Audio Visual Standards

IDS Cloud, Infrastructure & Service Delivery Management

Information and Digital Services

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Reference

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1.1	28 Jul 2022	New logo, Leigh H as AVSES Lead, Replacement of Audio Visual Services with IDS Audio Visual, Simulation & Event Services, updates to functional room descriptions, removal of VC references	Leigh Hoppenbrouwers

This document will be reviewed every six months to ensure alignment with the university's requirements, current vendor offerings and industry best practice.

Document Control

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1. Acronyms and Definitions

1.1. Acronyms

The following acronyms are used throughout this document.

Acronym	Definition
AC	Audio Conference
AEC	Acoustic Echo Cancellation
AFFL	Above Finished Floor Level
AV	Audio Visual
AVBB	Audio Visual Building Block
BCA	Building Code of Australia
DDA	Disability Discrimination Act
DGPO	Double General Power Outlet
DLP	Defects Liability Period
DP	DisplayPort
DSP	Digital Signal Processor
DVD	Digital Versatile Disc
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
EWB	Electronic Whiteboard
FB	Floor Box
FOH	Front of House
FPD	Flat Panel Display
FTA	Free to Air (TV)
FTP	File Transfer Protocol
GPO	General Power Outlet
HA	Hearing Augmentation
HD	High Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HVAC	Heating, Ventilation, and Air Conditioning
IDS	Information and Digital Services
IP	Internet Protocol
IPTV	Internet Protocol television
ISDN	Integrated Services Digital Network
IT	Information Technology
IWB	Interactive Whiteboard
K/M	Keyboard and Mouse
KVM	Keyboard, Video and Mouse
LAN	Local Area Network

Acronym	Definition
LCD	Liquid Crystal Display
MATV	Master Antenna Television
NCC	National Construction Code
PBC	Push Button Controller
PC	Personal Computer
PC	Practical Completion
PDU	Power Distribution Unit
PFD	Property, Facilities and Development
PIP	Picture in Picture
PIR	Passive Infrared
PoE	Power over Ethernet
PSTN	Public Switched Telephone Network
PTZ	Pan Tilt Zoom
QRG	Quick Reference Guide
RBS	Room Booking System
RT	Reverberation Time
SD	Standard Definition
SPL	Sound Pressure Level
STB	Set-top Box
STI	Speech Transmission Index
TPC	Touch Panel Controller
TV	Television
USB	Universal Serial Bus
VGA	Video Graphics Array
VWP	Video Wall Processor
WAN	Wide Area Network

1.1. Definitions

The following definitions are used throughout this document.

Approval	Formal acceptance of the submitted works. Approval does not relinquish the contractor's responsibility under the applicable contract or engagement.
Authorities	Statutory bodies or inspectors having jurisdiction to enforce current regulations or statutes.
AV Consultant	An individual or company that provides technical design and advice to deliver standards-based AV solutions to the University.
AV Integrator	The company and its sub-contractors, agents and representatives engaged to deliver the AV system as detailed in supporting documents. The AV integrator may be directly engaged or subcontracted under a builder or other services integrator.
Contract	An enforceable agreement between Flinders University and engaged contractor.
Contractor	The company, its staff, agents, or sub-contractors that have entered into an agreement to complete the works as detailed in the contract and/or "Scope of Works".
Defects Liability Period	A period of time (typically 12 months) from the day that Practical Completion was obtained where the contractor is to provide a warranty for all supplied goods and services.
Instruction	A formal direction issued by the Principal or their representative.
AV Practical Completion	The date the all works have been completed and there are no outstanding defects. Practical Completion may be conditionally granted if defect rectification is delayed by issues outside the contractor's control. DLP for outstanding items will commence from the day of rectification.
Principal (Project Officer)	Flinders University's representative who has full authority to act on behalf of the University for all technical and design related matters. Typically, this will be the Audio Visual Solutions Architect – Audio Visual Services
IDS Project Manager	Flinders University's representative responsible for scheduling and liaising with all concerned parties to ensure the delivery of the project is completed in a professional, timely and cost-efficient manner.
Project Manager	Flinders University's representative who has full authority to act on behalf of the University for all project related matters.

2. Introduction

Flinders University IDS Audio Visual, Simulation & Event Services is responsible for the design, delivery, maintenance and support centrally managed AV systems within the university.

The standards provide Architects, Engineers, Consultants and Contractors with the requirements to design and implement AV systems that meet the requirements of the university. Additionally, the standards also provide Flinders University faculties, departments, project managers and individuals with an understanding of best practices and the minimum requirements for the different types of teaching and learning spaces. Where these standards cannot be adhered to, the AV Consultant or AV Integrator must consult with Flinders University IDS staff during the design phase and prior to the commencement of works.

The Audio Visual Standards do not define architectural, electrical, network and cabling standards (please refer to the Flinders University Campus Cabling Standards), acoustic standards or the National Construction Code for further information.

Flinders University IDS AV endorses the standards and guidelines published by Avixa and endorsed by the AETM. Performance guidelines published in this document may vary from those published in the Avixa standards as they have been specified to meet the overall requirements of Flinders University.

2.1. Flinders University Compliance

All contractors and consultants working on Flinders University sites or projects must conform with all documented policies, guidelines and procedures. Further to this they must ensure compliance with all statutory and regulatory requirements.

Flinders University IDS AV and IT specific policies, guidelines and procedures are referenced in the relevant sections of this document. All others are managed by Property, Facilities and Development and can be review on the following website https://staff.flinders.edu.au/workplace-support/contractor-safety/contractor-information. All contractors and consultants must familiarise themselves with the content of this website prior to commencing any works.

2.2. Project Management

The AV systems project management processes will vary depending on which organisation it was initiated by. The following table details the organisation, Principal and project management process.

Organisation	Principal	Type
Property, Facilities & Development	Project Manager	Capital / Major Works
Information & Digital Services	Senior Project Manager	Major Works

2.3. Design Process

The design of modern learning spaces with integrated educational technology requires a coordinated project team and collaborative process from the earliest stages of project definition and concept design. The project team should consist of project managers, key stakeholders, IDS IT, AV staff and critically the users of the teaching space. The solutions need to meet the requirements of modern teaching and learning often includes distributed AV solutions with sophisticated media and communications technology.

The technology solution chosen for each venue can substantially change the special requirements and budget for learning spaces. Therefore, it is critical to consider AV solutions at early stages of the project. To formulate a project preliminary budget or architectural concept without the early input of AV expertise will put the project at risk unnecessarily. The most cost-effective time to make changes is early in the project lifecycle.

AV expertise and input is required at all design stages to:

- Document the technology functionality requirements of those who will use the spaces
- Discuss technology options with clients and stakeholders including the institution's AV staff
- Develop a technology concept that can then be incorporated into the project feasibility assessment, preliminary budget estimate and the design brief that goes to market

Any successful project which includes a professional audio-visual installation must provide for clear definition and management of goals, processes, resources, and responsibilities between the design and installation project teams and the client.

Flinders University IDS requires all AV Consultants and AV Integrators to provide schematics and equipment lists to allow a thorough review of the proposal before we consider the tender or quote as conforming.

This document has been written to ensure the following:

- A common look, feel and functionality across all AV deployments managed by Flinders University.
- Deployment of AV systems that can be supported in a timely and cost-effective manner.
- A defined minimum level of performance and installation benchmarks to ensure the quality of all AV deployments.
- Provide guidance to consultants, integrators, architects and other stakeholders regarding the selection, design or installation of AV systems.
- The use of common equipment types to allow for consolidation of spares and greater vendor support that are listed on Flinders University Preferred AV Equipment list or Bill of Materials.

Adherence to these standards is required for all deployments of AV within Flinders University.

3. Standard Designs

Flinders University will be adopting a network-based AV solution to ensure that deployed AV systems will support the teaching and learning activities of tomorrow as well as providing improved remote management and support capabilities.

To facilitate the transition to network-based AV, an AV Building Block (AVBB) approach has been utilised. This approach breaks the ties between Control, Audio, Video transport and switching. This will allow for a staged migration to centrally deployed control, centrally deployed audio and TCP/IP based distribution of AV signals on the shared enterprise network.

The AVBB approach breaks the AV system down into functional blocks instead of the current room-based designs. Standards room configurations are documented as a collection of the required AVBBs to deliver the required functionality.

As Flinders University deploys network-based components, the conventional AVBBs will be replaced with netcentric versions. These netcentric AVBBs will provide the following longer-term benefits to the university:

- Leverage existing network infrastructure and services to provide additional functionality, supportability and cost saving.
- Allows for standard designs to be made up of smaller AVBBs. The smaller building blocks allow designs to be tailored to stakeholder needs, providing more efficient and agile designs, while still maintaining all of the advantages that a standard based deployment offers.
- AV systems can be software defined meaning that functionality can be tailored to meet the exact users' needs on a class/use basis as required.
- Network connectivity will provide an unprecedented level of monitoring and support.
- A reduction in room upgrades or second iteration life-cycling costs.

The following sections detail the following:

- Functionality of each AVBB.
- Standard room designs consisting of AVBBs to ensure a common level of functionality exists across centrally managed and other common teaching spaces.
- A summary matrix to allow a quick reference of room functionality and associated AVBB.

3.1. Video – Source AV Building Blocks

3.1.1. Video Source IP – 1 to 2 Sources

A single input source AVBB is used to integrate up to two source devices into a netcentric AV solution.

Input device options are as follows:

- Resident PC (Academic & student)
- BYOD (Academic & student)
- Document camera
- PTZ camera
- Laboratory equipment

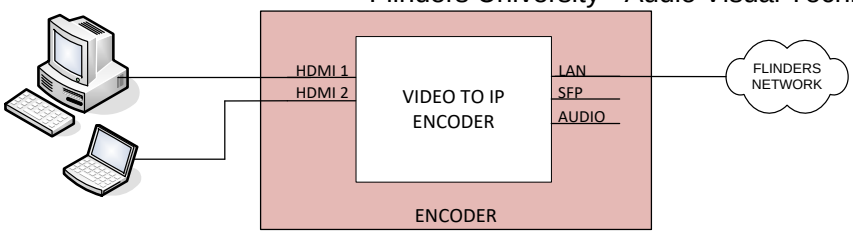


Image: Video Source IP – 1 to 2 Sources

3.1.2. Video Source IP – Multiple Inputs – Single Stream

A multiple input source AVBB is used to integrate multiple source devices into a netcentric AV solution. This option is to be used where no preview or routing individual content to multiply display is required as it only transmits a single stream of the selected source. This option also provides scaling capabilities.

Input device options are as follows:

- Resident PC (Academic & student)
- BYOD (Academic & student)
- Document camera
- PTZ camera
- Laboratory equipment

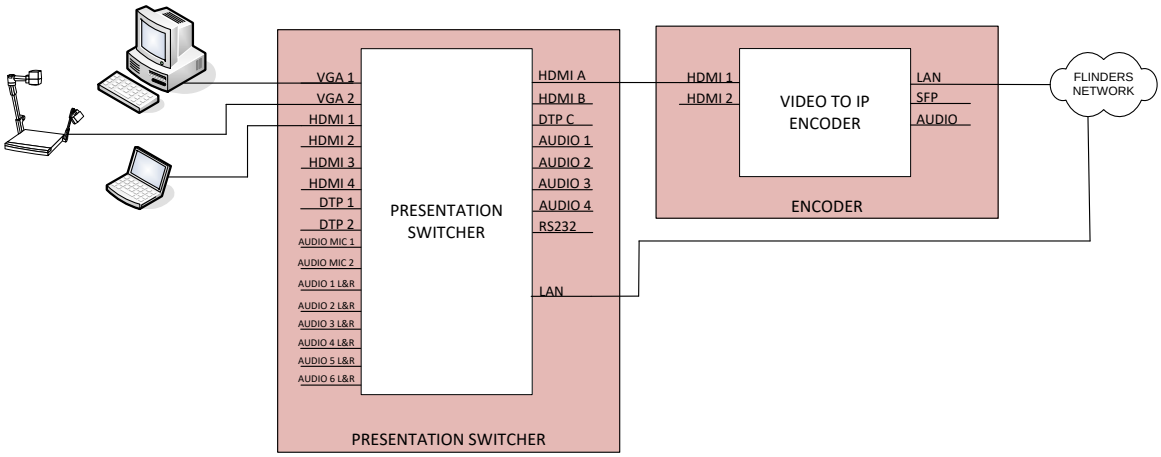


Image: Video Source IP – 3 to 4 Sources – Single Stream

3.1.3. Video Source IP – Up to 4 Sources – Dual Stream

A multiple input source AVBB is used to integrate up to four source devices into a netcentric AV solution. This option is to be used where preview or routing of content to multiply display required as it transmits two independent IP streams.

Input device options are as follows:

- Resident PC
- BYOD
- Document camera
- PTZ camera

- Laboratory equipment

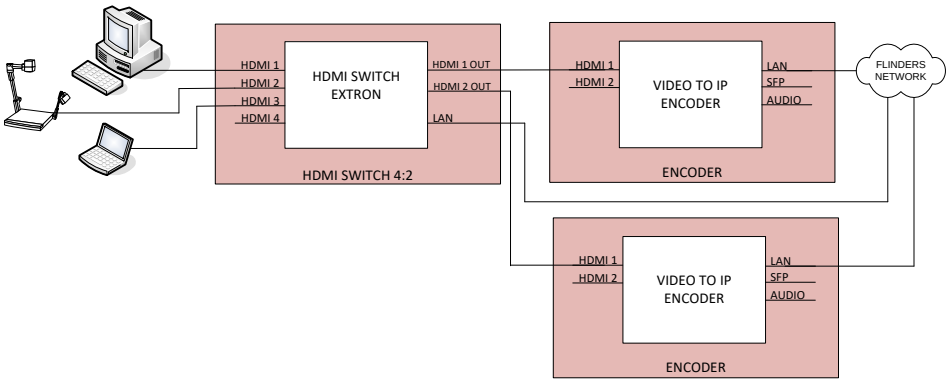


Image: Video Source IP – Multiple Sources – Dual Stream

3.1.4. Video Source IP – PTZ Camera

A PTZ Camera input source AVBB is used to integrate a PTZ Camera as a source input. Typically, this source would be routed directly to a USB AV interface for web-conference. In a laboratory space is could be used to provide an image of a model or other training aids.

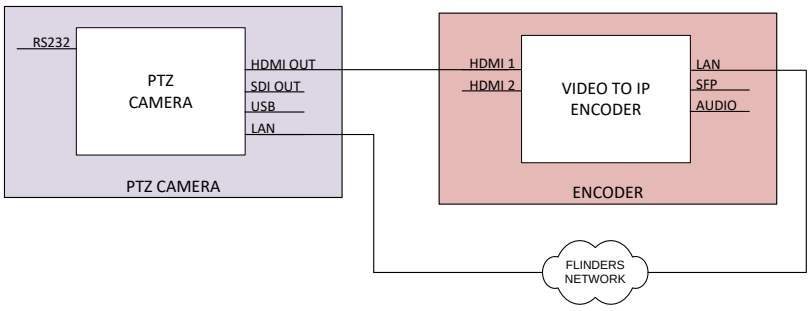


Image: Video Source IP – PTZ Camera

3.1.5. Video Source IP – Wireless Presentation

A wireless presentation input source AVBB is used to integrate wireless presentation functionality as a source input.

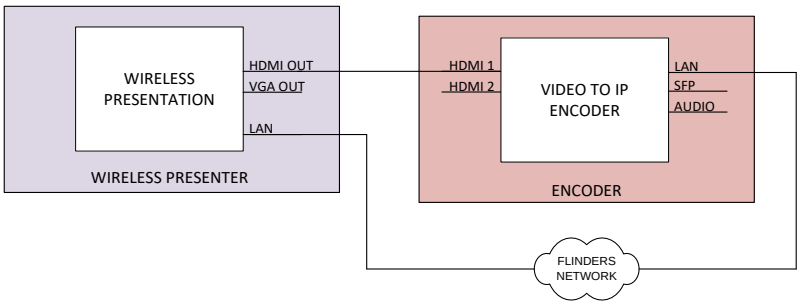


Image: Video Source IP – Wireless Presentation

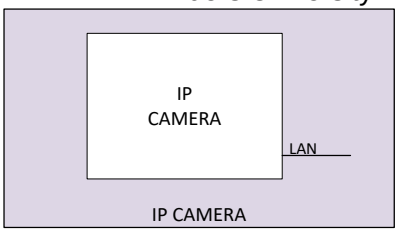


Image: Video Source IP – IP Camera

3.1.6. Video Source – Conventional

The following are the current conventional source devices are identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with the video input IP building block identified above.

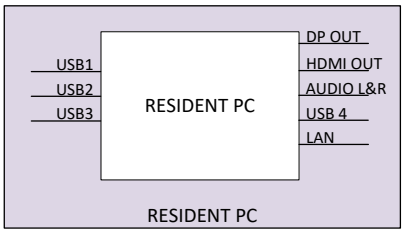


Image: Video Source Conventional Source – Resident PC

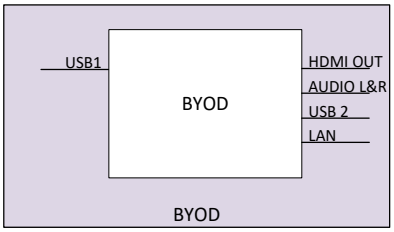


Image: Video Source Conventional Source – BYOD

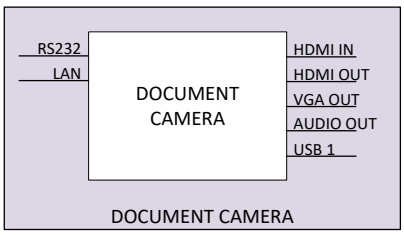


Image: Video Source Conventional Source – Document Camera

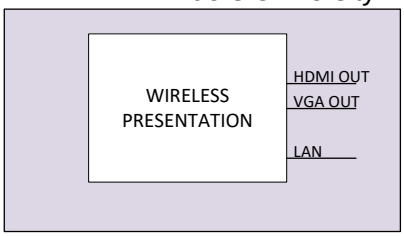


Image: Video Source Conventional Source – Wireless Presentation

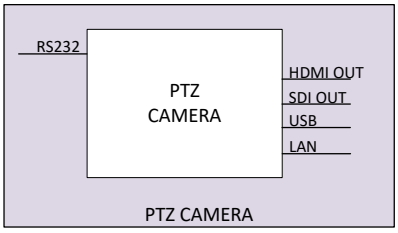


Image: Video Source Conventional Source – PTZ Camera

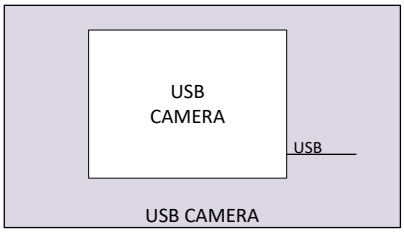


Image: Video Source Conventional Source – USB Camera

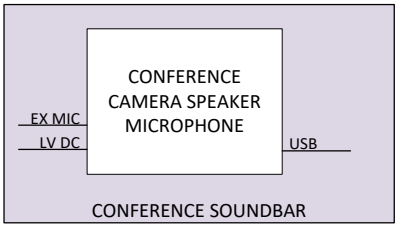


Image: Video Source Conventional Source – Conference Sound Bar / Camera / Mic

3.2. Video – Processing & Distribution AV Building Blocks

3.2.1. Video Processing IP

Typically, classrooms require minimal video processing other than scaling of source content to match the resolution or aspect ratio of a display device. In a netcentric design this is typically performed by the codec. This means that other than specialist spaces, video wall installations or other bespoke requirements, there is no requirement for IP based video processing equipment.

3.2.2. Video Processing – Conventional

The following are the current conventional video processing devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted unless used in standalone deployments.

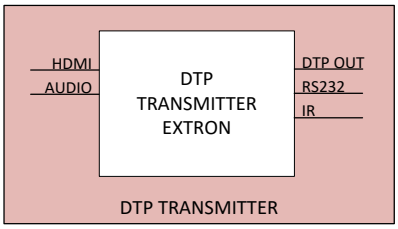


Image: Video Processing – Cat X HDMI Transmitter

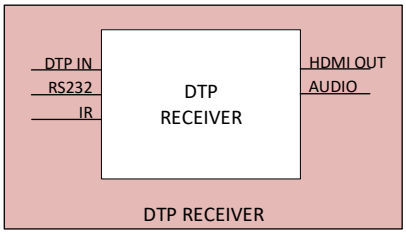


Image: Video Processing – Cat X HDMI Receiver

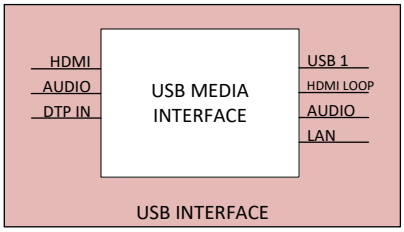


Image: Video Processing – USB Media Interface

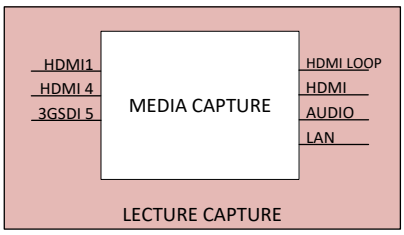


Image: Video Processing – Content Capture Appliance

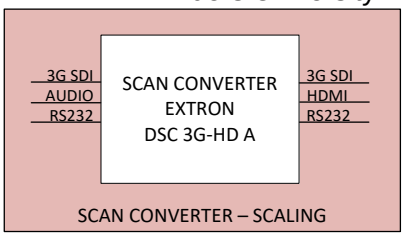


Image: Video Processing – Scan Converter

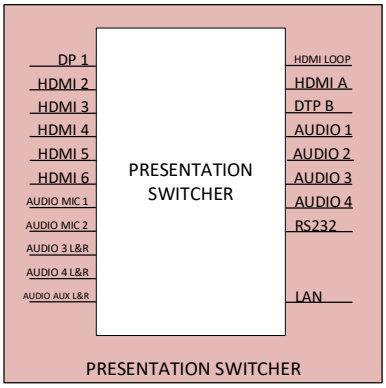


Image: Video Processing – Presentation Switcher

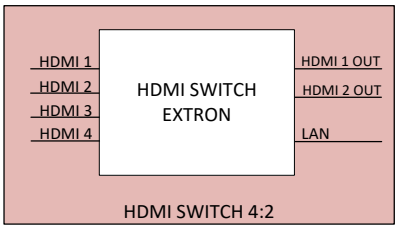


Image: Video Processing – Matrix Switcher 4:2

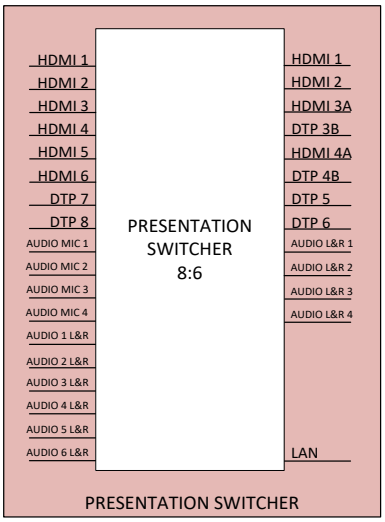


Image: Video Processing – Matrix Switcher

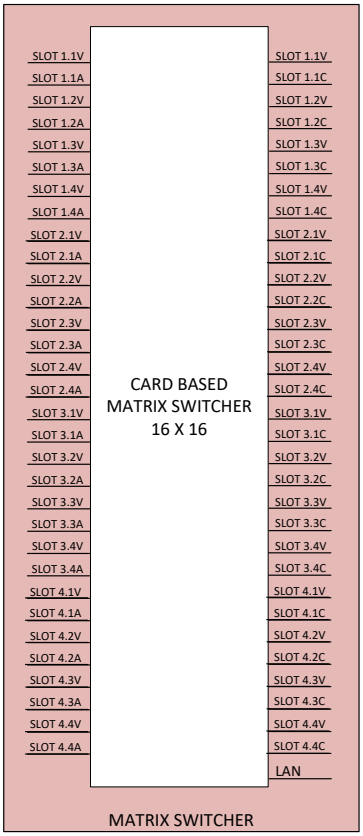


Image: Video Processing – Matrix Switcher

3.3. Video – Destination AV Building Blocks

3.3.1. Video Destination IP – Display

A single output AVBB is used to deploy either a projector or flat panel display as part of a netcentric AV solution. Display AVBBs can be deployed to deliver a variety of functionality with the display device and size selected to suit.

Display AVBBs may be used to deliver the following functionality:

- Primary display
- Secondary display(s). For dual projection or video reinforcement applications
- Preview monitor
- Confidence monitor (content)
- Student pod display

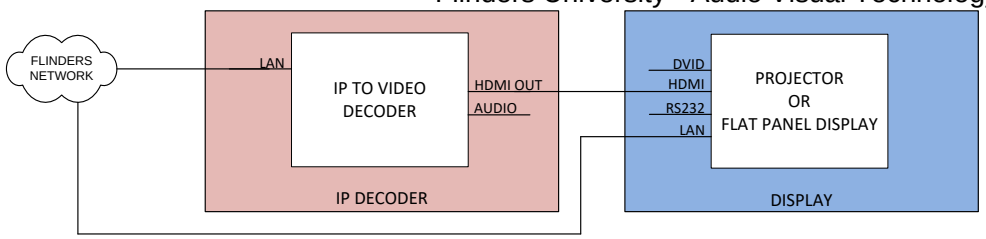


Image: Video Output IP – Display

3.3.2. Video Destination IP – Content Capture

A content capture AVBB is used to deploy capture functionality to spaces that deploy a netcentric AV solution. A content capture appliance AVBB can be used to support multiple spaces as any video and audio stream can be routed to the appliance.

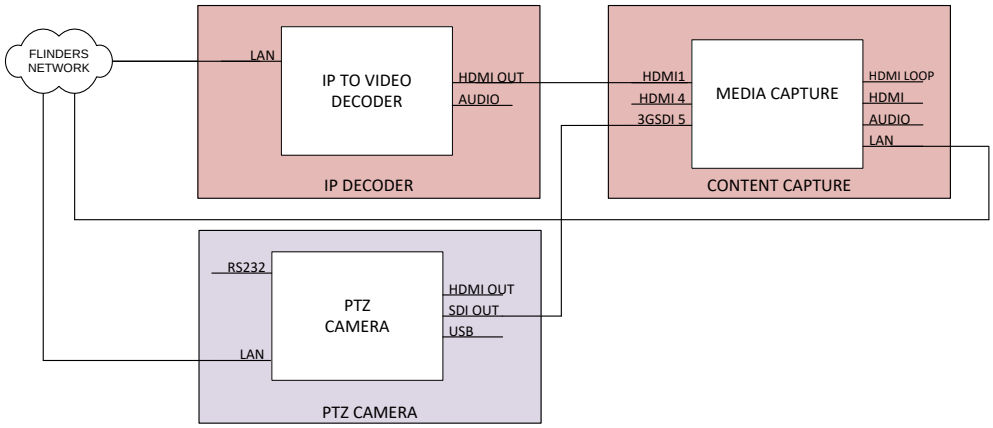


Image: Video Output IP – Content Capture

3.3.3. Video Destination IP – USB AV Interface

A USB AV interface AVBB is used to deploy web conferencing functionality to spaces that deploy a netcentric AV solution.

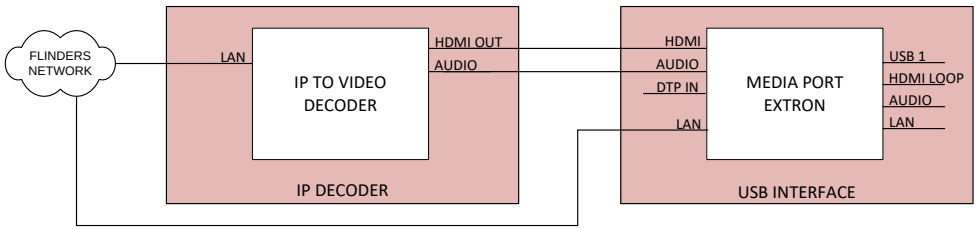


Image: Video Output IP – USB AV Interface

3.3.4. Video Destination IP – Videoconference

A Videoconference AVBB is used to provide codec based conferencing capability to a space that deploy a netcentric AV solution. A Videoconference AVBB can be used to support multiple spaces as any video and audio stream can be routed to the appliance.

