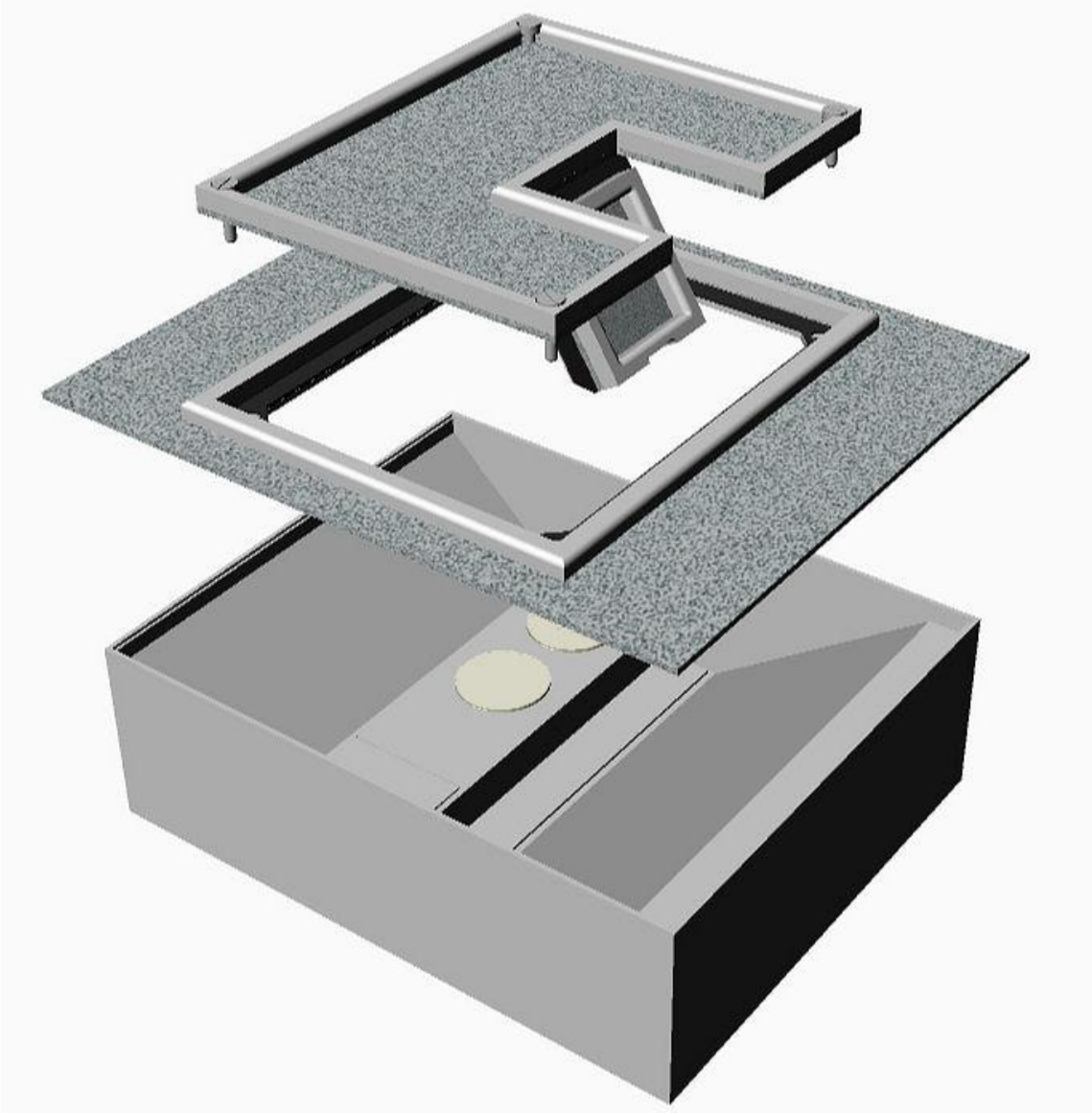
Floor boxes are required when considering power, network and occasionally, control to areas of a location where it is not convenient or physically possible to provide containment.

Floor boxes can increase the flexibility of a location but can also be restrictive. They require some management, as they can often be found open or broken. They can often become a trip hazard.

