

AUDIO VISUAL SYSTEMS SPECIFICATION

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1 Introduction

The University is a company limited by guarantee, established in 2004. The company has two members, being the University of Essex and the University of East Anglia. The company is regarded by HM Revenue and Customs as being an exempt charity.

The University currently has a student population in excess of 3,350 full time equivalents based both at the main campus in Ipswich and across the wider learning network. The UCS learning network is a distributed model delivered in partnership with five Colleges of Further Education across Suffolk and South East Norfolk.

Current major developments include:

- Acquiring land at Orwell Quay in Ipswich. The University is currently in the final stages of acquiring a plot of land on the Ipswich waterfront from Ipswich Borough Council. This plot, known as "Orwell Quay" will form the cornerstone of the University's development into the early part of the next decade. This site will encompass teaching accommodation, students housing and residential/commercial use.
- A collaborative venture between UCS, Suffolk County Council and the Suffolk Learning and Skills Council to establish a number of Learning & Enterprise Access Points (LEAPs) across the county. These will be able to deliver information, advice and guidance to prospective students and access to a range on on-line learning materials and the University's virtual learning environment.

These are just some of the major developments currently underway. The University has pursued a policy of growth and diversification of activity and this is set to continue both in the main Ipswich campus and across the learning network.

The University Campus Suffolk (UCS) has built a new landmark building on the waterfront off Coprolite Street, Ipswich.

Once completed the building will provide:

- 2 large (140 seat) lecture theatres
- 3 large (80 seat) classrooms
- 6 medium (60 seat) classrooms
- 3 small (35 seat) classrooms
- 2 small (30 seat) classrooms
- 8 small (18+ seat) teaching rooms
- 1 learning resource area
- 1 boardroom
- Circulation areas / lobbies / reception
- Administration office space

This document details general specifications and requirements for the audio visual systems that are to be installed in the new building. This document does not cover IT requirements, except those which affect the audio visual provision.



The AV equipped areas shall be within the ground and six upper floors.

The building will be used for a number of high profile events where members of the press may be invited to record guest speakers. In addition the facilities will be available for other organisations in education and the wider community to hire for conferences and seminars.

The new building will showcase the facilities UCS has to offer its students and the surrounding communities.

UCS is developing a standardised approach to audio visual facilities provided in their classrooms. This standardised approach will be employed in the new building. Where possible the AV Contractor shall apply these standards.

1.1 Definitions

The use of "shall" indicates an action on the part of the AV Contractor; the use of "will" indicates an action by another party.

"University" refers to the University Campus Suffolk.

"Main Contractor" refers to Willmott Dixon who is responsible for the construction of the new building.

"Tenderer" refers to the company responding to this document.

"AV Contractor" refers to the tenderer appointed to carry out the works.

Throughout this document where an item, component or service is marked as "optional" the tenderer shall provide the associated cost outside of the total. Should this option be included in the works during the project the University shall provide written instruction to the AV Contractor and the cost included in the AV tender package total. The University reserves the right not to purchase such items.

Where a "suggested model" has been stated it is intended only as a guide to the expected performance level and functionality of the device. The AV Contractor shall confirm its suitability. It is the AV Contractor's responsibility to ensure that the device installed fulfils the requirements of the system. Where a "preferred model" has been stated the AV Contractor shall provide this model. If this model is no longer available or is inappropriate the AV Contractor shall provide an alternative model, explaining the choice. Such alternative shall be of equal or better performance specification.

1.2 Instructions to Tenderers

Tender responses shall include a completed bill of quantities in hard and soft copy.

To provide a speedy and fair evaluation of all tender responses an Excel spreadsheet has been provided as a template. Responses not in this format will be rejected. Additional line items may be added to the data sheet if required.

All line items in the bill of quantities shall be priced exclusive of VAT.

Labour / Engineering daily charge rates shall be clearly shown (quantity values should be to the nearest ½ day)



Tenderers are encouraged to describe recent examples as references of similar project work.

Where necessary, Tenderers may be required to attend a mid-bid interview.

1.3 Scope of Work

This project is considered as a single 'package'. The installation and configuration of the system described below form part of that package; other activities such as user training and documentation are an equally important part of this project.

The scope of work consists of the final system design, equipment supply, factory acceptance testing, installation, control system configuration and programming, systems commissioning, documentation and user training.

Activities include:

- Site inspections, meetings and design co-ordination particularly in respect of architectural and infrastructure issues.
- Site meetings with the University AV and IT staff to design and coordinate the AV system functionality and user interface.
- Compliance with CDM 2007 requirements
- Production of equipment schedules with associated costs.
- Production of necessary drawings to advise the design team e.g. system schematics, equipment rack elevations, screen elevations, lectern layout plan, fixing details and equipment cut sheets.
 - Schematics shall be in the standard format, i.e. one drawing for each of audio, video and control/power with signal flow from left to right.
 - Where connectivity to other services is required they shall be clearly identified in these drawings.
- Documentation / O&M manuals (detailed in appendix A)
- Project management / planning and control
- Coordination of all design and installation works under the direction of the Main Contractor
- Provision of samples for approval

The installation element includes:

- Un-crating, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required of all equipment except as otherwise noted
- Provision of all necessary access and safety equipment
- Disposal of waste materials



- Protection of the works from effects of other trades
- Interconnect wiring of the components of the system
- System component configuration (e.g. audio mixer)
- Control system programming
- Equipment alignment and adjustment
- All other work whether or not expressly required herein which is necessary to result in a completely tested, functional and operating system

1.4 Associated Works by Others

The following will be undertaken by others:

- Installation of the lighting, power and earthing system to each AV equipped space.
- Installation and provision of all IT services (unless stated otherwise).
- All builders' work (unless stated otherwise) in connection with this contract including cutting of ceiling and floor -tiles, sealing of cable ducts and cutting of front wall for programme speakers.
- Containment (unless stated otherwise). This includes floorboxes, trays and conduit.

1.5 Programme

The project programme is planned to commence on 4th August 2008 and must be completed by 22nd August 2008. Completion implies full testing and user acceptance of all systems.

All rack building, programming and factory testing shall take place off-site prior to installation.

On award of contract the AV Contractor shall provide all necessary information to allow a fully co-ordinated construction programme to be produced. This shall be completed within one week of appointment.

The AV Contractor shall arrange off-site and post installation commissioning with the University and shall provide access for inspections and witness of commissioning should the University or its nominated representative wish to attend.

1.6 Control Code

The University has stated that they have no preference of control system manufacturer.

In smaller rooms such as classrooms a simple control system is required.

The AV Contractor shall meet with the University to develop the control methodology and user interfaces. The meetings shall define the control system scope/parameters, user interface design, process flows. The University will be required to approve the design at each stage.



On completion of the project all associated code, panel layout and configuration files for the AV system shall become the property of the University. Where copyright in the codes is held by another party and where necessary the AV Contractor shall arrange at no cost to the University a perpetual licence to use the codes in any way it requires throughout the life of the products.

1.7 User Training

The AV Contractor shall provide user training to The University's operational and maintenance staff. The training shall provide sufficient detail to the operators to configure and use all aspects of the systems. A training schedule with summarised agenda shall be provided for approval. The training sessions should cover every aspect of the system to ensure a complete understanding of how the system functions. The AV Contractor shall coordinate their efforts with the University to ensure all training requirements are delivered.

Maintenance staff training shall cover all first line maintenance operations including but not limited to:

- Projector lamp replacement
- Filter cleaning and replacement
- Screen and lens cleaning operations
- Camera set up and alignment
- Projector set up and alignment
- Microphone set up and maintenance (e.g. battery change)
- Limitations of the system
- Basic troubleshooting

1.8 Defects Liability Period

The defects liability period shall be for 12 months commencing from the issue date of the final completion certificate.

1.9 Warranty and Maintenance

1.9.1 1 Year Warranty

The AV Contractor shall provide a minimum 1 year warranty on all equipment and materials installed. The warranty period shall commence on the date the systems are accepted by the University or its representative. Where manufacturers provide more than 1 years warranty then this extended warranty period in its entirety shall also be passed on to the University.

1.9.2 Maintenance Contract

The AV Contractor shall provide a one year post install maintenance contract over and above the warranty provision. The tender response shall provide as a minimum support response



times, replacement equipment options, additional programming modifications and maintenance tasks all in accordance with Appendix D, Schedule 9 – Service and Support.

In addition pricing shall be provided for the same level of service for both a 3 year fixed price and a 5 year fixed price option. A separate line in the bill of quantities shall detail each of these prices.

2 Audio Visual Equipment

The following is a description of the equipment and infrastructure that shall be installed based on current user requirements and functionality that could be added at a later date.

As well as the audio, video and control systems the installation includes lecterns, equipment racks and connection panels/faceplates.

2.1 Standard Equipment

To simplify the ongoing support of the system, wherever possible, all equipment to be installed in the new building shall match that described in the Schedules. Where alternative equipment is provided the AV Contractor shall make all reasonable endeavours to ensure the make and model offered is a recognised standard product within the industry and will be available in similar or improved form for at least five years following completion of this contract.

2.1.1 Sources

Each lecture theatre, classroom and teaching room will have a number of sources that may include PC's, DVD player, Visualiser and Auxiliary inputs.

PC's and laptops will have VGA and stereo audio capability, they will have connectivity with University's network and will be free issued to the AV Contractor.

Details and schematic drawings of the requirements for each facility are given in the Schedules provided in Appendix D.

2.1.2 Lecture Recording

Lecture Theatres 1-2 shall be equipped with a presentation recorder supplied by others.

The University shall advise the location of the unit within the Lecture Theatre. The University shall advise on the modes of use during the design of the control system.

2.1.3 Security

Anti-theft devices shall be supplied and installed to all projectors, DVD players, LCD/plasma display screens and visualisers which are located in open access areas. It is not necessary to provide these in the rack mounting room since this room will be lockable.

2.1.4 Network Connectivity and Interconnectivity



AV equipment connecting to the University's IT network shall have static IP addresses. Other standards such as IP addressing schemes, cable colours and labelling shall be coordinated with the University's IT team to ensure compliancy. Devices shall connect directly to the network; no mini hubs or switches shall be used.

Where large events are in progress video and audio will be relayed out to the other theatres and classrooms if required.

2.2 Lecterns

The University has standardised teaching spaces around the TeamMate lectern system, this shall enable a lecturer to move from one teaching room to another with seamless transition.

Details and schematic drawings of the requirements for each facility are given in the Schedules provided in Appendix D.

Three copies of drawings of the lectern layout showing particular attention to cable management shall be provided to the University for approval prior to an order being placed.

Cables exiting lecterns shall be bundled, secured to the lectern and protected by sheathing.

The 'tail' shall be 2m long to provide easy manoeuvring.

The choice of connectors shall allow plugging up without error and shall have minimal impact on signal quality.

CAT5e cables and RJ45 ports shall be clearly colour coded to ensure that devices are connected to the correct network outlet.

PCs (free issued by the University) shall be located within the lectern rack space. The keyboard and mouse (free issued by the University) shall be placed on the top surface.

The PCs, DVD players and visualisers shall be secured from theft by the AV Contractor.

Combined VGA and audio cables shall be provided sufficient for the needs of each facility.

At the lectern tops there shall be two 'spare' 13A power sockets available for any additional equipment to be connected.

All installed lectern devices shall be powered from power outlets hidden within the lectern to reduce clutter and provide more table top power socket access. Transformer units shall not be placed on the lectern surface.

2.3 Audio

The AV Contractor shall supply and install programme and voice reinforcement audio systems.

All audio signal paths shall be balanced wherever possible.

Voice reinforcement and hearing loop system shall be operable without the need to activate the control system. It is expected that lecturers will enter the room, switch on a radio microphone and begin their lecture ("walk in and go").



2.3.1 Loudspeakers

Details of loudspeakers are included in the Schedules in appendix D.

Where flush ceiling mounted loudspeakers are supplied and installed within the suspended ceiling the AV Contractor shall coordinate these with the architect's reflected ceiling plan to ensure the designed solution will be effective. In such situations the AV Contractor shall design cable routes that avoid any interference from other electrical devices in the ceiling. It is expected that shielded cable will be required in this space.

2.3.2 Hearing Loop

Where a hearing loop is specified in the Appendix D Schedules this shall be an infra red system and shall interface with the main speech reinforcement and programme sound system.

2.3.4 Microphones

The AV Contractor shall supply and install the microphones detailed in the Appendix D Schedules.

Lectern mounted microphones shall be fitted with anti-vibration mounts (goose neck devices are not suitable).

The receiver antennae for radio microphones shall be discretely located for best signal reception and hidden from view. All associated receiver modules and antenna splitters shall be located in the AV rack.

The AV Contractor shall ensure there is no conflict between this and other neighbouring radio systems.

2.4 Video

2.4.1 Switching

Video switching shall be provided in accordance with Appendix D Schedules. In general a switching matrix shall be used for each sources (computer, TV/DVD/CCTV, audio). Tenderers shall clearly identify the extra capacity in the matrices provided for future expansion. As a guideline this should approximate to 10% of the total inputs and outputs.

2.4.2 Scaling

Where required in Appendix D Schedules each projector and lectern confidence monitor shall be fed a single RGBHV signal at its native resolution. This signal shall be generated by the specified scaler which shall be capable of roll-free or seamless switching.

2.4.3 Projectors and Screens

The AV Contractor shall supply and install the projectors and screens detailed in the Appendix D Schedules.

Screens will be mounted at a suitable dimension below ceiling height centred on the audience.

All projectors shall have lens shift capabilities to ensure pictures are correctly centred to each



screen position. The AV Contractor shall coordinate the design efforts with the architect to ensure optimal performance of the projectors. The projectors shall display all video sources from the matrices in the AV rack.

The projectors shall display all video sources from the lectern.

Projector brightness shall be calculated during final design. The images shall fill the screen without any key-stoning, or digital correction.

The projectors shall be secured from theft using devices agreed with the University.

2.4.4 Presentation Recording

The recorder devices do not form part of this contract. The location of these devices shall be confirmed with the University. From the lectern it shall be possible to start and stop recordings via the touch panel; additionally the University uses a scheduler to automatically record presentations. Cameras and microphones shall by default be left set-up in readiness for a recording at any time.

Classrooms do not require presentation recording or video conferencing facilities. However to accommodate any future upgrades the AV Contractor shall install Y/C cables to support a camera located next to the projector.

The cables shall be left coiled in the ceiling space (with a minimum tail length of 1m) terminated at each end (at the projector and at the teaching floor box).

2.4.5 Video Cameras and Camera Control Unit

The AV Contractor shall supply and install the camera detailed in the Appendix D Schedules.

Containment and power outlets to each location will be provided by others. The camera shall be powered locally. The camera point shall have a wall plate providing YC, component video and control connectivity. The wall plate shall be coordinated with the architect's finishes schedule.

The camera shall be secured from theft.