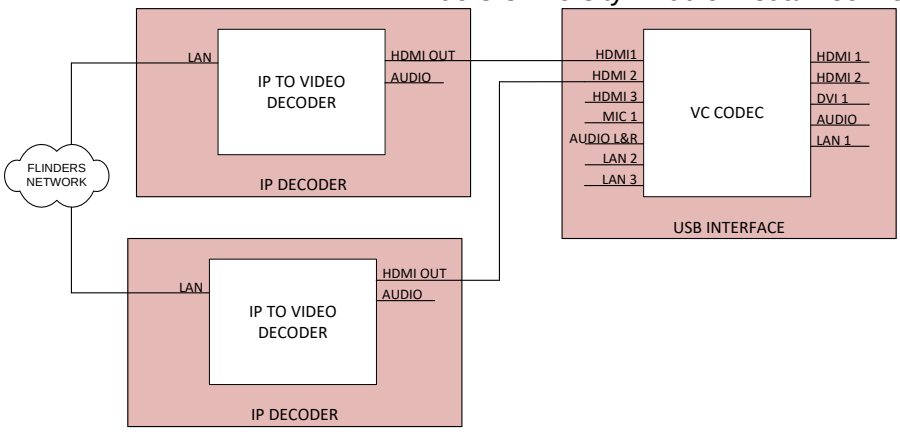


Image: Video Output IP – USB AV Interface

3.3.5. Video Destination Conventional– Single Device

The following are the current conventional video destination devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with the video output IP building block identified above.

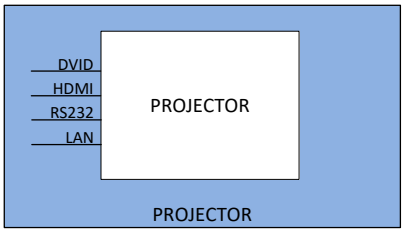


Image: Video Destination Conventional– Projector

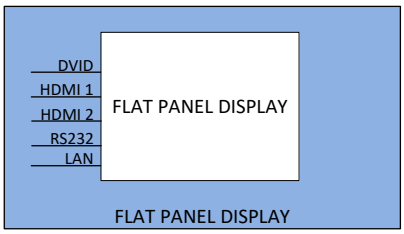


Image: Video Destination Conventional– Flat Panel Display

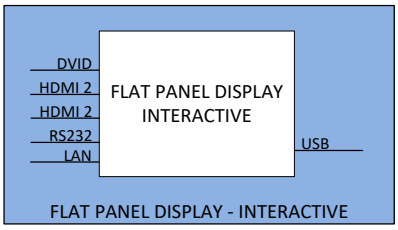


Image: Video Destination Conventional– Interactive Flat Panel Display

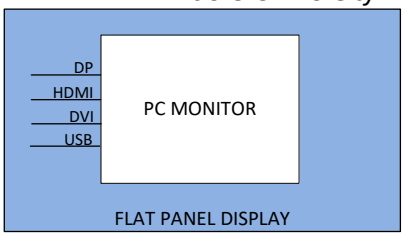


Image: Video Destination Conventional– PC Monitor

3.4. Audio – Input AV Building Blocks

3.4.1. Audio System IP – Microphones

Dante/AES67 based microphones are used where a Dante/AES67 equipped DSP is installed. The following AVBB identify the available microphones.

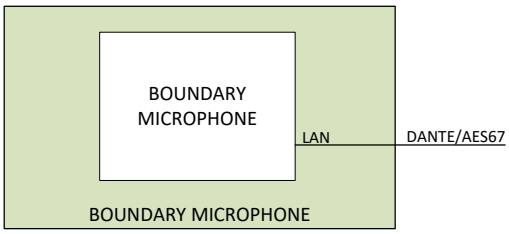


Image: Audio System IP – Boundary Microphone

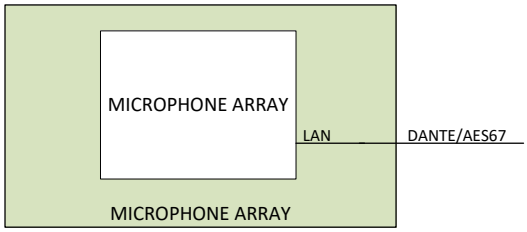


Image: Audio System IP – Microphone Array

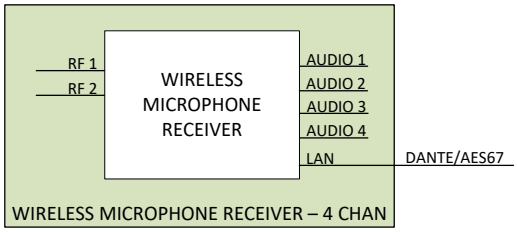


Image: Audio System IP – Wireless Microphone Receiver

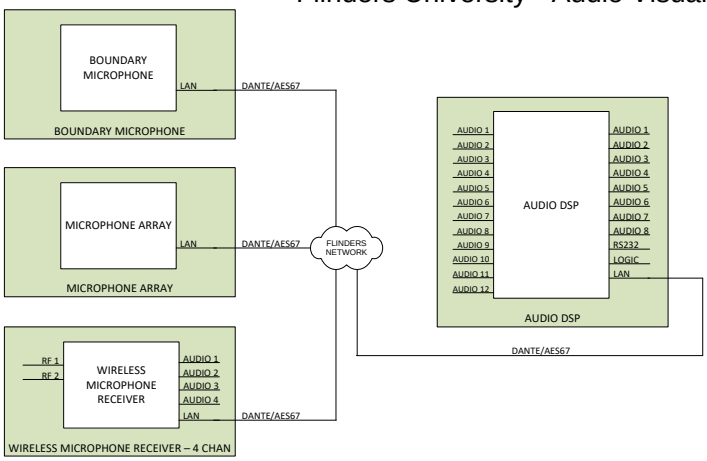


Image: Audio System IP – Audio DSP

3.4.2. Audio System Conventional – Source Devices

The following are the current conventional audio source devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with the audio source IP building blocks identified above.

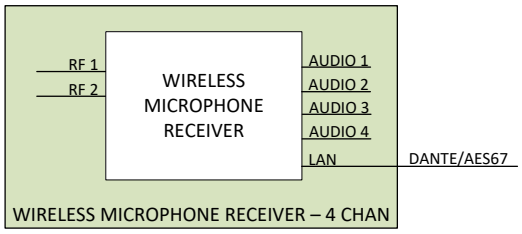


Image: Audio System Conventional – Wireless Microphone Receiver

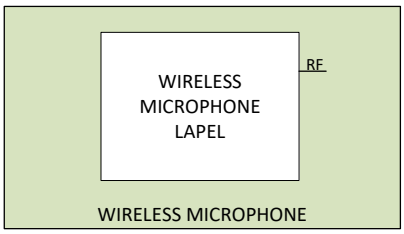


Image: Audio System Conventional – Wireless Lapel Microphone

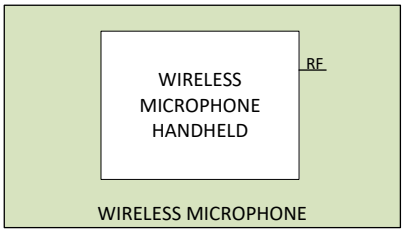


Image: Audio System Conventional – Wireless Handheld Microphone

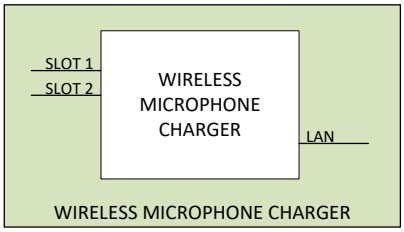


Image: Audio System Conventional – Wireless Microphone Charger

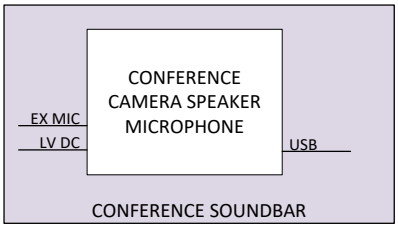


Image: Audio System Conventional – USB Microphone

3.5. Audio – Processing Building Blocks

3.5.1. Audio System IP – Processing Devices

Where Dante/AES67 enabled source devices are used, a compatible audio processing device is to be installed. The following is the current audio processing device AVBB.

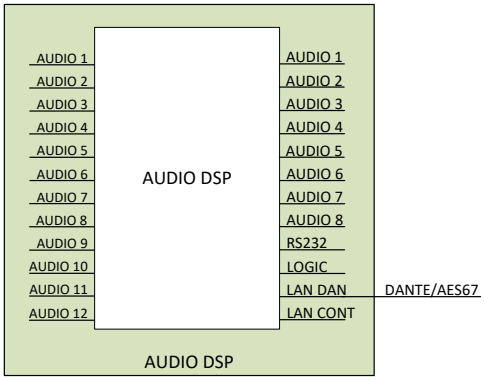


Image: Audio System IP – Audio DSP

3.5.2. Audio System Conventional – Processing Devices

The following are the current conventional audio processing devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with the audio processing IP building blocks identified above.

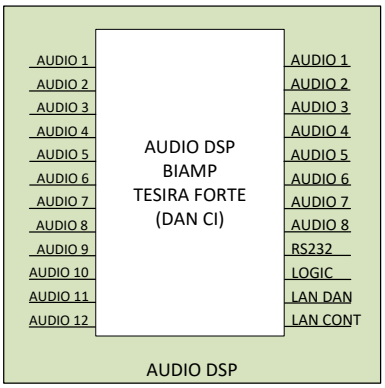


Image: Audio System Conventional – Audio DSP

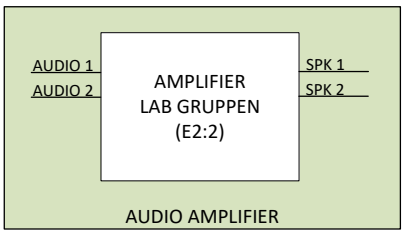


Image: Audio System Conventional – Dual Channel Audio Amp Low/high Impedance

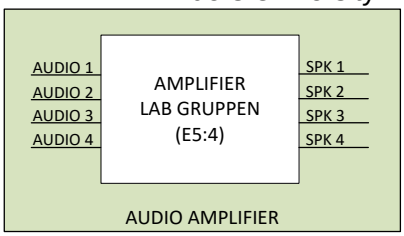


Image: Audio System Conventional – Quad Channel Audio Amp Low/high Impedance

3.6. Audio – Output AV Building Blocks

3.6.1. Audio System Conventional – Destination Devices

The follow are the current conventional audio destination devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with the audio destination IP building blocks identified above.

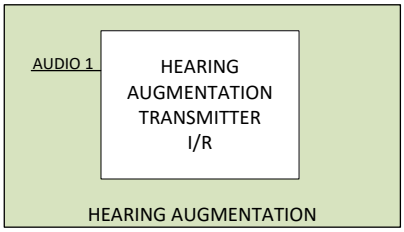


Image: Audio System Conventional – Hearing Augmentation IR Transmitter

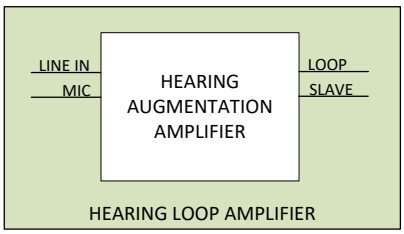


Image: Audio System Conventional – Hearing Augmentation Induction Loop

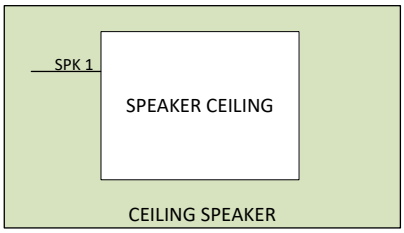


Image: Audio System Conventional – Ceiling Speaker

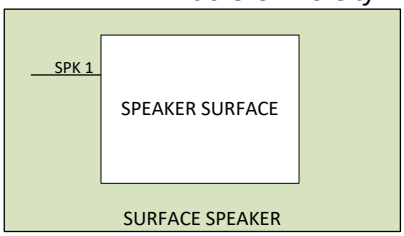


Image: Audio System Conventional – Surface Speaker

3.7. Control – AV Building Blocks

3.7.1. Control System IP – Centrally Deployed

One of the key components for a complete network-based AV solution is a server-based control platform. Flinders University will review and select an appropriate solution once the requirements have been identified and a suitable market offering is available. Once this decision is made the relevant details will be documented in this section.

3.7.2. Control System Conventional – Devices

The following are the current conventional control devices identified as an AVBB. As the designs transition to netcentric solutions these will be deleted and replaced with a centrally deploy controlled system and compatible user interfaces.

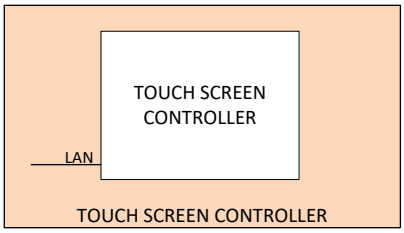


Image: Control System Conventional – Touch Screen Controller

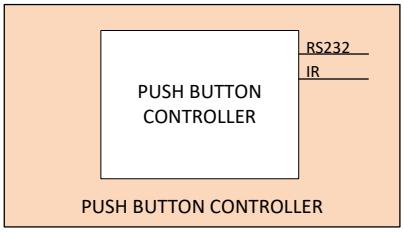


Image: Control System Conventional – Push Button Controller

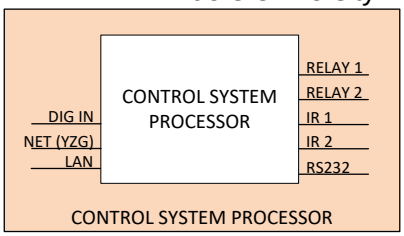


Image: Control System Conventional – Control System Processor

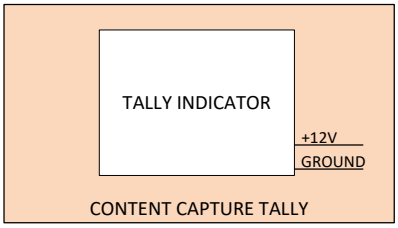


Image: Control System Conventional –Content Capture Tally (Record Indicator)

3.8. Ancillary Systems – AV Building Blocks

The following ancillary systems AVBBs are included to provide core, support or integration functionality as required:

- Motorised projection screen
- Support camera (AV technical support)
- IP controlled switched PDU

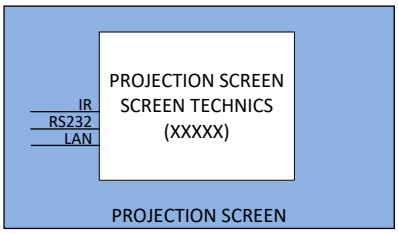


Image: Ancillary System Conventional – Projection Screen

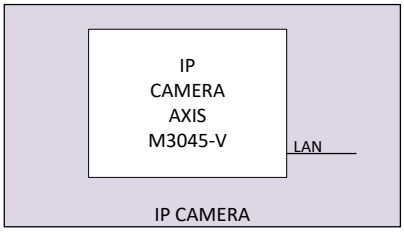


Image: Ancillary System Conventional – IP Room monitoring Camera

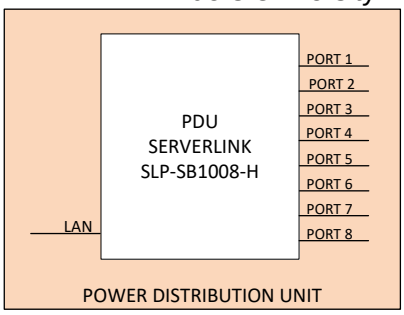


Image: Ancillary System Conventional – Power Distribution Unit

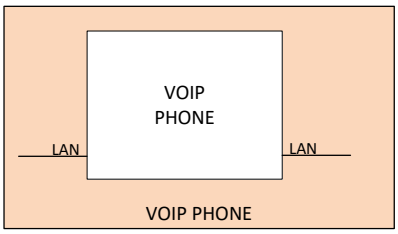


Image: Ancillary System Conventional – VoIP Phone

3.9. AV System Support Building Blocks (Ancillary Devices)

The following addition support equipment must be installed in all designs unless advised by the Principal:

- A fixed IP camera must be installed in every AV equipped space where AV support is expected. The camera is to be focused to cover the primary display and lectern area.
- An IP controlled power distribution unit must be installed when 4 or more mains powered AV devices are co-located. Must be connected to the building switch via a home run category cable.
- All network-based video encoders must be connected to the building switch via a home run category cable.
- All network-based equipment is to be connected to the building switch via a home run category cable. With the following exemptions:
    - A local network switch is identified in the standard designs. or
    - More than four network-based devices are co-located and there is a defined equipment storage area such as a lectern, equipment rack or similar then, with the permission of the Principal, a local network switch may be installed.

3.10. Room Designs

A user-based description for each room type can be found at Appendix A.

Detailed schematics for each room type can be found at Appendix B.

3.10.1. Large Teaching & Presentation Space

Functional Description

Large Teaching & Presentation Spaces are designed to engage a large number of students and are expensive to build. Due to their high rate of utilization, they are typically well featured, offering multiple content sources, Content capture and remote connectivity via web conferencing infrastructure. These spaces are normally raked to maximise visual and audio experiences and have a formal presentation area consisting of a large lectern. More recently, these spaces are transforming to flat floor/terraced spaces, with a flip style furniture layout, offering a formal learning environment at the front of the room, with collaborative style furniture at the rear to encourage group collaboration work. The addition of multiple large format displays around the room, mirroring the main presentation display further support visual sightlines for students not facing the primary presentation location.

The AV systems' primary role is to act as a conduit to facilitate the transmission of knowledge between the academic and student. These spaces can be deployed with either a single or multiple display device depending on functionality. Additional display functionality may include dual content display, web conference far end display or a confidence monitor. The displays can display the content from either a PC, laptop or document camera. Due to the size of the space, ceiling speakers are installed for speech reinforcement in addition to the left and right speakers for playback audio associated with the displayed content. To comply with relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a touch screen controller. A number of options such as content capture with a PTZ camera, document camera, additional microphones, Web conferencing, and additional displays can be added.

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

3.10.2. Teaching and Laboratory Spaces

Functional Description

Standard teaching spaces and laboratory spaces are formal teaching spaces designed to support class sizes of around 20 – 50 students. They typically consist of a fixed layout and a clearly defined presentation area for the delivery of teaching and learning content. Laboratories include facilities such as training aids, PCs, wet areas or other items to support the learning process. All AV equipped spaces will typically provide a minimum level of functionality to provide a common user experience across the campus.

The AV systems' primary role is to act as a conduit to facilitate the transmission of knowledge between the academic and student. Teaching spaces are typically deployed with a single display device. Laboratories may have multiple displays installed but they will mirror the content of the primary display. The display can display the content from either a PC, laptop or document camera. Program audio is reproduced by ceiling speakers, in noisy environments or larger spaces ceiling speakers will also provide speech reinforcement. To comply with the relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a touch screen controller. A number of options such as content capture with a PTZ camera, document camera, additional microphones, Web conferencing, and additional displays can be added.

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

3.10.3. Task Based Spaces

Functional Description

Collaborative learning spaces are designed to support task-based learning and student collaboration. To support this style of learning the room typically consists of 6 to 8 pods with 6 students sitting at each pod. Each pod has its own AV display that can display either the academics' or their own content. The Academic can also take the content from a single pod and share it across any or all of the other pod displays. Speech reinforcement is usually installed in these spaces to allow the Academic to be heard above the noise of the students discussing the task.

The AV system is required to route the video signals between all sources and destination in any combination. Flat panel displays are typically used as the display device for the pods and a larger display or projector used for the academic. The larger format display provides a focal point for the class when discussing a specific point, and also allows for task based spaces to be used as conventional teaching. A large display may also assist with academics transitioning to task based spaces as it provides a familiar feel to conventional teaching spaces. Source content is typically via a resident PC or academics' laptop. The students have the option of using either the pod based resident PC or their own device or switching between both. Audio reinforcement is via the flat panel display speakers or sound bar. To comply with relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a large touch screen controller. A number of options such as content capture with a PTZ camera, document camera and Web conferencing, can be added.

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

3.10.4. Meeting

Functional Description

Meeting spaces vary from an informal space where staff or students may share content as part of a meeting or study groups. Web-based conferencing rooms provide additional functionality to support the conferencing capability but can also be used as a standard meeting space.

To deliver the required functionality the following technology solutions have been chosen to support each type of meeting room space:

- Informal Spaces – Basic presentation via HDMI or wireless connection.
- Meeting Spaces – Web based conferencing (UC engine that will support web based conferencing) with HDMI or wireless connectivity

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

3.10.5. MoCow

Functional Description

MoCows provide a portable AV solution that can be used to support classroom activities or student study groups or meetings. The MoCow allows content to be displayed from either an installed PC or a BYOD via a HDMI connection.

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

3.10.6. Clinical Simulation

See section 3.11 Functionality Matrix Functional matrix and sect 3.12 Technical Matrix Technical matrix for further information.

A simulated learning unit is a space designed to record the audio and video of a class room, with the ability to easily annotate and mark important events in the video that can then be reviewed by both student and lecturers later. These spaces generally contain several discrete cameras and microphones mounted within the ceiling connected to a server that records and manages the video and audio content. In some instances, other complex sources such as medical manikins can be incorporated into the system to provide additional feedback to students and lecturers.

There are two simulation products being used throughout the University in simulated learning units. Deciding between solutions should be discussed with IDS prior to making a decision as the technology is advancing rapidly and should be reviewed on a case-by-case basis. The CAE Learning Space is the MLS (Management Learning System) that is currently used at the University.

The entire system is controlled via a touch panel or dedicated PC that sits in the training room or within a purpose built monitoring control room. There is the option to upgrade these spaces for content recording which maybe streamed live or played on demand. IDS can monitor these spaces and a small camera is installed to visually review the teaching space if required.

A simulated learning unit will provide the following functionality and audio visual capabilities:

- Several discretely mounted cameras and microphones to record sessions.
- A dedicated propriety server for managing content.

3.11. Functionality Matrix

The following table is a summary of the functionality of the rooms identified above.

AV Functionality	Large Teaching & Presentation Spaces	Teaching & Labs	Task Based Spaces	Meeting	MoCow	Clinical Simulation
Video Input						
Resident PC	✓	✓	✓	O	✓	✓
BYOD Source (HDMI connection)	✓	✓	✓	✓	✓	✓
Document Camera	O	O	O			O
Wireless Presentation	✓	✓	✓	✓		✓
Camera – PTZ (conferencing/Events Capture)	✓	✓	✓	✓	O	✓
Camera – PTZ (Content/presentation)	O	O	O	O		O
Video Output						
Preview Monitor	✓	C	✓			✓
Confidence / Far-end Monitor	O		O			
Projector Based Display	✓*	✓*	✓*	✓*		✓*
Flat Panel Display	✓*	✓*	✓*	✓*	✓	✓*
Multiple Displays – Single Content	O	O	O			O
Multiple Displays - Dual Content	O	O	O			
Multiple Displays – Student Pod			✓			
~~Video Conferencing~~						
Web Based Conferencing	✓	✓	O	✓	✓	✓
Events Capture	O	O	O			✓
Simulation Software						
Audio System						
Program Audio Reinforcement	✓	✓	✓	✓		✓
Speech Audio Reinforcement	✓	O	✓	O		✓
Microphone - Audience	O	O	O	O		O
Microphone - Lapel	✓	✓	✓			✓
Microphone – Handheld	✓	C	✓			✓
Speakers – Front of House	C	C	C	✓*		✓*
Speakers – Ceiling	✓	✓	✓	✓*		✓*
Sound Bar (with speakers, mic array and camera)				✓*	✓	
Hearing Augmentation – Infrared	✓*	✓	✓	✓*		✓
Hearing Augmentation – Induction Loop	✓*			O		
Control System						
Push Button Controller				✓*	✓	
Touch Screen Controller – 7”		O		✓*		✓*
Touch Screen Controller – 10”	✓	✓	✓	✓*		✓*
Ancillary Devices						
Motorised Projection Screen	C	C	C			C
Camera – Service support	✓	✓	✓	O		
USB Hub				O		
Power Distribution Unit – Intelligent	✓	✓	✓	✓		✓
Phone	✓	✓	✓	✓		✓

✓ = Standard Feature

✓* = Mutually exclusive options where there are two different technologies offering the same functionality. For example, where a flat panel display and projector is identified for the same design, only the most suitable device will be deployed.

O = Optional

C = Conditional – These items will be included based on external factors

3.12. Technical Matrix

The following table is a summary of the AV building blocks required to deliver the rooms identified above.

AV Building Blocks & Devices	Large Teaching & Presentation Spaces	Teaching & Labs	Task Based Spaces	Meeting	MoCow	Clinical Simulation
Video Source						
Video Source IP – 1 to 2 Sources			✓			✓
Video Source IP – Multiple Sources – Single Stream			✓			
Video Source IP – Up to 4 Sources – Dual Stream						
Video Source IP – PTZ Camera			O,C			
Video Source IP – Wireless Presentation			✓			
Video Source Conventional Source – Resident PC	✓	✓		✓	✓	✓ x2
Video Source Conventional Source – BYOD	✓	✓			✓	
Video Source Conventional Source – Document Camera	O	O				
Video Source Conventional Source – Wireless Presentation	✓	✓	O	✓		
Video Source Conventional Source – PTZ Camera	O,C	O,C				
Video Source Conventional Source – USB Camera						
Video Processing						
Video Processing – Cat X HDMI Transmitter	O			✓		
Video Processing – Cat X HDMI Receiver	✓	✓		✓		
Video Processing – USB Media Interface	O	O				
Video Processing – Content Capture Appliance	O	O				
Video Processing – Scan Converter	O	O				
Video Processing – Presentation Switcher		✓				
Video Processing – Matrix Switcher	✓					
Video Processing – Matrix Switcher 4:1						
Video Processing – Matrix Switcher 4:2						
Video Output						
Video Destination IP – Display			✓			
Video Destination IP – Content Capture			O			
Video Destination IP – USB AV Interface			O			
~~Video Destination IP – Videoconference~~						
Video Destination Conventional– Projector	✓	✓*	C			
Video Destination Conventional– Flat Panel Display		✓*		✓	✓	
Video Destination Conventional– Interactive Flat Panel Display		O				
Video Destination Conventional– PC Monitor	✓	✓				✓
Audio System						
Audio System Conventional – Audience Microphone	O	O	O	✓		O
Audio System Conventional – Wireless Microphone Receiver	✓	O	✓			

AV Building Blocks & Devices	Large Teaching & Presentation Spaces	Teaching & Labs	Task Based Spaces	Meeting	MoCow	Clinical Simulation
Audio System Conventional – Wireless Lapel Microphone	✓	O	✓			
Audio System Conventional – Wireless Handheld Microphone	✓	O	✓			
Audio System Conventional – Wireless Microphone Charger	✓	O	✓			
Audio System Conventional – USB Microphone					✓	
Audio Processing						
Audio System Conventional – Network Interface						✓
Audio System Conventional – Audio DSP	✓		✓			
Audio System Conventional – Dual Channel Audio Amp Low/high Impedance		✓				
Audio System Conventional – Quad Channel Audio Amp Low/high Impedance	✓		✓			
Audio Output						
Audio System Conventional – Hearing Augmentation IR Transmitter		✓	✓			
Audio System Conventional – Hearing Augmentation Induction Loop	✓*	O	O			
Audio System Conventional – Ceiling Speaker	✓		✓			
Audio System Conventional – Surface Speaker	✓	✓	✓			
Sound Bar (with speakers, mic array and camera)				✓	✓	
Control System						
Control System Conventional – Touch Screen Controller 7”				✓		
Control System Conventional – Touch Screen Controller 10”	✓	✓	✓			✓
Control System Conventional – Push Button Controller					✓	
Control System Conventional –Control System Processor	✓	✓	✓	✓		
Ancillary Devices						
Ancillary System Conventional – Projection Screen	C	C	C			
Ancillary System Conventional – IP Room monitoring Camera	✓	✓	✓	✓		✓ x2
Ancillary System Conventional – Power Distribution Unit	✓	✓	✓			
Ancillary System Conventional – VoIP Phone	✓	✓	✓			

✓ = Standard Feature

✓* = Mutually exclusive options where there are two different technologies offering the same functionality. For example, where a flat panel display and projector is identified for the same design, only the most suitable device will be deployed.