There are very few AV specific floor boxes and they sometimes require to be custom made.

There are other ways of providing these services to an area such as the use of wireless network, I/R control and fixed furniture e.g. a product like the Totem from TeamMate.

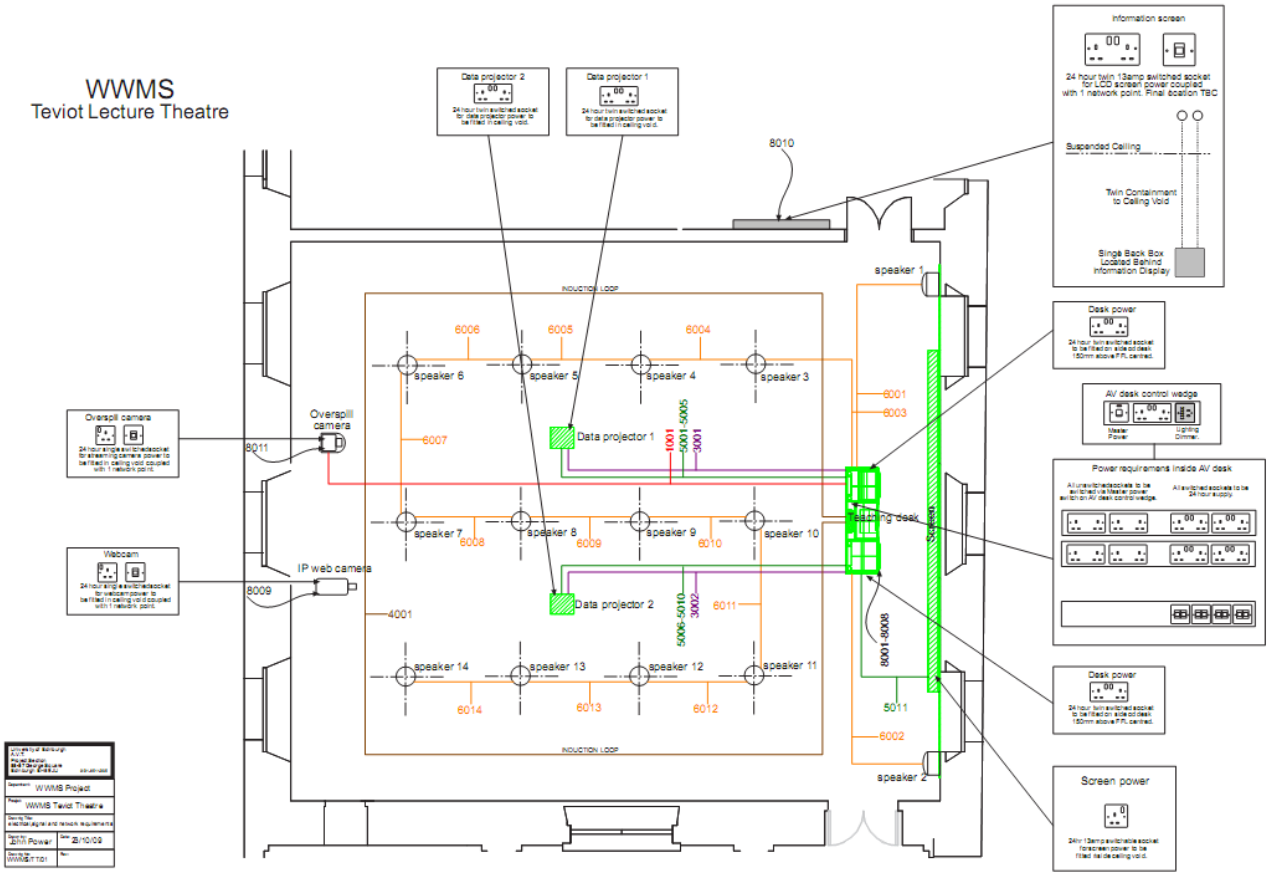
A typical floor box…



3.15 POWER

The power requirement associated with a lecture theatre would normally be for a 30amp supply to the teaching desk. Distribution inside the teaching desk to the equipment racks etc would be either via switched master supply to un-switched sockets or 24 hour supply for switched sockets (those not controlled via the master power switch in order to allow some equipment a constant, uninterrupted 24hour supply) with a possible further distribution via a surge protection unit.