PTZ control of the camera shall be available via the touch panel interface. It shall provide pan, tilt and zoom functions for the installed camera. Camera control shall also be made possible via the touch panel.

Technicians shall be able to store/modify and recall presets.

2.5 Control System

The AV Contractor shall supply, install, programme and configure the control system detailed in the Appendix D Schedules.

It shall be operated via a touch screen at the lectern.

All programming shall be done off site in readiness for factory testing.

The AV Contractor shall meet with the University to design the system to their requirements well in advance of installation. This will provide plenty of opportunity for snags to be identified and rectified. The following describes some of the basic functionality of the control system.



The University will advise on other requirements during design meetings.

- The control system shall make full use of handshaking/feedback techniques to confirm control requests have been completed by the device and the appropriate user feed back is provided.
- The touch panel shall be programmed so that its appearance and functionality meets the requirements of the University.
- The system shall automatically determine the lectern position and ensure that cameras and microphones used for presentation and/or videoconferencing are set-up correctly prior to a session beginning.
- The control processor and touch panels shall be connected to the University's IT network.
- The system shall provide status checks on the system. In particular lamp life emails shall be sent at appropriate intervals. The University's IT team will provide IP addressing and email address information on request.
- Remote control (web) support of the control system shall also be provided.
- The control system shall automatically power systems down when they are not needed. Users shall be prompted to cancel the shutdown with a countdown timer. The University shall provide further details during design meetings.
- The system shall be able to recover automatically in the event of a power failure.
- An 'Image Mute' button shall be made available to all users. It shall allow them to choose which image shall be muted where more than one image is available. Image mute shall call the projector's mute function (it is not acceptable to switch the input to an unused source)
- The control system shall mute all audio, it shall alert the user on the touch panel and bring house lights on (100%) in the event of a fire alarm. The electrical contractor will supply an interface cable for this purpose which shall be terminated at an agreed point. The AV Contractor shall ensure that regular fire tests do not impact the system
- All users shall be able to shutdown the system when they have finished using it. The system shall prompt them "Are you sure? Yes/No"
- During system wake up/shutdown and projector warm up/cool-down periods a timer shall be displayed and the control panel shall 'lock-out' any other user activity until completed.

The control system shall function in 2 'modes' – Presentation and Technician.

2.5.1 Presentation Mode

This shall be the default mode, from powering up the system this mode will be available. The user shall be presented with:

- Source selection (only lectern sources)



- Volume control
- Presentation recorder control
- Video conferencing control

2.5.2 Technician Mode

This mode is password protected. The technician shall have access to all the functionality of the system.

The technicians' page allows the adjustment of the following:

- Control system clock
- Default audio levels (all individual mic inputs)
- Camera control
- Camera preset storing
- Projector functions (e.g. focus, lens shift, menu/cursor/select)
- Matrix switching (e.g. following tie line patching)
- Connecting other theatres for over-spill events.

3 Digital Signage

3.1 Overview

The University requires a new digital signage solution to provide information to be displayed in the Ground floor reception area.

The AV Contractor shall supply and install the digital signage system which is detailed in the Appendix D Schedules.

The selected system shall be capable of distributing television channels over the IP network (IPTV) should the University wish to upgrade the system in the future. The distribution of analogue signals over CAT5/6 is not permitted.

Where the system has an annual support cost this should be clearly shown in the costings.

3.2 Display Screens

All screens shall be mounted at high level using a Unicol mounting system at each location listed above (mounting method will dependant on site survey). The screens shall be mounted in a portrait or landscape orientation as required by the University. The AV Contractor shall ensure that all mounting surfaces are suitably prepared to mount the equipment.

The screens shall be secured from theft.



Screens shall be powered down automatically out of hours.

4 Spares

The AV Contractor shall provide a list of suggested spare components with associated prices.

5 Proposed Tender Programme

The following list indicates the dates of planned events for this Tender process.

Contract notice issued:	1 April 2008
Invitations to Tender posted on website:	1 April 2008
Return of priced Tenders or No Bids no later than:	29 May 2008 noon (12:00 hrs)
Tender Opening:	2 June 2008
Notification of Award:	6 June 2008
Start Work on Site:	4 August 2008
Contract Practical Completion:	22 August 2008
End of Defects Liability Period:	21 August 2009

6 Selection Criteria

The following table indicates the selection criteria and their weightings.

	Criteria	Weighting
1	Compliance with specification	40%
2	Value for money supply, install and commission services	25%
3	Value for money support services	25%
4	Previous experience in HE sector	10%



Appendix A

Documentation



A1 Documentation

This section details the documentation that shall be provided.

A1.1 Maintenance Information

Both paper (A4) and copies on CD in pdf format shall be provided. The manual shall detail:
Schematics

User Manual(s) (content and format to be submitted to the University for approval)

Settings Records

Serial Numbers

A1.2 Other Documentation

A laminated system schematic and separate cable schedule showing cable connections and numbering within the rack shall be affixed to the inside of the rear rack door or to an adjacent wall.

A laminated user instruction sheet shall be provided for each control location it shall outline the basic functions of the system. The content and format shall be agreed with the University.

A1.3 Software

The AV Contractor shall supply a complete set of system software, software programming code and documentation as follows:

- In the case of commercial software, a complete set of software including the license and documentation for all devices, utilities, and tools used in the operation and maintenance of the audio visual system.

In the case of non-commercial or custom software, a complete set of software is required, including source code, license (if applicable) and documentation for all devices, utilities, and tools used in the operation and maintenance of the audio visual system. All code should include comments to assist others in understanding the programme logic and architecture.

Documentation shall allow the University the ability to perform unassisted operation, maintenance, troubleshooting and programming.



Appendix B

Commissioning



B1 Witnessing of Commissioning

B1.1 General

The witnessing of commissioning, hereafter referred to as "commissioning", by the University and/or its nominated representative shall not commence until the AV Contractor has completed all testing and fault rectification. Commissioning shall include a demonstration of the complete system, including all modes of control systems.

The AV Contractor shall provide a detailed commissioning schedule for approval.

Please see the specific commissioning requirements at the end of this section.

B1.2 Factory and Site Acceptance Testing

Factory and site acceptance testing in the presence of the University and/or its nominated representative is required to prove:

1. **Equipment provision:** The installation is as quoted, i.e. all facilities and equipment included in the tender return schedule, taking into account any approved amendments, have been supplied. The AV Contractor shall supply the University updated as-built bill of quantities for the University to use in making this check
2. **Safety:** The installation is safe physically and electrically
3. **Functionality:** The installation provides the required functionality and usability
4. **Labelling:** All parts of the installation are labelled in a satisfactory manner for ease of use (e.g. patch fields, floor boxes cables)
5. **Engineering Integrity:** Signal levels and bandwidth are appropriate at various parts of the audio, video and graphics chains, there is no hum on the sound systems or video systems and that the installation has been wired as per the agreed drawings.

B1.3 Commissioning of Audio Equipment

The AV Contractor shall demonstrate that the sound levels of all loudspeaker systems have been set up correctly, with consistent gain structure throughout the audio chain.

All equipment with variable controls shall have their pre-sets marked for recognition following commissioning. The method of marking is to be approved by the University prior to being adhered.

The following tests shall be carried out for systems as directed by the University.

- (1) Results shall be noted for all paths through the audio system (up to the inputs of the loudspeaker amplifiers):
 - Signal polarity (at all points in the audio chain)
 - Frequency response over the range 20 Hz to 20 kHz



- Harmonic distortion at 100 Hz and at 1 kHz at 20 dB above nominal operating levels
- Signal to noise ratio at nominal operating level

(2) The AV Contractor shall show using a pink noise source and a spectrum analyser that all equalisers have been set up correctly.

B1.4 Commissioning of Video and Graphics Equipment

The AV Contractor shall demonstrate that all video/data projectors are set up correctly and parameters stored for all common computer graphics resolutions and for video. In addition the AV Contractor shall demonstrate the following parameters:

- Geometry
 - Pixel clock phasing over several input resolutions
 - Screen brightness relative to projector/screen specifications
 - Colourimetry on different sources
 - Correct adjustment of gain, shift and equalisation introduced by interfaces and line drivers. Settings shall be marked on equipment

B1.5 Specific Commissioning Requirements

In addition to the general commissioning requirements, the following specific tests are required:

B1.5.1 Factory Stage Testing

Full factory testing of all system components and assemblies is required for these systems.

This shall include fully assembled and tested equipment racks and interconnecting cable looms. The complete system shall be set up in a suitable space on the AV Contractor's premises, utilising temporary cable interconnections where necessary to ensure all signal paths are present.

B1.5.2 Video Systems

- Measurement of image intensity and contrast according to IEC 61947-1/2
- Demonstration of RGBHV signals at XGA and SXGA
- Sending and receiving both video and graphics signals to and from VC codecs.
- Camera control, preset setting and recall

B1.5.3 Audio Systems

- Audio matrix control
- Time alignment of ceiling speakers
- Correct function of echo canceller of all sources in room when monitored at the far



end of an audio and video conference.

- Monitor feeds correctly routed and at correct level

B1.5.4 Control System

- Matrix operation, linked to display switching where appropriate
- Source transport control
- Video and audio conference control, including dialling, source switching and incoming call management



Appendix C

Standards



C1 Standard of Installation

General standards used in the design and installation of the audiovisual system shall conform to the highest quality Broadcast Industry standards. The following list provides a general indication of the type of industry organizations with published technical standards, and is not intended to be all-inclusive.

1. AES Audio Engineering Society: Audio Standards
2. EIA Electronic Industry Association: Equipment mounting, construction, tooling
3. IEE Institute of Electrical Engineers: Wiring Regulations 16th edition
4. NEC National Electrical Code: Electrical Standards
5. NCAC National Council of Acoustical Consultants: Acoustic Standards
6. BSI British Standards Institute: Induction Loops and infra red systems in buildings
7. IEC International Engineering Consortium: Electrical and EMC Standards, Image intensity and contrast measurement methodology.

Audio visual system conformance to individual equipment manufacturer and broadcast performance standards will be verified by the procedures outlined for System Test and Adjust, and Acceptance herein.

Where European or other standards are offered that are of equal or better performance it shall be the responsibility of the Tenderer to demonstrate the parity or better status.

C1.1 Lifespan and Availability

The audio visual system shall be engineered to operate under normal conditions 12 hours a day, 365 days per year, for 10 years (approximately 4380 hours per year).

The audiovisual system and related components will have an expected operational life of ten (10) years with 95% availability for the audio portion, 85% for the video portion and 80% for the computer / control portion, as calculated with actual operating hours when maintained to the University's performance specifications.

C1.2 Maintainability

The AV Contractor shall provide a fully functioning system that is easily accessible for service while the system is operational. Where this is not practical due to mutually accepted circumstances, service functions will be designed to allow a minimal amount of equipment and support disassembly. The audio visual system design, construction and installation will allow components to be accessible for inspection, maintenance and repair with a minimal disassembly of other components or surrounding equipment.

C1.3 Safety of the Installed System

The audio visual system will be inherently safe, when operated and maintained in compliance with the AV Contractor provided operations and maintenance / technical



manuals. In addition, equipment will meet or exceed governing standards and requirements for safety. This includes any relevant EU requirements. Equipment shall carry the CE safety mark.

C1.4 Date Change Compatibility

The AV Contractor shall warrant that all relevant software, products or systems supplied as part of this requirement shall be coded such that neither the performance nor the functionality of the software, product or system will be adversely affected by any impact upon the date format caused by any change of date.

The Tenderer shall highlight in writing at the time of Tender any currently associated problems with the offered equipment, and the required solution.

C1.5 Excluded Materials

Substances generally known to be deleterious at the time of specification including but not restricted to:

1. Substances which have been expressly disapproved by the Building Research Establishment in written guidance made available to the industry as being hazardous to health and safety or to the durability of the property in the particular circumstances in which they are used.
2. Substances expressly disapproved by applicable British Standards Specifications and Codes of Practice current at the date of specification (together the "Deleterious Materials").

C1.6 AV Contractor Performance

All equipment shall be firmly secured in place unless requirements of portability dictate otherwise. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three times.

All boxes, equipment, etc. shall be plumb and square.

All assembly and material cutting shall be limited to a working area specifically designated for this purpose.

Cable and wire stripping scrap and conductor strands shall be kept away from sensitive electronic equipment such that loose pieces do not become lodged inside equipment.

All racks, consoles, connection boxes and other equipment enclosures shall be degreased and cleaned prior to installation of equipment or panels.

The AV Contractor shall take measures to protect all cabinets, casework, finished flooring, wall coverings, equipment, etc. from damage resulting from its work. This shall include, but not limited to, the installation of temporary protective coverings. Any such damage shall be corrected by the AV Contractor at no additional cost to the University.

All equipment racks and sub-assemblies shall be as far as is possible constructed at AV Contractor's premises. This will include, but not be limited to, wiring, labelling, dressing, supports, and ventilation.

All spaces shall be cleaned as an ongoing activity. The AV Contractor shall clean all work areas and remove all debris, scrap and waste at least daily and after any substantial debris



accumulation. At the conclusion of the work in a given room area cleaning of all such access spaces shall be performed. All loose items, including those which were existing at the start of the project shall be removed. Wet mopping shall be performed on flooring only when other dry cleaning methods are insufficient. No brushing or wet cleaning of equipment shall be permitted.

The AV Contractor shall generate any additional drawings or information required for fabrication, installation and wiring of the system.

The AV Contractor shall be responsible for the proper alignment, adjustment and calibration of all audio visual equipment including equipment specified as Owner Furnished Equipment (OFE), and shall provide all personnel and test equipment for the system test and adjust.

The AV Contractor shall be responsible for verifying the compatibility of all equipment and related hardware with related work performed by others. This includes, but is not limited to, electrical, mechanical, structural, and all finish work.

The AV Contractor shall furnish all software necessary to operate software controlled audio visual equipment or sub-systems (e.g. remote control system). Whether produced by the AV Contractor or supplied by a software manufacturer, all software will be installed and tested prior to the delivery of equipment to the site.

C1.7 Hardware

The AV Contractor shall use metal equipment racks of required height taking into account any need for a monitor or other equipment installed on top of a rack to be at a suitable viewing height.

Equipment mounting shall conform to the industry standard of 1-3/4" rack units.

The AV Contractor shall implement a general ventilation scheme for all racks in the systems.

All racks shall be sufficient in depth to accommodate all equipment and allow space for signal and power wiring.

All rough or sharp edges on racks that may cause injury to personnel or damage equipment or cabling shall be deburred or a permanent protective covering applied.

Blank rack panels shall be provided in all rack openings not occupied by equipment. Blank filler panels shall not exceed three rack units in size. Panel colour shall be agreed with the University. Perforated panels may be used to aid in proper ventilation.

The AV Contractor shall allow at least 6U free per rack for future expansion and free issue equipment.

Space shall be allowed for future expansion wherever possible. All devices within equipment racks shall be mounted to the equipment rack. No devices shall be resting atop (monitor excepted) or mounted to other devices within the equipment racks.