O = Optional

C = Conditional – These items will be included based on external factors

4. Performance Criteria

To ensure the highest quality installations and compliance for the deployment of AV systems, the following section details the minimum standards required. The AV Consultant and AV Integrator must ensure that all AV systems must comply with all relevant standards, regulations and authorities.

4.1. Standards

As a minimum all works undertaken for Flinders University must comply with the following:

ANSI/INFOCOMM 10-2013	Audio Visual Systems Performance Verification
ANSI/INFOCOMM 1M-2009	Audio Coverage Uniformity in Enclosed Listener Areas
ANSI/INFOCOMM 2M-2010	Standard Guide for Audio Visual System Design & Coordination Process
ANSI/INFOCOMM 3M-2011	Projected System Image Contrast Ratio
Flinders University Cabling Specification	Campus Cabling Standards https://staff.flinders.edu.au/content/dam/staff/ids/campus-cabling-standards.pdf
AS 1428.1-2009	Design for Access and Mobility General Requirements for Access – New Building Work (AS1428)
AS 1428.2-1992	Design for Access and Mobility - Enhanced and Additional Requirements – Buildings and Facilities
AS 1428.5:2010	Design for Access and Mobility - Communication for People who are Deaf or Hearing Impaired
AS 3080:2013	Information Technology - Generic Cabling for Customer Premises
AS 3084:2003 (R2013)	Telecommunications Installation, Pathways and Spaces for Commercial Buildings.
AS 60118.4-2007	Hearing Aids Magnetic Field Strength in Audio Frequency Induction Loops for Hearing Aid Purposes
AS/ACIF S008:2010	Requirements for Customer Cabling Products
AS/ACIF S009:2013	Installation Requirements for Customer Cabling (wiring rules)
AS/NZS 2107:2016	Acoustics – Recommended Design Sound Levels and Reverberations Times for Building Interiors
AS/NZS 3000:2016	Electrical Installations
AS/NZS 3760-2010	In-Service Safety Inspection and Testing of Electrical Equipment
NCC (BCA)	National Construction Code 2019
C-tick:	Complying with Australia and New Zealand EMC Framework requirements.
DDA	Commonwealth Disability Discrimination Act 1992 (DDA) Commonwealth Disability Standards for Education 2005 (Education Standards)
Disability Standards 2005	Disability Standards for Education 2005

4.2. Safety in Design

All works conducted at Flinders University must comply with all relevant WHS legislation. Flinders University specific policies can be found on the following website https://staff.flinders.edu.au/workplace-support/whs. Any AV Consultant or AV Integrator must ensure that their designs or installations do not breach any WHS requirements during its use or maintenance. Potential risks must be identified during the requirements gathering phase and mitigated during the design phase. Any outstanding risks must be brought to the attention of the Principal.

4.3. Design for Serviceability

The AV Consultant or AV Integrator must ensure that all installed AV systems are easily maintained and serviced. As a minimum, consideration should be given to the following:

- Projectors mounted above raked floors, fixed seating or at a height greater than 3.5Mtrs AFFL should be installed with a projector lifter. Note: The cost of a projector lifter must be considered against the typical service interval, mean time of failure of a laser projector compared to the cost and reputation damage, due to potential down time, if the projector was to fail.
- Clear access must be available to all equipment either via clear space, access panel or retractable rack systems.
- Castors or Teflon slides should be fitted to all equipment racks unless advised by the principal.
- Equipment racks greater than 20RU that could pose a safety issue due to height or weight are to be physically secured to either a floor or wall surface and sufficient clearance provided to access and service equipment.
- Equipment mounted behind flat panel displays must be securely mounted with a clear view of all indicators and must be accessible without removal of the panel. Where the equipment can't be accessed then it must be mounted on a commercially manufactured slide out equipment rack.
- Equipment mounted under joinery must be positioned so there is no risk of injury to people sitting at or moving near the joinery.
- Equipment must not be positioned in ceiling voids without the prior approval of the Principal.

4.4. Disability Discrimination Act (DDA) Requirements

Flinders University complies with all current requirement regarding people with disabilities. The current policy can be found here https://students.flinders.edu.au/student-services/hcd/disability. The AV Consultant or AV Integrator must ensure that all designs and works comply with the above mentioned policy and current legislation.

As a minimum, consideration should be given to the following:

- Hearing augmentation
- The location and mounting height of:
    - Touch screen controllers
    - Push button panels
    - Connector plates and fly leads
    - Room booking displays
    - Self-service kiosks
    - Information displays
- Lectern design and access

- Installation of signage
- Lighting levels (programming of control interface only)

4.5. Displayed Images

The AV systems primary role is to reproduce the Audio and Video. Flinders University endorse all ANSI/INFOCOMM standards to ensure all AV systems meet or exceed the specified industry best practice.

The AV Consultants and AV Integrators are to ensure that all designs align with the appropriate standards. It is accepted that not all AV equipped spaces are ideal and many factors are outside the scope of this document. If a particular performance level cannot be achieved, then this must be brought to the attention of the Principal at the earliest possible opportunity.

Notes:

1. Large Teaching & Presentation Spaces and specialist spaces may require more complex calculations and considerations and should be considered on a case by case basis.
2. Where optimal viewing sightlines and distances cannot be met with a single display (preferred option) then additional displays can be added to ensure adequate coverage.

The following sections provide a summary of the key components.

The AV Consultants must provide the following information as part of the design documentation:

- Sight line study detailing all vertical and horizontal viewing angles and distances.
- AV Layout plans
- Elevation of the presentation area
- Rack layouts for custom or nonstandard designs

4.5.1. Sight Lines

As a minimum, the viewing angle of a displayed image for any viewer should not exceed the following:

- 35º from the horizontal to the top of the image.
- 15º from the horizontal to the centre of the image.
- 45 º from straight ahead to the furthest vertical edge of the image.
- The bottom edge of any image must be:
    - 1200AFFL in a teaching space.
    - 1100AFFL in a meeting room.

4.5.2. Viewing Distance

As a minimum, the viewing distance of a displayed image for any viewer should not exceed the following:

- The distance to the closest viewer must be greater than 2 times the image height.
- The distance to the furthest viewer must be less than 5.3 times the image height. This distance can be relaxed to 6 times with prior approval from the Principal.

The following table provides recommended viewing distances for a 16:9 screen.

Maximum Viewing Distances for a 16:9 Screen			
Diagonal Screen Size	**Screen Width Viewable Area**	**Screen Height Viewable Area**	**Recommended viewing distance (H x 5.3)**
65” (1651 mm)	1430 mm	804 mm	4.2 m
70” (1780 mm)	1540 mm	866 mm	4.6 m
80” (2032 mm)	1771 mm	997 mm	5.3 m
84” (2130 mm)	1871 mm	1057 mm	5.6 m
90” (2286 mm)	1992 mm	1121 mm	6.0 m
98” (2490 mm)	2159 mm	1214 mm	6.4 m
100” (2540 mm)	2215 mm	1245 mm	6.6 m
120” (3050 mm)	2655 mm	1495 mm	7.9 m
130” (3300 mm)	2880 mm	1615 mm	8.6 m

4.5.3. Contrast Ratio

As a minimum, the viewing distance of a displayed image for any viewer should not exceed the following:

Content	Examples	Minimum Contrast Ration
Text and numerals	Word and PDF documents Power point Spread sheets Graphs	7:1
Pictorial	Photographs Artwork Illustration	15:1
Motion picture	Film Video (YouTube) Television	80:1 – Cinema/theatre 50:1 - Classroom

4.5.4. Projectors - Resolutions & Aspect Ratio

As a minimum, all projectors must provide the following:

- FHD (1920 x 1080 – 16:9).
- FHD (1920 x 1080 – 16:9) for ultra-short throw devices.
- 4K (4069 x 2160 – 1.9:1 or 3840 x 2160 – 16:9 – Application depending). For specialised spaces only.

4.5.5. Image Geometry

As a minimum, the projected image must conform to the following:

- Image is to be rectangular with parallel edges and 90° corners.
- Projected without the use of lens shift.
- Projected without the use of digital correction methods such as “Keystone”.
- Where possible, projectors should be installed so that the zoom range of the lens is approximately 50% (mid-range) whilst providing full image coverage of the screen or projection surface.

Note: Where there are physical restrictions an exemption can be granted by the Principal prior to commencing works.

4.5.6. Lamp Source

Laser based projection is the preferred option across all teaching spaces.

Lamp based projectors are not to be used unless:

- Advised by the Principal. or
- There are no laser or solid-state based solutions and then only with the prior approval of the Principal.

4.5.7. Flat Panel Displays - Resolutions

As a minimum all flat panel displays must provide the following:

- FHD (1920 x 1080 – 16:9)
- 4K (3840 x 2160 – 16:9) for specialised spaces only

Note: Check current preferred equipment list at time of design as current model will specify the resolution.

4.5.8. Display Specifications

As a minimum, all display devices must have the following functionality:

- HDCP 2.2
- HDMI 2.0 required – HDMI 2.1 acceptable

4.5.9. Projector Settings

As a minimum, the AV Integrator must configure the projector for the following functionality:

- All onscreen displays, other than warning notifications, are turned off.
- Display a blue image when no input is applied.
- Internal speaker is muted.
- Pixel alignment is carried out

4.5.10. Flat Panel Display Settings

As a minimum, the AV Integrator must configure the flat panel display for the following functionality:

- All onscreen displays, other than warning notifications, are turned off.
- Display a black image (Black out) when no input is applied.
- Internal fans are set to “Auto”.
- Internal speaker is operation (where local audio is required).
- Where possible the functionality of external buttons is to be restricted to input selection and power on/off.

4.5.11. Projection Screens

Dedicated projections screens must be used where the projected image is greater than 100”. Projections screens are optional in spaces requiring less than 100” and where there is a whiteboard installed at the projection location.

As a minimum, all projections screens must have the following functionality:

- Motorised deploy and retract
- Ethernet control interface. Note, replacement screens were typically deployed RS232 control and an appropriate model may need to be purchased for upgrade or repair works.
- 16:9 aspect ratio to match projectors native resolution. Specialist spaces may have custom or other ratios.

If the Principal has advised that a projection screen is not to be used, then the following minimum, requirements must apply:

- Plaster walls will be finished to a “Level 5 Finish” in accordance with AS/NZS 2589:2017.
- Where whiteboards are used as a projection surface, they must be supplied with a suitable non-reflective surface designed for front projection.
- Other surfaces and finishes require the prior approval of the Principal.

4.5.12. Physical Installation

As a minimum the following must be considered when installing a display device:

- All mounts must be commercially manufactured, rated with the appropriate engineering loads and fit for purpose.
- All primary attachments must be commercially manufactured and rated for the intended application.
- Structural members used for mounting of devices must be free from vibration and movement to minimise shake of the projected image.
- Additional strengthening members must be used when a flat panel display is mounted to a partition or stud wall. Structural members may include mounting brackets that span multiple studs, structural rated ply or additional noggins in the cavity void.
- Projectors and ceiling mounted flat panel displays must be mounted at least 2100mm AFFL to the lowest point.
- Wall mounted flat panel displays must be located so as not to create a hazard to pedestrians.
- Flat panel displays must be mounted using a commercially made mounting bracket.
- Where flat panel displays are installed in public or high traffic areas, shrouds must be installed on the sides to improve the aesthetics and security of system caballing.
- Projection angles must be designed so that the projected image does not shine in the academic’s eyes while presenting.
- Display devices must be installed to minimise the impact of ambient and other light sources.

4.6. Acoustics

As mentioned in the displayed images section, the AV system's primary role is to reproduce the Audio and Video. The Flinders University endorse all ANSI/INFOCOMM standards to ensure all AV systems meet or exceed the specified industry best practice.

Recently there has been a number of studies into the effect of acoustics of an environment has on the learning experience. These studies show a direct correlation between Reverberation Time (RT) and background noise to the learning outcomes. An internationally accepted measurement of the acoustic environment is the Speech Transmission Index (STI). The architectural parameters that affect STI are outside of the scope of this document and generally not applicable during a redevelopment or lifecycle upgrade of a space. What is to be consider as in scope is when:

1. An existing space has proven to be problematic and simple acoustics strategies, such as wall panels and soft furnishings could provide an improvement, then they must be considered be considered.
2. Green field projects where the services of an Acoustic Consultant must be engaged to assist with acoustics and electroacoustic design.

The Flinders University aims to offer the highest standard or teaching and learning possible and further development will be done in relation to acoustic design, measurement and mitigation. In the meantime, the following shall apply.

4.6.1. Acoustics Performance

As a minimum, the following acoustic performance criteria should be met in all non-videoconference equipped spaces:

- STI of 0.6 and 0.75
- Intern noise level of 40-50 L_{Aeq} dB(A)
- RT60 of 0.5 – 1.0 s (500Hz, 1kHz, 2Khz avg)

As a minimum, the following acoustic performance criteria should be met in all videoconference equipped spaces:

- STI of 0.75 and 1.0
- Intern noise level of 35-45 L_{Aeq} dB(A)
- RT60 of 0.6 – 0.7 s (500Hz, 1kHz, 2Khz avg)

Notes:

1. The Principal will advise if these criteria are in scope.
2. The AV Consultant or IT Integrator must notify the Principal, at the earliest opportunity, if the acoustics in any space, covered by the contract, will have a negative impact on the performance of the installed AV system.
3. The minimum L_{Aeq} period should be:
    a. HVAX - 30s
    b. Road noise - 2m
    c. Building occupancy - 5m

4.7. Audio Reinforcement

The audio system is currently based around the audio processing capabilities of the specified presentation switchers or an external DSP.

For standalone audio system, the AV Integrator will be responsible for all DSP design, configuration and programming.

The AV Consultants must provide the following information as part of the design documentation:

- Audio coverage plan including speaker placement (may be part of the AV plan).
- An Ease plot for complex or larger spaces such as a Large Teaching & Presentation Space.

4.7.1. System Requirements

As a minimum, the audio system must deliver the following requirements:

- Program audio reinforcement
- Speech reinforcement as required (As per section 3.11 above)
- Hearing augmentation
- Audio processing including but not limited to:
    - Gain control
    - Ducking
    - Equalisation
    - Compression
    - AEC
- Integration with any other device requiring speech or program audio.

4.7.2. Audio Coverage - Design

Audio coverage shall conform with the ANSI/INFOCOMM 1M-2009. While this standard is the benchmark that specifies a minimum acceptable reference, it is very onerous and is typically used as a general guide. Full testing of conformity to the standard is also rarely undertaken until recently. The current research into STI in the learning environments has resulted in more awareness and many AV Consultants and AV Integrators are now equipped with the expertise to design the system and make the appropriate measurements. The Flinders University plans to incrementally phase in greater control of acoustics and coverage standards. This approach will allow for all factors to be considered to deliver the best possible outcome for the Flinders University and students. As a starting point the intent and methodology of the audio coverage standard will be applied but the reference levels will be marginally relaxed.

Following is the minimum, acceptable, requirements that the AV systems must be designed to meet:

Quality	Desirable	Acceptable	Unacceptable
System Noise – Above Ambient, L_{Aeq} dB(A)	< 0	0 – 5	> 5
Program System SPL, dB(A)$_{Slow}$	85	75 – 85	< 75
Program Frequency Response (100Hz – 10kHz)	± 3dB	+3/-6dB	> +3/-6dB
Speech System SPL, L_{Aeq} dB(A)	65 – 70	60 – 65	< 60
Speech Frequency Response (100Hz – 10kHz)	± 3dB	+3/-10dB	> +3/-10dB
Coverage Uniformity (%)	> 90	> 75	< 75
Speech Transmission Index (STI)	> 0.68	0.68 – 0.56	< 0.56

4.7.3. Audio Coverage - Measurement

As detailed above the Flinders University will be phasing in greater control of acoustics and coverage requirements. As part of this process, detailed measurements will be required to gain an understanding of the acoustic response and coverage conformity across all Flinders University teaching spaces. To achieve this with minimal impact, a number of spaces will be selected based their architecture, use and commonality. The data from these tests will be used to inform future acoustic and audio requirements and designs across the Flinders University. The AV Integrators will be required to undertake these tests strictly in accordance with ANSI/INFOCOMM 1M-2009 Standard. This will only be required when identified by the Principal in the scope of works.

4.7.4. Wired Microphones

All wired microphones are processed by the presentation switcher or external DSP. As the audio system migrates to a netcentric approach these devices will be replaced with either native Dante models or an appropriate Dante AVIO adaptor.

4.7.5. Wireless Microphones

Wireless microphone receivers are currently hardwired to the presentation switcher or DSP. As the audio system migrates to a netcentric approach these devices will be replaced with either native Dante or network-based models.

4.7.6. DSP Server Integration

One of the key components for a complete network-based AV solution is a server-based (centralised) audio server platform. Flinders University will review and select an appropriate solution once the requirements have been identified. Once this decision is made the relevant details will be documented in this section

4.8. Hearing Augmentation

4.8.1. General Requirements

Installed hearing augmentation/assistive listening systems at Flinders University shall be in accordance with AS60118.4-2007 standards and the National Construction Code NCC 2019.

The hearing augmentation systems shall be professionally designed and installed by contracted experts with test results, for audit purposes, that the installed system meets or exceeds the current standards.

The supply and installation of any hearing augmentation system into a teaching space is to comply strictly with the following:

- Hearing augmentation system must be installed in all teaching spaces with an audio visual systems and all major public accessible venues with audio re-enforcements.
- All hearing augmentation systems must be clearly labelled with appropriate signage

- The type of hearing augmentation system to be installed is based and the venues individual variables as meeting rooms and classroom are often closely adjacent and special care must be taken as to ensure that if induction loops are installed, they do not interfere with each other.
- Both Induction loop and Infra-red systems are acceptable solutions with Infra-red being the preferred option. The required solution will be advised by the principal.

As a minimum, the hearing augmentation system shall comply with the following:

- AFILS must provide greater than 80% coverage within acceptable tolerances.
- IR systems must provide greater than 95% coverage within acceptable tolerances.
- A minimum of 1 IR receiver for every 25 persons or part thereof must be provided in each space.
- Induction loop amplifiers must be as per the current preferred equipment list.
- Infra-red modulators, transmitters must be as per the current preferred equipment list.
- Coverage must be even across the designated loop / IR coverage area.
- The AFILS must be commissioned and tested to conform to AS60118-4.
- The system must be designed to minimise the effects caused by:
    - Electrical and other cabling.
    - Metal objects, such as ductwork.
    - Other sources.
- The system must ensure that the audio DSP is configured correctly to provide a mixed feed of program and microphone audio.
- The system must remain active and reproduce boundary and lapel radio microphone audio when the AV system is shut down. This is to allow for hearing augmentation when the AV system is not in use.

The AV Integrator must provide a certificate of compliance as per AS1428-2010 for all hearing augmentation systems.

4.8.2. Infra-Red System (Preferred)

The preferred hearing augmentation solution at Flinders University is IR based. As a minimum, the IR Hearing Augmentation system must meet the following criteria:

- IR Hearing Augmentation must provide greater than 95% coverage of the room.
- Multiple transmitters may be required to ensure correct operation for all room configurations.
- Transmitters must not be installed outside or in direct sunlight.
- The number of receivers must correspond to the number of people the space accommodates to meet NCC regulations.
- Recharger and rechargeable batteries must be provided for each receiver supplied.
- AV Integrator must conduct a site survey and review line of sight restrictions and ambient light prior to submitting a detail design submission.

4.8.3. Induction Loop System

If directed by the principal, an induction loop hearing augmentation system may be installed in Large Teaching & Presentation Spaces and other spaces that are regularly used for public events. Loops may also be installed in rooms as determined by the Principal.

The AV Integrator must:

- Conduct a preliminary survey of the space to ensure that all Standards and Regulation are met and allowed for prior to the final design of the loop.
- Ensure that all loop designs are issued to the Principal for approval prior to commencing works.
- Install loops below floor coverings using flat copper tape. If loop cannot be installed due to no floor coverings or bare concrete floors an alternative solution must be offered. Typically, an Infrared solution would be acceptable in this instance.
- Design and install ‘ultra-low loss phased array’ loops to minimise audio spill into adjacent spaces.
- Ensure greater than 80% coverage of the space.
- Ensure that the hearing loop meets the following minimum acceptance criteria:
  a) Field strength inside the area of use must be equal to 400mA/m plus/minus 3dB (tested with 125ms RMS measurement with 1kHz Sine wave).
  b) Total variation in signal across the frequency band 100Hz to 5kHz at 1kHz must be within 3dB anywhere in the loop area.
  c) Background noise must be less than or equal to -32dB relative to 400mA/m.

4.8.4. Signage

The AV Integrator must provide signage indicating the coverage area of the hearing augmentation systems and the location where IR receivers (if used) are located, in each area in accordance with AS 1428.2.

4.9. Lighting

Lighting has a major impact on the perceived quality of a displayed image. Both ambient and artificial lighting must be controlled to ensure optimum performance of the display system. The artificial lighting system must also be correctly designed and interfaced with the AV control.

As with acoustics, the design of the lighting system is outside of scope and not applicable during a redevelopment or lifecycle upgrade. What is to be considered in scope are the following:

1. If the existing installed lighting system has a programmable interface then the lighting system must be integrated with the AV system.
2. Where the lighting system is being redeveloped as part of the overall project. In this instance the AV Consultant and/or AV Integrator must coordinate with the Electrical Consultant and/or Electrical Contractor to ensure that the lighting system conforms with the requirements listed below.
3. In the case of green field projects, the AV Contractor must coordinate with the Electrical Consultant to ensure the lighting design conforms with the requirements listed in the sections below.

4. Where the installed lighting system is not covered by the previous points and would have a detrimental effect on the AV system. In this case this must be brought to the Principal's attention at the earliest possible opportunity.
5. In situations where there is no separate "Display area - zone" (see below), or there is excessive spill on the display surface that will degrade the performance of the display system then the AV Consultant or AV Integrator must bring this to the attention of the Principal at the earliest possible opportunity.

4.9.1. Ambient Lighting

Ambient lighting must be controlled to ensure the display system conforms to this standard. To ensure this, the following techniques may be utilised:

- Black out blinds. Motorised and integrated to the AV system is the preferred option.
- Grey out blinds. Motorised and integrated to the AV system is the preferred option.
- Repositioning the main presentation area to avoid ambient light spill – subject to architectural restraints and prior approval by the Principal.

4.9.2. Artificial Lighting

Artificial lighting system must be designed to ensure the display system conforms to this standard. As a minimum the following techniques may be utilised:

- Well defined zones such as:
    - **Display area** – The area immediately above and adjacent to the display device.
    - **Presentation area** – The area typically at the front of the class around the lectern that the academic may occupy during a presentation.
    - **Lectern** (Podium or bench) – The main joinery item and close surrounding areas where an academic would present from. Where there is more than one, separate control of each is required.
    - **Whiteboard** – The area immediately above or adjacent to an installed whiteboard.
    - **Backlighting** – Typically a controlled light to illuminate the Academic from the rear. Its primary use is to make the academic stand out from the background when a camera is used to capture or transmit video. Depending on the vertical angle of the backlighting it may also function as task lighting. A separate backlight with individual control should be installed for the lectern and presentation area.
    - **Task lighting** – In certain situations, specific, highly focused lighting is required to illuminate an area such as the top of a podium lectern. Typically, this is a local device, such as a Littlite gooseneck type product installed by the AV Integrator. The AV Consultant is to ensure that a suitable solution is deployed as part of the overall project.
    - **Audience area** – The areas where students are typically seated.
    - **Aisles** – Steps and passageways.
- All zones are to be to controlled by commercial dimmers such as:
    - Cbus – Preferred
    - Other manufacturers require prior approval from the Principal.
- Where electronic dimmers are not installed the following is required as a minimum. In order of preference:

    - 2 zones of mechanically dimmed lighting
        - Display area
        - Remaining areas
    - 2 zones of switched lighting
        - Display area
        - Remaining areas
    - 1 zoned of switched lighting
- All lighting fixtures must be capable of providing flicker free dimming down to 10%

The artificial lighting system must be integrated to the AV control system. The lighting levels within the preset scenes are detailed below:

Scenes

Scene	Zone	Level
On	Display	100%
	Presentation	100%
	Lectern	100%
	Whiteboards	100%
	Backlight	Final level configured on site
	Task	Final level configured on site
	Audience	100%
	Aisles	100%
Presentation	Display	0%
	Presentation	70%
	Lectern	70%
	Whiteboard	N/A
	Backlight	Final level configured on site
	Task	Final level configured on site
	Audience	70% Minimum level as per NCC
	Aisles	70% Minimum level as per NCC
Off	Display	0%
	Presentation	0%
	Lectern	0%
	Whiteboard	0%
	Backlight	0%
	Task	0%
	Audience	0% Minimum level as per NCC
	Aisles	0% Minimum level as per NCC

The integration information is detailed in Appendix C.

The above information is provided for coordination and programming only. All lighting design and associated specifications are to be by a suitable qualified design engineer.

Where another consultant is engaged to design the lighting systems, the AV Consultant is to coordinate:

- The integration of the lighting control system with eth AV control system.
- Programming of lighting levels as per the above table.

4.10. Control

4.10.1. Integrated Control Systems

Flinders University fully support and recommends the use of integrated control systems where AV has been deployed to simplify operation as well as provide the ability for remote IDS AV support.

Across Flinders University the integrated control equipment is exclusively Crestron unless otherwise specified by Flinders University IDS AV. Should a design require a control product not able to be supplied by Crestron any variation will not be accepted unless written permission with relevant data sheet is supplied to Flinders University IDS AV before the design is approved and installation can be arranged.

Minimum standard requires the control system to perform the following actions:

- Control of local audio visual equipment to include
    - Power On/Off
    - Inputs Switching
    - Volume Up/Down
    - Status reporting
- Control of mechanical devices, i.e. Screens, curtain, blinds
- Power management
- EWIS integration, where high level sound reinforcement systems are installed

For best practice the integrated controller should perform:

- Control of local audio visual equipment to include
    - Power On/Off
    - Inputs Switching
    - Volume Up/Down
    - Transport Control
    - Status reporting
- Screens, curtain, blinds
- Lighting – dimming/switching
- Power management
- EWIS integration, where high level sound reinform=cement systems are installed
- Status Reporting Error Logging
- Remote Monitoring and Support.

Functions should be automated in such a way that a single button press should be able to activate all the AV in the room into an ON Status, including switching on the display, lowering a projector screen, adjusting the volume to a predetermined default level and switching to the default device input.

Where possible all control systems will be networked, and on the Flinders specified network for additional security and management purposes.

4.10.2. Control System Touch Screens Interface

Touch screens shall be provided and interfaced to the equipment control system for AV teaching, meeting and event spaces across Flinders University.

The touch screen design is to conform to the University wide standards, to maximise usability and minimise the need for specific training.

An ongoing provision should be provided, at no additional charge, for the revision of the control interface and programming functionality after practical completion for a period of up to six months.

Image: Sample Touch Screen Layout

4.10.3. Control System Button Interface

Button Panels may be used as an interface to control AV in basic teaching rooms, meeting rooms, event spaces and mobile trolleys across Flinders University.

The button panel shall be capable of controlling all equipment specified. The contractor shall design the layout of buttons and controls on this touch screen using the approved Flinders University layout.

For best practice the button controller should perform:

- Control of local audio visual equipment to include
- Power On/Off
- Inputs Switching
- Volume Up/Down
- Control of mechanical screen.

-

4.10.4. Control System Programming Code

General requirements

Flinders University has requirements for AV programming that must be adhered to. These requirements ensure the code produced by the Integrator is of a consistent and high quality in design and operation. It facilitates simple understanding of the code for maintenance and enhancement. The University also has developed a standard Smart Graphics touch panel template that must be used to provide a consistent user interface across the University. This standard interface can only be altered with prior approval of the Principal.

All Crestron control systems are to include an XPanel that is a mirror of the touch panel/keypad in the room for remote management purposes. Where content capture is installed the XPanel instance must include the following additional functionality; start, stop and pause.

An uncompiled archive copy of the control system code must be stored on the control system controller.

The AV Contractor must not install code from a previous project unless the they have confirmed with the Principal it is the current revision.

4.10.5. DNS Naming

All TCP/IP device references in the code must use the DNS name of the target device as opposed to the TCP/IP address. Flinders IDS AV will provide a spreadsheet to be filled in by the Integrator during commissioning which includes details on the devices and their MAC addresses to allow IP address allocation. All devices which can be set to DHCP for their IP information must be done so and any exceptions noted in the IP spreadsheet.