Power and network provision would also be required for AV equipment external to the teaching desk i.e. data projectors, cameras, interactive boards etc. In the case of locations where some equipment may be located in a projection room or booth or an AV cupboard it is important to note that all the AV equipment should be wired from the same ring mains in order to avoid hum on the audio or any distortion of the projected image.

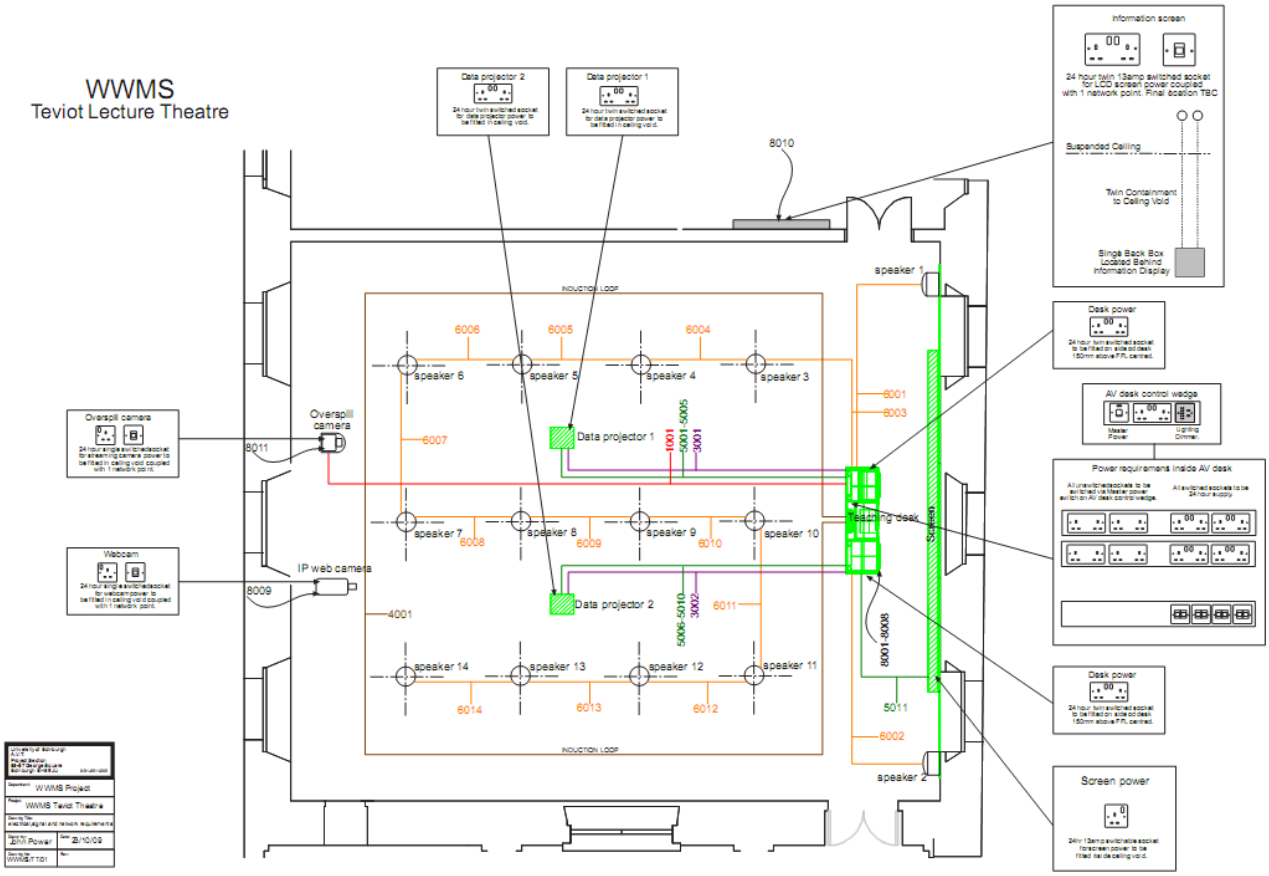


3.16 NETWORK

The network requirement associated with a lecture theatre would normally be in the region of eight network points in the teaching desk to allow for the dedicated pc, the control system and to control and monitor the audio. This assumes wireless network provision in the theatre for laptops and allows some room for expansion of the system if required. Similarly, there would be a provision of up to four network points at the rear of the theatre to allow for cameras and data projector connectivity if required.