Devices will be mounted in the racks in logical order. Generally, signal flow should move from the top of the rack to bottom. Heavier devices should be mounted in the lower portion to ensure that the assembly is not too top heavy. Frequently used devices will be mounted at the optimal elevation for operator use.

AV Contractor rack logo panels shall be confined to a single rack unit.



Where racks are installed in rooms other than dedicated equipment rooms, retractable working lights shall be installed on the front and rear of the units for use during maintenance.

C1.8 Wiring

C1.8.1 Rack Connections

In general and unless otherwise agreed, all major clusters of equipment (such as equipment racks, credenzas or minor items of equipment in different rooms) shall be connected in to the installation via a connectorised wiring loom and connection box. Connectors shall be of an appropriate type for the signal e.g. BNC for video, Neutrik for loudspeaker, D-type or EDAC for control and XLR or EDAC (multi-way) for audio.

The loom shall be wired in appropriate type of cable appropriate to the signal. The cables shall be bundled to form a loom and bound in expandable sheathing (preferred colour is black or grey). Mains cables shall be loomed separately.

Any deviation from this arrangement, in full or in part, must be agreed with the University prior to build.

C1.8.2 Equipment Looms

In general, cable dressing shall be considered from a maintenance standpoint. Where there is no rear access to the rack mounted equipment, this requirement shall be carefully addressed, and cabling shall be of sufficient length to enable the removal and replacement of any individual piece of equipment with all others in place.

The AV Contractor shall be responsible for determining the proper length of all cable looms whether manufactured on or off the job site.

The AV Contractor shall determine the desired method of securing cables. All of the following requirements must be met by the system:

1. Plastic cable ties are the preferred method of cable dressing. Lay-in systems are not acceptable except as applied to a horizontal cable tray.

2. Wires and cable shall be installed in a neat and orderly fashion, with like cable types following similar paths. Groups of cables shall be neatly combed and harnessed.

Harnessed groups of cables shall be anchored at suitable intervals to reduce and relieve wire strain, especially strain on connections. Adequate service loops shall be provided at all cable endpoints.

3. Some rack-mounted equipment utilizes slide assemblies for front extension while in operation. For this type of mounting, additional, carefully dressed service loops on all cables shall be provided and installed with spring operated cable retractor assemblies to gather and recoil the service loop.

4. For all schemes of cable routing, no point in the path shall be subjected to a bend radius of less than eight (8) times the cable diameter, or minimum cable bend radius specified by the manufacturer.

5. Captive cables shall not be dressed in such a manner as to prevent removal of the equipment to which they are captive.



6. Wires and cables shall be segregated according to signal type. In addition, audio cable shall be subdivided into three (3) classes: microphone level circuits, line level circuits, and speaker circuits.

These cables should be separated as per the following table:

	Microphone Level Circuits	Line Level Circuits	Speaker Circuits	AC Power Circuits	All Other Parallel Signal Circuits
Microphone Level Circuits		75	75	150	75
Line Level Circuits			75	75	75
Speaker Circuits				75	75
AC Power Circuits					75

Table 1: Cable separations

Where circuits of different types must cross, they shall do so at right angles and then return to the above required separations in as short a distance as possible.

7. Wires and cables shall be continuous between termination points. Splices are not acceptable.

8. Cable dressing installation shall be accomplished using hand tools specifically designed to apply proper tension to the cable tie, and to cut the end off flush with no protruding sharp edges. The AV Contractor's field supervisor shall spot check assemblies using cable ties both visually and by touch, thereby detecting any sharp edges of improperly cut cable ties.

9. Cable ties shall be used on all cable runs of two or more cables which are not supported by raceway, cable tray, or other means. Place cable ties approximately 150mm apart.

Do not use more cable ties than are necessary for a neat installation. Cable ties shall not be applied with excessive force that may damage or deform sensitive and fragile cables.

10. Rack mounting rails shall not be used for cable dressing. Dressing bars and/or tie mount bases mounted to cabinets or console shall be provided where appropriate.

C1.9 Cables

C1.9.1 Audio Cables

All audio cables shall be of the balanced pair type. Installed cables shall have a braided, lapped or foil screen around each pair. The two cores making up the pair shall have 0.22mm² minimum copper conductors, and have different coloured insulation, one of which shall be



coloured red. Screen shielding for each pair shall be 94% coverage or better. The same type of cable shall be used throughout the installation unless otherwise agreed; the Tenderer shall state the type of cable in the tender return.

C1.9.2 Video Cables

High quality cable such as PSF 1/3M Belden 1506A, Vandamme 278-075-000 or Canford SDV-L-LFA shall be used for all video cabling. The same type of cable shall be used throughout the installation; the Tenderer shall state the type of cable and its specification in the tender return.

Where a number of cables run between the same source and destination the variation in cable length shall be less than 100 mm.

C1.9.3 Graphics Cables

The graphics cabling shall be Vandamme 278-305-020, suitable for use for signals of up to 400 MHz. The same type of cable shall be used throughout the installation. No substitutes are acceptable.

Individual signal cores shall be terminated with a variation in cable length of less than 10mm.

C1.9.4 Other Details

The AV Contractor is encouraged to suggest alternate cable types where a significant cost savings may be realised without any loss of quality, reliability and performance. Alternatives must be approved by the University prior to use.

The AV Contractor shall determine building and other regulating authority requirements for cables installed as part of the AV scope of the Project. This requirement applies to cables in return air plenums as well as other areas. If the cable type indicated does not comply with these requirements, the AV Contractor shall propose alternate cable types, and/or encasement in complying raceways or conduits. All cabling not in conduit shall be plenumrated.

C1.9.5 Power Cords

All equipment power cords shall terminate in a standard plug that shall be wired in compliance with British Standards and IEE regulations.

All power cords shall be plugged into an AC power distribution strip.

C1.9.6 Cable Termination

Wire and cable termination shall be performed in accordance with Broadcast Industry Standards and the guidelines of generally accepted installation practices.

Wire and cable termination shall include all aspects of equipment connection, including, but not limited to, the following:

Wire and cable length

- Protective jacket removal
- Conductor separation, dressing and trimming



- Conductor stripping

Connector device installation including, but not limited to, the following:

- Conductor termination
- Shell assembly
- Strain relief installation
- Locking/latching device installation

Exposed portions of shield shall be protected with PVC heat shrinkable sleeving. Exposed ends of outer jackets on shielded cables shall be insulated with sleeves to eliminate the possibility of portions of the cut off foil shielded touching adjacent shields or metal. Either rubber "Hellerman" type sleeves or heat shrink sleeves shall be used. Bare shield drain wires shall be insulated with small diameter clear Teflon or PVC heat shrink (as appropriate) from under the sleeve to within 3mm of the point of termination.

C1.9.7 Cable Designations

Cable designation shall be fixed to each distinct wire or cable, except where the colour code or pair number of individuals of pairs of a multi-pair eliminates the need for this.

Cable designations shall be fixed within 50mm of connectors, unless this interferes with the disassembly of the connector. They shall be installed in such a manner as to be visible without unlacing any harnesses.

The cable designation shall be a colour coded cable number as well as a circuit identification label. A unique cable-numbering scheme shall be used; this shall be approved at the start of the contract by the University.

C1.9.8 Cable and Conductor Preparation

All cables shall be prepared in such a way that the individual conductors, shield or their insulation are not nicked or cut in any way. The cable outer jacket shall be cut square.

Insulation shall be removed from conductor in such a manner that conductor strands shall be nicked to the extent that base metal shows through the plating and wire strands remain in the original lay, and are not combed out. The conductor's insulation shall be cut square within 5mm of the outer diameter of the insulated conductor. If required, the conductor shall be tinned with a minimum amount of solder (with resin flux).

C1.10 Connectors

C1.10.1 General

All cable mounted connectors shall be covered by a connector hood or shall have crimp ferrules which securely grasp the cable outer jacket to provide protection to the rear connections made on the connector and provide strain relief for the cable. All connectors shall have incorporated a mechanical means of attaching the connector to its mate to assure that a connector will not fall off unless intentionally removed.

Audio Connector Requirements - Circular (XLR type): These shall be premium quality connectors with tarnish resistant contact surfaces. No connection shall be made to the shell



unless specifically called out in the drawings.

Video Connector Requirements: Only connectors with tarnish resistant contact surfaces shall be used. The centre conductor pin and socket shall be captive and finished with gold or silver surfaced over nickel. All connectors shall be specified by the manufacturer as to be acceptable with the specific cable being used.

Panel Mounted Connectors: Care shall be taken to insure that the sleeves of panel mount connectors do not make contact with the mounting panel.

C1.10.2 Solder Connections

Only solder with rosin flux shall be used. The solder shall be designed for electronic use.

Solder fillets shall wet and flow around conductor and terminal. In no case shall the general outline of the conductor be visible in excessive solder. The insulation shall not be charred, melted or burned by the soldering operation. There shall be no evidence of terminal contamination. The final solder joint shall be bright and shiny and shall show no evidence of being a "dry" joint.

Mechanical connections made to terminals prior to soldering shall be the minimum required to reliably retain wire, usually a simple bend around solder eyelet or post. Avoid practice of multiple wraps on solder terminals, as this makes conductor removal very difficult after soldering.

C1.10.3 Insulation Displacement Connections

Insulation displacement connections such as ribbon cables and the telephone connector technology shall only be installed with termination tooling as specified by the connector manufacturer. If shown in the connector manufacturer's data, the controlled-cycle crimp tool shall be selected. If the manufacturer has a multi-conductor mass-termination tool available, this shall be selected for all connectors of ten pins or more.

Individual conductors of cables installed on terminal blocks shall not be stripped, and shall be punched down with a spring loaded impact tool designed for this specific purpose. Bare cable conductors shall be insulated with Teflon, PVC heat shrink or other insulating sleeve (as appropriate) prior to being punched down on terminal block. During the punch down process, the free end of the conductor shall be cut off, and the installer shall ascertain that this cut off end is not left within the block or block assembly.

Only cables designed specifically for insulation displacement termination with the specific termination device employed shall be used.

C1.10.4 Crimp Connections

Where crimp connectors are utilised, they shall be installed using the manufacturer recommended controlled cycle crimp tool that assures that the proper crimp pressure has been applied. The AV Contractor shall develop a procedure to insure that the crimp tooling is properly checked for compliance with the manufacturer's standards, and that it is producing crimp-type connections within the required tolerances. The frequency of this depends on the usage and on the length of time a particular tool holds its calibration.

Only tooling recommended by the manufacturer shall be used. Only pins and connectors of the proper size and design for the cable to which they are to be applied shall be used. There shall be no abnormal deformation of the contact during the crimping operation. There shall



be no damage to the contact during the crimping operation that could interfere with its retention in its shell or its mating. There shall be no damage done to the conductor which either severs strands or exposes the individual strands base metal by the crimping operation.

C1.10.5 Screw Connections

Only insulated crimp-on spade terminals shall be used for application to barrier strips.

Multiple gang lugs or ring lugs are not acceptable for this purpose. This is only applicable to stranded conductor wires. It is suggested that stranded conductor wire be "double over" on the crimp end prior to crimping. Solid conductors may be attached directly to the barrier strip.

C1.11 Electrical Power

Power distribution shall have 1U high IEC power distribution incorporating a fuse and neon per IEC outlet. There shall be an overall on/off switch on each distribution panel. Where there are a number of plug-top power supplies, a 13A mains distribution shall be located within the rack and fed from one of the IEC outlets; no other units shall be powered from this 13A distribution. All assembled rack internal power strips will conform to approved testing laboratory specifications. Each circuit will consist of a "live" wire, a dedicated neutral wire, and a dedicated safety earth wire of equal current carrying capacity.

The AV Contractor shall co-ordinate the power interface between the building and the equipment enclosure with the Consultant. The audio visual system will be designed so that power may be supplied or removed smoothly or abruptly at any time without causing damage to system equipment.

C1.12 Grounding Practices

The audio visual system will be serviced by the earthing conductor that is provided with the mains supply.

Audio cables shield shall be connected to ground at one point only. Exceptions may be made for phantom powered microphones and some ICM and IFB systems. This ground point shall be at the system ground of the destination device, which shall be strapped to the system ground in the rack. For intra-rack wiring this requires the shield to be connected at both ends, but grounded at only one end.

Pin 1 on both free and fixed XLRs shall not be connected to the XLR casing anywhere in the installation to avoid panel earth (which is building earth) from being connected to the clean technical earth. Any metalwork that is not already earthed through conduit shall be earthed to an approved point.

All video receptacles shall be insulated from the mounting panel, outlet box, or wireway. Unless otherwise detailed, this shall be accomplished by using insulated-from-panel type receptacles.

The AV Contractor should take care to consider ground references within each device and the grounding factors on site.

Under no circumstances should the earth wire be removed from any piece of equipment.



Appendix D
Systems Schedules



D1 Systems Schedules

Schedule

- 1 Lecture Theatre - 140 seats
- 2 Classrooms – 60 & 80 seats
- 3 Teaching Rooms – 30 + seats
- 4 Teaching Rooms – 18 + seats
- 5 Media Screening Room
- 6 Lecterns
- 7 Digital Signage
- 8 Portable FHD Video Conference System
- 9 Service and Support



Schedule 1

Lecture Theatres – 140 seats

A solution with infrastructure capable of delivering full high definition images from a variety of sources.

The solution should include components required for automated rich media recording; the recorder devices do not form part of this tender.

The main LT is located on ground floor UCS building, due to building constraints all AV signal switching, processing, amplification and distribution equipment will be installed on first floor of the UCS building. Source, destination and control devices will need to supply / be fed via TCPIP Network / Dedicated CAT5 / Fibre or other cable solution.

As part of the solution a lectern housing the PC, DVD, Control system touch screen, Interactive LCD panel, Visualiser and laptop inputs is to be provided, generic minimum specification is provided – respondents should provide a detailed lectern proposal with plans / images / technical specification to support their proposal.

Connection between the lectern and AV equipment rack / projector / speakers will be via preinstalled containment. All cabling to be supplied by the appointed AV contractor.