All references in IP tables and code should use the DNS name of the device. This will allow Flinders IDS flexibility in moving IP addresses of AV assets without having to recompile code.

See section 5.6 Host Names & DNS

4.10.6. Additional Control Functionality

When additional control functionality is required, the project scope of works will identify if the additional works are to be completed by the AV Integrator or supplied by the Flinders University. Where the AV Integrator has been nominated to supply additional control code, they must issue shop drawings of the GUI and a functional description of the proposed syntax of operation, for approval by the Principal prior to commencing works. An uncompiled version of any modified control code is to be supplied to the Principal as part of the project deliverables.

5. Installation and Workmanship

AV Integrators must complete all work in a professional manner. All works must be undertaken by well supervised and qualified staff. All works must:

- Comply with all applicable Australian and International Standards.
- Comply with all applicable IDS and AV Standards.
- Comply with all applicable Facilities and Services Standards.
- Where there are no applicable Standards, follow industry best practice.
- Be undertaken by qualified staff.
- Follow the intent and requirements as detailed in the scope of works.

The following sections provide additional information to ensure the AV Consultant and AV Integrators are informed of the minimum expectations of Flinders University.

Any areas that are not included in this section that will impact on the quality, functionality or timely delivery of the project, must be brought to the Principal's attention at the earliest possible opportunity.

5.1. General

5.1.1. Qualification

All contractors, sub-contractors and their representatives must hold appropriate trade, manufacture or industry qualifications. The following list is a sample of the typical qualifications required:

- Trade qualifications:
    - Electrician
- Manufacturer qualification:
    - Crestron DM
    - Crestron NVX
    - BiAmp DSP
    - Extron
    - Other manufacturers qualifications as required
- Industry qualifications:
    - CTS
    - CTS-D, CTS-E as required
    - CCNA as required
    - Network cabling – Cat7. Flinders University do not nominate a particular cable manufacturer but all installed category cable must be from a reputable manufacture, meet all required specifications and be installed and tested to industry standards.
- Professional:
    - All engineering tasks require the services of a suitable competent and qualified engineer with current memberships to all required professional and legislative bodies.

5.1.2. Insurance

All AV Consultants and AV Integrators working at Flinders University must hold the following insurances:

- Public Liability - $20M.
- Professional Indemnity - $10M.
- Work Cover as required by state or territory law.

5.1.3. Provide a Fully Working System

The AV Consultant and/or the AV Integrator must supply all items necessary to provide a fully working system that has been completely finished in line with the scope of works, design intent and statutory requirements whether specifically mentioned in the project documentation or not. A fully working system must include all sub-systems that interface with the AV systems. As a minimum these may include:

- Lighting systems
- Motorised blinds and shutters
- Network requirements
- All peripheral equipment
- Control systems and servers
- Audio processors and servers
- Videoconferencing systems
- Content capture systems
- Joinery
- Locks

5.1.4. Equipment and Services

All supplied equipment must comply with the following:

- Be nominated on the current preferred equipment list.
- Not to be substituted (from the preferred list) without prior permission from the Principal.
- Provided with all applicable licences, options and accessories to provide the functionality as detailed in the scope of works.
- Installed on site during the construction process.
- Protected from mechanical damage, dust and other hazards until handover or practical completion.
- Installed as per manufacturer's instructions or guidelines.
- Not have its warranties voided due to works by the AV Integrator.
- Be delivered in manufacturers packaging and unopened except for:
    - Item has been pre-deployed into a rack, or
    - Item has been pre-configured in the AV Integrator's factory. In this case it must be repacked into its original package.
- Is the responsibility of the AV Integrator until practical completion, or until it has been delivery into a secure project store and accepted by the Builder, Flinders University or other authorised representative.
- Be provided with appropriate certificates i.e. hearing augmentation compliance certificates, structural and fire certifications.
- See section 5.5.1 for details relating to Test and Tagging of AV devices.

5.1.5. Warranty

All equipment and services must be provided with all manufacturer's warranties. As a minimum the following must apply in respect to all products and warranties:

- All products must be purchased as new in Australia or through a legitimate supply chain – no grey imports will be accepted without prior approval from the Principal.
- All products must be covered for commercial use 24/7 unless otherwise detailed.
- Australian support including technical resources and spares must be available for all products.
- Have a minimum 12 month warranty.
- Where the warranty is longer than 12 months, the AV Integrator must either support the product for the life of the manufacturer's warranty or transfer the warranty to Flinders University after 12 months.
- All installations must be warranted for a period of 12 months.
- Where second hand equipment is either purchased from a third party (only with Flinders University approval) or supplied by Flinders University, the Integrator is to ensure that the equipment is fully operational prior to installation. In this instance the Integrator will only be required to provide warranty for installation and integration of this equipment.

5.1.6. Surface Finishes

All supplied products must be professionally finished with a hardwearing surface finish such as:

- Powder coat
- Two pack paint finish
- Commercial grade clear or stain to raw wooden finishes.

5.1.7. Mechanical Attachments and Fasteners

All methods of attachment and fastening must be:

- Commercially manufactured.
- Designed for the intended use.
- Be suitably rated for the intended use.
- Installed as per manufacturers specifications and appropriate engineering advice.
- Use a threaded construction to allow for the removal and replacement of equipment.
- Be approved for use in the designated substrate by Flinders University Facilities and Services.

5.1.8. Penetration

Any penetration to the following must be in accordance with the appropriate regulations and standards:

- Fire partitions
- Walls
- Floors
- Structural members
- Damp courses

Any penetration through an acoustic seal is to be treated to maintain the appropriate isolation.

Prior approval from Maintenance & Ground Services https://staff.flinders.edu.au/workplace-support/topic/maintenance-ground-services is required prior to the commencement of any penetrations.

5.1.9. Locks and Physical Security

AV equipment is considered “valuable and attractive” and must be secured to prevent theft. The following sections detail the relevant measures required.

Barrels and Padlocks

Flinders University uses a master key system to streamline the access requirement for staff across different areas and disciplines. AV equipment is secured with a Lincoln Sentry 032 key and all joinery, lecterns, cupboards or racks used to secure AV equipment, must be secured with an appropriate barrel or padlock.

Projectors

Projectors are secured with standard mounting hardware and arrangements only. No additional physical security measures are required.

Flat Panel Displays

Flat panel displays installed outdoors or unsecured environments, or as advised by the Principal, must be secured with a 4mm split pin fitted into the padlock hole on mounting bracket locking arm. Shrouds must also be installed to improve the aesthetics and security of system caballing.

Supply of Locks

Supply and installation of project related barrels and padlocks are to be included in the AV Integrators submissions.

General Security

The following general security items must be implemented where applicable:

- All equipment must be secured.
- Items mounted in a rack that does not have a locking door or other forms of security must be secured with #14 snake eye security screws.
- All accessible front panel controls not protected by tamper proof covers, must be locked out or reprogramed by the AV control system on power on.
- Fly leads, such as HDMI cables, must be secured internal to the joinery unit with heavy duty cable ties or similar. Fly leads that terminate external to the joinery must be secured with a block nylon “P Clip” or similar.

5.2. Equipment racks

5.2.1. Physical

Where multiple pieces of AV equipment are co-located, a suitable equipment rack must be installed.

Rack construction and style is application dependent and may include the following:

- Free standing rack sized to suit.

- Rack unit deployed within joinery.
- Rack strip installed in joinery.

As a minimum the equipment rack must conform with the following:

- IEC 297 compliant.
- Commercially built.
- Provided with locking doors, sides top and bottom (if free standing).
- Supplied with all rack trays, supports, shelving, looming bars, blanking/vent panels and accessories as required to support the installed equipment.
- Welded or use permanent fasteners to join members.
- Finished with a matt black powder coat or anodised finish.
- Castors should be fitted to all equipment racks unless advised by the principal.
- On rails with cable support – where rack cannot be accessed from the rear.
- Equipment racks greater than 20RU that could pose a safety issue due to height or weight are to be physically secured to either a floor or wall surface and sufficient clearance provided to access and service equipment.
- 700mm deep if over 24RU or free standing.
- Conform to Flinders University IDS requirements if installed in a communications room or similar space.
- Supplied with commercially manufactured IP controlled PDU(s).
- Supplied with tamper proof covers if front panel controls are exposed to users and functions cannot be locked.
- Supplied with 20% spare capacity for future equipment.
- Supplied with M6 screws, plastic cup washers and cage nuts.
- Supplied with #14 snake eye security screws if there are no other methods of security.
- Listed on the Flinders University preferred equipment list.

5.2.2. Layout

Rack layout will be as detailed in the standard design technical drawings. For specialised and custom spaces, the AV Consultant must ensure that the rack layouts consider the following:

- Provide sufficient, effective airflow and cooling.
- Group similar devices to allow for simplified cabling and cables separation.
- Position user accessible equipment so that the user has clear unobstructed access to the equipment while maintain security to all other equipment.
- Where a device has a service port it must be accessible. If the port is not easily accessible then an internal patch lead is to be proved and remote socket installed with an appropriate label.
- Position heavy items such as amplifiers at the bottom of the rack.
- Provide black or vent panels to all free rack spaces.

5.3. Lecterns and Joinery

Lecture benches or lecterns are typically designed to provide an ergonomic standing work surface and shall include a PC monitor, keyboard and mouse, a laptop provision and touch panel controller allowing the presenter to control the audio visual system within the room.

The audio visual equipment required for teaching is to be securely mounted in a 19” rack frame and installed within the joinery. The minimum internal dimensions are to be: 750 mm (H) x 600 mm (W) x 800 mm (D).

It is essential that any joinery, cupboards or rack enclosures are provided with ventilation slots at the bottom (to draw in fresh air) and at the top (to exhaust hot air). Ventilation slots should be covered with expanded metal mesh to render them vermin proof. Ventilation provision should be such that the air temperature in the interior of the equipment enclosure does not rise by more than 10 degrees Celsius above ambient room temperature.

All lockable sections of the lectern shall be keyed alike with the Flinders University standard key and are to be supplied with a minimum of 2 keys per lock. The open sections shall be for user accessible playback devices such as PCs, Blu-ray players. Any equipment located on top of benches must in consultation with IDS AV.

Suitable cable paths throughout a lecture bench shall be provided. Final lecture bench design should be determined during the design consultation process.

All power and network outlets required for connection to the AV equipment must be provided inside the lecture bench cupboard space and should where possible be run out of the wall, with the outlets positioned 300 mm AFFL (Above Finished Floor Level). A cable path should be sufficient in capacity to allow for all of the signal cables and future expansion, typically 2 to 4 x 50 mm diameter conduits.

Any cable loom or service loop should be of sufficient length, without being excessive, to allow access to the rack or equipment. Excessive loom or service loop lengths will be rejected.

5.3.1. Typical Lectern Configuration

A typical teaching lectern may have the following equipment installed:

- A resident PC with wired keyboard, mouse and monitor and easily accessible USB ports.
- Document camera.
- BYOD connectivity include HDMI, network and mains power.
- Wireless microphone including charging base station.
- Telephone with configured speed dials for support and security.
- Touch panel controller.

5.3.2. Lectern Layouts

Image: Typical Lectern layout Configuration

5.4. Cable, Fly and Patch Leads

5.4.1. Types

The following cables types (exclude network-based cables) must be used on all Flinders University installations. All cables must be manufactured from a reputable manufacturer and be fit for purpose and meet all statutory requirements and standards.

All network based cabling must be as per Flinders University Cabling Specification. See standards table in Section 4.1 Standards

All fly and patch leads must be provided as part of the contractors works. This includes fly leads such as HDMI and USB required by the user to connect to the AV systems.

Where a manufacturer has specified a particular cable to ensure correct operation of their product, then this must take precedence. Where this affects structured or network cabling, the Principal must be notified at the earliest possible opportunity.

The AV Integrator may substitute any of the AV cables identified below providing they supply appropriate documentation to demonstrate that the alternative cable meets or exceeds the specifications detailed below and have received approval from the Principal.

Cable Type	Part number	Description	Brand	Alternative
UTP/STP				
SFTP Bulk Cable	R305649	R&M Cat6a Shielded Cat6A S/FTP	Krone 1711163	SFTP Bulk Cable
SFTP Connector	R795765	R&M RJ45 shielded plug (for S/FTP & F/FTP 23 gauge cable)		SFTP Connector
SFTP Connector	R509505	R&M Shielded Cat6A S/FTP Jacks		SFTP Connector
Module Holder	R795751	R&M Module Holder for Clipsal Face Plate		Module Holder
Shielded Patch	R302332	R&M Shielded patch cable - 1.0m		Shielded Patch
Video				
HDMI Patch	HD-EC-010	Comsol High Speed HDMI Cable with Ethernet - Male to Male – 1m	Kramer C-MHM/MHM-3	HDMI Patch
HDMI Patch	HD-EC-020	Comsol High Speed HDMI Cable with Ethernet - Male to Male – 2m	Kramer C-MHM/MHM-6	
HDMI Patch	HD-EC-030	Comsol High Speed HDMI Cable with Ethernet - Male to Male – 3m	Kramer C-MHM/MHM-10	
DP to HDMI Patch	DP-HDMI-MM-01	Comsol DisplayPort Male to HDMI Male Cable - 1m	Kramer C-DPM/HM-3	
DP to HDMI Patch	DP-HDMI-MM-01	Comsol DisplayPort Male to HDMI Male Cable – 2m	Kramer C-DPM/HM-6	

Cable Type	Part number	Description	Brand	Alternative
DP to HDMI Patch	DP-HDMI-MM-01	Comsol DisplayPort Male to HDMI Male Cable – 3m	Kramer C-DPM/HM-10	
SDI Bulk	1694A	Belden 1694A Coax - Low Loss Serial Digital Coax		
Audio				
Line / Mic Audio	L-2B2AT	Canare 2 pair individual shield + common drain (rack only)	Belden 8723 Belden 9761	
Mic Audio	L-4E6S	Canare star quad microphone install cable	Belden 1192A	
Speaker - Constant voltage	8471	Belden standard speaker Cable	W2184	
Speaker - low impedance	8477	Belden heavy duty speaker cable	N/A	
Audio	60-739-01	Extron ASA 121 Passive Audio Summing Adapter	N/A	
Control				
2 core + shield	EAS7201P	Electra 1 pair + shield control cable	Turnbull TCAP01E	
4 core + shield	EAS7202P	Electra 2 pair + shield control cable	Extron STP22-2	
8 core + shield	EAS7204P	Electra 4 pair + shield control cable	Turnbull TCAC08	

5.4.2. Installation

Cabling installation must comply with the following:

- Separation of cables in the field and rack as per AS3000.
- Other standards, as required, as detailed in section 4.1 Standards
- Drawing as per manufacturer's specification.
- Bend radii as per manufacturer's specification.
- Cables must be horizontally supported by cable tray or catenary. All cable trays and catenaries must be installed according to the appropriate standards.
- All cables that contain data or video cables must be loomed with Velcro style ties. Nylon cable ties must not be used.
- All cables must be installed as a "home run" and no joins will be accepted.
- Where cables are installed in a rack or an area of collocated equipment the following requirements must be met:
    - All equipment must be securely mounted.
    - Non-rack mounted equipment must be installed on an appropriate shelf or installed with a suitable mounting bracket.
    - Signal cables must be grouped and loomed together.
    - Low and high powered signal cables must be physically separated to minimise interference.
    - All cables must be installed with sufficient strain relief.
    - The manufacturers recommended bend radius must not be exceeded.

  - Where premanufactured cables are used the shortest length that meets the requirements of this document must be used.
  - Lacing bars must be installed for cable management.
  - Velcro ties must be used for all signal cables. Mechanical cable ties are not permitted.
- Fly and patch leads must be approved and commercially manufactured. No field manufactured leads will be accepted.
- Where more than one cable is deployed as a fly lead or loom, they must be installed in appropriately sized Techflex or equivalent black expandable braid cable sheath.
- Fly leads should extend from the cable cubby with sufficient length, without been excessive, to allow connected devices to be freely positioned on the lectern or presentation area. Typically, cables should not exceed 1.2mtrs in length.
- All fly leads must be secured against theft or unauthorised removal. Fly leads that are connected directly to an end device that is not accessible to the user is considered secure only if the fly lead cannot be removed by pulling on it. Fly leads that have connections that are user accessible or can be removed by 'pulling' must be secured by a 'P clip' or similar method.

5.4.3. Cable Labelling and Numbering

For consistency and to simplify fault-finding, Flinders University specify the following cable labelling requirements:

- All cables must have a permanently attached cable label.
- Labels are to be placed no further than 100mm from the connector.
- Labels must be printed on commercially supplied, self-laminating, cable labels.
- Labels must be printed. Handwritten labels will not be accepted.
- A label schedule must be provided as part of the deliverables.

Labels must adhere to the following convention:

Cable Type	Description	Naming Convention
Audio	Mic, line, speaker, STP/UTP	A001, A002, A003, …
Video	HDMI, DVI, Display Port, STP/UTP, Fibre	V001, V002, V003, …
Control	RS-232,/422/485, Relay, IR, I/O	C001, C002, C003, …
Data	USB	D001, D002, D003, …
Network	Ethernet category cabling cat6/6a/7	N001, N002, N003, …
Power	Mains & DC supplies	P001, P002, P003, …
Future	any	F001, F002, F003, …

5.5. Power

5.5.1. Testing and Tagging

All mains powered devices must be tested and tagged in accordance with https://staff.flinders.edu.au/workplace-support/whs/information-documents/topic/electrical-safety. As a minimum, the following must apply:

- Be fitted with a "New to Service" tag in accordance with the appropriate legislation.
- Be portable appliance tested and tagged in accordance with the appropriate legislation if it is second hand, reused or has been modified since manufacture prior to installation. Modification includes the shortening or a mains cable to facilitate installation in an equipment rack.

- Supply the following information must be provided in excel format and submitted with the deliverables:
    - Equipment type
    - Equipment serial number
    - Equipment location
    - Tested date
    - Name of tester
    - Testers authority

5.5.2. Installed Power

- Lecterns, if not hard wired, must be powered via a GPO if the lectern contains a power distribution unit.
- AV equipment racks greater that 20 RU must be powered by a 15A captive connection. Larger racks may require multiple 15A supplies, this will be determined during the design phase.
- All rack-based power distribution units must be IP controlled. Where multiple items of a similar type required mains power, a non IP based power board may be used providing it is powered via the IP based power unit.

5.6. Host Names & DNS

A majority of the equipment specified in the new AV designs require network connectivity and for complete management an approved naming convention must be used for the device host name. The host name can also become a domain name when appended with a Flinders University tier 3 domain.

Note: A host name must be assigned in all cases even if a device does not currently allow for the setting of a host name:

Following, is the naming convention that must be used for all network connected AV devices:

All networked AV equipment will have a standard hostname and DNS name in the following format:

5.6.1. Nomenclature

BBBBB-RRRRR-DDDDDD-NN.av.flinders.edu.au

Variable	Description	Example
B	Building code – 3-5 characters	Bio – Biological Sciences
R	Room number – 2-5 characters	101 – Room 101. First floor room 1
D	Device	Projs – Projection screen
NN	Sequential device number – 2 digits	02 – Device number 2

5.6.2. Buildings Identifier

Building	Identifier
Australian Science & Maths School	ASMS
Biological Sciences	BIO
Biology Discovery Centre	DIS
Central Library	LIB

Centre for Regional Health	CRH
Charles Darwin University	CDU
Child Care	CCC
Child Care Centre - Baby House	CCB
Child Care Centre - May Mills Building	CCM
Child Care Centre - Office	CCO
Child Care Centre - Pre School	CCP
Child Care Centre - Staff Room	CCR
Child Care Centre - Sturt House	CCS
Child Care Centre - Toddler House	CCT
Data Centre	DAT
Drama (Mathew Flinders Theatre)	DRM
Earth Sciences	EASC
Education	EDU
Engineering	ENG
Flinders Living - Deirdre Jordan Village Community Centre	FCC
Flinders Living - Deirdre Jordan Village Laundry East	VEL
Flinders Living - Deirdre Jordan Village Laundry West	VWL
Flinders Living - Deirdre Jordan Village Townhouses	FLT
Flinders Living - Deirdre Jordan Village Units	FLU
Flinders Living - Hall	FLH
Flinders Living - Hall Annex	FLA
Flinders Living - Hall Common	FLC
Flinders Medical Centre	FMC
Flinders Press	FLP
Function Centre	FUN
Gove (Nhulunbuy)	GDH
Health Science Lecture Theatre Complex	HSLTC
Health Sciences	HSC
Humanities	HUM
Information Science & Technology	IST
Joint Library Store	JLS
Katherine	KDH
Law & Commerce	LCM
Maintenance	MTC
Matthew Flinders Theatre & Drama	MFD
McHughs Café	MHC
Multi Purpose Centre	MPC
North Lecture Theatres	NLT
Physical Sciences	PHY
Physical Sciences Workshops	PYW
Pump House	PUM
Registry	REG
Registry Annex	RGX
Research Repository	RRP
Royal Darwin Hospital	RDH
Rubuntja	RBJ
Science & Innovation Learning Centre	SLC
Social Science North	SSN
Social Science South	SSS
South Lecture Theatres	SLT
Sports Centre	GYM
Sports Pavilion	PAV
Student Centre	STC
Sturt East Wing	STE
Sturt Grounds Depot	SGD
Sturt Gym	STG

Sturt Library	SLI
Sturt North Wing	STN
Sturt South Wing	STS
Sturt West Wing	STW
The Pendopo	PND
Union	UNI
University Research Repository	URR
Yungorrendi	YUN
Western Admin Building	WAD

5.6.3. Device Identifiers

Class	Device	Identifier
Cameras	Web conferencing cameras	CAM
	Content capture cameras	CAM
	Security cameras	SCAM
	Monitoring cameras	AVCAM
	Document cameras	DOCCAM
	Presentation cameras	CAM
	Microscopes	CAM
	Universal Serial Bus	USB
Audio	Wireless mic receiver	MIC
	Audio Mixers	DSP
	Audio Amplifiers	AMP
	Digital Sound Processors	DSP
	Speakers	SPK *In place of a number, FR, FL, BR, BL could also be used for front/back/left/right for extra clarity*
	Audio Switchers	ASW
	VoIP	VOIP
Sources	Media Player	MDP
	Vision Mixer	VSW
	Vision Switcher	VSW
	Free TV	FTA
	Video Recorder	REC
	PC for AV	AVPC
	Wireless Presenter	WPS
	Vision Matrix	VSW
	Extron SMP358/351 etc	SMP
	Control Dock	CTRLDOCK
	AV over IP Trans (Tx)	ENC
Destination	Projector	PROJ
	Flat Display Panel	FDP
	Projection screen	SCR
	Projector lifter	PROJL
	AV over IP Receive (Rx)	DEC
	Content Capture	LC
Control	Touch panel	TP
	AV Controller	CONT
	Tablet Control	TABLET
	DMX Lighting Control	DMX
	Media Port 200	MDP

	C-Bus Lighting Interface	CBUS
Power / BMS	Managed Power Unit	PDU
	Building Management System	BMS
	Blind or Curtains	CURTAIN
	Unit Power Supply	UPS
	Lighting Control	LIGHTING
	CBUS	CBUS

5.7. Network Security

Flinders University implements several layers of security around its network connected AV assets.

All AV assets must also be secured to the best of the abilities of each individual device. Flinders preference is for encrypted communications to a device, using passwords supplied by Flinders IDS, and for unencrypted/unsecured communication methods to be disabled. As such use of the Crestron SSH communications module is advised.

Note that device security should include all forms of communications. As such if the device offers other interface e.g. HTTP, FTP or Telnet, they should be disabled and a secure protocol such as HTTPS, SFTP or SSH must be used instead.

All implemented passwords should be recorded and returned on the (supplied) Flinders IDS IP Spreadsheet as part of the handover package at the conclusion of commissioning.

5.8. Network Integration

All network integration must conform with Flinders University IDS requirements. Standard deployment patterns and other supporting information is detailed in Appendix E. All custom or project related deployments must be forwarded to the Principal for IDS approval.

For details regarding network integration of AV systems please see Appendix E.

6. Deliverables

The required deliverables will depend on whether the AV system is based on the current published designs or a custom design.

All deliverables must be electronically delivered via SharePoint and be in the following format:

- Native editable format (Word, Excel, Visio, CAD etc).
- PDF version of all native documents.
- Source code including all modules:
    - Uncompiled, and
    - Compiled

The new deliverable requirements are detailed in the following sections.

6.1.1. Intellectual Property

The AV Integrator responsible for providing AV services to the University must assign rights in all design and programming to the Principal at Practical Completion. Such rights may be non-exclusive, but must include the right to modify and/or re-use elsewhere within the University.

This section applies to all programmable devices including, but not limited to, AV switching equipment, control systems and audio DSP devices. All source codes must be provided in a form that is not locked and editable by any suitably qualified programmer. The AV Integrator must provide any proprietary programs necessary for the authoring and modification of such code.

All project related intellectual property and documentation generated by the AV Integrator or AV Consultant, other than background IP, vests in Flinders University at time of creation. You grant Flinders University a perpetual, world-wide, royalty free, non-exclusive license (including the rights to sublicence) to use, reproduce, adapt, modify and communicate that material.

6.1.2. Pre-Installation

The shift to network-based control and products means that there is a greater reliance on Flinders University IDS to provision the network to support the infrastructure. To ensure that all provisioning is completed prior to the AV Integrator attending site, the AV Integrator must deliver the following information, on the approved Device Host Name template, at the earliest possible opportunity:

- MAC address
- Assigned host name
- Room port numbers
- Port power requirements (N/A, PoE, PoE+, UPoE)
- Device certificate requirements

Once this information is received the IDS department will issue any applicable IP addresses and authentication certificates so that the AV Integrator can configure the devices prior to attending site.

6.1.3. Post Installation

Within 14 days of practical completion the AV Integrator must deliver the following As-built documentation for standard room deployments:

- Equipment Schedule (Host Name Document) with the inclusion of device serial numbers.
- AV Schematic.
- AV layout plan.
- Hearing augmentation compliance certificates.
- Copies of any engineering certificates (if any mounting or structure required independent engineering advice).
- Test and Tag register.
- Copy of installed control code – Compiled and uncompiled.
- Copy of touch panel source files.
- Any warranty information, including expiry date.
- Any remotes, spares or accessories supplied with the equipment.

The following additional documentation is to be provided as PDF and native file formats (Floor plans and technical drawings - DWG, Schematics -Visio):

- As-built system schematic.
- As-built rack layouts.
- Other documents as indicated in the scope of works.

6.2. Acceptance Testing

To ensure the that the AV installation is delivered to the requirements specified in this document and to ensure a minimum level of quality, the AV Consultant must ensure the following is completed:

- The AV Consultant must complete the commissioning check list detailed in Appendix H.
- Coordinate with the AV Integrator for the rectification of any defects.
- Advise the Principal of any outstanding issues prior to Practical Completion.
- Verify all deliverables are accurate and delivered prior to Practical Completion.

7. Project and Technical Coordination

Depending on the project hierarchy, the AV Consultant and AV Integrator will be responsible for varying levels of coordination. The following sections identify the relevant roles for different projects.

Note: The AV Integrator must ensure all services and trades have been coordinated prior to commencing works and/or as part of the normal construction process, the Principal must be notified of any deficiencies at the earliest possible opportunity.

7.1. Property, Facilities & Development – Capital/Major Works

Property, Facilities & Development initiated Capital or Major Works will utilise the services of multiple Consultants Architects and Engineers. There will be a design phase managed by a Project Manager who will coordinate all trades, services and disciplines.

7.1.1. AV Consultant

As a minimum the AV Consultant must ensure the coordination of the following:

- All spatial requirements for AV systems and services.
- AV requirements, including spatial for joinery housing AV services.
- Acoustics (may be a separate Acoustic Consultant)
- Lighting:
    - Zoning
    - Spill
    - Integration with the AV Control system
- Power
- Data
- HVAC:
    - Coordination of services in shared spaces.
    - Mechanical isolation
    - Acoustic noise
    - AV imposed heat loads
- Fire Services:
    - Coordination of services in shared spaces.
    - EWIS integration.
- Control of ambient environmental such as:
    - Light
    - Noise
    - Vibrations
- Network:
    - Bandwidth requirements
    - Port count
    - Provisioning of services/network
    - Security
- All other services required to install AV systems and services.