For smaller locations these numbers would be scaled down but the minimum requirement might reasonably be considered as four in the teaching desk / presentation area and two at the rear (wherever the camera and data projector is located).

Typical network requirements would be included in the AV wiring diagram along with power, signal and control cables.



3.17 BRACKETS

There are a variety of specialist brackets and shelving associated with AV equipment for use with things like ceiling-mounted data projectors, wall-mounted pull-down screens, information screens, interactive boards, cameras, monitors, etc. In particular, consideration has to be taken to where ceiling-mounted data projector brackets and ceiling-mounted loudspeaker brackets may be located in relation to lighting grids and to reinforcing walls where a large LCD or plasma screen may be installed.

Some typical brackets…

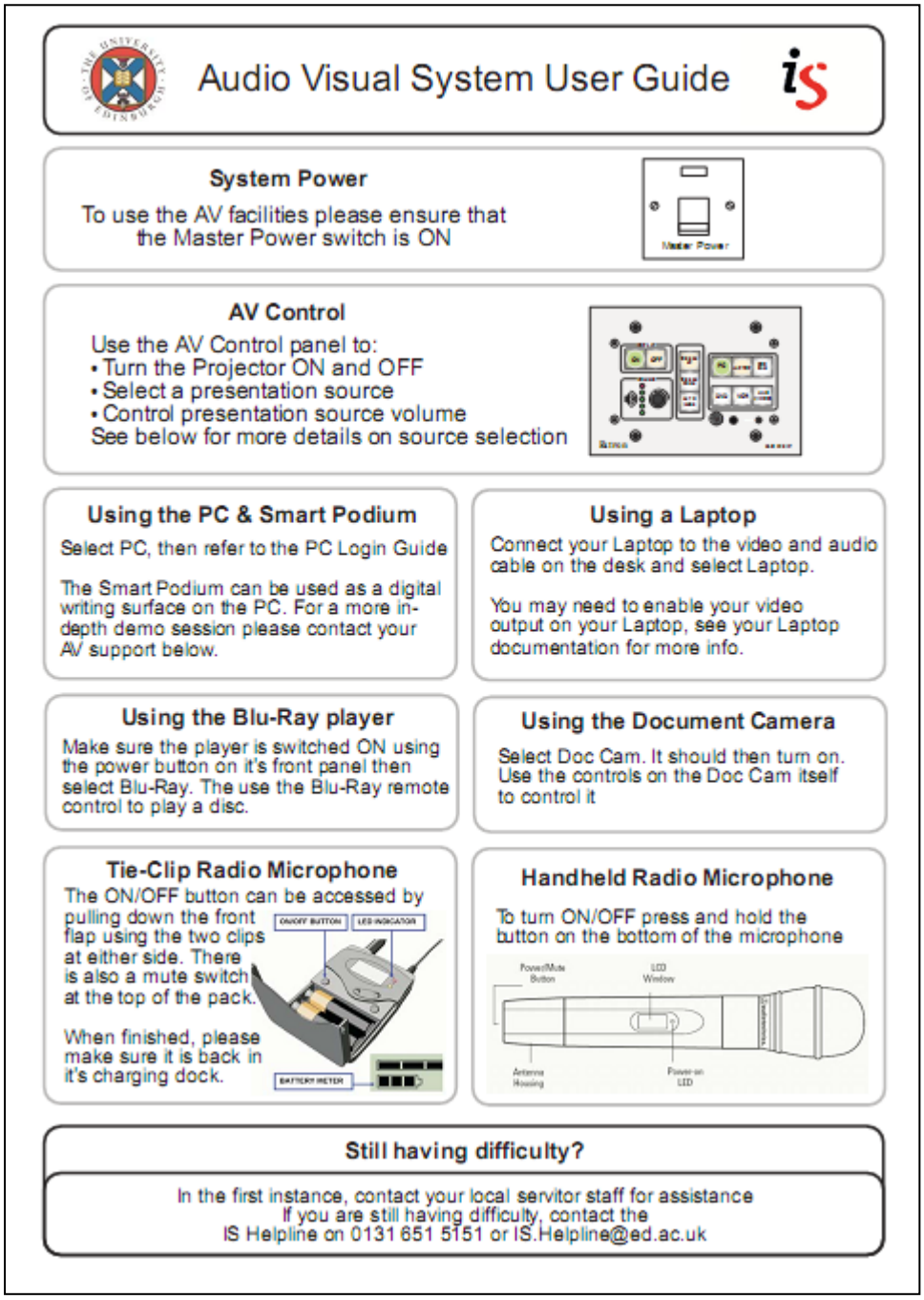
3.18 WELCOME / INFORMATION SCREENS

Welcome screens are often located in Reception areas and other public spaces in order to display information about the School / Building / Department or events etc. They require power and network and need to be securely mounted. The weight of the screens can vary a great deal depending on the size and type of screen and ventilation can be an issue if they are to be surface mounted or enclosed. LCD and plasma screens have been identified as potential fire hazards and they should be carefully located to avoid stairwells or lifts where toxic fumes may present a problem.

There are many systems for delivering information to these screens and the function of the screens can sometimes be limited to room booking or timetable information. It should be remembered that they very often require management e.g. to update information on the screens as well as power management so users in Schools and Colleges need to be aware of this issue.

3.19 SIGNAGE AND USER GUIDES

User Guides can often be superfluous, especially if a control system is correctly designed, programmed and set-up to be as intuitive as possible. However, they have a place and it is worthwhile noting that projects should include some degree of signage to ensure that users are aware of induction loops, how to use the facilities, how to get help, how to log-in etc as well as the standard signage in a room to indicate Fire Exits etc. Electronic signage and User Guides are becoming the norm and it is worth considering this when looking at projects. Try to ensure that any signage whether it is text or graphics, or both, is designed to be as accessible as possible. Here are examples of a Ser Guide and a Login Guide…