Minimum Equipment Specification Detailed Below:

PROJECTOR REQUIREMENTS:

Minimum Specification:

- Native Widescreen Format
- Optical H/V shift
- Min 5K Lumen
- Min WXGA Resolution (option for FHD 1920 x 1080 required)
- TCP/IP / PJ Link Network Control
- RS232 Control
- Web Browser Interface
- Email reporting
- Twin Lamp
- RGBHV / DVI-D
- Short Throw Zoom Lens capable of producing 133" diagonal image with a throw in the range of 3950mm – 5030mm (Lens to projection surface).
- UNICOL mounting hardware

CONTROL SYSTEM:

Touch Panel

Minimum Specification:

- 10" active-matrix display
- Aspect Ratio: 16:9
- Screen Resolution (HV): 800 x 480 pixels



- Display colours: 256 K (18-bit colour depth)
- Anti-glare touch screen
- Wired Ethernet 10/100
- Built-in Speakers (2) and microphone
- Motion Sensor
- Light Sensor
- 64 MB SDRAM / 128 MB CompactFlash Memory
- C-video & S-Video inputs
- Table Top Stand

Processor

Minimum Specification:

- 8 – IR / Serial
- 8 – Digital I/O
- 8 – Relays
- 7 – Configurable RS-232 / RS-422 / RS-485 Serial ports
- 3 – Communication Networks: Proprietary plus Ethernet (TCP/IP)
- 4 – Control Card Expansion slots

SWITCHING / SCALING / DISTRIBUTION:

Graphics still store:

Minimum Specification:

- Store BMP and JPEG format high resolution graphic files, play back on analogue RGBHV output
- Inputs: RGBHV or RGBS pass-through on BNCs
- Output: RGBHV or RGBS on BNCs
- Upload graphic files via Ethernet
- 16 MB internal image storage
- RGB pass-through
- Plays back of stored images as an automated, programmable slide show
- IP Ethernet monitoring and control
- Smooth image transitions including cut and variable-rate dissolves
- Programmable RGB delay when switching between stored image and RGB pass-through
- Auto sync sensing to maintain an on-screen image.
- Selectable output rates including HDTV 1080p.
- Local or remote file management via Ethernet.
- RS-232 serial control port.

Switcher Scaler:

Minimum Specification:

INPUTS:

- 4 x CV 1Vpp/75Ω on BNC connectors;
- 4 x YC 1Vpp (Y): 0.3Vpp (C)/75Ω on 4p connectors;
- 4 x Component (Y/G, Pb/B, Pr/R or RGsB (progressive and interlaced)) on BNC connectors;
- 4 x VGA (VGA through UXGA, RGBS or RGsB (progressive and interlaced))



- on 15-Pin HD F connectors;
- 2 x DVI-D on DVI-I connectors;
- 18 x balanced stereo audio on terminal block connectors,
- 22dBm; microphone on a female XLR connector.

OUTPUTS:

- Group outputs: 1x CV 1Vpp/75Ω on a BNC connector;
- 1 x YC 1Vpp (Y), 0.3Vpp (C)/75Ω on a 4p connector;
- 1 x Component (Y/G, Pb/B, Pr/R) on BNC connectors;
- 1 x VGA (VGA through UXGA) on an 15-Pin HD F connector;
- 1 x DVI-D on a DVI-I connector.

SCALED OUTPUTS:

- 1x RGBHV (VGA format)/component HDTV on a 15-Pin HD F connector;
- 1 x RGBHV / YPbPr on BNC connectors;
- 1 x DVI-D on a DVI-I connector.
- 6 x balanced stereo audio on terminal block connectors, 22dBm.

OUTPUT RESOLUTIONS:

- VGA (640 x 480), SVGA (800 x 600), XGA (1024 x 768), SXGA (1280 x 1024), UXGA (1600 x 1200),
- 1024 x 852, 1024 x 1024, 1366 x 768, 1365 x 1024, 1280 x 720, 720 x 483, 852 x 480, 1400 x 1050, 480p, 720p, and 1080i, as well as a user definable output mode.

CONTROL: Front panel touch switches, IR remote control, RS-232, Ethernet; with OSD and front-panel LCD.

DVI Optical Transmitter & Receiver

Minimum Specification:

INPUTS:

- DVI IN

OUTPUTS:

- DVI OUT

RESOLUTION:

- Up to WUXGA @ 60Hz (1.65Gbps)

System Range:

- 500 meters

CATx Multiformat Transmitter / Receiver units

Minimum Specification:

- Transmit images up to 1600 x 1200 screen resolution
- Up to 220m transmission
- cat-6 compliant
- Optional 24-bit digital stereo audio
- Optional Bidirectional RS232
- Receive and transmit units can be line-powered from either end
- Floorplate, rack or desk-mounted option



VGA DA

Minimum Specification:

INPUT:

- 1 analogue red, green, blue signals - 0.7Vpp/75Ω, H & V sync, TTL level, on 15-Pin HD F connectors.

OUTPUTS:

- 2 analogue red, green, blue signals - 0.7Vpp/75Ω H & V sync, TTL level, on 15-Pin HD F connectors.

MAX. OUTPUT LEVEL:

- 1.8Vpp.

BANDWIDTH (-3dB):

- 400MHz.

RICHMEDIA INTEGRATION:

Switcher:

Minimum Specification:

INPUTS:

- 2 composite video (1Vpp/75Ω) on RCA connectors.
- 2 s-Video 1Vpp (Y), 0.3Vpp (C) / 75Ω on 4p connectors
- 2 component video/UXGA on 15-Pin HDF connectors
- 4 VGA/UXGA on 15-Pin HDF connectors

OUTPUTS:

- 1 composite video (1Vpp/75Ω) on an RCA connector
- 1 s-Video 1Vpp (Y), 0.3Vpp (C) / 75Ω on a 4p connector
- 1 component video/UXGA on 15-Pin HDF connector
- 1 VGA/UXGA on an 15-Pin HDF connector

Composite Video DA

Minimum Specification:

INPUT:

- 1 video, 1Vpp/75Ω on a BNC connector.

OUTPUTS:

- 2 video, 1Vpp/75Ω on BNC connectors.

MAX. VIDEO OUTPUT:

- 2Vpp.

VIDEO BANDWIDTH (-3dB):

- 430MHz.

AUDIO SYSTEM:

Line Mic Mixer

Minimum Specification:

- Eight balanced mic-line input channels
- One unbalanced 1/4" aux input level control



- Eight unbalanced 1/4" direct line level outputs
- One balanced master line/mic level output
- Selectable 48V phantom power per channel
- Level selectable peak output limiter
- Full rack width (single rack height)
- Automatic mixer activates only microphones being addressed

Audio Matrix / System Processor

Minimum Specification:

- Digital feedback reduction
- Parametric and Graphic EQ
- Up to 20 seconds of Delay
- Mono and Stereo Compressors and Limiters
- Gate / Downward Expander
- Ducker
- Automatic Gain Control
- 2 to 5-way Crossovers
- 4x8 matrix mixer
- RS232 Control
- Rack Mount Unit

Power Amplifier

Minimum Specification:

- 4 Channel Amplifier
- 250Watt per channel into 8ohms
- 400Watt per channel into 4ohms
- Distortion (SMPTE-IM) Less than 0.01%
- Comprehensive protection circuitry including DC, infrasonic, thermal overload and short circuit protection
- 2U Rack Mount

Loudspeakers (4)

Minimum Specification:

- Compact two way, ported enclosure
- Dual 8" high power, treated paper cone, 2" voice coil, neodymium magnet
- 1" high output compression driver
- Frequency Range
- 60 Hz - 29.5 kHz
- Maximum Output
- 125 dB SPL
- Nominal Impedance 8 ohms (5.25 ohms minimum, 17.6 kHz, 64.22 ohms maximum, 2.56 kHz)
- Power Rating
- 450 W (IEC, 8 hours)
- Recommended Max Amp Power 900 W RMS
- Sensitivity 93 dB, 1 m, free field
- Nominal Coverage 90° H x 60° V (-6 dB) (rotatable to 60° H x 90° V)



- Bass Loading Ported, tuned to 60 Hz
- Yoke Mount
- Paintable finish

Lectern Microphone (2)

Minimum Specification:

- Highly directional mini shotgun
- super-cardioid / lobar
- pressure gradient transducer / interference tube transducer
- 40 Hz – 20 kHz
- Impedance 50 ohms
- Min. terminating impedance 1 ohm
- Equivalent noise level 23 dB(A)
- Gooseneck Mount

Wireless Microphones (3)

Minimum Specification:

- RF frequency range 518..... 866 MHz
- Transmission/receiving frequencies 1440
- Presets 8
- Switching bandwidth 36 MHz
- Peak deviation +/- 48 kHz
- Comander HDX
- Frequency response (microphone) 40.....18000 Hz
- Signal-to-noise ratio > 112 dB(A)
- THD, total harmonic distortion < 0.9 %
- In compliance with ETS 300422 , ETS 300445 , CE , FCC
- Antenna connector 2 BNC, 50 Ohm
- Audio-XLR connector 6.3 mm
- Audio output level (balanced) XLR: +18 dBu max
- Audio output level (unbalanced) Jack: +12 dBu max

Wireless Microphones – Antenna Distribution System

Minimum Specification:

- Active antenna splitter 2 x 1 : 8.
- Wideband 470-870 MHz
- Passive directional antenna.
- Frequency range: 450-960 MHz
- Apex angle: approx. 100°
- Front-to-back ratio: ≥ 14 dB
- Gain: approx. 10 dB

Audio Server

Minimum Specification:

- 160GB internal hard drive for storing digital music files



- Built-in DVD drive for playing and ripping CDs
- PC File Sharing for transferring music files to and from a PC or Mac
- Web interface for remote control via third party control system or any standard web browser
- RS232 Control
- Music playback in repeat and random modes

INFRA RED HEARING 'LOOP'

Minimum Specification:

- System to provide DDA compliant hearing assistance
- 2 x 2watt IR Radiator / Modulator
- 10 x Neck worn receiver
- 10 x Delegate Earphone / Personal Induction Loop
- All mounting hardware
- System to interface with main speech reinforcement and program sound system

PTZ VIDEO DOME CAMERA SYSTEM:

Minimum Specification:

- Colour Dome Camera with ceiling mount
- 540 lines (colour) & 570 lines (b/w)
- Minimum Illumination 0.5 lux in colour; 0.04 lux in B/W
- Zoom Speed Approx. 6.0s (TELE to WIDE) in manual mode
- Zoom Ratio 300x (30x optical zoom plus 10x electronic digital zoom)
- Lens Control Zoom, Focus, Iris
- Pan/Tilt Control Manual, Auto Pan

VISUALISER

Minimum Specification:

- 1-CCD camera
- sRGB color precision
- Horizontal resolution 820 lines
- Resolution in Image Turn mode 1050 lines
- Native signal output SXGA- 720p
- Converted computer outputs (4:3 and 5:4) UXGA SXGA+ SXGA XGA SVGA
- Converted Widescreen outputs (16:9 HD - High Definition) 1080p WXGA WSXGA
- DVI output (compatible with HDMI)
- USB port / USB Standard (Twain compatible) USB 2
- RS232 port with professional protocol
- Ethernet (LAN) port, IP-addressable, advanced LAN features
- Image Turn mode (portrait pages with increased resolution)
- Frames per second 30
- Effective megapixels per second 36.8
- Built-in LCD preview monitor
- Live to Freeze comparison
- On screen menu
- Firmware updates via LAN USB RS232



- Optical zoom factor 12x
- Digital zoom factor 4x
- High Speed Autofocus
- Recording possibility behind the unit and room views
- Recording possibility in front of the unit with image flip
- Turntable mounted (with table lock bolt)
- Working surface for transparencies
- Slide pick-up
- Bottom light
- Computer input / Input switch
- Image memory (number of pictures) 9
- "Show all" function (9 picture split-screen) yes
- Infrared remote control with laser pointer yes

INTERACTIVE LCD PANEL

Minimum Specification:

- 17-inch LCD display screen.
- SXGA resolution
- Eight hardware function buttons.
- A smoothly adjustable tilt stand.
- Software suite of professional presentation and collaboration software.
- A pen driven, icon orientated user interface allowing users to move from running Windows or digital video applications to annotating over them.
- Ability for simultaneous viewing and annotation by multiple systems connected either locally or across the Internet.

DVD PLAYER

Minimum Specification:

- DVD/ DVD-R, CD, VCD Playback
- MP3, WMA, DivX Playback
- High Definition Multimedia Interface (HDMI)
- NTSC / PAL Conversion
- iR Control
- Optical / Coaxial Digital Output
- Hide OSD
- Changeable Wallpaper
- Auto Play
- High precision 96 kHz 24-bit D/A converter
- Key Lock
- RS-232C control terminal.
- Serial Remote Control

RACK SYSTEM

Minimum Specification:

- 19" Rack System – Floor Standing
- Internal Power Distribution
- Passive / Active Cooling



PROJECTION SCREEN

Minimum Specification:

- 16:9 Format
- 3810mm Diagonal
- Extruded Aluminium Frame
- Black Powder Coat Finish
- Matt White Viewing Surface

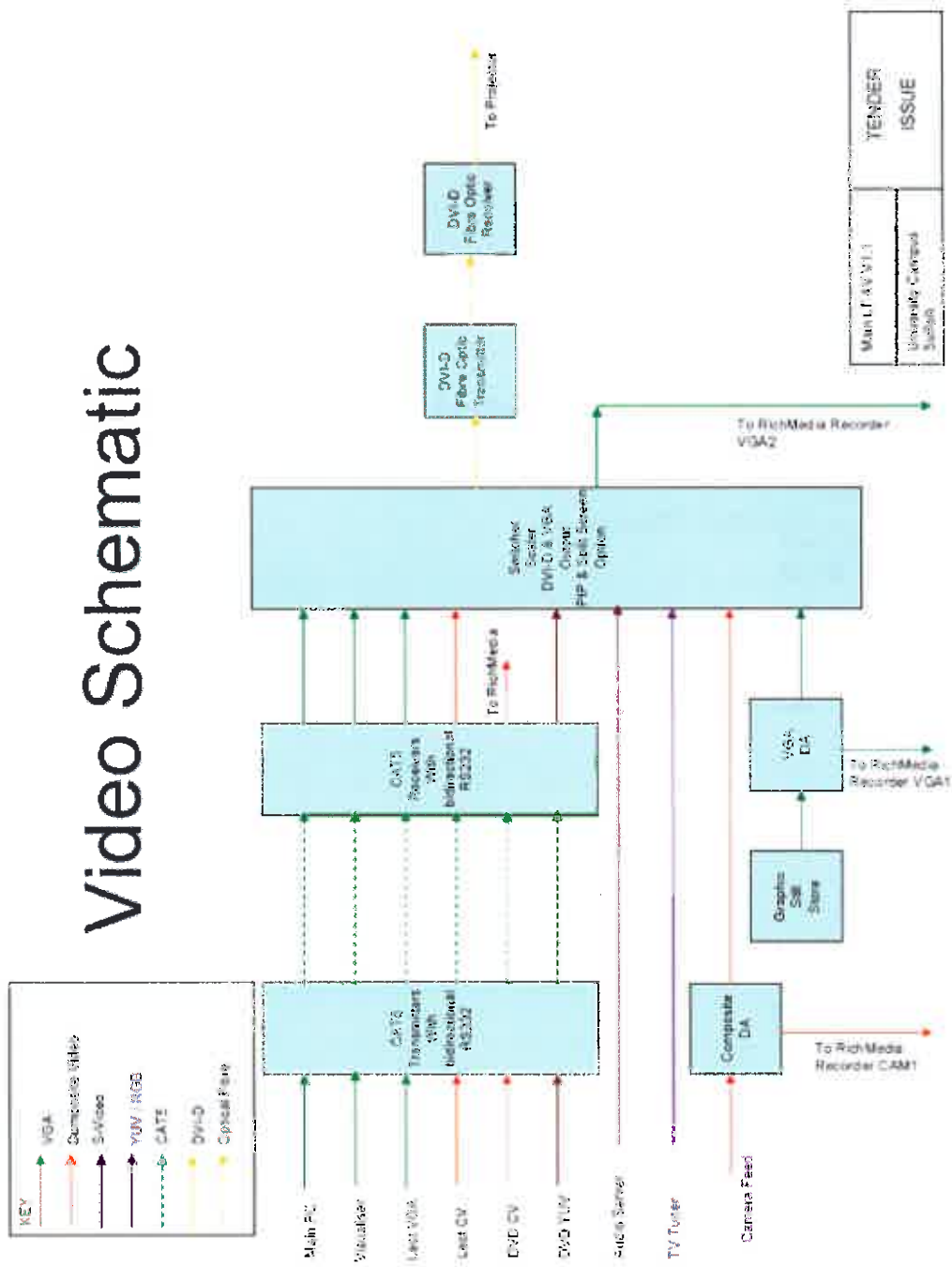
PRESENTATION LECTERN

Minimum Specification:

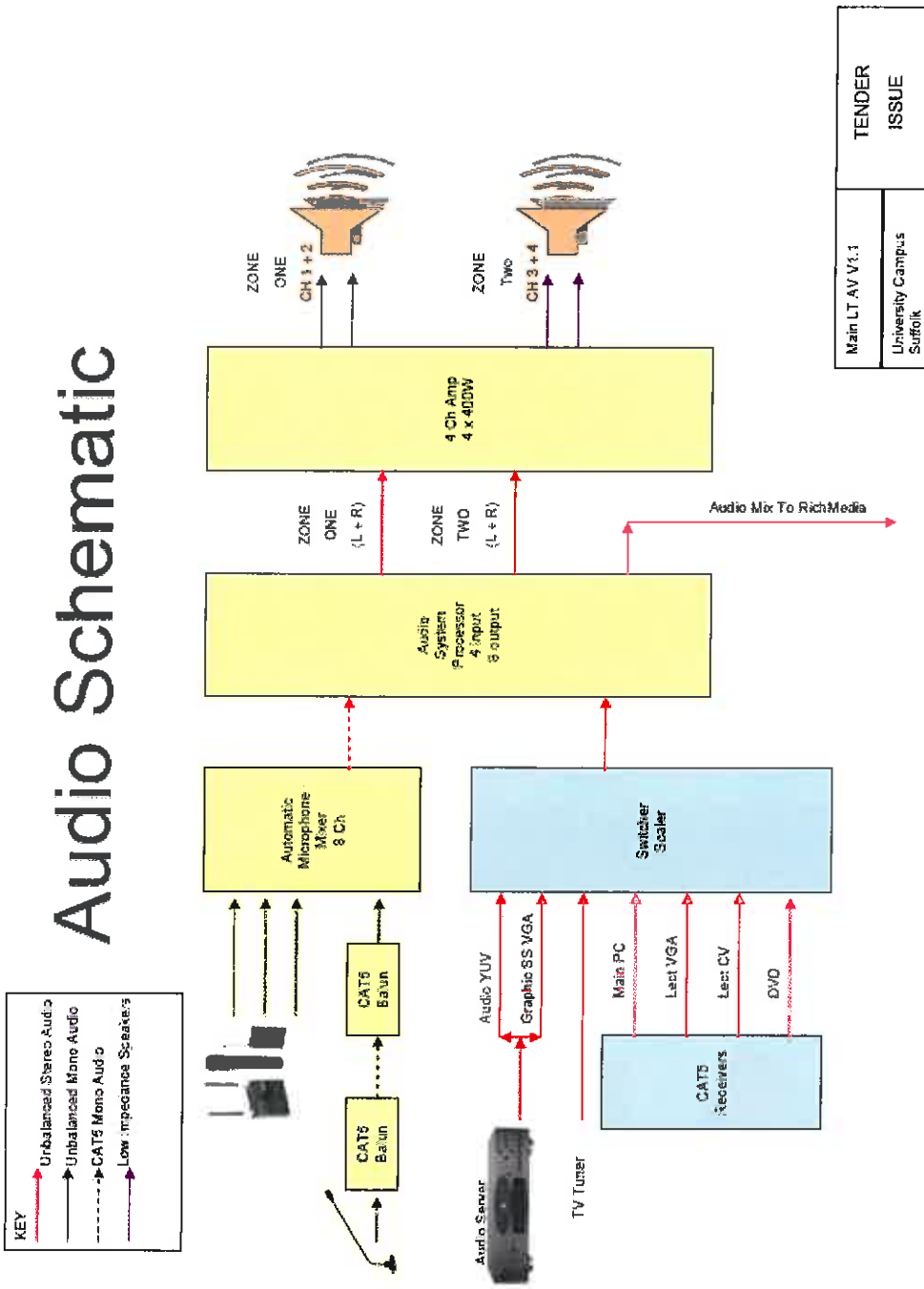
- Lectern unit incorporating 19inch rack mounts
- Front & rear or side opening ventilated rack doors
- Built in power distribution feeding surge protected female IEC sockets and three pin sockets.
- Ability to interconnect via umbilical cable to wall mounted connection point.
- Variety of finish options
- Lectern to provide adequate space / housings for:
 - Interactive Monitor
 - Keyboard & Mouse
 - Visualiser
 - Control Panel
 - Laptop / Video Inputs
 - Microphones
- Controls & equipment must be available to both able bodied and wheelchair bound users



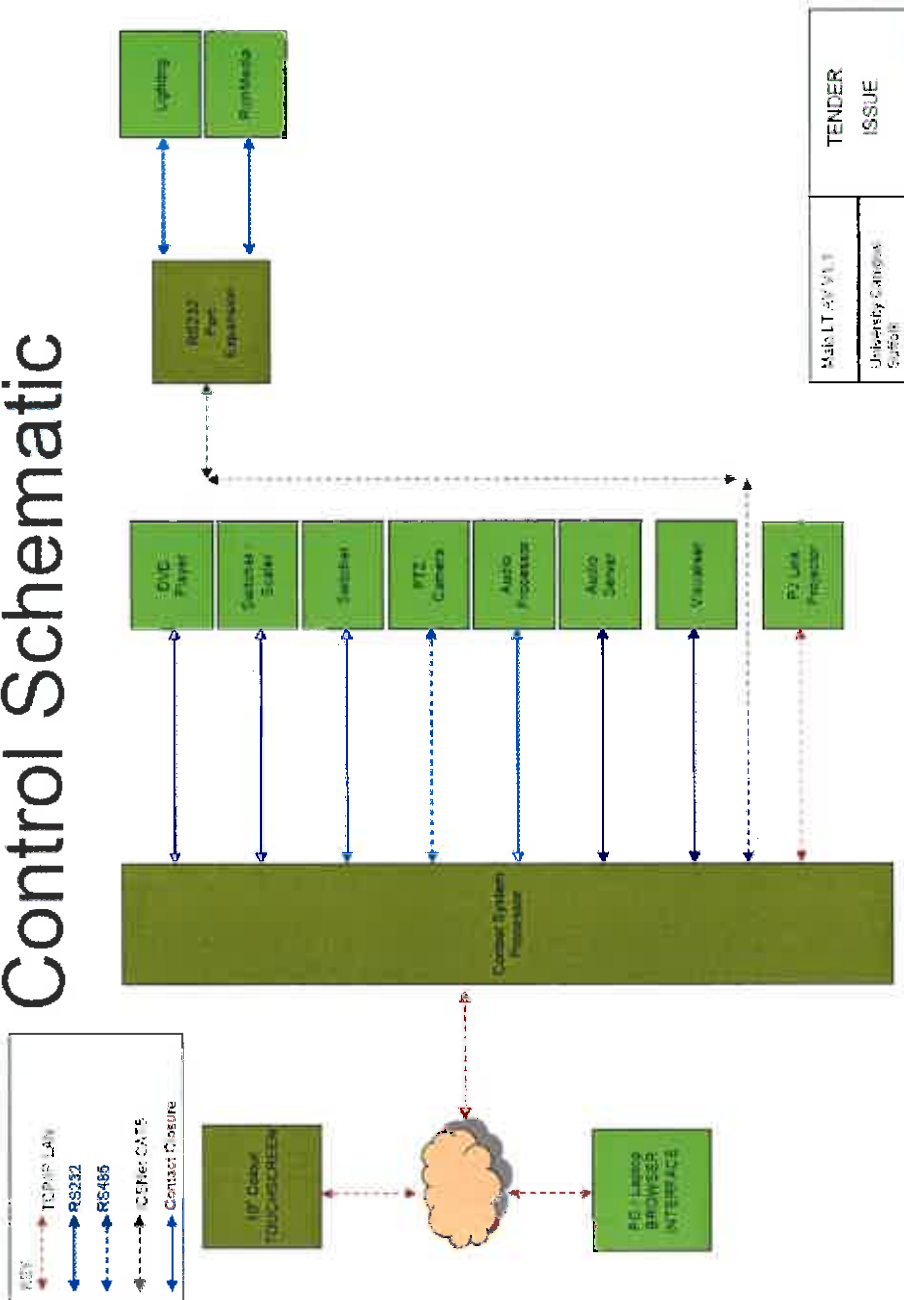
Video Schematic



Audio Schematic



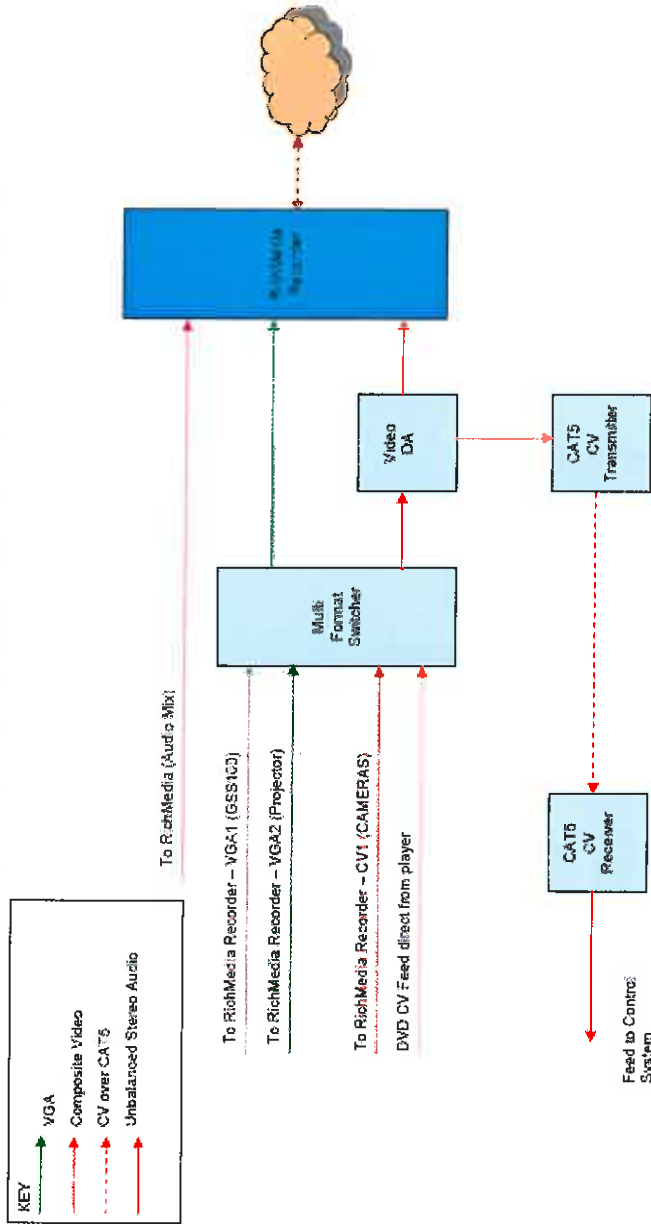
Control Schematic



Main IT: 01753 5411 University Campus Suffolk	TENDER ISSUE
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RichMedia Schematic



Main LT AV V1.1	TENDER ISSUE
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Schedule 2

Classrooms – 60 & 80 seats

An audio visual system comprising of a presentation desk housing the source, switching, amplification and control devices and supplying a ceiling mounted data projector and wall mounted speaker system.

Connection between the presentation desk and projector / speakers will be via preinstalled floor box to device containment. All cabling to be supplied by the appointed AV contractor

PROJECTOR REQUIREMENTS:

Minimum Specification:

- Native Widescreen Format
- Optical Lens Shift Vertical: $\pm 51\%$, horizontal: $\pm 24\%$
- Min 3K Lumen
- Min 1280 x 800 pixel Resolution
- TCP/IP / PJ Link Network Control
- Wired and Wireless LAN Network presentation
- RS232 Control
- Web Browser Interface
- Email reporting
- Zoom Lens capable of producing 119" diagonal image with a throw in the range of 3610mm – 5270mm (Lens to projection surface).
- Ambient Light Sensor for automatic Image Adjustment
- Ability to produce Side by Side display of two separate sources
- Ability to Simultaneously display multiple PC's (minimum four PC's) via wired and wireless LAN
- Automatic Filter Mechanism reducing maintenance requirements
- Unicol Mounting Hardware

ROOM CONTROL SYSTEM:

Minimum Specification:

- 2 Gang presentation desk mounted push button control panel
- Min 7 discrete backlit buttons (On/Off, PC, Laptop, Visualiser, Video, Volume+, Volume-)
- Ability to control two RS232 devices
- Custom programmable
- Customisable Button Legends

SWITCHING / AUDIO CONTROL / MICROPHONE MIX

Minimum Specification:

INPUTS:

- 2 composite video (1Vpp/75 Ω) on RCA connectors.
- 2 s-Video 1Vpp (Y), 0.3Vpp (C) / 75 Ω on 4p connectors
- 2 component video/UXGA on 15-Pin HDF connectors



- 4 VGA/UXGA on 15-Pin HDF connectors
- 4 unbalanced stereo audio on 3.5mm jack connectors (for VGA/UXGA) +4dBm/10k Ω
- 6 unbalanced stereo audio channels: +4dBm / 10k Ω on RCA connectors (for CV, YC, COMP/UXGA)
- Mic: 3mV / 10k Ω condenser / dynamic on a 6.3mm Phone Jack connector

OUTPUTS:

- 1 composite video (1Vpp/75 Ω) on an RCA connector
- 1 s-Video 1Vpp (Y), 0.3Vpp (C) / 75 Ω on a 4p connector
- 1 component video/UXGA on an 15-Pin HDF connector
- 1 VGA/UXGA on an 15-Pin HDF connector
- 1 unbalanced stereo master audio channel: +4dBm / 50 Ω on RCA connectors.