7.1.2. AV Integrator

As a minimum the AV Integrator must ensure the coordination of the following:

- On site coordination of services detailed above. Particular attention must be applied to services co-located with AV equipment and services. This is typically done through the AV Consultant or as stipulated by the Project Manager.
- Network requirements as per section 5.6, 5.8 & 6 above.

Note: If the project is a Design and Construct, then the AV Integrator may be required to coordinate some or all of the services identified in section 7.1.1. AV Consultant. The AV Integrator must ensure all coordination has been completed to ensure the correct delivery of the AV services.

7.2. Information & Digital Services – Major Works

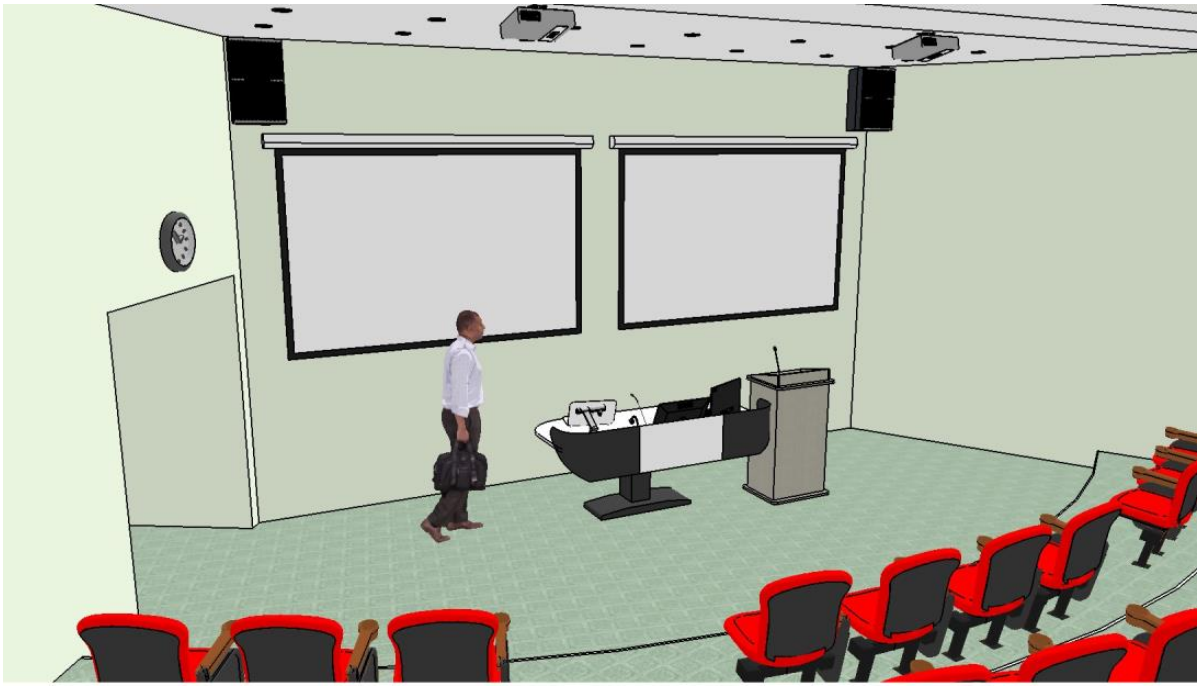
Information & Digital Services initiated Major works will typically involve the replacement or upgrade of an existing install. In this case there may be an AV Consultant appointed or the AV Integrator will be engaged to undertake a design and construct project, based on the standards. For this, coordination is only required where other trades are engaged and would typically only involve the coordination of joinery and the final location of power and data. The AV Consultant or AV Integrator must ensure all relevant items from the Major project list are coordinated when required.

Appendix A – Room Descriptions

The following sections describe the use case for each of the following common teachings spaces that are deployed across Flinders University:

- Large Teaching & Presentation Spaces
- Teaching & Laboratory spaces
- Task Based space
- Meeting Rooms
- MoCow
- Clinical Simulation

Large Teaching & Presentation Spaces



Functional Description

Large Teaching & Presentation Spaces are designed to engage a large number of students and are expensive to build. Due to their high rate of utilization, they are typically well featured, offering multiple content sources, Content capture and remote connectivity via web conferencing infrastructure. These spaces are normally raked to maximise visual and audio experiences and have a formal presentation area consisting of a large lectern. More recently, these spaces are transforming to flat floor/terraced spaces, with a flip style furniture layout, offering a formal learning environment at the front of the room, with collaborative style furniture at the rear to encourage group collaboration work. The addition of multiple large format displays around the room, mirroring the main presentation display further support visual sightlines for students not facing the primary presentation location.

The AV systems' primary role is to act as a conduit to facilitate the transmission of knowledge between the academic and student. These spaces can be deployed with either a single or multiple display device depending on functionality. Additional display functionality may include dual content display, web conference far end display or a confidence monitor. The displays can display the content from either a PC, laptop or document camera. Due to the size of the space, ceiling speakers are installed for speech reinforcement in addition to the left and right speakers for playback audio associated with the displayed content. To comply with relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a touch screen controller. A number of options such as content capture with a PTZ camera, document camera, additional microphones, Web conferencing, and additional displays can be added.

A Large Teaching & Presentation Space will provide the following functionality:

STANDARD FUNCTIONALITY

Large format display

Display of the following sources:

- Resident PC
- Laptop connectivity
- Wireless presentation

Web conferencing

Content capture

Program audio reinforcement

Lapel microphone for speech reinforcement

Handheld microphone for student Q&A

Hearing augmentation system

Touch screen controller

OPTIONAL FUNCTIONALITY

Dual large format display

Display or two video sources

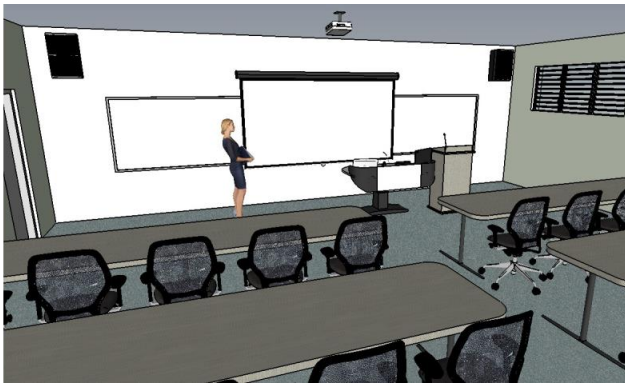
Document camera

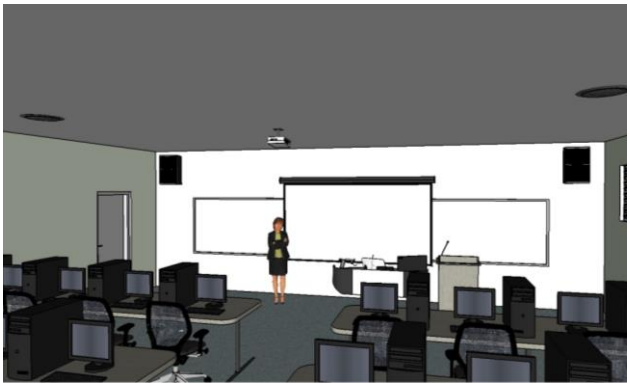
Confidence monitor to allow presenter to roam

Far end monitor to support web conferencing

Room Booking Panel

Teaching and Laboratory Spaces





Functional Description

Standard teaching spaces and laboratory spaces are formal teaching spaces designed to support class sizes of around 20 – 50 students. They typically consist of a fixed layout and a clearly defined presentation area for the delivery of teaching and learning content. Laboratories include facilities such as training aids, PCs, wet areas or other items to support the learning process. All AV equipped spaces will typically provide a minimum level of functionality to provide a common user experience across the campus.

The AV systems' primary role is to act as a conduit to facilitate the transmission of knowledge between the academic and student. Teaching spaces are deployed with a single display device. Laboratories may have multiple displays installed but they will mirror the content of the primary display. The displays can display the content from either a PC, laptop or document camera. In noisy environments or larger spaces ceiling speakers are installed for speech reinforcement in addition to the left and right speakers for playback audio associated with the displayed content. To comply with relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a touch screen controller. Content capture with a PTZ camera and handheld microphones may be provided as an option.

A typical teaching space will provide the following functionality:

STANDARD FUNCTIONALITY

Large format display

Display of any one of the following sources:

- Resident PC
- Laptop connectivity
- Wireless presentation
- Laboratory equipment etc

Program audio reinforcement

Lapel microphone for speech reinforcement

Hearing augmentation system

Touch screen controller

Web conferencing

OPTIONAL FUNCTIONALITY

Document camera

Handheld microphone for student Q&A

Content capture

Multiple displays (all show the same content)

Room Booking Panel

Task Based Spaces

Functional Description

Task base learning spaces are designed to support task-based learning and student collaboration. To support this style of learning the room typically consists of 6 to 8 pods with 6 students sitting at each pod. Each pod has its own AV display that can display either the academics' or their own content. The Academic can also take the content from a single pod and share it across any or all of the other pod displays. Speech reinforcement is usually installed in these spaces to allow the Academic to be heard above the noise of the students discussing the task.

The AV system is required to route the video signals between all sources and destination in any combination. Flat panel displays are typically used as the display device for the pods and a larger display or projector used for the academic. The larger format display provides a focal point for the class when discussing a specific point, and also allows for task based spaces to be used as conventional teaching. A large display may also assist with academics transitioning to task based spaces as it provides a familiar feel to conventional teaching spaces. Source content is typically via a resident PC or academics' laptop. The students have the option of using either the pod based resident PC or their own device or switching between both. Audio reinforcement is via the flat panel display speakers or sound bar. To comply with relevant legislation a hearing augmentation system is provided for the hearing impaired. The AV system is controlled by graphical user interface operating on a large touch screen controller.

A task based space will provide the following functionality:

STANDARD FUNCTIONALITY	OPTIONAL FUNCTIONALITY
Large format display for academics	Document camera
Multiple student pod displays	Web conferencing
Display of any one of the following sources: ▪ Resident PC (academic) ▪ Laptop connectivity (academic) ▪ Wireless presentation (academic & student) ▪ Student pod content	Content capture
	Room Booking Panel
Program audio reinforcement	
Lapel microphone for speech reinforcement	
Handheld microphone for student Q&A	
Hearing augmentation system	
Touch screen controller	

Meeting Space

Functional Description

Meeting spaces vary from an informal space where staff or students may share content as part of a meeting or study groups. Web-based conferencing rooms provide additional functionality to support the conferencing capability but can also be used as a standard meeting space.

To deliver the required functionality the following technology solutions have been chosen to support each type of meeting room space:

- Informal Spaces – Basic presentation via HDMI or wireless connection.
- Meeting Spaces – Web based conferencing (UC engine that will run Teams) with HDMI or wireless connectivity

STANDARD FUNCTIONALITY	OPTIONAL FUNCTIONALITY
Wall mounted display	
Room Booking Panel	Web conferencing
Display of any one of the following sources: ▪ Resident PC ▪ Laptop connectivity	Wireless presentation Lapel mic for speech reinforcement
Web conferencing	Touch Screen controller
Video Bar (Camera/Sound) for web conferencing	
Push Button Controller	

MoCow

MoCows provide a portable AV solution that can be used to support classroom activities or student study groups or meetings. The MoCow allows content to be displayed from either an installed PC or a BYOD via a HDMI connection

STANDARD FUNCTIONALITY

Large format display

Display of any one of the following sources:

- Resident PC (academic)
- Laptop connectivity (academic)

Web based conferencing

Program audio reinforcement

Boundary microphone for conferencing

Camera for web conferencing

Push button controller

Clinical Simulation

A simulated learning unit is a space designed to record the audio and video of a class room, with the ability to easily annotate and mark important events in the video that can then be reviewed by both student and lecturers later. These spaces generally contain several discrete cameras and microphones mounted within the ceiling connected to a server that records and manages the video and audio content. In some instances, other complex sources such as medical manikins can be incorporated into the system to provide additional feedback to students and lecturers.

Appendix B – Technical documentation

The following section provides the following information:

- Details of all approved Audio Visual Building Blocks (AVBB)
- Large Teaching & Presentation Space
- Teaching & Laboratory Spaces
- Task Based Space
- Meeting Rooms
- MoCow

AV BUILDING BLOCKS
‘AVBB’

Notes:

1.

Flinders University
Sturt Road, Bedford Park
South Australia 5042

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project name	AV BUILDING BLOCKS
file name	AVBB V1.0.vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	1 OF 4	09/02/2021	09/02/2021

RESIDENT PC
USB1
USB2
USB3
RESIDENT PC
DP OUT
HDMI OUT
AUDIO L&R
USB 4
LAN

BYOD
USB1
BYOD
HDMI OUT
AUDIO L&R
USB 2
LAN

WIRELESS PRESENTATION
WIRELESS PRESENTATION CRESTRON AM200
HDMI OUT
VGA OUT
LAN

WIRELESS PRESENTATION
USB
WIRELESS PRESENTATION BARCO CLICKSHARE200
HDMI OUT
USB
USB
LAN

DOCUMENT CAMERA
RS232
DOCUMENT CAMERA LUMENS (DC193)
HDMI IN
HDMI OUT
VGA OUT
AUDIO OUT
USB 1

PTZ CAMERA
RS232
PTZ CAMERA PANASONIC HE40SW
HDMI OUT
SDI OUT
USB
LAN

PTZ CAMERA (ACADEMIC)
PTZ CAMERA PANASONIC HE40HW
HDMI OUT
LAN

IP CAMERA
IP CAMERA AXIS M3045-V
LAN

IP CAMERA
IP CAMERA AXIS M1065
LAN

CONFERENCE SOUNDBAR
EX MIC
LV DC
CONFERENCE CAMERA SPEAKER MICROPHONE LOGITECH MEETUP
USB

DTP TRANSMITTER
HDMI
AUDIO
DTP TRANSMITTER EXTRON DTP HDMI 4K 330 TX
DTP OUT
RS232
IR

DTP RECEIVER
DTP IN
RS232
IR
DTP RECEIVER EXTRON DTP HDMI 4K 330 RX
HDMI OUT
AUDIO

HD BASE T TRANSMITTER
HDMI
AUDIO
USB A
USB MINI
HD BASE T TRANSMITTER CRESTRON HD-TX-USB-2000-C
HD BT OUT
RS232
IR

HD BASE T RECEIVER
DTP IN
RS232
IR
HD BASE T RECEIVER CRESTRON HD-RX-USB-2000-C
HDMI OUT
AUDIO
USB A
USB MINI

USB INTERFACE
HDMI
AUDIO
DTP IN
MEDIA PORT EXTRON (MEDIA PORT 200)
USB 1
HDMI LOOP
AUDIO
LAN

CONTENT CAPTURE
HDMI1
HDMI 4
3GSDI 5
AUDIO
MEDIA CAPTURE EXTRON (SMP351)
HDMI LOOP
HDMI
AUDIO
LAN

VC CODEC
HDMI 1
HDMI 2
CAM 1
MIC 1
MIC 2
MIC 3
CAMERA CTR
VC CODEC CISCO WEBEX CODEC PLUS
HDMI 1
HDMI 2
USB A
USB B
AUDIO L&R
LAN 1

VC CODEC
HDMI 1
HDMI 2
HDMI 3
CAM 1
CAM 2
CAM 3 (SDI)
CAM CTR 1
CAM CTR 2
MIC 1
MIC 2
MIC 3
MIC 4
MIC 5
MIC 6
MIC 7
MIC 8
LAN 1
LAN TSC
VC CODEC CISCO WEBEX CODEC PRO
HDMI 1
HDMI 2
HDMI 3
USB A 1
USB A 2
USB B 1
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
AUDIO 5
AUDIO 6
GPIO 1-4
RS232
LAN 1 POE

MTR Nuk
USB1
USB2
USB3
UC Engine Intel Nuk/Android Appliance
DP OUT
HDMI OUT
AUDIO L&R
USB 4
LAN

TABLE BOX
HDMI
LAN
TABLE BOX TBA
HDMI
LAN

ENCODER
HDMI 1
HDMI 2
VIDEO TO IP ENCODER CRESTRON (NVX-352)
LAN
SFP
AUDIO

DECODER
LAN
IP TO VIDEO DECODER CRESTRON (NVX-352)
HDMI OUT
AUDIO

HDMI ENCODER
HDMI1
AUDIO
USB
LAN
VIDEO TO IP ENCODER MARSHALL VS-102-HDMI
HDMI
AUDIO
RS422/485
RS232

SCAN CONVERTER – SCALING
3G SDI
AUDIO
RS232
SCAN CONVERTER EXTRON DSC 3G-HD A
3G SDI
HDMI
RS232

HDMI SWITCH 4:2
HDMI 1
HDMI 2
HDMI 3
HDMI 4
HDMI SWITCH EXTRON DXP 42 HD 4K PLUS
HDMI 1 OUT
HDMI 2 OUT
LAN

CONFERENCE SOUNDBAR
HDMI 1
3.5mm
LV DC
CONFERENCE CAMERA SPEAKER MICROPHONE POLY X Series
3.5mm
HDMI OUT
HDMI OUT
USB
LAN

PRESENTATION SWITCHER
HDMI 1
HDMI 2
HDMI 3
HDMI 4
HDMI 5
HDMI 6
DTP 7
DTP 8
AUDIO MIC 1
AUDIO MIC 2
AUDIO MIC 3
AUDIO MIC 4
AUDIO 1 L&R
AUDIO 2 L&R
AUDIO 3 L&R
AUDIO 4 L&R
AUDIO 5 L&R
AUDIO 6 L&R
PRESENTATION SWITCHER EXTRON (CROSS POINT 86)
HDMI 1
HDMI 2
HDMI 3A
DTP 3B
HDMI 4A
DTP 4B
DTP 5
DTP 6
AUDIO L&R 1
AUDIO L&R 2
AUDIO L&R 3
AUDIO L&R 4
LAN

PRESENTATION SWITCHER
VGA 1
VGA 2
HDMI 1
HDMI 2
HDMI 3
HDMI 4
DTP 1
DTP 2
AUDIO MIC 1
AUDIO MIC 2
AUDIO 1 L&R
AUDIO 2 L&R
AUDIO 3 L&R
AUDIO 4 L&R
AUDIO 5 L&R
AUDIO 6 L&R
PRESENTATION SWITCHER EXTRON (IN1608)
HDMI A
HDMI B
DTP C
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
RS232
LAN

PRESENTATION SWITCHER
DP 1
HDMI 2
HDMI 3
HDMI 4
HDMI 5
HDMI 6
AUDIO MIC 1
AUDIO MIC 2
AUDIO 3 L&R
AUDIO 4 L&R
AUDIO AUX L&R
PRESENTATION SWITCHER EXTRON (IN1806)
HDMI LOOP
HDMI A
DTP B
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
RS232
LAN

MATRIX SWITCHER
SLOT 1.1V
SLOT 1.1A
SLOT 1.2V
SLOT 1.2A
SLOT 1.3V
SLOT 1.3A
SLOT 1.4V
SLOT 1.4A
SLOT 2.1V
SLOT 2.1A
SLOT 2.2V
SLOT 2.2A
SLOT 2.3V
SLOT 2.3A
SLOT 2.4V
SLOT 2.4A
SLOT 3.1V
SLOT 3.1A
SLOT 3.2V
SLOT 3.2A
SLOT 3.3V
SLOT 3.3A
SLOT 3.4V
SLOT 3.4A
SLOT 4.1V
SLOT 4.1A
SLOT 4.2V
SLOT 4.2A
SLOT 4.3V
SLOT 4.3A
SLOT 4.4V
SLOT 4.4A
CARD BASED MATRIX SWITCHER 16 X 16 (EXTRON CROSS POINT 1600)
SLOT 1.1V
SLOT 1.1C
SLOT 1.2V
SLOT 1.2C
SLOT 1.3V
SLOT 1.3C
SLOT 1.4V
SLOT 1.4C
SLOT 2.1V
SLOT 2.1C
SLOT 2.2V
SLOT 2.2C
SLOT 2.3V
SLOT 2.3C
SLOT 2.4V
SLOT 2.4C
SLOT 3.1V
SLOT 3.1C
SLOT 3.2V
SLOT 3.2C
SLOT 3.3V
SLOT 3.3C
SLOT 3.4V
SLOT 3.4C
SLOT 4.1V
SLOT 4.1C
SLOT 4.2V
SLOT 4.2C
SLOT 4.3V
SLOT 4.3C
SLOT 4.4V
SLOT 4.4C
LAN

BOUNDARY MICROPHONE
BOUNDARY MICROPHONE BEYERDYNAMIC (OM302)
AUDIO OUT

BOUNDARY MICROPHONE
CEILING MICROPHONE SHURE MX202W C
AUDIO OUT

WIRELESS MICROPHONE RECEIVER – 2 CHAN
RF 1
RF 2
WIRELESS MICROPHONE RECEIVER SHURE (ULXD4D)
AUDIO 1
AUDIO 2
LAN

WIRELESS MICROPHONE RECEIVER – 4 CHAN
RF 1
RF 2
WIRELESS MICROPHONE RECEIVER SHURE (ULXD4Q)
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
LAN

WIRELESS MICROPHONE
WIRELESS MICROPHONE SHURE (ULXD1 & WL185)
RF

WIRELESS MICROPHONE
WIRELESS MICROPHONE SHURE (ULXD2/K8)
RF

WIRELESS MICROPHONE CHARGER
SLOT 1
SLOT 2
WIRELESS MICROPHONE CHARGER SHURE (SBC220)
LAN

MICROPHONE ARRAY
MICROPHONE ARRAY SHURE (MXA910)
LAN

NETWORK AUDIO INTERFACE
AUDIO 1
AUDIO 2
I/O
LAN
NETWORK AUDIO INTERFACE AXIS P8221
AUDIO 1
AUDIO 2
RS422/485
RS232

AUDIO DSP
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
AUDIO 5
AUDIO 6
AUDIO 7
AUDIO 8
AUDIO 9
AUDIO 10
AUDIO 11
AUDIO 12
AUDIO DSP BIAMP TESIRA FORTE (DAN CI)
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
AUDIO 5
AUDIO 6
AUDIO 7
AUDIO 8
RS232
LOGIC
LAN DAN
LAN CONT

HEARING AUGMENTATION
AUDIO 1
HEARING AUGMENTATION TRANSMITTER I/R

HEARING LOOP AMPLIFIER
LINE IN
MIC
HEARING AUGMENTATION AMPLIFIER AMPERTRONIC
LOOP
SLAVE

AUDIO AMPLIFIER
AUDIO 1
AUDIO 2
AMPLIFIER LAB GRUPPEN (E2:2)
SPK 1
SPK 2

AUDIO AMPLIFIER
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
AMPLIFIER LAB GRUPPEN (E5:4)
SPK 1
SPK 2
SPK 3
SPK 4

CEILING SPEAKER
SPK 1
SPEAKER CEILING TANNOY (CVS6)

CEILING SPEAKER
SPK 1
SPEAKER CEILING TANNOY (CMS503DCLP)

SURFACE SPEAKER
SPK 1
SPEAKER SURFACE TANNOY (DVS6T)

SURFACE SPEAKER
SPK 1
SPEAKER SURFACE TANNOY (DVS8T)

PROJECTOR
DVID
HDMI
RS232
LAN
PROJECTOR SONY (VXXXX)

FLAT PANEL DISPLAY
DVID
HDMI 1
HDMI 2
RS232
LAN
FLAT PANEL DISPLAY SONY (KDLXXXX)

FLAT PANEL DISPLAY - INTERACTIVE
DVID
HDMI 2
HDMI 2
RS232
LAN
FLAT PANEL DISPLAY INTERACTIVE NEC (VXXXX)
USB

TOUCH SCREEN CONTROLLER
LAN
TOUCH SCREEN CONTROLLER POLY (TC-8)

TOUCH SCREEN CONTROLLER
LAN
TOUCH SCREEN CONTROLLER CRESTRON (TSC-1060-BS)

TOUCH SCREEN CONTROLLER
LAN
TOUCH SCREEN CONTROLLER CRESTRON (TSC-760-BS)

TOUCH SCREEN CONTROLLER
LAN
ROOM SCHEDULING TOUCH SCREEN CONTROLLER CONCIERGE (ACMG10)

CONTROL SYSTEM PROCESSOR
DIG IN
NET (YZG)
LAN
CONTROL SYSTEM PROCESSOR CRESTRON (RMC3)
RELAY 1
RELAY 2
IR 1
IR 2
RS232

CONTROL SYSTEM PROCESSOR
DIG IN
NET (YZG)
LAN
CONTROL SYSTEM PROCESSOR CRESTRON (CP3)
RELAY 1
RELAY 2
IR 1
IR 2
RS232

PUSH BUTTON CONTROLLER
PUSH BUTTON CONTROLLER EXTRON MLC55RS
RS232
IR

PROJECTION SCREEN
IR
RS232
LAN
PROJECTION SCREEN SCREEN TECHNICS (XXXXX)

FLAT PANEL DISPLAY
DP
HDMI
DVI
USB
PC MONITOR DELL (XXXX)

POWER DISTRIBUTION UNIT
LAN
PDU SERVERLINK SLP-SB1008-H
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8

CONTENT CAPTURE TALLY
TALLY INDICATOR
+12V
GROUND

VOIP PHONE
LAN
VOIP PHONE
LAN

NETWORK SWITCH
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8
PORT 9
PORT 10
PORT 11
PORT 12
NETWORK SWITCH CISCO (CATALYST 3560CX)
PORT 13
PORT 14
SFP 1
SFP 2

Notes:

1.