Audio Visual System User Guide

System Power

To use the AV facilities please ensure that the Master Power switch is ON

AV Control

Use the AV Control panel to:
- Turn the Projector ON and OFF
- Select a presentation source
- Control presentation source volume

See below for more details on source selection

Using the PC & Smart Podium

Select PC, then refer to the PC Login Guide

The Smart Podium can be used as a digital writing surface on the PC. For a more in-depth demo session please contact your AV support below.

Using a Laptop

Connect your Laptop to the video and audio cable on the desk and select Laptop.

You may need to enable your video output on your Laptop, see your Laptop documentation for more info.

Using the Blu-Ray player

Make sure the player is switched ON using the power button on it's front panel then select Blu-Ray. The use the Blu-Ray remote control to play a disc.

Using the Document Camera

Select Doc Cam. It should then turn on. Use the controls on the Doc Cam itself to control it

Tie-Clip Radio Microphone

The ON/OFF button can be accessed by pulling down the front flap using the two clips at either side. There is also a mute switch at the top of the pack.

When finished, please make sure it is back in it's charging dock.

Handheld Radio Microphone

To turn ON/OFF press and hold the button on the bottom of the microphone

Still having difficulty?

In the first instance, contact your local servitor staff for assistance
If you are still having difficulty, contact the
IS Helpline on 0131 651 5151 or IS.Helpline@ed.ac.uk

Teaching Spaces PC Login Guide

Choose the mode you want to use

Normal Login mode:
(**U**niversity **U**ser **N**ame required – giving access to full functionality)

1. Press **Ctrl-Alt-Del** at the login screen.
2. In the Login box, type:
   Username: **Your UUN**
   Password: **Your password**
3. Click the Arrow button or press return.

This mode gives full access to both the Network and the complete suite of managed software, but only if the user has a **U**niversity **U**ser **N**ame.

Guest User login mode:
(Visitor login with **Limited** applications and no network access)

1. Press **Ctrl-Alt-Del** at the login screen.
2. In the Login box, type:
   Username: **.\pcguest** (using dot, backslash)
   Password: **pcguest**
3. Click the Arrow button or press return.