NB: Unit must provide Microphone mix input level control and audio level control for mixed master output.

CONTROL: Front panel selector buttons, master audio level, microphone audio level, mix, lock, mute, RS-232.

VGA DA

Minimum Specification:

INPUT:

- 1 analogue red, green, blue signals - 0.7Vpp/75 Ω , H & V sync, TTL level, on 15-Pin HD F connectors.

OUTPUTS:

- 2 analogue red, green, blue signals - 0.7Vpp/75 Ω H & V sync, TTL level, on 15-Pin HD F connectors.

MAX. OUTPUT LEVEL:

- 1.8Vpp.

BANDWIDTH (-3dB):

- 400MHz.

INTERACTIVE LCD PANEL

Minimum Specification:

- 17-inch LCD display screen.
- SXGA resolution
- Eight hardware function buttons.
- A smoothly adjustable tilt stand.
- Software suite of professional presentation and collaboration software.
- A pen driven, icon orientated user interface allowing users to move from running Windows or digital video applications to annotating over them.
- Ability for simultaneous viewing and annotation by multiple systems connected either locally or across the Internet.



VISUALISER

Minimum Specification:

- XGA output resolution 1024 x 768
- Composite Video/Svideo output
- 20 Frames per second
- 15 x Optical Zoom
- 4 x Digital Zoom
- Max shooting Area A3
- Multi Position Camera Arm & Lamp
- 35mm Slide adapter included
- Upper lighting
- Auto Focus
- Auto Iris
- Image Save
- Image Rotate
- Split Screen Mode (freeze / live)
- USB2 Port

POWER AMPLIFIER

Minimum Specification:

- Rack mount
- Convection Cooled
- 2 x 120W RMS @ 8 ohms

SPEAKERS

Minimum Specification:

- Configuration: Compact two way, ported enclosure
- Low Frequency Transducer: 5.25" shielded, weather-resistant
- High Frequency Transducer: 1" neodymium tweeter
- Frequency Range (-10 dB): 60 Hz - 20 kHz
- Continuous: 104 dB SPL
- Peak: 110 dB SPL
- Nominal Impedance: 8 ohms
- Power Rating: 60 W (IEC, 100 hours)
- Material: Injection moulded high impact polystyrene
- Finish: White or black (paintable)
- Grille: Heavy duty powder coated aluminium
- Mounting Hardware: Ball mount assembly / optional yoke mount

MICROPHONE

UCS Require two options:

1. Wired
2. Wireless



WIRED OPTION

Minimum Specification:

- Highly directional mini shotgun
- super-cardioid / lobar
- pressure gradient transducer / interference tube transducer
- 40 Hz – 20 kHz
- Impedance 50 ohms
- Equivalent noise level 23 dB(A)
- Gooseneck Mount
- Phantom power supply

WIRELESS OPTION

Minimum Specification:

- Lapel / Hand held Option
- RF frequency range 518..... 866 MHz
- Transmission/receiving frequencies 1440
- Presets 8
- Switching bandwidth 36 MHz
- Peak deviation +/- 48 kHz
- Comander HDX
- Frequency response (microphone) 40.....18000 Hz
- Signal-to-noise ratio > 112 dB(A)
- THD, total harmonic distortion < 0,9 %
- In compliance with ETS 300422 , ETS 300445 , CE , FCC
- Antenna connector 2 BNC, 50 Ohm
- Audio-XLR connector 6,3 mm
- Audio output level (balanced) XLR: +18 dBu max
- Audio output level (unbalanced) Jack: +12 dBu max

PROJECTION SCREEN

Minimum Specification:

- 16:9 Format
- 3020mm Diagonal
- Extruded Aluminium Frame
- Black Powder Coat Finish
- Matt White Viewing Surface

PRESENTATION DESK

Minimum Specification:

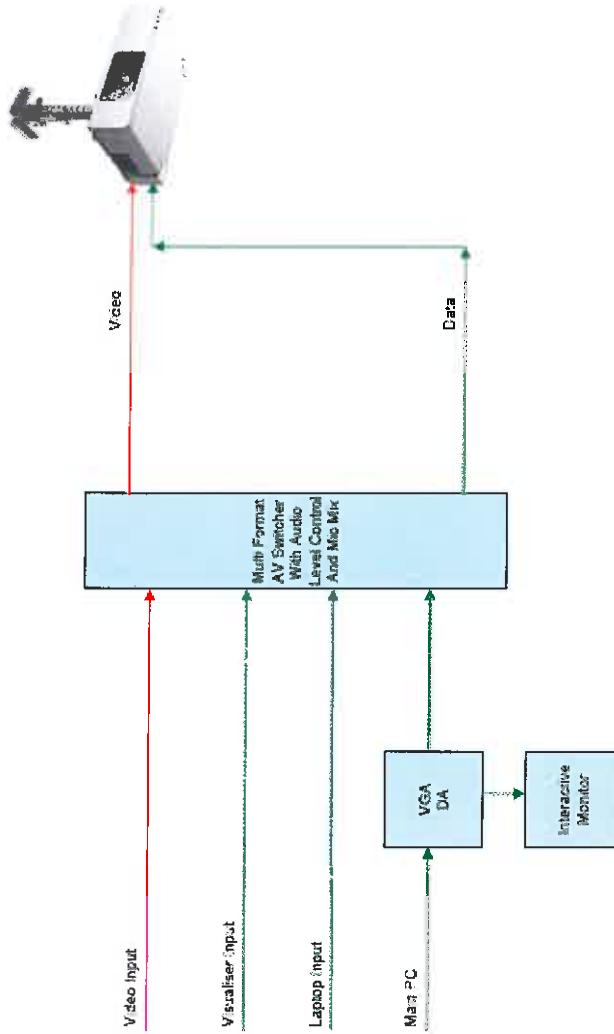
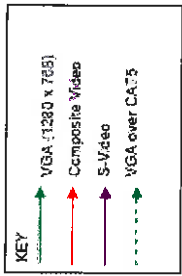
- Teaching desk unit incorporating 1 X 14U 19inch rack
- Front & rear or side opening ventilated rack doors
- Built in power distribution feeding surge protected female IEC sockets and three pin sockets.
- Ability to interconnect via umbilical with Floor box directly underneath rack.
- Variety of finish options



- Desktop to provide adequate space / housings for:
 - Interactive Monitor
 - Keyboard & Mouse
 - Visualiser
 - Control Panel
 - Laptop / Video inputs
 - Microphone



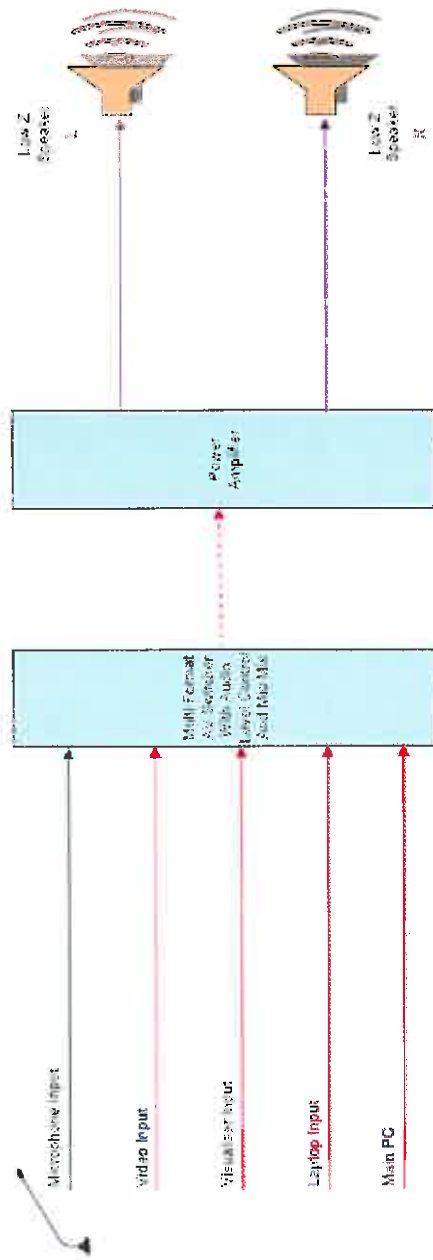
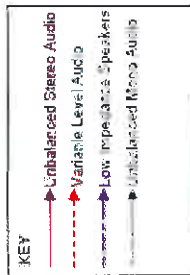
Video Schematic



60 / 80 Seat Teaching V1.0	TENDER
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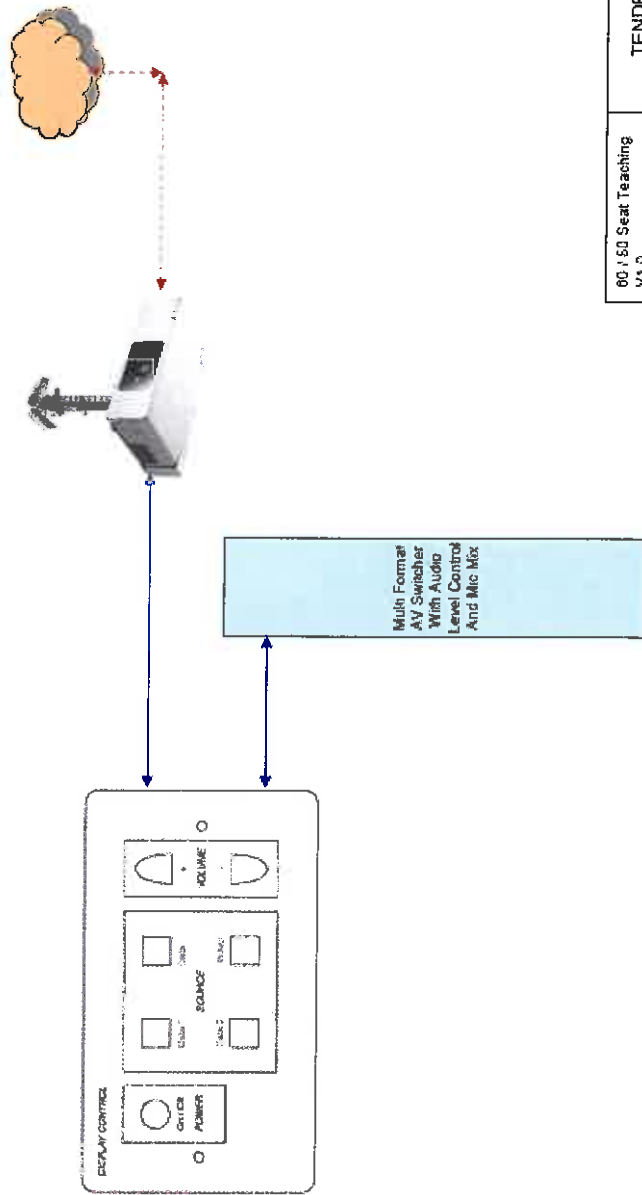
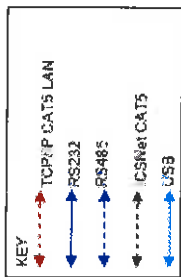
Audio Schematic



60 / 150 Seat Teaching V.I.P.	TENDER
University Campus Suffolk	ISSUE



Control Schematic



60 / 60 Seat Teaching V1.0 University Campus Suffolk	TENDER ISSUE
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Schedule 3

Teaching Rooms – 30+ seats

An audio visual system comprising of a presentation desk housing the source, switching, amplification and control devices and supplying a ceiling mounted data projector and wall mounted speaker system.

Connection between the presentation desk and projector / speakers will be via preinstalled floor box to device containment. All cabling to be supplied by the appointed AV contractor

PROJECTOR REQUIREMENTS:

Minimum Specification:

- Native Widescreen Format
- Optical Lens Shift Vertical: $\pm 51\%$, horizontal: $\pm 24\%$
- Min 3K Lumen
- Min 1280 x 800 pixel Resolution
- TCP/IP / PJ Link Network Control
- Wired and Wireless LAN Network presentation
- RS232 Control
- Web Browser Interface
- Email reporting
- Zoom Lens capable of producing 92" diagonal image with a throw in the range of 2690mm – 4340mm (Lens to projection surface).
- Ambient Light Sensor for automatic Image Adjustment
- Ability to produce Side by Side display of two separate sources
- Ability to Simultaneously display multiple PC's (minimum four PC's) via wired and wireless LAN
- Automatic Filter Mechanism reducing maintenance requirements
- Unicol Mounting Hardware

ROOM CONTROL SYSTEM:

Minimum Specification:

- 2 Gang presentation desk mounted push button control panel
- Min 7 discrete backlit buttons (On/Off, PC, Laptop, Visualiser, Video, Volume+, Volume-)
- Ability to control two RS232 devices
- Custom programmable
- Customisable Button Legends

SWITCHING / AUDIO CONTROL

Minimum Specification:

INPUTS:

- 2 composite video (1Vpp/75 Ω) on RCA connectors.
- 2 s-Video 1Vpp (Y), 0.3Vpp (C) / 75 Ω on 4p connectors
- 2 component video/UXGA on 15-Pin HDF connectors
- 4 VGA/UXGA on 15-Pin HDF connectors



- 4 unbalanced stereo audio on 3.5mm jack connectors (for VGA/UXGA) +4dBm/10kΩ
- 6 unbalanced stereo audio channels: +4dBm / 10kΩ on RCA connectors (for CV, YC, COMP/UXGA)

OUTPUTS:

- 1 composite video (1Vpp/75Ω) on an RCA connector
- 1 s-Video 1Vpp (Y), 0.3Vpp (C) / 75Ω on a 4p connector
- 1 component video/UXGA on an 15-Pin HDF connector
- 1 VGA/UXGA on an 15-Pin HDF connector
- 1 unbalanced stereo master audio channel: +4dBm / 50Ω on RCA connectors.

NB: Unit must provide audio level control for master output.

CONTROL: Front panel selector buttons, master audio level, lock, mute, RS-232.

VGA DA

Minimum Specification:

INPUT:

- 1 analogue red, green, blue signals - 0.7Vpp/75Ω, H & V sync, TTL level, on 15-Pin HD F connectors.

OUTPUTS:

- 2 analogue red, green, blue signals - 0.7Vpp/75Ω H & V sync, TTL level, on 15-Pin HD F connectors.

MAX. OUTPUT LEVEL:

- 1.8Vpp.

BANDWIDTH (-3dB):

- 400MHz.

INTERACTIVE LCD PANEL

Minimum Specification:

- 17-inch LCD display screen.
- SXGA resolution
- Eight hardware function buttons.
- A smoothly adjustable tilt stand.
- Software suite of professional presentation and collaboration software.
- A pen driven, icon orientated user interface allowing users to move from running Windows or digital video applications to annotating over them.
- Ability for simultaneous viewing and annotation by multiple systems connected either locally or across the Internet.