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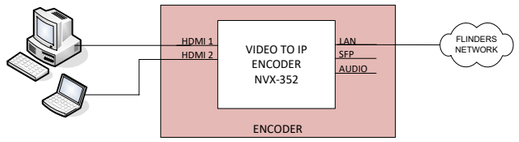
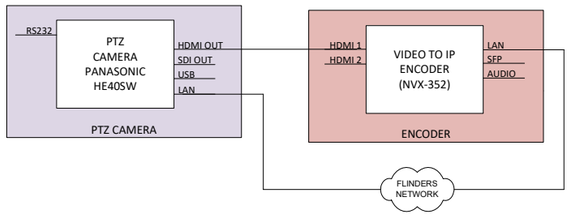
project name	AV BUILDING BLOCKS
file name	AVBB V1.0.vsd
drawing name	AV BUILDING BLOCKS
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE
page size	A1
page	2 OF 4
created	09/02/2021
revised	03/08/2022

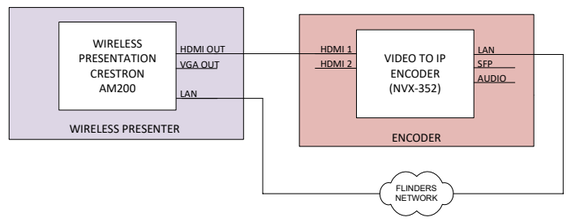
VIDEO INPUT IP – SINGLE SOURCE



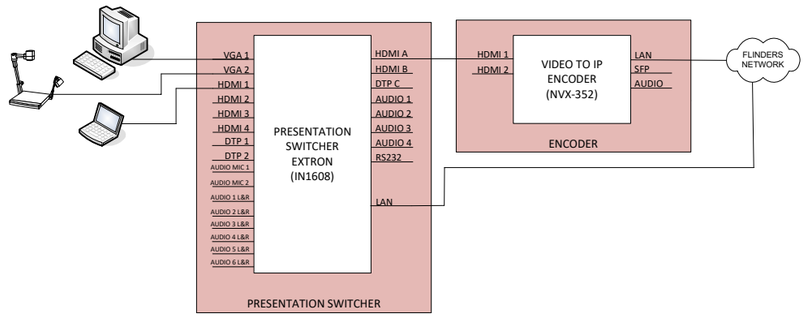
VIDEO INPUT IP – PTZ CAMERA



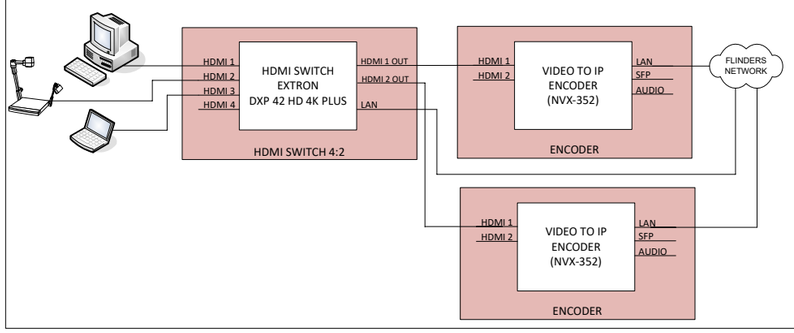
VIDEO INPUT IP – WIRELESS PRESENTATION



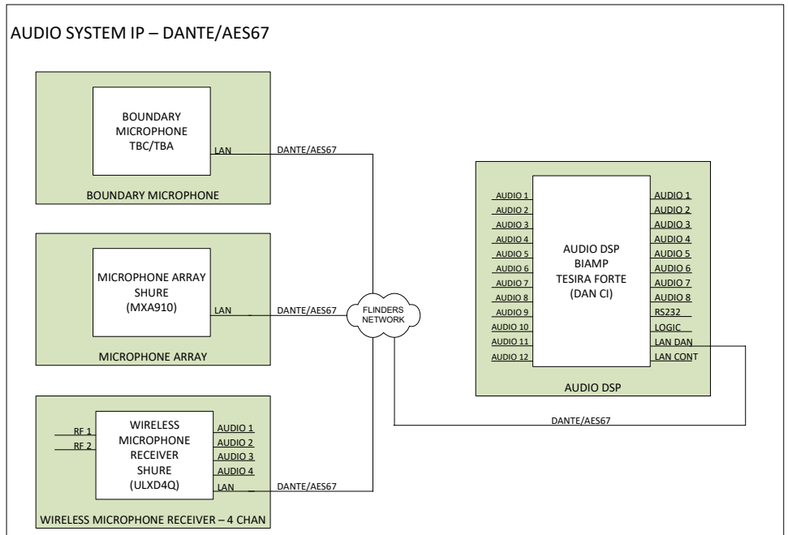
VIDEO INPUT IP – MULTIPLE SOURCES – SINGLE STREAM



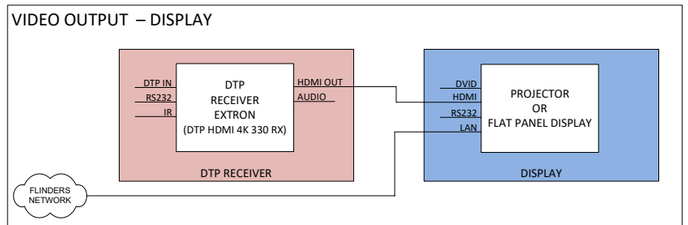
VIDEO INPUT IP – MULTIPLE SOURCES – DUAL STREAM



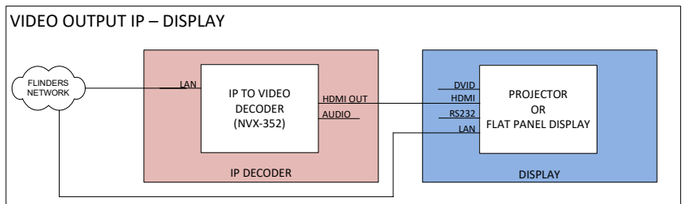
AUDIO SYSTEM IP – DANTE/AES67



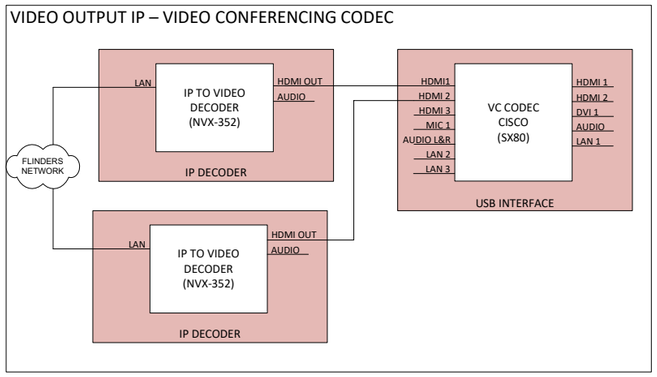
VIDEO OUTPUT – DISPLAY



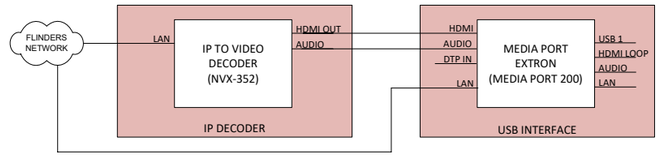
VIDEO OUTPUT IP – DISPLAY



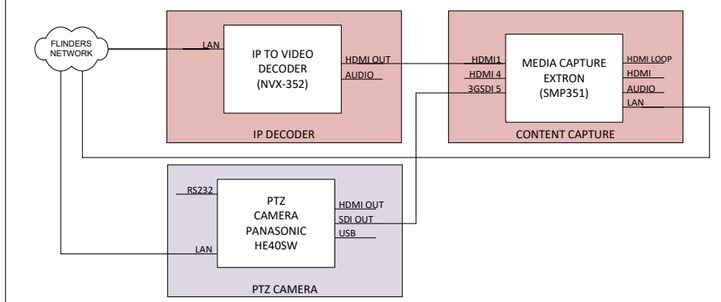
VIDEO OUTPUT IP – VIDEO CONFERENCING CODEC



VIDEO OUTPUT IP – WEB CONFERENCING



VIDEO OUTPUT IP – CONTENT CAPTURE



Notes:

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project name	AV BUILDING BLOCKS
file name	AVBB V1.0.vsd
drawing name	AVBB MODULES
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	3 OF 4	09/02/2021	09/02/2021

VIDEO INPUT IP – SINGLE SOURCE

SOURCE DEVICE 1 →

FLOOR SWITCH - POE

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

VIDEO INPUT IP – MULTIPLE SOURCES – SINGLE STREAM

SOURCE DEVICE 1 →
SOURCE DEVICE 2 →
SOURCE DEVICE 3 →
SOURCE DEVICE 4 →

FLOOR SWITCH - POE

PSW01	
EXTRON PRES SW IN1608XL	
INPUT	OUTPUT
VGA 1 IN – DB15	HDMI – HDMI 1A
VGA 2 IN – DB15	HDMI – HDMI 1B
HDMI 1 - HDMI	RJ45 – DTP 1C
HDMI 2 - HDMI	PHX[3] – VAR OUT L
HDMI 3 - HDMI	PHX[3] – VAR OUT R
HDMI 4 - HDMI	PHX[3] – FIXED OUT L
DTP 1 – RJ45	PHX[3] – FIXED OUT R
DTP 2 – RJ45	
LINE ST 1 – PHX5	
LINE ST 2 – PHX5	
LINE ST 3 – PHX5	
LINE ST 4 – PHX5	
LINE ST 5 – PHX5	
LINE ST 6 – PHX5	
MIC 1 – PHX3	
MIC 2 -PHX3	PHX – RS232
MAINS - IEC	RJ45 - LAN
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH - POE

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

VIDEO INPUT IP – MULTIPLE SOURCES – DUAL STREAM

SOURCE DEVICE 1 →
SOURCE DEVICE 2 →
SOURCE DEVICE 3 →
SOURCE DEVICE 4 →

FLOOR SWITCH - POE

DXP 42 HD 4K PLUS	
4X2 HDMI SWITCHER	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	HDMI-HDMI 2
HDMI 3-HDMI	PHX- AUDIO 3 L&R
HDMI 4-HDMI	PHX- AUDIO 4 L&R
USB – TYPE A	
LAN 1-RJ45	SOCKET-DC
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH - POE

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH - POE

NVX02	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

VIDEO INPUT IP – PTZ CAMERA

FLOOR SWITCH →

FLOOR SWITCH - POE

CAM02	
PANASONIC HE40HWE	
INPUT	OUTPUT
LAN POE – RJ45	HDMI – HDMI
VISCA/RS232 - VISCA	VISCA – VISCA/RS232
LV DC - SKT	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

NOTE: HE40SW MODELS ARE TYPICALLY USED, THIS OPTION IS ONLY USED WHERE A NVX-352 STREAM IS REQUIRED.

VIDEO INPUT IP – WIRELESS PRESENTATION

FLOOR SWITCH - POE →

FLOOR SWITCH - POE

WMP01	
CRESTRON AIRMEDIA AM200	
INPUT	OUTPUT
HDMI-HDMI	HDMI-HDMI
USB-TYPE A	PHX-IR 1
CONSOLE-USB MIC A	PHX-IR 2
	PHX-FLEX I/O B
	PHX- RS232
LAN A-RJ45	JACK- DC
NETWORK	
HOSTNAME	CCC-8888-LL-###-FFF-ZZ

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

VIDEO OUTPUT IP – LECTURE CAPTURE

FLOOR SWITCH - POE →

FLOOR SWITCH - POE →

NVX01	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

CAM01	
PANASONIC HE40SW SDI	
INPUT	OUTPUT
LAN POE – RJ45	BNC - SDI
VISCA/RS232 - VISCA	VISCA – VISCA/RS232
LV DC - SKT	

CAP01	
EXTRON SMP351 3G-SDI	
INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI 1&2 LOOP
HDMI 2 - HDMI	HDMI – HDMI OUT
AUDIO 1&2 L&R –PHX5	PHX5 – AUD 1&2 LOOP
RGB 3 - BNC	PHX5 – AUD 1&2 LOOP
HDMI 4 - HDMI	PHX5[2] – IP 1
3GSDI - BNC	PHX5[2] – IP 2
MIC 1 – PHX3	PHX5[2] – OP 1
AUDIO L&R –PHX5	PHX5[2] – OP 2
MAINS - IEC	RJ45 - LAN
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH

VIDEO OUTPUT IP – WEB CONFERENCING

FLOOR SWITCH - POE →

TO PC →

FLOOR SWITCH - POE

NVX02	
CRESTRON – NVX-352	
INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.zx.flinders.edu
STREAM AV	xxx.xxx.xxx1.zx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.zx.flinders.edu

USB01	
EXTRON MEDIAPORT 200	
INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI LOOP
LINE AUX L&R –PHX5	TYPE B - USB
MIC 1 – PHX3	PHX5 – REF/AUX
REF/AUX – PHX5	PHX5[2] – IP 1
	PHX5[2] – IP 2
	PHX5[2] – OP 1
	PHX5[2] – OP 2
MAINS - IEC	RJ45 - LAN
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH

CONTROL SYSTEM – TOUCH SCREEN CONTROLLER

TSC01	
CRESTRON TSW 1060-B-S	
INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH - POE

VIDEO ANCILLARY IP – PROJECTION SCREEN

MPS01	
SCREEN TECHNICS PROJ SCREEN	
INPUT	OUTPUT
LAN1-RJ45	MAINS
NETWORK	
HOSTNAME	xxx.xxx.xxx1.zx.flinders.edu

FLOOR SWITCH → GPO

VIDEO ANCILLARY IP – ROOM MONITORING CAM

CAM01	
AXIS IP CAMERA – M3045-V	
INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOST NAME	CCCC-BBBB-LL-RRR-FFFF-ZZ
STREAM AV	CCCC-BBBB-LL-RRR-FFFF-ZZ
STREAM AUDIO	CCCC-BBBB-LL-RRR-FFFF-ZZ

FLOOR SWITCH - PoE

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project name	AV BUILDING BLOCKS
file name	AVBB V1.0.vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	4 OF 4	09/02/2021	09/02/2021

LARGE TEACHING AND PRESENTATION SPACE

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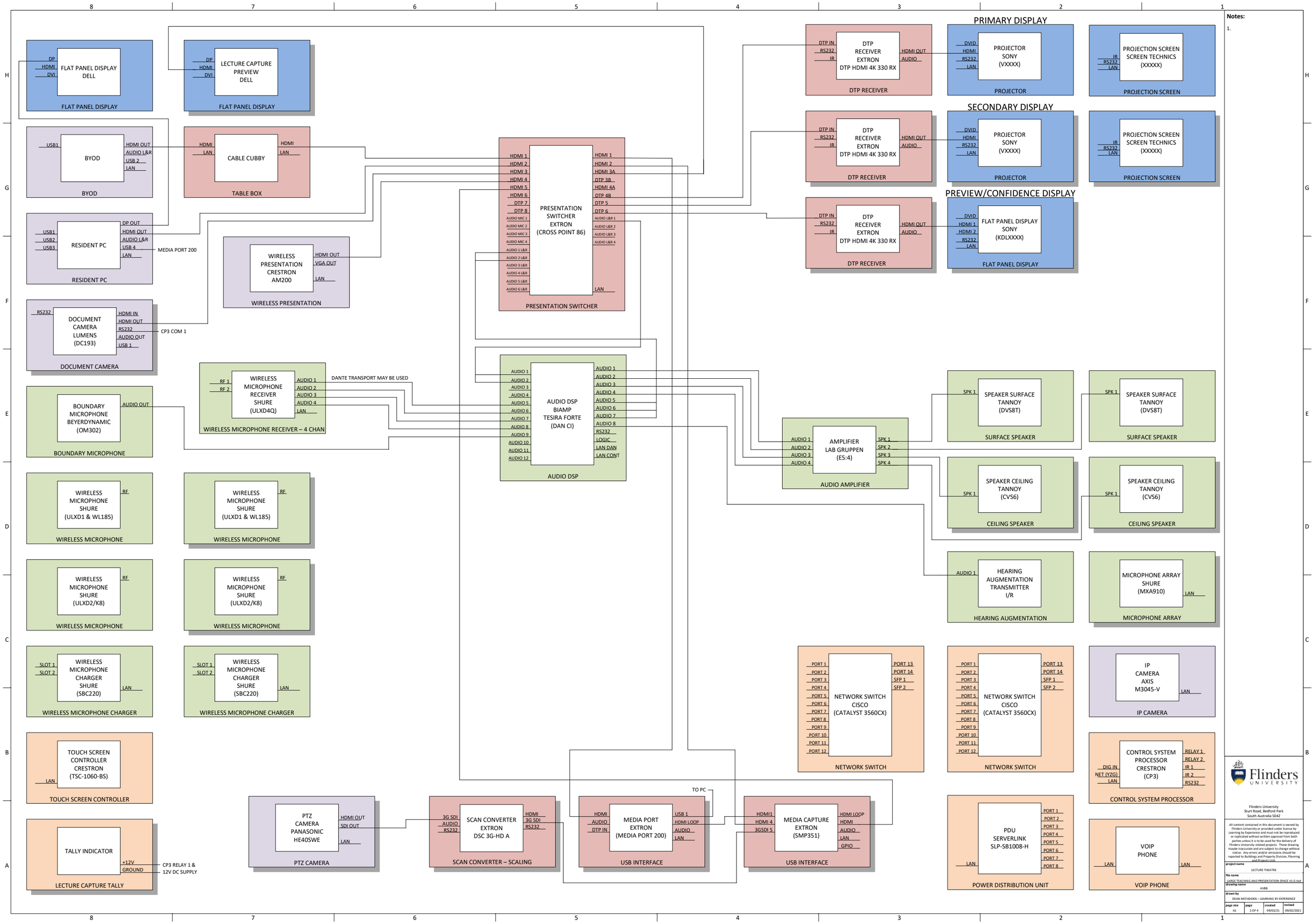
project name	LECTURE THEATRE
file name	LARGE TEACHING AND PRESENTATION SPACE V1.0 Vol
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	1 OF 4	09/02/21	09/02/2021


FLAT PANEL DISPLAY
DELL
DP
HDMI
DVI
FLAT PANEL DISPLAY
LECTURE CAPTURE PREVIEW
DELL
FLAT PANEL DISPLAY
BYOD
USB1
HDMI OUT
AUDIO L&R
USB 2
LAN
BYOD
CABLE CUBBY
TABLE BOX
RESIDENT PC
USB1
USB2
USB3
DP OUT
HDMI OUT
AUDIO L&R
USB 4
LAN
MEDIA PORT 200
RESIDENT PC
WIRELESS PRESENTATION CRESTRON AM200
HDMI OUT
VGA OUT
LAN
WIRELESS PRESENTATION
DOCUMENT CAMERA LUMENS (DC193)
RS232
HDMI IN
HDMI OUT
RS232
AUDIO OUT
USB 1
CP3 COM 1
DOCUMENT CAMERA
BOUNDARY MICROPHONE BEYERDYNAMIC (OM302)
AUDIO OUT
BOUNDARY MICROPHONE
WIRELESS MICROPHONE RECEIVER SHURE (ULXD4Q)
RF 1
RF 2
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
LAN
DANTE TRANSPORT MAY BE USED
WIRELESS MICROPHONE RECEIVER – 4 CHAN
WIRELESS MICROPHONE SHURE (ULXD1 & WL185)
RF
WIRELESS MICROPHONE
WIRELESS MICROPHONE SHURE (ULXD1 & WL185)
RF
WIRELESS MICROPHONE
WIRELESS MICROPHONE SHURE (ULXD2/K8)
RF
WIRELESS MICROPHONE
WIRELESS MICROPHONE SHURE (ULXD2/K8)
RF
WIRELESS MICROPHONE
WIRELESS MICROPHONE CHARGER SHURE (SBC220)
SLOT 1
SLOT 2
LAN
WIRELESS MICROPHONE CHARGER
WIRELESS MICROPHONE CHARGER SHURE (SBC220)
SLOT 1
SLOT 2
LAN
WIRELESS MICROPHONE CHARGER
TOUCH SCREEN CONTROLLER CRESTRON (TSC-1060-BS)
LAN
TOUCH SCREEN CONTROLLER
TALLY INDICATOR
+12V
GROUND
CP3 RELAY 1 & 12V DC SUPPLY
LECTURE CAPTURE TALLY
PRESENTATION SWITCHER EXTRON (CROSS POINT 86)
HDMI 1
HDMI 2
HDMI 3
HDMI 4
HDMI 5
HDMI 6
DTP 7
DTP 8
AUDIO MIC 1
AUDIO MIC 2
AUDIO MIC 3
AUDIO MIC 4
AUDIO 1 L&R
AUDIO 2 L&R
AUDIO 3 L&R
AUDIO 4 L&R
AUDIO 5 L&R
AUDIO 6 L&R
HDMI 1
HDMI 2
HDMI 3A
DTP 3B
HDMI 4A
DTP 4B
DTP 5
DTP 6
AUDIO L&R 1
AUDIO L&R 2
AUDIO L&R 3
AUDIO L&R 4
LAN
PRESENTATION SWITCHER
AUDIO DSP BIAMP TESIRA FORTE (DAN CI)
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
AUDIO 5
AUDIO 6
AUDIO 7
AUDIO 8
AUDIO 9
AUDIO 10
AUDIO 11
AUDIO 12
AUDIO 1
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AUDIO 7
AUDIO 8
RS232
LOGIC
LAN DAN
LAN CONT
AUDIO DSP
PTZ CAMERA PANASONIC HE40SWE
HDMI OUT
SDI OUT
LAN
PTZ CAMERA
SCAN CONVERTER EXTRON DSC 3G-HD A
3G SDI
AUDIO
RS232
HDMI
3G SDI
RS232
SCAN CONVERTER – SCALING
MEDIA PORT EXTRON (MEDIA PORT 200)
HDMI
AUDIO
DTP IN
USB 1
HDMI LOOP
AUDIO
LAN
USB INTERFACE
TO PC
MEDIA CAPTURE EXTRON (SMP351)
HDMI1
HDMI 4
3GSDI 5
HDMI LOOP
HDMI
AUDIO
LAN
GPIO
USB INTERFACE
PRIMARY DISPLAY
DTP RECEIVER EXTRON DTP HDMI 4K 330 RX
DTP IN
RS232
IR
HDMI OUT
AUDIO
DTP RECEIVER
PROJECTOR SONY (VXXXX)
DVID
HDMI
RS232
LAN
PROJECTOR
PROJECTION SCREEN SCREEN TECHNICS (XXXXX)
IR
RS232
LAN
PROJECTION SCREEN
SECONDARY DISPLAY
DTP RECEIVER EXTRON DTP HDMI 4K 330 RX
DTP IN
RS232
IR
HDMI OUT
AUDIO
DTP RECEIVER
PROJECTOR SONY (VXXXX)
DVID
HDMI
RS232
LAN
PROJECTOR
PROJECTION SCREEN SCREEN TECHNICS (XXXXX)
IR
RS232
LAN
PROJECTION SCREEN
PREVIEW/CONFIDENCE DISPLAY
DTP RECEIVER EXTRON DTP HDMI 4K 330 RX
DTP IN
RS232
IR
HDMI OUT
AUDIO
DTP RECEIVER
FLAT PANEL DISPLAY SONY (KDLXXXX)
DVID
HDMI 1
HDMI 2
RS232
LAN
FLAT PANEL DISPLAY
AMPLIFIER LAB GRUPPEN (E5:4)
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
SPK 1
SPK 2
SPK 3
SPK 4
AUDIO AMPLIFIER
SPEAKER SURFACE TANNOY (DVS8T)
SPK 1
SURFACE SPEAKER
SPEAKER SURFACE TANNOY (DVS8T)
SPK 1
SURFACE SPEAKER
SPEAKER CEILING TANNOY (CVS6)
SPK 1
CEILING SPEAKER
SPEAKER CEILING TANNOY (CVS6)
SPK 1
CEILING SPEAKER
HEARING AUGMENTATION TRANSMITTER I/R
AUDIO 1
HEARING AUGMENTATION
MICROPHONE ARRAY SHURE (MXA910)
LAN
MICROPHONE ARRAY
NETWORK SWITCH CISCO (CATALYST 3560CX)
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8
PORT 9
PORT 10
PORT 11
PORT 12
PORT 13
PORT 14
SFP 1
SFP 2
NETWORK SWITCH
NETWORK SWITCH CISCO (CATALYST 3560CX)
NETWORK SWITCH
IP CAMERA AXIS M3045-V
LAN
IP CAMERA
CONTROL SYSTEM PROCESSOR CRESTRON (CP3)
DIG IN
NET (YZG)
LAN
RELAY 1
RELAY 2
IR 1
IR 2
RS232
CONTROL SYSTEM PROCESSOR
PDU SERVERLINK SLP-SB1008-H
LAN
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8
POWER DISTRIBUTION UNIT
VOIP PHONE
LAN
LAN
VOIP PHONE
Notes:
1.
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Flinders University
Sturt Road, Bedford Park
South Australia 5042
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project name
LECTURE THEATRE
file name
LARGE TEACHING AND PRESENTATION SPACE V1.0.Vsd
drawing name
AVBB
drawn by
DEAN MCFADDEN – LEARNING BY EXPERIENCE
page size
A1
page
2 OF 4
created
09/02/21
revised
09/02/2021

DISP01	
DELL 21" LCD MONITOR	
INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DP - DP	TYPE A - USB
L MAINS - IEC	TYPE A - USB

LECTURE CAPTURE PREVIEW

DISP01	
DELL 21" LCD MONITOR	
INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DVI - DVID	TYPE A - USB
MAINS - IEC	TYPE A - USB

PC01	
OPTIPLEX 3040	
INPUT	OUTPUT
USB 1 – TYPE A	HDMI-HDMI 1
USB 2 – TYPE A	DP – DISPLAY PORT
USB 3 – TYPE A	3.5MM - AUDIO
USB 4 – TYPE A	RJ45 - LAN 1
A MAINS - IEC	MAINS OUT – IEC F
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PHN01	
VOIP PHONE	
INPUT	OUTPUT
LAN - RJ45	RJ45 - LAN 2

TBX01	
CABLE CUBBY 1202 + AC 2 X USB	
OUTPUT	INPUT
RJ45 - LAN	LAN – RJ54 3
HDMI - HDMI	HDMI - HDMI
USB – TYPE A	
USB – TYPE A	MAINS - IEC

CAM01	
DOC CAM LUMENS DC193	
INPUT	OUTPUT
HDMI – HDMI	HDMI - HDMI
RS232 – MIN DIN	VGA – DB15
K IEC - MAINS	USB 2 – TYPE A

VIA DB9 – MIN DIN ADAPTOR

MIC01	
BOUNDARY MIC BEYER OM302	
INPUT	OUTPUT
	XLR-MIC

TSC01	
CRESTRON TSW 1060-B-S	
INPUT	OUTPUT
	LAN1-RJ45 6
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

MIC02	
SHURE BODY PACK TX – ULXD1	
INPUT	OUTPUT
	ANT - RF

INC LAPEL MIC – WL185

MIC04	
SHURE BODY PACK TX – ULXD1	
INPUT	OUTPUT
	ANT - RF

INC LAPEL MIC – WL185

MIC03	
SHURE HANDHELD TX ULXD2/K8	
INPUT	OUTPUT
	ANT - RF

MIC05	
SHURE HANDHELD TX ULXD2/K8	
INPUT	OUTPUT
	ANT - RF

CGR01		CGR02	
SHURE 2 CHAN CHGR – SBC220		SHURE 2 CHAN CHGR – SBC220	
INPUT	OUTPUT	INPUT	OUTPUT
LV DC - SOCKET	CHARGING SLOT 1	LV DC - SOCKET	CHARGING SLOT 1
M LAN – RJ45	CHARGING SLOT 2	LAN – RJ45	CHARGING SLOT 2
NETWORK		NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu	HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU01	
SHURE POWER SUPPLY	
INPUT	OUTPUT
F IEC - MAINS	DC JACK – LV DC

IND01	
HELLA RED DURALED 959.560-431	
INPUT	OUTPUT
+12V & GND	

LECTERN

CAM02	
PANASONIC HE40SWE	
INPUT	OUTPUT
LAN POE – RJ45	SDI - BNC
VISCA/RS232 - VISCA	VISCA – VISCA/RS232
LV DC - SKT	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

PRESENTER CAMERA

SCL01	
EXTRON DSC 3G-HD A	
INPUT	OUTPUT
3GSDI - BNC	HDMI - HDMI
AUDIO L&R – PHS	BNC – 3GSDI
D MAINS - IEC	
RS232 – PHX3	

USB01	
EXTRON MEDIAPORT 200	
INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI LOOP
LINE AUX L&R –PHX5	TYPE B - USB
MIC 1 – PHX3	PHX5 – REF/AUX
REF/AUX – PHX5	PHX5[2] – IP 1
	PHX5[2] – IP 2
	PHX5[2] – OP 1
	PHX5[2] – OP 2
J MAINS - IEC	RJ45 - LAN 12
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

CAP01	
EXTRON SMP351 3G-SDI	
INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI 1&2 LOOP
HDMI 2 - HDMI	HDMI – HDMI OUT
AUDIO 1&2 L&R –PHX5	PHX5 – AU DIO L&R
RGB 3 - BNC	PHX5 – AUD 1&2 LOOP
HDMI 4 - HDMI	PHX5[2] – IP 1
3GSDI - BNC	PHX5[2] – IP 2
MIC 1 – PHX3	PHX5[2] – OP 1
AUDIO L&R –PHX5	PHX5[2] – OP 2
C MAINS - IEC	RJ45 - LAN 11
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

MSW01	
EXTRON CROSS POINT 86	
INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI 1
HDMI 2 - HDMI	HDMI – HDMI 2
HDMI 3 - HDMI	HDMI – HDMI 3A
HDMI 4 - HDMI	RJ 45(DTP) – HDMI 3B
HDMI 5 - HDMI	HDMI – HDMI 4A
HDMI 6 - HDMI	RJ45(DTP) – HDMI 4B
HDMI 7 – RJ45(DTP)	RJ45(DTP) – HDMI 5
HDMI 8 – RJ45(DTP)	RJ45(DTP) – HDMI 6
MIC 1 – PHX3	PHX5[3] – OUT 1
MIC 2 – PHX3	PHX5[3] – OUT 2
MIC 3 – PHX3	PHX5[3] – OUT 3
MIC 4 – PHX3	PHX5[3] – OUT 4
LINE 1 – PHX5[3]	
LINE 2 – PHX5[3]	
LINE 3 – PHX5[3]	
LINE 4 – PHX5[3]	
LINE 5 – PHX5[3]	RJ45 – DMP EXP
LINE 6 – PHX5[3]	PHX3 – RS232
E MAINS - IEC	RJ45 - LAN 7
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

WMP01	
CRESTRON AIRMEDIA AM200	
INPUT	OUTPUT
HDMI-HDMI	HDMI-HDMI
USB-TYPE A	PHX-IR 1
CONSOLE-USB MIC A	PHX-IR 2
	PHX-FLEX I/O 8
	PHX- RS232
4 LAN A-RJ45	JACK - DC
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