This mode has been designed to allow the presentation of pre-prepared material, when the user does not have a **U**niversity **U**ser **N**ame or in the event of a Network Fault.

To copy files onto the PC:

Press the Start Button select Computer then locate folder C:\Workspace

To connect a USB device:
Plug it into USB port on the front of the PC. Windows will self-install the device.

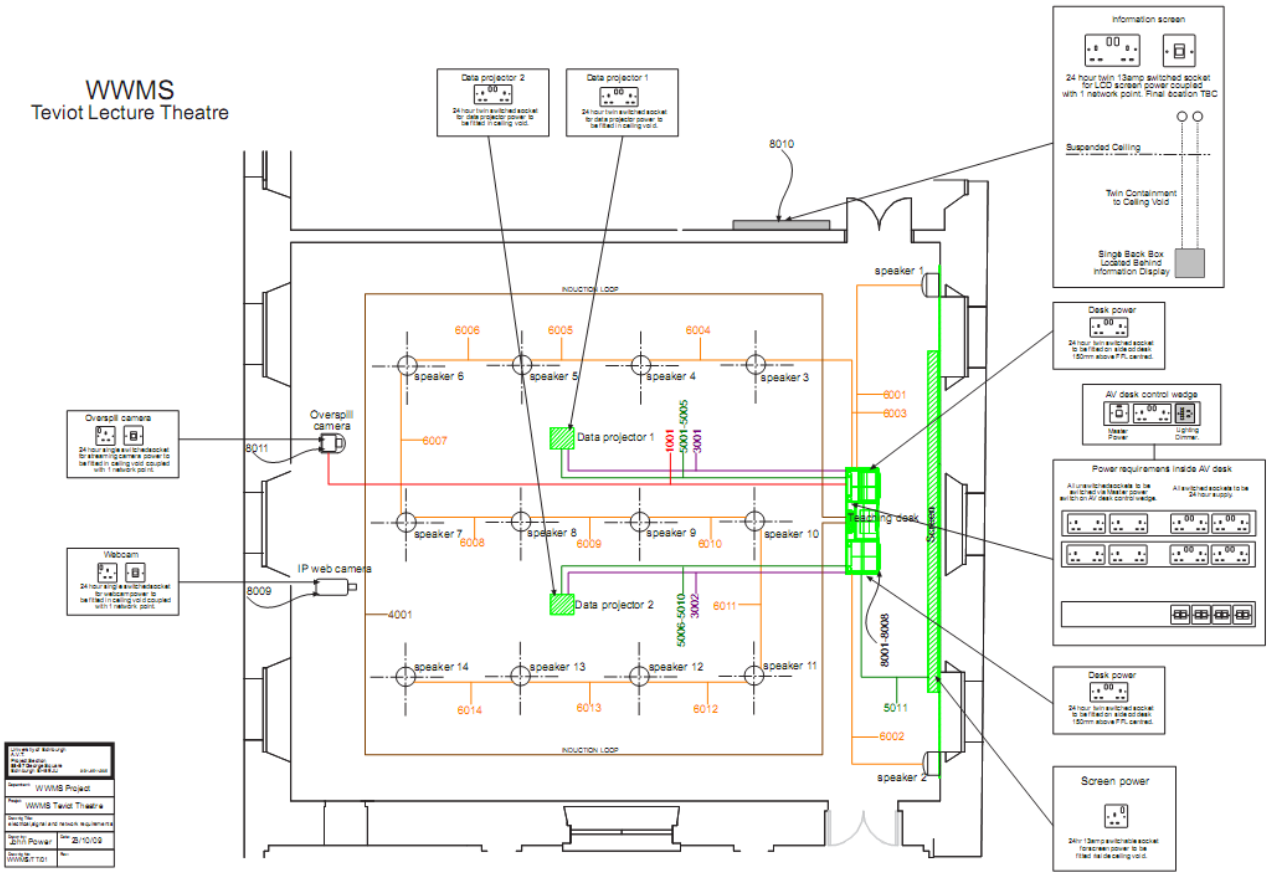
When finished you session, please LOG OFF Log off **DO NOT switch off the PC**

If you have any problems during login, or to report a system fault, please contact LTSTS.
Phone: (6)50 4097
Email: ltsts@ed.ac.uk

3.20 SIGNAL & CONTROL

The wiring requirement associated with signal and control in a lecture theatre are concentrated in the teaching desk with additional cables being run to external devices such as the data projectors, the induction loop, cameras, additional microphones, loudspeakers etc.