VISUALISER

Minimum Specification:

- XGA output resolution 1024 x 768
- Composite Video/Svideo output
- 20 Frames per second
- 15 x Optical Zoom
- 4 x Digital Zoom
- Max shooting Area A3
- Multi Position Camera Arm & Lamp
- 35mm Slide adapter included
- Upper lighting
- Auto Focus
- Auto Iris
- Image Save
- Image Rotate
- Split Screen Mode (freeze / live)
- USB2 Port

POWERED SPEAKERS

Minimum Specification:

- Type : Active 2-way HiFi Pro, sealed box
- Cabinet : ABS
- Woofer : 5.3" PP Shielded
- Tweeter : 1" mylar shielded
- Impedance : 4 Ohm/channel
- RMS Power 4 ohm : Build in amplifier
- AES Rated : 2 x 25 watt
- Dynamic Peak : 2 x 40 watt
- SPL 1 Watt/1M : 89 dB
- SPL Max peak : 105 dB
- Freq. range : 65 Hz - 20 kHz (bass-treble tone control)
- Dispersion : 80° H x 80° V
- IP rating : Indoor use only (IP40)

PROJECTION SCREEN

Minimum Specification:

- 16:9 Format
- 2337 mm Diagonal
- Manual spring roller operated screen
- Matt White Viewing Surface with Black Border
- Universal hanging brackets for attachment to wall or ceiling



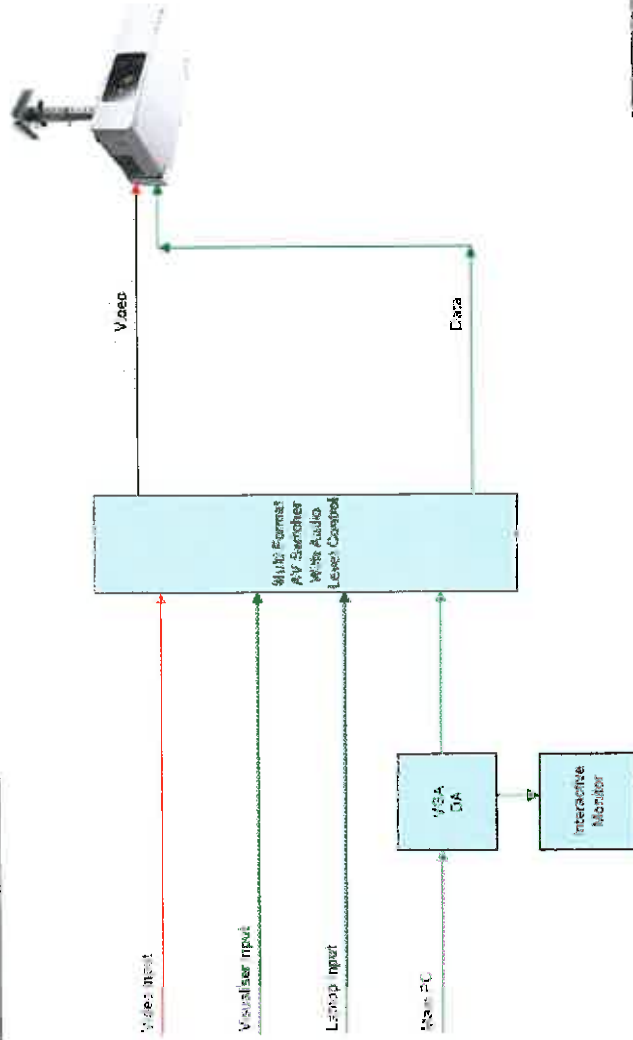
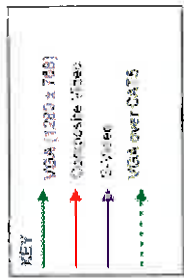
PRESENTATION DESK

Minimum Specification:

- Teaching desk unit incorporating 1 X 14U 19inch rack
- Front & rear or side opening ventilated rack doors
- Built in power distribution feeding surge protected female IEC sockets and three pin sockets.
- Ability to interconnect via umbilical with Floor box directly underneath rack.
- Variety of finish options
- Desktop to provide adequate space / housings for:
 - Interactive Monitor
 - Keyboard & Mouse
 - Visualiser
 - Control Panel
 - Laptop / Video Inputs
 - Microphone



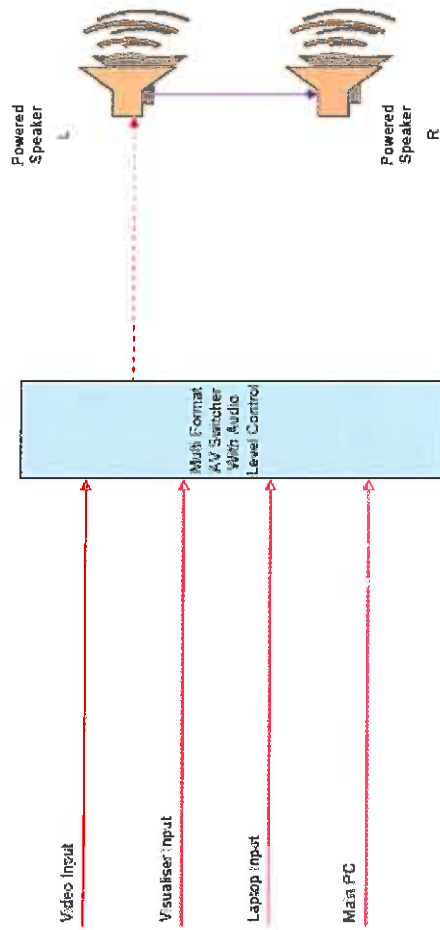
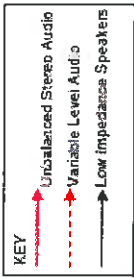
Video Schematic



30 Seat Teaching V.I.D	TENDER ISSUE
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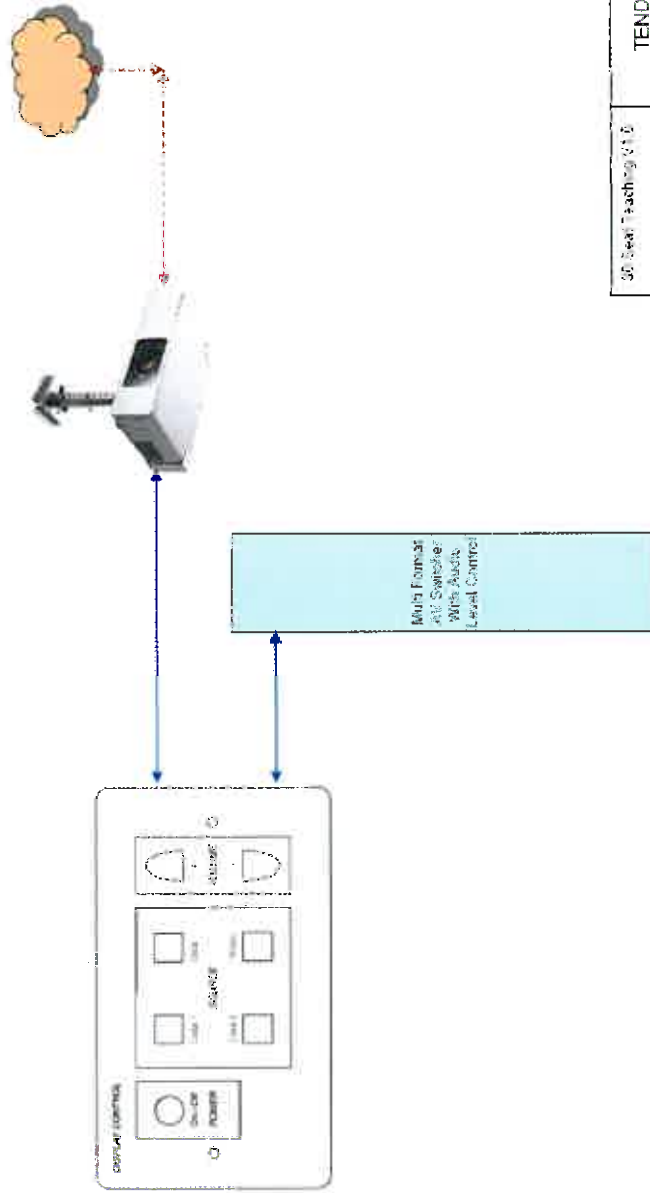


Audio Schematic



30 Seat Teaching V1.0	TENDER
University Campus Suffolk	ISSUE

Control Schematic



30 Seal Teaching 015	TENDER
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Schedule 4

Teaching Rooms – 18+ seats

An audio visual system comprising of a 50" WXGA resolution flat panel display, speakers and heavy duty trolley mount with cabinet and power distribution.

Connection between the presentation desk and flat panel display will be via preinstalled floor box to device containment. All cabling to be supplied by the appointed AV contractor

FLAT PANEL DISPLAY REQUIREMENTS:

Minimum Specification:

- 50" Diagonal Screen
- Native WXGA Resolution
- VGA (x2) / YC / CV / Audio / RS232 Inputs
- Availability of Wireless LAN Presentation & Control Module
- Ability to expand / upgrade Inputs via modular system
- Dual Picture / PIP Mode
- Inbuilt or Display mounted Speakers

MOBILE TROLLEY / CABINET / HIGH LEVEL MOUNT

Minimum Specification:

- Mobile trolley base with 4 lockable castors.
- 36U high column supporting cabinet / 19" rack.
- Detachable side covers & column covers
- Lockable door
- Top with cable entry gland
- Universal column adaptor for up to 50inch FPD
- Built in IEC power inlet feeding surge protected female IEC sockets and three pin sockets
- Input/output connector patch panel

ROOM CONTROL SYSTEM:

Minimum Specification:

- 2 Gang teaching desk / wall mounted push button control panel
- Min 7 discrete backlit buttons
- Ability to control RS232 devices
- Custom programmable
- Customisable Button Legends



VGA DA

Minimum Specification:

INPUT:

- 1 analogue red, green, blue signals - 0.7Vpp/75Ω, H & V sync, TTL level, on 15-Pin HD F connectors.

OUTPUTS:

- 2 analogue red, green, blue signals - 0.7Vpp/75Ω H & V sync, TTL level, on 15-Pin HD F connectors.

MAX. OUTPUT LEVEL:

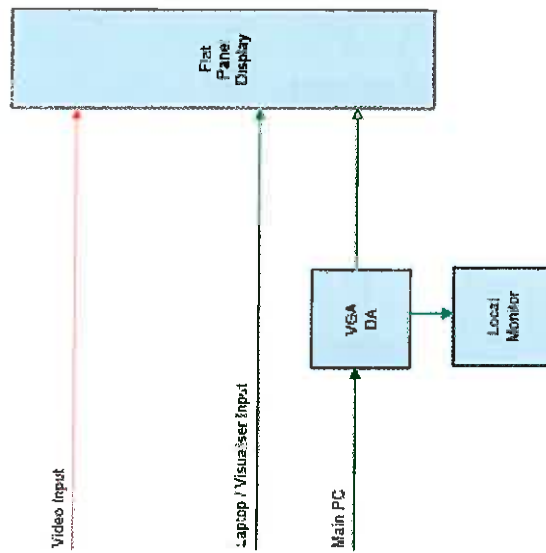
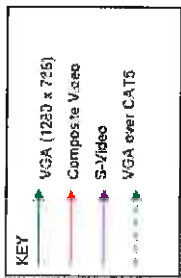
- 1.8Vpp.

BANDWIDTH (-3dB):

- 400MHz.

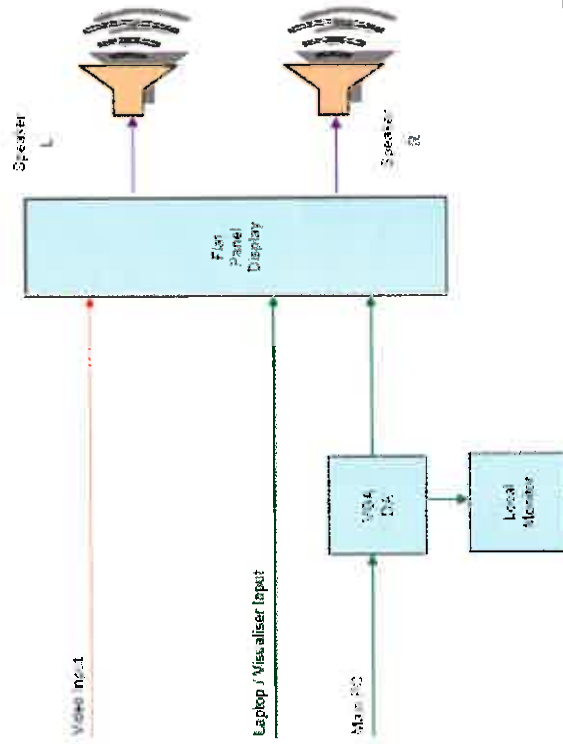
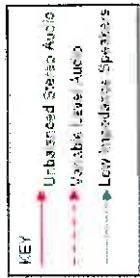


Video Schematic



18 Seat Teaching V1.0	TENDER
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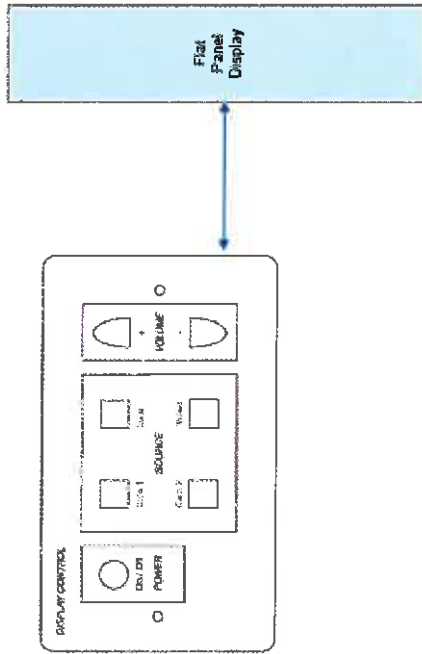
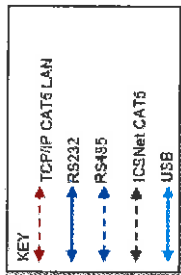
Audio Schematic



10 Beat Teaching VLO	TENDER ISSUE
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Control Schematic



18 Seat Teaching V1.0	TENDER
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Schedule 5

Media Screening Room

A solution suitable for the screening media studies material and capable of delivering digital surround sound and full high definition images from DVD & Computer sources.

The sound system should allow for audiences of 30 – 50 people.

The system must also allow PCs and Laptops to be used for standard presentation.

Minimum Equipment Specification Detailed Below:

PROJECTOR REQUIREMENTS:

Minimum Specification:

- Native Widescreen Format
- Optical H/V shift
- Min 3K Lumen
- Min WXGA Resolution (option for FHD 1920 x 1080 required)
- TCP/IP / PJ Link Network Control
- RS232 Control
- Web Browser Interface
- RGBHV / DVI-D (HDCP) / YUV
- UNICOL mounting hardware

CONTROL SYSTEM:

Minimum Specification:

- 2 Gang wall mounted push button control panel
- Discrete backlit buttons (On/Off, PC, DVD, Volume+, Volume-)
- Ability to control two RS232 devices
- Custom programmable
- Customisable Button Legends

DVD PLAYER:

- Blu Ray Disc Playback
- DVD / CD Playback
- Multiregion Playback
- Optical / Coaxial Digital Output

VGA DA

Minimum Specification:

INPUT:

- 1 analogue red, green, blue signals - 0.7Vpp/75Ω, H & V sync, TTL level, on



15-Pin HD F connectors.

OUTPUTS:

- 2 analogue red, green, blue signals - 0.7Vpp/75Ω H & V sync, TTL level, on 15-Pin HD F connectors.

MAX. OUTPUT LEVEL:

- 1.8Vpp.

BANDWIDTH (-3dB):

- 400MHz.

AUDIO SYSTEM:

Surround Sound Preamp

Minimum Specification:

- Full 7.1 EX/ES, THX Ultra 2 And Dolby Pro Logic IIx
- 4 Analog, 2 Coax, 2 Optical And 7.1 Analog Audio Inputs
- 4 Composite, 4 S-Video And 2 Component Video Inputs
- 1U Rack Mount
- Front panel control (Volume, input select, mode select)
- Front panel display
- RS232 Control

Power Amplifier (2)

Minimum Specification:

- 4 Channel Amplifier
- 250Watt per channel into 8ohms
- 400Watt per channel into 4ohms
- Distortion (SMPTE-IM) Less than 0.01%
- Comprehensive protection circuitry including DC, infrasonic, thermal overload and short circuit protection
- 2U Rack Mount

Loudspeakers:

Left / Right / Centre (3)

Minimum Specification:

- Frequency Response 62 - 20000 Hz
- Sensitivity 1W/1m 94 dB
- Max. SPL / 1m (calc); full space 122 dB
- Coverage (nominal -6dB) H° 100 °
- Coverage (nominal -6dB) V° 80 °
- System Power Handling 300 Watts
- Nominal Impedance (Passive) 8 Ohms
- Minimum Impedance 6 Ohms
- Paintable finish



Surround Channels (4)

Minimum Specification:

- Frequency Response 65 - 20000 Hz
- Sensitivity 1W/1m 89 dB
- Max. SPL / 1m (calc); full space 115 dB
- Coverage (nominal -6dB) H° 120 °
- Coverage (nominal -6dB) V° 80 °
- System Power Handling 200 Watts
- Nominal Impedance (Passive) 8 Ohms
- Minimum Impedance 6 Ohms
- Paintable finish

Subwoofer (1)

Minimum Specification:

- Frequency Response 40 - 140 Hz
- Sensitivity 1W/1m 100 dB
- Max. SPL / 1m (calc); full space 125 dB
- System Power Handling 350 Watts
- Nominal Impedance (Passive) 6 Ohms

RACK SYSTEM

Minimum Specification:

- 19" Rack System – Floor Standing
- Internal Power Distribution
- Passive / Active Cooling

PROJECTION SCREEN

Minimum Specification:

- 16:9 Format
- 2540mm Diagonal
- Supernova Optical Viewing Surface
- Extruded Aluminium Frame



Schedule 6

Lecterns

TEAMMATE EXECUTIVE

Specifications

- Mobile trolley base with 4 lockable castors
- 36u high cable management column
- 12u x 350mm rack with detachable side covers for easy access
- Curved acrylic door dark smoked grey – lockable
- Profiled frosted glass top
- Universal column adaptor for up to 50" FPD
- Built in IEC power inlet feeding surge protected female IEC sockets and 4 three pin sockets
- Input/output connector patch panel 2 x 2u modules & 1 x blank as standard
- Metal work finish in stainless steel and silver

Options

- Secure panel for control panels
- Wood veneer top with polished edges
- Stainless steel lockable 8u door
- Sliding AV drawer 3u

TEAMMATE TUTOR SINGLE

Specifications

- Teaching desk unit consisting of 1 x 14u x 500 19" equipment rack with removable side panels
- 2 x AV shelves for free standing hardware
- Outtrigger and column
- Fully transportable with lockable heavy duty levelling castors
- Stainless steel 8u lockable door
- Input/output patch panel with tamper proof cover.
- Built in IEC power inlet feeding surge protected 16 female IEC sockets and 4 three pin sockets
- Standard desktop in Formica Stardust grey
- Metal work finish in stainless steel and silver
- Includes Ergo double articulated monitor arm with VESA mount
- Can be ordered in stage left or right orientation.

Options

- Secure housing for control panel
- Visualizer security tray
- Wood veneered desk top with polished edges
- Sliding AV storage drawer
- Modesty panel in stainless steel finish
- Cantilever desk extension in matching desk top finish.



TEAMMATE VARIHITE PODIUM

Specifications

- A twin 14u 500mm 19" AV rack lecturing Podium and a centre pod with VariHite lift and lower module
- Front and rear detachable panel for easy access
- Full DDA compliance for wheelchair access
- Centre pod with modesty panel
- 4 x AV shelves for free standing hardware
- Fully manoeuvrable on heavy duty lock down levelling castors
- Sculptured worktop finish in customers choice
- Top and bottom rack trims double slotted for natural ventilation
- Built in IEC power inlet feeding surge protected 16 female IEC sockets and 4 three pin sockets

Options

- Ergo double articulated monitor arm with VESA mount
- Sliding AV drawer 3u
- Secure housing unit for control panel
- Visualiser security tray

UCS MAIN LT (140 Seat) LECTERN REQUIREMENT		
PRODUCT	PART NUMBER	QTY
TeamMate VariHite Podium	VHPODIUM	1
TO INCLUDE	Twin 14u 500mm racks with top and bottom double slotted trims for natural ventilation. Front and rear detachable panels to provide easy access	
	Centre pod with varihite lift and lower module	
	Full DDA compliance with wheelchair access	
	AV rack tray s for free standing equipment	
	Hi duty lock down levelling castors	
	Two plexiglass dark smoked lockable doors	
	Sculptured worktop in Formica finish of choice	
	Built in IEC power inlet feeding surge protected 16 female IEC sockets and four three pin plugs	
	Metalwork finish in silver and stainless steel	
OPTIONS		
TM Ergo monitor arm double articulated	ERGOFLEXARM	1



TM control housing unit	CUTHOUSING	1
TM visualiser security tray	SECTRAYVISCUST	1
TM stainless steel security door 8u	SS8UDOOR14X500	1
TM sliding AV drawer	SLIDE500	1
TM twin gang patch panel housing		1



Schedule 7

Digital Signage

DIGITAL SIGNAGE SYSTEM – COPPER DISTRIBUTION¹

A digital signage system capable of delivering high definition content comprising live TV or Video feed, RSS, HTML and Flash content all on one screen. The solution must be scalable and provide scheduling software and branded user templates. The solution must also provide a secure browser interface with access to functionality limited by user log on rights.

The solution should provide a controllable CAT5 / 6 signal distribution matrix, the output from the digital signage servers being distributed by the matrix.

The display screens must be commercial type designed for extended operation, minimum 60000Hrs operation.

FLAT PANEL DISPLAY REQUIREMENTS:

Minimum Specification:

- 50" Diagonal Screen (<quantity>)
- 42" Diagonal Screen (<quantity>)
- Native WXGA Resolution or above
- VGA / YC / CV / Audio / RS232 Inputs
- Ability to expand / upgrade Inputs via modular system desirable
- Inbuilt or Display mounted Speakers
- Unicol mounting hardware

DIGITAL SIGNAGE SERVERS (<quantity>):

Minimum Specification:

- Ability to display:
 - MPEG 1,2,4 DivX, AVI, WMV, Real, QT Animation Flash, HTML with Javascript, JPEG, GIF, TIFF, BMP, PNG, MP3 Audio, text with multiple fonts, speeds and directions.
- Portrait or landscape operation
- Ethernet MPEG/UDP/IP Stream
- Widescreen VGA output
- Local Composite & S-Video inputs
- Inbuilt DVB-T Tuner
- Management via secure web browser with multiple levels of user access
- Scheduling to provide any number of layouts at predetermined times / days
- RSS feed reader
- Scalable to include master slave configuration for multiple servers
- Hardware 3.0Ghz P4 512MB RAM 80GB HDD or above
- Either rack mount or to fit 2U rack shelf



CAT5 / 6 Distribution Matrix:

Minimum Specification:

- ~~4 multi-format inputs (plus 4 CVBS inputs) x 16 outputs~~
- ~~Digital audio support~~
- ~~Central device control~~
- ~~1U rack-mounting~~
- ~~Cascadable to support higher number of outputs~~
- ~~Network Interface~~
- ~~Dynamic scheduling ability~~
- ~~Turn on / off displays via RS232~~
- ~~Outputs up to 300m via CAT5 or CAT6 cable~~
- ~~Multi formats to include RGBHV, YUV, CVBS, SVideo~~

Comment [e1]: Deleted not required – 10 April 2008 Rev 1

Digital Signage System – Fibre + Copper Distribution

A digital signage system capable of delivering high definition content comprising live TV or Video feed, RSS, HTML and Flash content all on one screen. The solution must be scalable and provide scheduling software and branded user templates. The solution must also provide a secure browser interface with access to functionality limited by user log on rights.

The solution should provide an IPTV encoder for the purpose of streaming DVB-T television channels to the Digital Signage Servers.

The display screens must be commercial type designed for extended operation, minimum 60000Hrs operation.

A total of six¹ servers will be required configured in a master – slave arrangement, refer to provided schematic for method of operation.

Comment [e2]: Confirmed quantity - 10 April 2008 Rev 1

FLAT PANEL DISPLAY REQUIREMENTS:

Minimum Specification:

- 50" Diagonal Screen (1 x 50" for floor 0)
- 42" Diagonal Screen (6 x 42" one per floor 1 - 6)
- Native WXGA Resolution or above
- VGA / YC / CV / Audio / RS232 Inputs
- Ability to expand / upgrade Inputs via modular system desirable
- Inbuilt or Display mounted Speakers
- Unicol mounting hardware

Comment [e3]: Confirmed quantity – 10 April 2008 Rev 1

DIGITAL SIGNAGE SERVERS (6 x Server)¹:

Minimum Specification:

- Ability to display:
 - MPEG1,2,4 DivX, AVI, WMV, Real, QT Animation Flash, HTML with Javascript, JPEG, GIF, TIFF, BMP, PNG, MP3 Audio, text with multiple fonts, speeds and directions.



- Portrait or landscape operation
- Ethernet MPEG/UDP/IP Stream
- Widescreen VGA output
- Local Composite & S Video inputs
- Management via secure web browser with multiple levels of user access
- Scheduling to provide any number of layouts at predetermined times / days
- RSS feed reader
- Scalable to include master slave configuration for multiple servers
- Hardware 3.0Ghz P4 512MB RAM 80GB HDD or above
- Either rack mount or to fit 2U rack shelf

IPTV Gateway:

Minimum Specification:

- DVB-T Reception
- 2 MUX minimum
- 802.3 10/100BaseT Ethernet
- Configurable multicast addresses & port per transport stream
- Media Streaming Protocols:
 - RTP/RTSP
 - SDP, SAP
 - Unicast / Multicast





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Schedule 8

Portable FHD Video Conference System

An audio visual system comprising of a 50" FHD resolution flat panel display, speakers and heavy duty trolley mount with cabinet and power distribution.

Connection between the presentation desk and flat panel display will be via preinstalled floor box to device containment. All cabling to be supplied by the appointed AV contractor

FLAT PANEL DISPLAY REQUIREMENTS:

Minimum Specification:

- 50" Diagonal Screen
- Native 1920 x 1080 Resolution
- DVI-D / VGA / YUV / Audio / RS232 Inputs
- Availability of Wireless LAN Presentation & Control Module
- Ability to expand / upgrade Inputs via modular system
- Dual Picture / PIP Mode
- Inbuilt or Display mounted Speakers

MOBILE TROLLEY / CABINET / HIGH LEVEL MOUNT

Minimum Specification:

- Mobile trolley base with 4 lockable castors.
- 36U high column supporting cabinet / 19" rack.
- Detachable side covers & column covers
- Lockable door
- Top with cable entry gland
- Universal column adaptor for up to 50inch FPD
- Built in IEC power inlet feeding surge protected female IEC sockets and three pin sockets
- VC Shelf
- Input/output connector patch panel

VIDEO CONFERENCE SYSTEM

Minimum Specification:

- 720p Resolution High Definition System
- Equivalent Polycom HDX8002XL Package



Schedule 9

Service and Support Package

The package for the Audio Visual maintenance support Service Level Agreement shall consist as a minimum of the following requirements.

Applicants should be ISO9001 accredited in the maintenance of commercial audio visual systems and have a proven track record in the HE / FE field. References shall be provided by the Tenderer.

1st line support will be provided by UCS staff, once a fault has been established by UCS staff a swift response will be required from the AV Service contractor as detailed below.

The required Working Times are: Monday – Friday, 8am – 5pm.

Response time – engineer on site:

The Tenderer shall provide Options with operating criteria for:

1. Same Working Day Response / 4 Hr Response:
2. Next Working Day Response / 8Hr Response:
3. Three Working Day Response / 24Hr Response

Callout Charges

The Service shall be fully inclusive with no further cost to UCS regardless of the number of site visits.

Faulty Equipment

Loan equipment shall be provided without cost to UCS until such time as faulty equipment is repaired and re-installed. The service contractor shall be responsible for de-install and reinstall of all AV equipment covered under this agreement.

Repair Costs

All labour & spares shall be included in the service contract and without further cost to UCS (excluding consumables - projector lamps, filters etc)

Preventive Maintenance / Equipment Audit

The service contractor shall provide twice a year preventive maintenance visits without further cost to UCS. All Audio Visual equipment supplied under this contract shall be covered by this arrangement. A written audit of equipment tested, maintenance work performed, faults found and action taken shall be provided to UCS on an agreed schedule.

Costed responses shall be provided for the following terms:

- 12 Months
- 36 Months
- 60 Months



Appendix E
Drawing Schedule



E1 Drawing Schedule
Drawing No., Title, Status

Drawing No	Title	Status
2068 (72.1)100 Rev. C4	Ground Floor Plan Furniture Layout	For Comment
2068 (72.1)110 Rev. C6	First Floor Plan Furniture Layout	Construction Issue
2068 (72.1)120 Rev. C5	Second Floor Plan Furniture Layout	Construction Issue
2068 (72.1)130 Rev. C5	Third Floor Plan Furniture Layout	Construction Issue
2068 (72.1)140 Rev. C4	Fourth Floor Plan Furniture Layout	Construction Issue
2068 (72.1)150 Rev. C2	Fifth Floor Plan Furniture Layout	Construction Issue
2068 (72.1)160 Rev. C3	Sixth Floor Plan Furniture Layout	Construction Issue