For smaller locations the cable numbers would be scaled down but there will generally be a minimum requirement for cabling and containment between the AV cabinet or presentation desk and the data projector, Interactive Board or LCD screen.



4.0 TECHNICAL APPENDIX REFERENCE MATERIAL

4.01 Programme of Works N/A

4.02 Small Teaching Room http://www.ed.ac.uk/schools-departments/estates-buildings/buildings-information/a-z-buildings-list?rid=1.2&fid=01&bid=252&cw_xml=http://www.scripts.csg.ed.ac.uk/estates/rooms/Room_info.cfm

4.03 Seminar Room http://www.ed.ac.uk/schools-departments/estates-buildings/buildings-information/a-z-buildings-list?rid=G.02&fid=00&bid=228&cw_xml=http://www.scripts.csg.ed.ac.uk/estates/rooms/Room_info.cfm

4.04 Lecture Theatre http://www.ed.ac.uk/schools-departments/estates-buildings/buildings-information/a-z-buildings-list?rid=1.06&fid=01&bid=201&cw_xml=http://www.scripts.csg.ed.ac.uk/estates/rooms/Room_info.cfm

4.05 Teaching Studio http://www.ed.ac.uk/schools-departments/estates-buildings/buildings-information/a-z-buildings-list?rid=1.03&fid=01&bid=201&cw_xml=http://www.scripts.csg.ed.ac.uk/estates/rooms/Room_info.cfm

http://www.ltsmg.org.uk/FinalV42.htm

http://www.agocg.ac.uk/reports/mmedia/casestdy/brunel/standard.htm

http://www.jiscinfonet.ac.uk/infokits/learning-space-design/design-high

http://www.jiscinfonet.ac.uk/Resources/external-resources/sfc-spaces-for-learning

http://www.jisc.ac.uk/media/documents/publications/videoconferencetb.pdf

http://www.avtechnologyonline.com/article/31400.aspx

http://www.ed.ac.uk/schools-departments/estates-buildings/buildings-information

http://www.flickr.com/photos/jimsheach/4099824263/in/photostream

http://www.flickr.com/photos/jimsheach/4100581806/in/photostream

http://www.flickr.com/photos/jimsheach/4099824429/in/photostream

4.06 Videoconferencing Suite
http://www.jisc.ac.uk/media/documents/publications/videoconferencetb.pdf

http://www.ed.ac.uk/schools-departments/information-services/services/computing/comms-and-collab/videoconferencing/overview

http://www.jisc.ac.uk/media/documents/publications/videoconferencesmb.pdf

4.07 Screens http://www.silisoftware.com/tools/screen.php

http://myhometheater.homestead.com/viewingdistancecalculator.html

4.08 Lighting http://www.ilight.co.uk/downloads/iLIGHT%20Binder-LecTheatre.pdf

http://www.cibse.org/pdfs/lg5addendum.pdf

4.09 AV Furniture
http://www.educause.edu/ELI/LearningPrinciplesandPractices/LearningSpaceDesign/5521?bhcp=1

4.10 Disability
http://www.direct.gov.uk/en/DisabledPeople/EducationAndTraining/Schools/DG_10013035

4.11 Interactive Boards http://smarttech.com/

http://www.prometheanworld.com/

4.12 Teaching Walls http://www.teacherboards.co.uk/column-boards/

http://www.spacerighteurope.com/products/column-boards

4.13 Control Systems http://www.amx.com/

http://www.extron.com/

http://www.crestron.eu/

4.14 Floor-boxes http://www.floorbox.co.uk/_files_/user_files/pdf_specs/ip66_spec.pdf

4.15 Power N/A

4.16 Network N/A

4.17 Brackets http://www.unicol.com/

http://www.chiefmfg.com/

4.18 Welcome / Information Screens N/A

http://www.onelandigitalsignage.com/

http://www.igel.com/uk/

4.19 Signage and User Guides N/A

4.20 Signal & Control N/A