RXR01	
SHURE QUAD RXER - ULXDQ	
INPUT	OUTPUT
ANT A IN - BNC	XLR3M – LINE OUT 1
ANT B IN - BNC	XLR3M – LINE OUT 2
	XLR3M – LINE OUT 3
	XLR3M – LINE OUT 4
8 LAN – RJ45	BNC – ANT A OUT
H MAINS - IEC	BNC – ANT B OUT

ALTERNATIVE: DIRECT DANTE CONNECTION TO DSP

DSP01	
BIAMP TESIRA FORTE DAN CI	
INPUT	OUTPUT
MIC/LINE 1 - PHX3	PHX3 – LINE OUT 1
MIC/LINE 2 - PHX3	PHX3 – LINE OUT 2
MIC/LINE 3 - PHX3	PHX3 – LINE OUT 3
MIC/LINE 4 - PHX3	PHX3 – LINE OUT 4
MIC/LINE 5 - PHX3	PHX3 – LINE OUT 5
MIC/LINE 6 - PHX3	PHX3 – LINE OUT 6
MIC/LINE 7 - PHX3	PHX3 – LINE OUT 7
MIC/LINE 8 - PHX3	PHX3 – LINE OUT 8
MIC/LINE 9 - PHX3	
MIC/LINE 10 - PHX3	DB9 – RS232
MIC/LINE 11 - PHX3	TYPE A – USB
MIC/LINE 12 - PHX3	RJ 45 – LAN 9
G MAINS - IEC	RJ45 – DANTE
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU01	
WILLIAM SOUND POWER SUPPLY	
INPUT	OUTPUT
N IEC - MAINS	DC JACK – LV DC

CP3	
CRESTRON CONTROL PROCESSOR	
INPUT	OUTPUT
	PHX4-NET
	PHX8[2]- RELAY 1
	PHX8[2]- RELAY 2
	PHX8[2]- RELAY 3
	PHX8[2]- RELAY 4
	PHX8[1]- I/O 1
	PHX8[1]- I/O 2
	PHX8[1]- I/O 3
	PHX8[1]- I/O 4
	PHX8[1]- I/O G
	PHX8[2]- IR 1
	PHX8[2]- IR 2
USB-MINI AB FEM	PHX8[2]- IR 3
	PHX8[2]- IR 4
	PHX5-COM 1
S LAN 1-RJ45	PHX3-COM 2
LV DC - JACK	PHX3-COM 3
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU02	
CRESTRON POWER SUPPLY	
INPUT	OUTPUT
D IEC - MAINS	LV – DC PLUG

PSU02	
12V POWER SUPPLY	
INPUT	OUTPUT
O IEC - MAINS	LV – DC PLUG

PDU01	
SERVERLINK SLP-SB1008-H	
INPUT	OUTPUT
GPO MAINS 16A-IEC	IEC-MAINS 1 A ROOM PC
	IEC-MAINS 2 B
	IEC-MAINS 3 C LECTURE CAPTURE
	IEC-MAINS 4 D CONTROL PROCESSOR
	IEC-MAINS 5 E VIDEO SWITCHER
	IEC-MAINS 6 F RADIO MICROPHONE CHARGER
	IEC-MAINS 7 G AUDIO DSP & PROCESSING
FLOOR SWITCH LAN1-RJ45	IEC-MAINS 8 H MICROPHONE RECEIVER
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PDU02	
SERVERLINK SLP-SB1008-H	
INPUT	OUTPUT
GPO MAINS 16A-IEC	IEC-MAINS 1 I VIDEO PROCESSING AND DISTRIBUTION
	IEC-MAINS 2 J MEDIA PORT
	IEC-MAINS 3 K DOCUMENT CAMERA
	IEC-MAINS 4 L LECTERN MONITOR
	IEC-MAINS 5 M AUDIO AMPLIFIER
	IEC-MAINS 6 N HEARING AUGMENTATION
	IEC-MAINS 7 O RECORDING INDICATOR
FLOOR SWITCH LAN1-RJ45	IEC-MAINS 8 P TBA
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

NWS01		
CISCO 3560CX		
I/O	I/O	
FLOOR SWITCH LINK 1 – SFP	RJ45 – PORT 8	H WIRELESS MICROPHONE RECEIVER
LINK 2 – SFP	RJ45 – PORT 9	G AUDIO DSP
ROOM PC 1 PORT 1 – RJ45	RJ45 – PORT 10	F WIRELESS MICROPHONE CHARGER
VOIP PHONE - PoE 2 PORT 2 – RJ45	RJ45 – PORT 11	E LECTURE CAPTURE
BYOD 3 PORT 3 – RJ45	RJ45 – PORT 12	B MEDIA PORT
WIRELESS PRESENTATION -PoE 4 PORT 4 – RJ45	RJ45 – PORT 13	C VIDEO CONFERENCE CODEC
CONTROL PROCESSOR - PoE 5 PORT 5 – RJ45	RJ45 – PORT 14	
CONTROL USER INTERFACE - PoE 6 PORT 6 – RJ45		
VIDEO SWITCH /PRESENTATION DEVICE 7 PORT 7 – RJ45	IEC - MAINS	GPO
NETWORK		
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu	

AV RACK

PRIMARY DISPLAY

CATX01	
EXTRON 4K HDMI RX HDMI-330R	
INPUT	OUTPUT
DTP IN – RJ45	HDMI - HDMI
	PHX – RS232
LV DC – PHX2	PHX2 – IR

PROJ01	
SONY VPL-FHZ65	
INPUT	OUTPUT
VGA – DB15	DB15 – VGA
DVI-DVI-D	DVI – DVI-D
HDMI - HDMI	
AUDIO IN – 3.5MM	3.5MM – AUDIO OUT
HDBASET-RJ45	
RS232 – DB9	
LAN1-RJ45	
MAINS - IEC	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

GPO

MPS01	
SCREEN TECHNICS PROJ SCREEN	
INPUT	OUTPUT
	MAINS GPO
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

SECONDARY DISPLAY

CATX02	
EXTRON 4K HDMI RX HDMI-330R	
INPUT	OUTPUT
DTP IN – RJ45	HDMI - HDMI
	PHX – RS232
LV DC – PHX2	PHX2 – IR

PROJ02	
SONY VPL-FHZ65	
INPUT	OUTPUT
VGA – DB15	DB15 – VGA
DVI-DVI-D	DVI – DVI-D
HDMI - HDMI	
AUDIO IN – 3.5MM	3.5MM – AUDIO OUT
HDBASET-RJ45	
RS232 – DB9	
LAN1-RJ45	
MAINS - IEC	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

MPS02	
SCREEN TECHNICS PROJ SCREEN	
INPUT	OUTPUT
	MAINS GPO
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

PREVIEW/CONFIDENCE DISPLAY

CATX03	
EXTRON 4K HDMI RX HDMI-330R	
INPUT	OUTPUT
DTP IN – RJ45	HDMI - HDMI
	PHX – RS232
LV DC – PHX2	PHX2 – IR

FPD01	
FLAT PANEL DISPLAY	
INPUT	OUTPUT
HDMI 1- HDMI	3.5MM JACK- AUDIO
HDMI 2-HDMI	USB 1- TYPE A
DVI-DVI-D	
VGA – DB15	
RS232-DB9	
IR- 3.5MM JACK	
LAN1-RJ45	IEC-MAINS GPO

FLOOR SWITCH

CAM01	
AXIS IP CAMERA – M3045-V	
INPUT	OUTPUT
	LAN1-RJ45 FLOOR SWITCH - PoE
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

SUPPORT CAMERA

AMP01	
LAB GRUPPEN ES:4	
INPUT	OUTPUT
LINE BAL 1 – SCR3	BIND – OUT 1
LINE BAL 2 – SCR3	BIND – OUT 2
LINE BAL 3 – SCR3	BIND – OUT 3
LINE BAL 4 – SCR3	BIND – OUT 4
GPI – SCR3	SCR3 - GPO
M MAINS - IEC	

SPK01	
TANNOY SURFACE DVS8T	
INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

SPK02	
TANNOY SURFACE DVS8T	
INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

SPK03	
TANNOY CEILING CVS6	
INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

PRESENTATION ZONE QTY TO ENSURE COVERAGE AS PER STANDARDS

SPK04	
TANNOY CEILING CVS6	
INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

AUDIENCE ZONE QTY TO ENSURE COVERAGE AS PER STANDARDS

IRT01	
WILLIAM SOUND IR T2	
INPUT	OUTPUT
MIC-3.5MM JACK	RJ45-SLAVE 1
CHAN 1 AUDIO-PHX	RJ45-SLAVE 2
CHAN 2 AUDIO-PHX	SOCKET-DC

INFRARED IS THE PREFERRED OPTION. LOOP TO BE INSTALLED IF REQUESTED

MIC06	
SHURE MIC ARRAY MXA910	
INPUT	OUTPUT
	RJ45 – LAN FLOOR SWITCH - PoE

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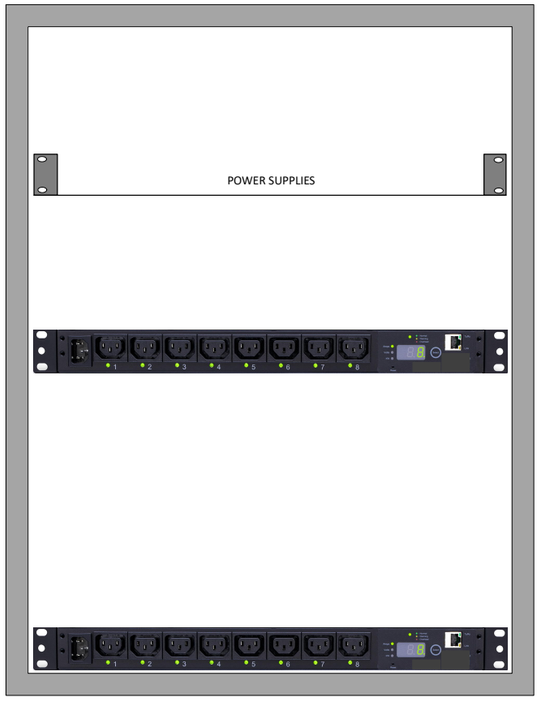
project name	LECTURE THEATRE
file name	LARGE TEACHING AND PRESENTATION SPACE V1.0.Vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

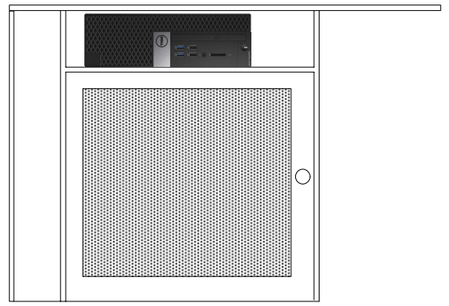
page size	page	created	revised
A1	3 OF 4	09/02/21	09/02/2021

RACK FRONT

RACK REAR



LECTERN LAYOUT



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project name	LECTURE THEATRE
file name	LARGE TEACHING AND PRESENTATION SPACE V1.0.Vsd
drawing name	LAYOUTS
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	4 OF 4	09/02/21	09/02/2021

TEACHING AND LABORATORY SPACES

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project name	TEACHING & LABORATORY SPACES
file name	TEACHING AND LAB SPACES V1.0.vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	1 OF 4	09/02/2121	09/02/2021

Notes:

1.

LECTURE CAPTURE MONITOR DELL
DP
HDMI
DVI
FLAT PANEL DISPLAY

BYOD
USB1
HDMI OUT
AUDIO L&R
USB 2
LAN
BYOD

CABLE CUBBY
HDMI
LAN
HDMI
LAN
TABLE BOX

PC MONITOR DELL
DP
HDMI
DVI
FLAT PANEL DISPLAY

RESIDENT PC
USB1
USB2
USB3
DP OUT
HDMI OUT
AUDIO L&R
USB 4
LAN
FROM MEDIA PORT 200
RESIDENT PC

DOCUMENT CAMERA LUMENS (DC192)
HDMI IN
HDMI OUT
VGA OUT
AUDIO OUT
USB 1
DOCUMENT CAMERA

WIRELESS PRESENTATION CRESTRON AM200
HDMI OUT
VGA OUT
LAN

BOUNDARY MICROPHONE BEYERDYNAMIC (OM302)
AUDIO OUT
BOUNDARY MICROPHONE

PRESENTATION SWITCHER EXTRON (IN1806)
DP 1
HDMI 1
HDMI 2
HDMI 3
HDMI 4
HDMI 5
AUDIO MIC 1
AUDIO MIC 2
AUDIO 3 L&R
AUDIO 4 L&R
AUDIO AUX L&R
HDMI LOOP
HDMI A
DTP B
AUDIO 1
AUDIO 2
AUDIO 3
AUDIO 4
RS232
LAN
PRESENTATION SWITCHER

DTP RECEIVER EXTRON (DTP HDMI 4K 330 RX)
DTP IN
RS232
IR
HDMI OUT
AUDIO
DTP RECEIVER

PROJECTOR SONY (VXXXX)
DVID
HDMI
RS232
LAN
PROJECTOR

PROJECTION SCREEN SCREEN TECHNICS (XXXXX)
LAN
PROJECTION SCREEN

HEARING AUGMENTATION TRANSMITTER I/R
AUDIO 1
HEARING AUGMENTATION

WIRELESS MICROPHONE SHURE (ULXD1 & WL185)
RF
WIRELESS MICROPHONE

WIRELESS MICROPHONE RECEIVER SHURE (ULXD4D)
RF 1
RF 2
AUDIO 1
AUDIO 2
LAN
WIRELESS MICROPHONE RECEIVER

AMPLIFIER LAB GRUPPEN (E2:2)
AUDIO 1
AUDIO 2
SPK 1
SPK 2
AUDIO AMPLIFIER

SPEAKER SURFACE TANNOY (DVS6T)
SPK 1
SURFACE SPEAKER

WIRELESS MICROPHONE SHURE (ULXD2/K8)
RF
WIRELESS MICROPHONE

SPEAKER SURFACE TANNOY (DVS6T)
SPK 1
SURFACE SPEAKER

WIRELESS MICROPHONE CHARGER SHURE (SBC220)
SLOT 1
SLOT 2
LAN
WIRELESS MICROPHONE CHARGER

TOUCH SCREEN CONTROLLER CRESTRON (TSC-760-BS)
LAN
TOUCH SCREEN CONTROLLER

NETWORK SWITCH CISCO (CATALYST 3560CX)
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8
PORT 9
PORT 10
PORT 11
PORT 12
PORT 13
PORT 14
SFP 1
SFP 2
NETWORK SWITCH

IP CAMERA AXIS M3045-V
LAN
IP CAMERA

CONTROL SYSTEM PROCESSOR CRESTRON CP3
DIG IN
NET (YZG)
LAN
RELAY 1
RELAY 2
IR 1
IR 2
RS232
CONTROL SYSTEM PROCESSOR

TALLY INDICATOR
+12V
GROUND
CP3 RELAY 1 & 12V DC SUPPLY
LECTURE CAPTURE TALLY

PDU SERVERLINK SLP-SB1008-H
LAN
PORT 1
PORT 2
PORT 3
PORT 4
PORT 5
PORT 6
PORT 7
PORT 8
POWER DISTRIBUTION UNIT

VOIP PHONE
LAN
LAN
VOIP PHONE

PTZ CAMERA PANASONIC HE40SW
HDMI OUT
SDI OUT
LAN
PTZ CAMERA

SCAN CONVERTER EXTRON DSC 3G-HD A
3G SDI
AUDIO
RS232
HDMI
3G SDI
RS232
SCAN CONVERTER – SCALING

TO PC

MEDIA PORT EXTRON (MEDIA PORT 200)
HDMI
AUDIO
DTP IN
USB 1
HDMI LOOP
AUDIO
LAN
USB INTERFACE

MEDIA CAPTURE EXTRON (SMP351)
HDMI1
HDMI 4
3GSDI 5
HDMI LOOP
HDMI
AUDIO
GPIO
LAN
USB INTERFACE

Flinders University
Sturt Road, Bedford Park
South Australia 5042

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project name	TEACHING & LABORATORY SPACES
file name	TEACHING AND LAB SPACES V1.0.vsd
drawing name	AVBB
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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Notes:

1.

DISP01
DELL 21" LCD MONITOR

INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DVI - DVID	TYPE A - USB
MAINS - IEC	TYPE A - USB

GPO

LECTURE CAPTURE PREVIEW

DISP01
DELL 21" LCD MONITOR

INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DVI - DVID	TYPE A - USB
MAINS - IEC	TYPE A - USB

PC01
OPTIPLEX 3040

INPUT	OUTPUT
USB 1 – TYPE A	HDMI-HDMI 1
USB 2 – TYPE A	DP – DISPLAY PORT
USB 3 – TYPE A	3.5MM - AUDIO
USB 4 – TYPE A	RJ45 - LAN (1)
(B) MAINS - IEC	MAINS OUT – IEC F
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PHN01
VOIP PHONE

INPUT	OUTPUT
LAN - RJ45	RJ45 - LAN (2)

TBX01
CABLE CUBBY 1202 + AC 2 X USB

OUTPUT	INPUT
RJ45 - LAN	LAN - RJ54 (3)
HDMI - HDMI	HDMI - HDMI
USB – TYPE A	
USB – TYPE A	MAINS - IEC

CAM01
DOC CAM LUMENS DC193

VIA DB9 – MINI DIN ADAPTOR

INPUT	OUTPUT
HDMI – HDMI	HDMI - HDMI
DB15 - VGA	VGA – DB15
IEC - MAINS	USB 2 – TYPE A

GPO

MIC01
BOUNDARY MIC BEYER OM302

INPUT	OUTPUT
	XLR-MIC

TSC01
CRESTRON TSW 760-B-S

INPUT	OUTPUT
	LAN1-RJ45 (6)
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

MIC02
SHURE BODY PACK TX – ULXD1

INPUT	OUTPUT
	ANT - RF

INC LAPEL MIC – WL185

MIC03
SHURE HANDHELD TX ULXD2/K8

INPUT	OUTPUT
	ANT - RF

CGR01
SHURE 2 CHAN CHGR – SBC220

INPUT	OUTPUT
LV DC - SOCKET	CHARGING SLOT 1
(9) LAN – RJ45	CHARGING SLOT 2
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU01
SHURE POWER SUPPLY

INPUT	OUTPUT
IEC - MAINS	DC JACK – LV DC

GPO

IND01
HELLA RED DURALED 959.560-431

INPUT	OUTPUT
+12V & GND	

LECTERN

CAM02
PANASONIC HE40SWE

INPUT	OUTPUT
LAN POE – RJ45	SDI - BNC
VISCA/RS232 - VISCA	VISCA – VISCA/RS232
LV DC - SKT	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

PRESENTER CAMERA

SCL01
EXTRON DSC 3G-HD A

INPUT	OUTPUT
3GSDI - BNC	HDMI - HDMI
AUDIO L&R – PHS	BNC – 3GSDI
(D) MAINS - IEC	
RS232 – PHX3	

USB01
EXTRON MEDIAPORT 200

INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI LOOP
LINE AUX L&R –PHX5	TYPE B - USB
MIC 1 – PHX3	PHX5 – REF/AUX
REF/AUX – PHX5	PHX5[2] – IP 1
	PHX5[2] – IP 2
	PHX5[2] – OP 1
	PHX5[2] – OP 2
(H) MAINS - IEC	RJ45 - LAN (11)
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

CAP01
EXTRON SMP351 3G-SDI

INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI 1&2 LOOP
HDMI 2 - HDMI	HDMI – HDMI OUT
AUDIO 1&2 L&R –PHX5	PHX5 – AUDIO L&R
RGB 3 - BNC	PHX5 – AUD 1&2 LOOP
HDMI 4 - HDMI	PHX5[2] – IP 1
3GSDI - BNC	PHX5[2] – IP 2
MIC 1 – PHX3	PHX3[2] – OP 1
AUDIO L&R –PHX5	PHX3[2] – OP 2
(C) MAINS - IEC	RJ45 - LAN (10)
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

PSW01
EXTRON PRES SW IN1806

INPUT	OUTPUT
DISPLAY PORT – DP	HDMI – HDMI LOOP
HDMI 1 - HDMI	HDMI – HDMI 1A
HDMI 2 - HDMI	RJ45(DYP) – HDMI 1B
HDMI 3 - HDMI	
HDMI 4 - HDMI	PHX5[3] – OUT 1
HDMI 5 - HDMI	PHX5[3] – OUT 2
MIC 1 – PHX3	PHX5[3] – OUT 3
MIC 2 – PHX3	PHX5[3] – OUT 4
LINE AUX L –PHX5[3]	
LINE AUX R –PHX5[3]	
LINE 3 – PHX5[3]	
LINE 4 – PHX5[3]	PHX3 – RS232
(D) MAINS - IEC	RJ45 - LAN (7)
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

WMP01
CRESTRON AIRMEDIA AM200

INPUT	OUTPUT
HDMI-HDMI	HDMI-HDMI
USB-TYPE A	PHX-IR 1
CONSOLE-USB MIC A	PHX-IR 2
	PHX-FLEX I/O 8
	PHX- RS232
(4) LAN A-RJ45	JACK - DC
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

RXR01
SHURE DUAL RXER – ULXD4D

INPUT	OUTPUT
ANT A IN - BNC	XLR3M – LINE OUT 1
ANT B IN - BNC	XLR3M – LINE OUT 2
(8) LAN – RJ45	BNC – ANT A OUT
(F) MAINS - IEC	BNC – ANT B OUT

PSU01
WILLIAM SOUND POWER SUPPLY

INPUT	OUTPUT
(F) IEC - MAINS	DC JACK – LV DC

CP3
CRESTRON CONTROL PROCESSOR

INPUT	OUTPUT
	PHX4-NET
	PHX8[2]-RELAY 1
	PHX8[2]-RELAY 2
	PHX8[2]-RELAY 3
	PHX8[2]-RELAY 4
	PHX8[1]-I/O 1
	PHX8[1]-I/O 2
	PHX8[1]-I/O 3
	PHX8[1]-I/O 4
	PHX8[1]-I/O 6
	PHX8[2]-IR 1
	PHX8[2]-IR 2
USB-MINI AB PER	PHX8[2]-IR 3
	PHX8[2]-IR 4
	PHX5-COM 1
(5) LAN1-RJ45	PHX3-COM 2
LV DC - JACK	PHX3-COM 3
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU02
CRESTRON POWER SUPPLY

INPUT	OUTPUT
(A) IEC - MAINS	LV – DC PLUG

PSU02
12V POWER SUPPLY

INPUT	OUTPUT
(C) IEC - MAINS	LV – DC PLUG

NETWORK SWITCH
MANAGED NETWORK SWITCH

I/O	I/O	
LINK 1 – SFP	RJ45 – PORT 8	(8) WIRELESS MICROPHONE RECEIVER
LINK 2 – SFP	RJ45 – PORT 9	(9) WIRELESS MICROPHONE CHARGER
ROOM PC (1) PORT 1 – RJ45	RJ45 – PORT 10	(10) LECTURE CAPTURE
VOIP PHONE - PoE (2) PORT 2 – RJ45	RJ45 – PORT 11	(11) MEDIA PORT
BYOD (3) PORT 3 – RJ45	RJ45 – PORT 12	(12) TBC
WIRELESS PRESENTATION -PoE (4) PORT 4 – RJ45	RJ45 – PORT 13	(13) TBC
CONTROL PROCESSOR - PoE (5) PORT 5 – RJ45	RJ45 – PORT 14	(14) PDU
CONTROL USER INTERFACE - PoE (6) PORT 6 – RJ45		
VIDEO SWITCH / PRESENTATION DEVICE (7) PORT 7 – RJ45	IEC - MAINS	GPO
NETWORK		
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu	

PDU01
SERVERLINK SLP-SB1008-H

INPUT	OUTPUT	
GPO MAINS 16A-IEC	IEC-MAINS 1	(A) CONTROL PROCESSOR
	IEC-MAINS 2	(B) ROOM PC
	IEC-MAINS 3	(C) LECTURE CAPTURE
	IEC-MAINS 4	(D) VIDEO SWITCHER
	IEC-MAINS 5	(E) VIDEO PROCESSING AND DISTRIBUTION
	IEC-MAINS 6	(F) AUDIO DSP & PROCESSING
	IEC-MAINS 7	(G) AUDIO AMPLIFIER
(14) LAN1-RJ45	IEC-MAINS 8	(H) MEDIA PORT
NETWORK		
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu	

AV RACK

AMP01
LAB GRUPPEN E2:2

INPUT	OUTPUT
LINE BAL 1 – SCR3	BIND – OUT 1
LINE BAL 2 – SCR3	BIND – OUT 2
GPI – SCR3	SCR3 - GPO
(G) MAINS - IEC	

CATX01
EXTRON 4K HDMI RX HDMI-330R

INPUT	OUTPUT
DTP IN – RJ45	HDMI - HDMI
	PH3 – RS232
LV DC – PHX2	PH2 – IR

PROJ01
SONY VPL-FHZ58

INPUT	OUTPUT
VGA – DB15	DB15 – VGA
DVI-DVI-D	DVI – DVI-D
HDMI -HDMI	
AUDIO IN – 3.5MM	3.5MM – AUDIO OUT
HDBASET-RJ45	
RS232 – DB9	
LAN1-RJ45	
MAINS - IEC	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

GPO

MPS01
SCREEN TECHNICS PROJ SCREEN

INPUT	OUTPUT
LAN1-RJ45	MAINS
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

GPO

CAM01
AXIS IP CAMERA – M3045-V

INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

SPK01
TANNOY SURFACE DVS6T

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

SPK02
TANNOY SURFACE DVS6T

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

IRT01
WILLIAM SOUND IR T2

INPUT	OUTPUT
MIC-3.5MM JACK	RJ45-SLAVE 1
CHAN 1 AUDIO-PHX	RJ45-SLAVE 2
CHAN 2 AUDIO-PHX	SOCKET-DC

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project name	TEACHING & LABORATORY SPACES
file name	TEACHING AND LAB SPACES V1.0.vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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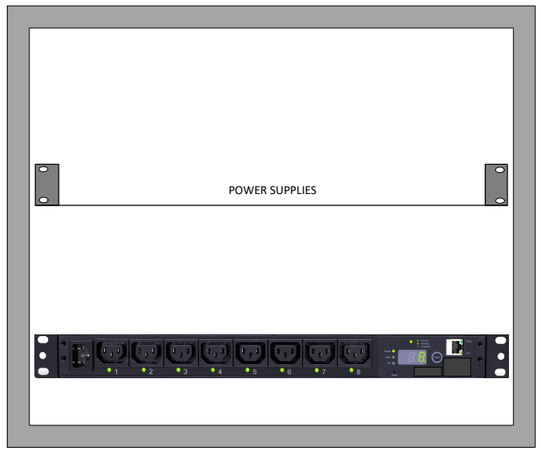
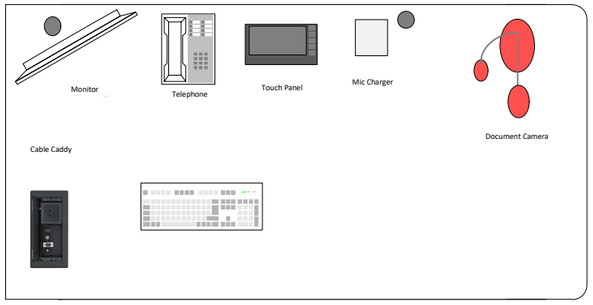
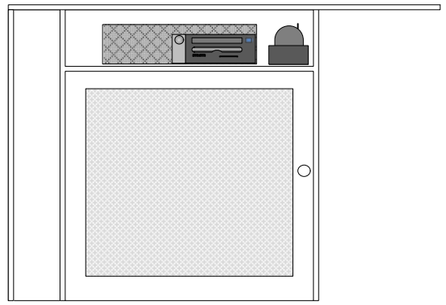
RACK FRONT

RACK REAR



LECTERN LAYOUT





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project name	TEACHING & LABORATORY SPACES		
file name	TEACHING AND LAB SPACES V1.0.vsd		
drawing name	LAYOUTS		
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE		
page size	**page**	**created**	**revised**
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TASK BASED SPACES

Notes:

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project name	TASK BASED SPACES
file name	TASK BASED SPACES V1.0.Vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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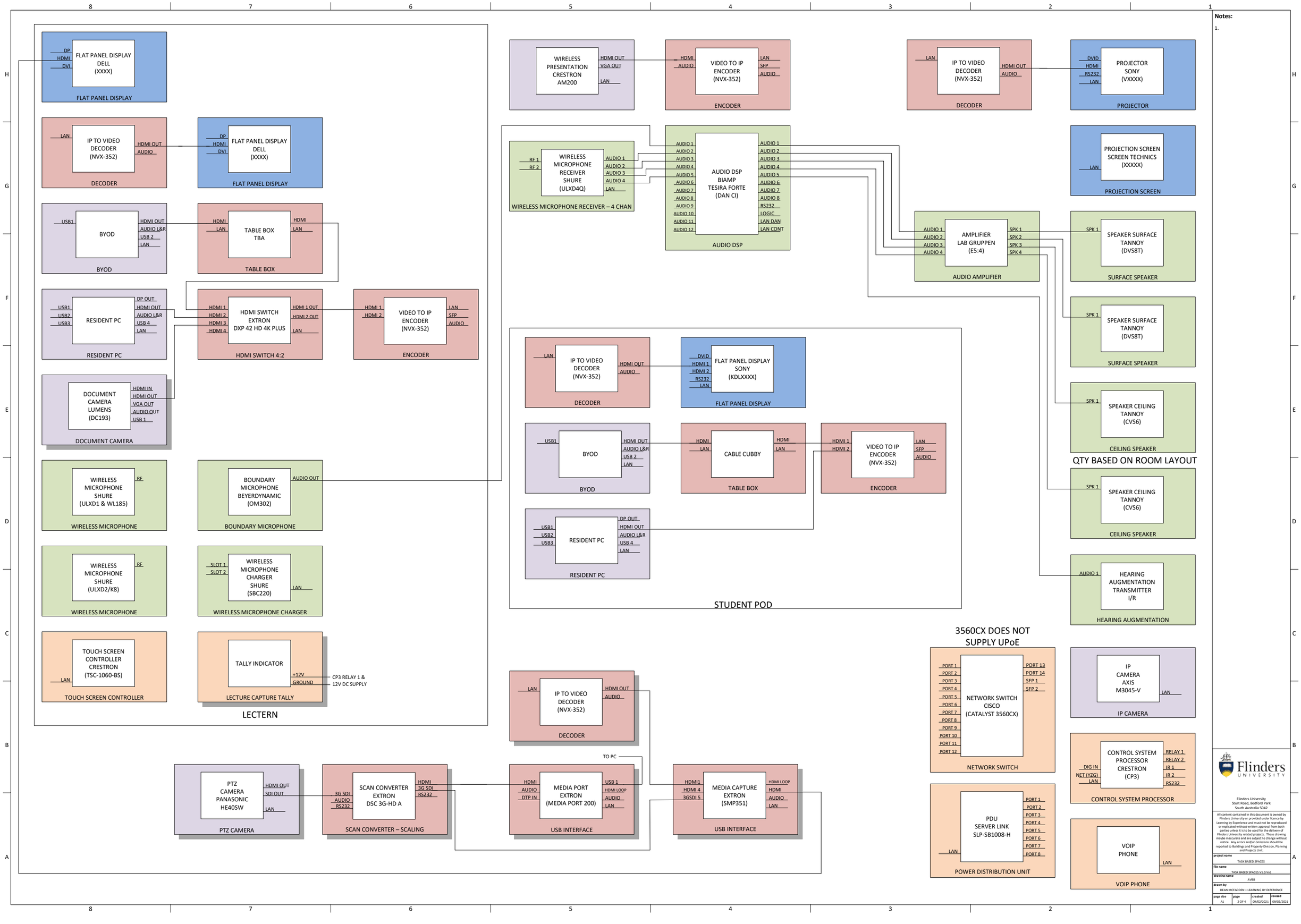

Notes:

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project name	TASK BASED SPACES
file name	TASK BASED SPACES V1.0.Vsd
drawing name	AVBB
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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DISP01
DELL 21" LCD MONITOR

INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DVI - DVID	TYPE A - USB
(F) MAINS - IEC	TYPE A - USB

LECTURE CAPTURE PREVIEW

NVX01
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

DISP01
DELL 21" LCD MONITOR

INPUT	OUTPUT
HDMI - HDMI	TYPE A - USB
DVI - DVID	TYPE A - USB
MAINS - IEC	TYPE A - USB

PC01
OPTIPLEX 3040

INPUT	OUTPUT
USB 1 – TYPE A	HDMI-HDMI 1
USB 2 – TYPE A	DP – DISPLAY PORT
USB 3 – TYPE A	3.5MM - AUDIO
USB 4 – TYPE A	RJ45 - LAN
(B) MAINS - IEC	MAINS OUT – IEC 7
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

DXP 42 HD 4K PLUS
4X2 HDMI SWITCHER

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	HDMI-HDMI 2
HDMI 3-HDMI	PHX- AUDIO 3 L&R
HDMI 4-HDMI	PHX- AUDIO 4 L&R
USB – TYPE A	
LAN 1-RJ45	SOCKET-DC
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

PSU02
EXTRON POWER SUPPLY

INPUT	OUTPUT
(F) IEC - MAINS	LV – DC PLUG

PHN01
VOIP PHONE

INPUT	OUTPUT
LAN - RJ45	RJ45 - LAN (2)

NVX02
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH PoE

TBX01
CABLE CUBBY 1202 + AC 2 X USB

OUTPUT	INPUT
RJ45 - LAN	LAN – RJ54
HDMI - HDMI	HDMI - HDMI
USB – TYPE A	
USB – TYPE A	MAINS - IEC

FLOOR SWITCH

CAM01
DOC CAM LUMENS DC193

INPUT	OUTPUT
HDMI – HDMI	HDMI - HDMI
DB15 - VGA	VGA – DB15
(F) IEC - MAINS	USB 2 – TYPE A

MIC01
BOUNDARY MIC BEYER OM302

INPUT	OUTPUT
	XLR-MIC

TSC01
CRESTRON TSW 1060-B-S

INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

MIC02
SHURE BODY PACK TX – ULXD1

INPUT	OUTPUT
	ANT - RF

INC LAPEL MIC – WL185

MIC03
SHURE HANDHELD TX ULXD2/K8

INPUT	OUTPUT
	ANT - RF

CGR01
SHURE 2 CHAN CHGR – SBC220

INPUT	OUTPUT
LV DC - SOCKET	CHARGING SLOT 1
LAN – RJ45	CHARGING SLOT 2
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

PSU01
SHURE POWER SUPPLY

INPUT	OUTPUT
(F) IEC - MAINS	DC JACK – LV DC

IND01
HELLA RED DURALED 959.560-431

INPUT	OUTPUT
+12V & GND	

LECTERN

CAM02
PANASONIC HE40SWE

INPUT	OUTPUT
LAN POE – RJ45	SDI - BNC
VISCA/RS232 - VISCA	VISCA – VISCA/RS232
LV DC - SKT	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

PRESENTER CAMERA

CP3
CRESTRON CONTROL PROCESSOR

INPUT	OUTPUT
	PHX4-NET
	PHX[2]-RELAY 1
	PHX[2]-RELAY 2
	PHX[2]-RELAY 3
	PHX[2]-RELAY 4
	PHX[1]-I/O 1
	PHX[1]-I/O 2
	PHX[1]-I/O 3
	PHX[1]-I/O 4
	PHX[1]-I/O G
	PHX[2]-IR 1
	PHX[2]-IR 2
USB-MINI AB FEM	PHX[2]-IR 3
	PHX[2]-IR 4
(A) LAN1-RJ45	PHX[1]-COM 1
LV DC - JACK	PHX[1]-COM 2
	PHX[1]-COM 3
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

PSU02
12V POWER SUPPLY

INPUT	OUTPUT
(H) IEC - MAINS	LV – DC PLUG

SCL01
EXTRON DSC 3G-HD A

INPUT	OUTPUT
3GSDI - BNC	HDMI - HDMI
AUDIO L&R – PHX5	BNC – 3GSDI
MAINS - IEC	
(D) RS232 – PHX3	

USB01
EXTRON MEDIAPORT 200

INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI LOOP
LINE AUX L&R –PHX5	TYPE B - USB
MIC 1 – PHX3	PHX5 – REF/AUX
REF/AUX – PHX5	PHX5[2] – IP 1
	PHX5[2] – IP 2
	PHX5[2] – OP 1
	PHX5[2] – OP 2
(H) MAINS - IEC	RJ45 - LAN
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

NVX03
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

CAP01
EXTRON SMP351 3G-SDI

INPUT	OUTPUT
HDMI 1 - HDMI	HDMI – HDMI 1&2 LOOP
HDMI 2 - HDMI	HDMI – HDMI OUT
AUDIO 1&2 L&R –PHX5	PHX5 – AUDIO L&R
RGB 3 - BNC	PHX5 – AUD 1&2 LOOP
HDMI 4 - HDMI	PHX5[2] – IP 1
3GSDI - BNC	PHX5[2] – IP 2
MIC 1 – PHX3	PHX5[2] – OP 1
AUDIO L&R –PHX5	PHX5[2] – OP 2
(C) MAINS - IEC	RJ45 - LAN
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

WMP01
CRESTRON AIRMEDIA AM200

INPUT	OUTPUT
HDMI-HDMI	HDMI-HDMI
USB-TYPE A	PHX-IR 1
CONSOLE-USB MIC A	PHX-IR 2
	PHX-FLEX I/O 8
	PHX- RS232
LAN A-RJ45	JACK- DC
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

NVX04
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH PoE

RXR01
SHURE QUAD RXER - ULXDQ

INPUT	OUTPUT
ANT A IN - BNC	XLR3M – LINE OUT 1
ANT B IN - BNC	XLR3M – LINE OUT 2
	XLR3M – LINE OUT 3
	XLR3M – LINE OUT 4
LAN – RJ45	BNC – ANT A OUT
(E) MAINS - IEC	BNC – ANT B OUT

FLOOR SWITCH

DSP01
BIAMP TESIRA FORTE DAN CI

INPUT	OUTPUT
MIC/LINE 1 - PHX3	PHX3 - LINE OUT 1
MIC/LINE 2 - PHX3	PHX3 - LINE OUT 2
MIC/LINE 3 - PHX3	PHX3 - LINE OUT 3
MIC/LINE 4 - PHX3	PHX3 - LINE OUT 4
MIC/LINE 5 - PHX3	PHX3 - LINE OUT 5
MIC/LINE 6 - PHX3	PHX3 - LINE OUT 6
MIC/LINE 7 - PHX3	PHX3 - LINE OUT 7
MIC/LINE 8 - PHX3	PHX3 - LINE OUT 8
MIC/LINE 9 - PHX3	
MIC/LINE 10 - PHX3	DB9 – RS232
MIC/LINE 11 - PHX3	TYPE A – USB
MIC/LINE 12 - PHX3	RJ 45 – LAN
(E) MAINS - IEC	RJ45 – DANTE
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH
FLOOR SWITCH

AMP01
LAB GRUPPEN ES:4

INPUT	OUTPUT
LINE BAL 1 – SCR3	B/ND – OUT 1
LINE BAL 2 – SCR3	B/ND – OUT 2
LINE BAL 3 – SCR3	B/ND – OUT 3
LINE BAL 4 – SCR3	B/ND – OUT 4
GPI – SCR3	SCR3 - GPO
(G) MAINS - IEC	

PSU01
WILLIAM SOUND POWER SUPPLY

INPUT	OUTPUT
(E) IEC - MAINS	DC JACK – LV DC

PDU01
SERVERLINK SLP-SB1008-H

INPUT	OUTPUT
GPO MAINS 16A-IEC	IEC-MAINS 1 (A) CONTROL PROCESSOR
	IEC-MAINS 2 (B) ROOM PC
	IEC-MAINS 3 (C) LECTURE CAPTURE
	IEC-MAINS 4 (D) VIDEO PROCESSING AND DISTRIBUTION
	IEC-MAINS 5 (E) AUDIO DSP & PROCESSING
	IEC-MAINS 6 (F) LECTERN POWER
	IEC-MAINS 7 (G) AUDIO AMPLIFIER
FLOOR SWITCH LAN1-RJ45	IEC-MAINS 8 (H) MEDIA PORT
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

TBA

NWS01
CISCO 3560CX

I/O	I/O
LINK 1 – SFP	RJ45 – PORT 8 (8) WIRELESS MICROPHONE RECEIVER
LINK 2 – SFP	RJ45 – PORT 9 (9) WIRELESS MICROPHONE CHARGER
ROOM PC (1) PORT 1 – RJ45	RJ45 – PORT 10 (10) LECTURE CAPTURE
VOIP PHONE - PoE (2) PORT 2 – RJ45	RJ45 – PORT 11 (11) MEDIA PORT
BYOD (3) PORT 3 – RJ45	RJ45 – PORT 12 (12) AUDIO DSP
WIRELESS PRESENTATION -PoE (4) PORT 4 – RJ45	RJ45 – PORT 13 (13) VIDEO CONFERENCE CODEC
CONTROL PROCESSOR - PoE (5) PORT 5 – RJ45	RJ45 – PORT 14 (14) PDU 1
CONTROL USER INTERFACE - PoE (6) PORT 6 – RJ45	
VIDEO SWITCH /PRESENTATION DEVICE (7) PORT 7 – RJ45	IEC - MAINS GPO
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

AV RACK

NVX05
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

PRIMARY DISPLAY

PROJ01
SONY VPL-FHZ65

INPUT	OUTPUT
VGA – DB15	DB15 – VGA
DVI-DVI-D	DVI - DVI-D
HDMI - HDMI	
AUDIO IN – 3.5MM	3.5MM – AUDIO OUT
HDBASET-RJ45	
RS232 – DB9	
LAN1-RJ45	
MAINS - IEC	
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH
GPO

MPS01
SCREEN TECHNICS PROJ SCREEN

INPUT	OUTPUT
LAN1-RJ45	MAINS
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH

GPO

PROJECTOR/FPD SIZE TO BE SELECTED TO ENSURE VIEWING GUIDELINES AS PER STANDARDS

CAM03
AXIS IP CAMERA – M3045-V

INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

SUPPORT CAMERA

SPK01
TANNOY SURFACE DVS8T

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

SPK02
TANNOY SURFACE DVS8T

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

SPK03
TANNOY CEILING CVS6

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

AUDIENCE ZONE QTY TO ENSURE COVERAGE AS PER STANDARDS

SPK04
TANNOY CEILING CVS6

INPUT	OUTPUT
INPUT – SCR [2]	SCR4 [2] - LOOP

AUDIENCE ZONE QTY TO ENSURE COVERAGE AS PER STANDARDS

IRT01
WILLIAM SOUND IR T2

INPUT	OUTPUT
MIC 3.5MM JACK	RJ45-SLAVE 1
CHAN 1 AUDIO PHX	RJ45-SLAVE 2
CHAN 2 AUDIO PHX	SOCKET-DC

NVX06
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

FPD01
SONY FW-55BZ35F

INPUT	OUTPUT
HDMI 1 - HDMI	3.5MM JACK-AUDIO
HDMI 2 - HDMI	USB 1 - TYPE A
HDMI 3 – HDMI	USB 2 - TYPE A
HDMI 4 - HDMI	USB 3 - TYPE A
RS232 - 3.5MM JACK	
AUDIO - 3.5MM JCK	
MAINS - IEC	RJ45 - LAN

GPO

TBX01
CABLE CUBBY 1202 + AC 2 X USB

OUTPUT	INPUT
RJ45 - LAN	LAN – RJ54
HDMI - HDMI	HDMI - HDMI
USB – TYPE A	
USB – TYPE A	MAINS - IEC

FLOOR SWITCH

GPO

PC01
OPTIPLEX 3040

INPUT	OUTPUT
USB 1 – TYPE A	HDMI-HDMI 1
USB 2 – TYPE A	DP – DISPLAY PORT
USB 3 – TYPE A	3.5MM - AUDIO
USB 4 – TYPE A	
GPO MAINS - IEC	MAINS OUT – IEC F
NETWORK	
HOSTNAME	xxx.xxx.xxx1.xx.flinders.edu

NVX07
CRESTRON – NVX-352

INPUT	OUTPUT
HDMI 1-HDMI	HDMI-HDMI 1
HDMI 2-HDMI	PHX-AUDIO L I/O
LAN1-RJ45	PHX-AUDIO R I/O
	PHX- IR 1
LAN3-SFP	PHX- IR 2
USB-TYPE A	
USB-TYPE B	SOCKET- DC
NETWORK	
HOST NAME	xxx.xxx.xxx1.xx.flinders.edu
STREAM AV	xxx.xxx.xxx1.xx.flinders.edu
STREAM AUDIO	xxx.xxx.xxx1.xx.flinders.edu

FLOOR SWITCH - PoE

STUDENT POD

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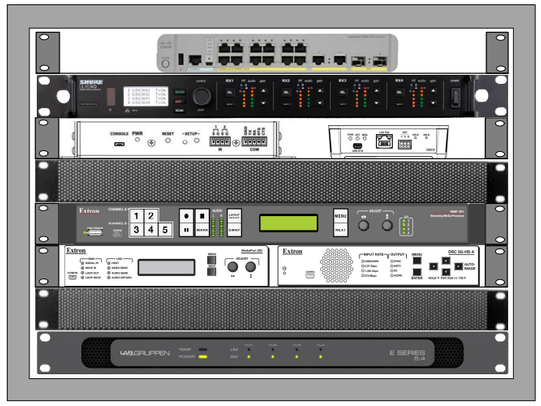
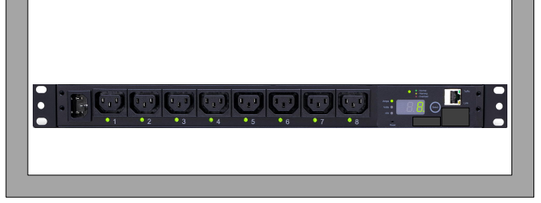
project name	TASK BASED SPACES
file name	TASK BASED SPACES V1.0.Vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	3 OF 4	09/02/2021	09/02/2021

RACK FRONT



RACK REAR



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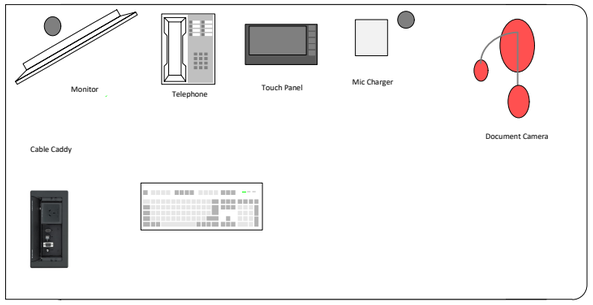

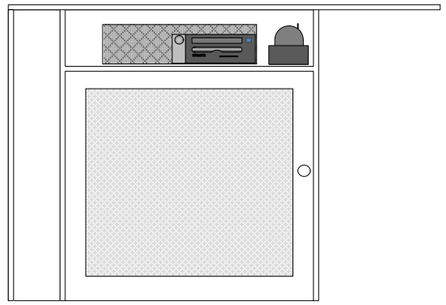

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project name	TASK BASED SPACES
file name	TASK BASED SPACES V1.0.Vsd
drawing name	LAYOUTS
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

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MEETING ROOM

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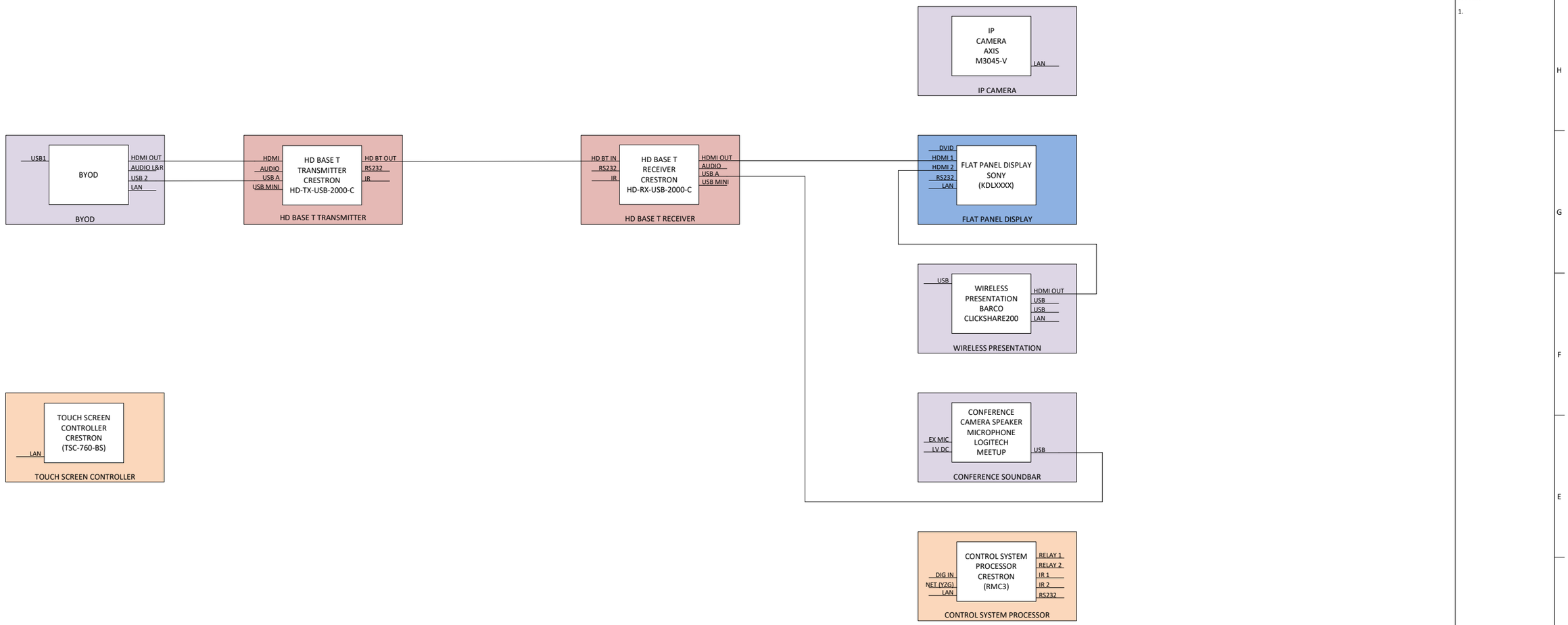
project name	MEETING ROOM
file name	MEETING ROOM V1.0.vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	1 OF 4	09/02/2021	09/02/2021



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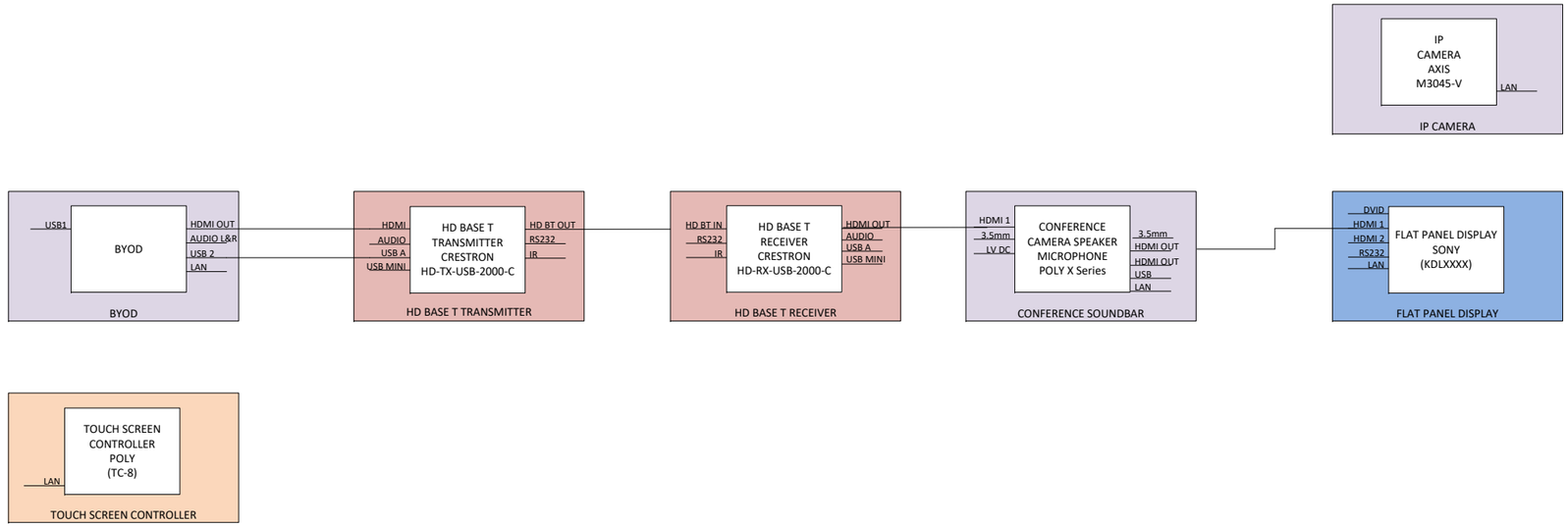
project name	MEETING ROOM
file name	MEETING ROOM V1.0.vsd
drawing name	AVBB
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	2 OF 4	09/02/2021	09/02/2021



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project name	MEETING ROOM
file name	MEETING ROOM V1.0.vsd
drawing name	AVBB MTR
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

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CAM01	
AXIS IP CAMERA – M3045-V	
INPUT	OUTPUT
	LAN1-RJ45

FLOOR SWITCH - POE

TBX01	
CABLE CUBBY 1202 + AC 2 X USB	
OUTPUT	INPUT
RJ45 - LAN	LAN – RJ54
HDMI - HDMI	HDMI - HDMI
USB – TYPE A	
USB – TYPE A	MAINS - IEC

FLOOR SWITCH

CATX01	
CRESTRON HD-TX-USB-200-C	
INPUT	OUTPUT
HDMI – HDMI	RJ45 – HD BASE T
AUDIO – TRS/PHX(S)	TRS/PHX(S) – AUDIO
USB – TYPE A	PHX(2) – IR
USB – TYPE MINI	

TSC01	
CRESTRON TSW 760-W-S	
INPUT	OUTPUT
	LAN1-RJ45
NETWORK	
HOSTNAME	xxx.xxx.xxx1.ie.flinders.edu

FLOOR SWITCH - POE

PHN01	
VOIP PHONE	
INPUT	OUTPUT
LAN - RJ45	RJ45 - LAN

FLOOR SWITCH - POE

CATX01	
CRESTRON HD-RX-USB-200-C	
INPUT	OUTPUT
HD BASE T – RJ45	HDMI – HDMI
AUDIO – TRS/PHX(S)	TRS/PHX(1) – AUDIO
IR – PHX(2)	TYPE A – USB
LV DC – PLUG	TYPE MINI – USB

PSU02	
CRESTRON POWER SUPPLY	
INPUT	OUTPUT
IEC - MAINS	LV – DC PLUG

GPO

RMC3	
CRESTRON ROOM CONTROLLER	
INPUT	OUTPUT
DIGITAL IN-PHX	PHX-NET
USB-MINI AB FEM	PHX-RELAY 1
	PHX-RELAY 2
	PHX-IR 1
	PHX-IR 2
LAN1-RJ45	PHX-RS232
NETWORK	
HOSTNAME	xxx.xxx.xxx1.ie.flinders.edu

FLOOR SWITCH - POE

FPD01	
SONY KD65X80G	
INPUT	OUTPUT
HDMI 1 - HDMI	3.5MM JACK-AUDIO
HDMI 2 - HDMI	USB 1 - TYPE A
HDMI 3 – HDMI	USB 2 - TYPE A
HDMI 4 - HDMI	USB 3 - TYPE A
RS232 - 3.5MM JACK	
AUDIO - 3.5MM JCK	
MAINS - IEC	RJ45 - LAN

GPO — FLOOR SWITCH

WMP01	
BARCO CLICKSHARE CS200	
INPUT	OUTPUT
USB 1 -TYPE A	HDMI - HDMI
USB 2 – TYPE A	
LAN A-RJ45	
LV DC - JACK	

PSU02	
BARCO POWER SUPPLY	
INPUT	OUTPUT
IEC - MAINS	LV – DC PLUG

GPO

SB01	
LOGITECH MEETUP	
INPUT	OUTPUT
USB – USB MINI	
EX MIC –	
LV DC - JACK	

PSU04	
MEETUP POWER SUPPLY	
INPUT	OUTPUT
IEC - MAINS	LV – DC PLUG

GPO

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project name	MEETING ROOM
file name	MEETING ROOM V1.0.vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

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project name	MEETING ROOM
file name	MEETING ROOM V1.0.vsd
drawing name	LAYOUT
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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MOCOW

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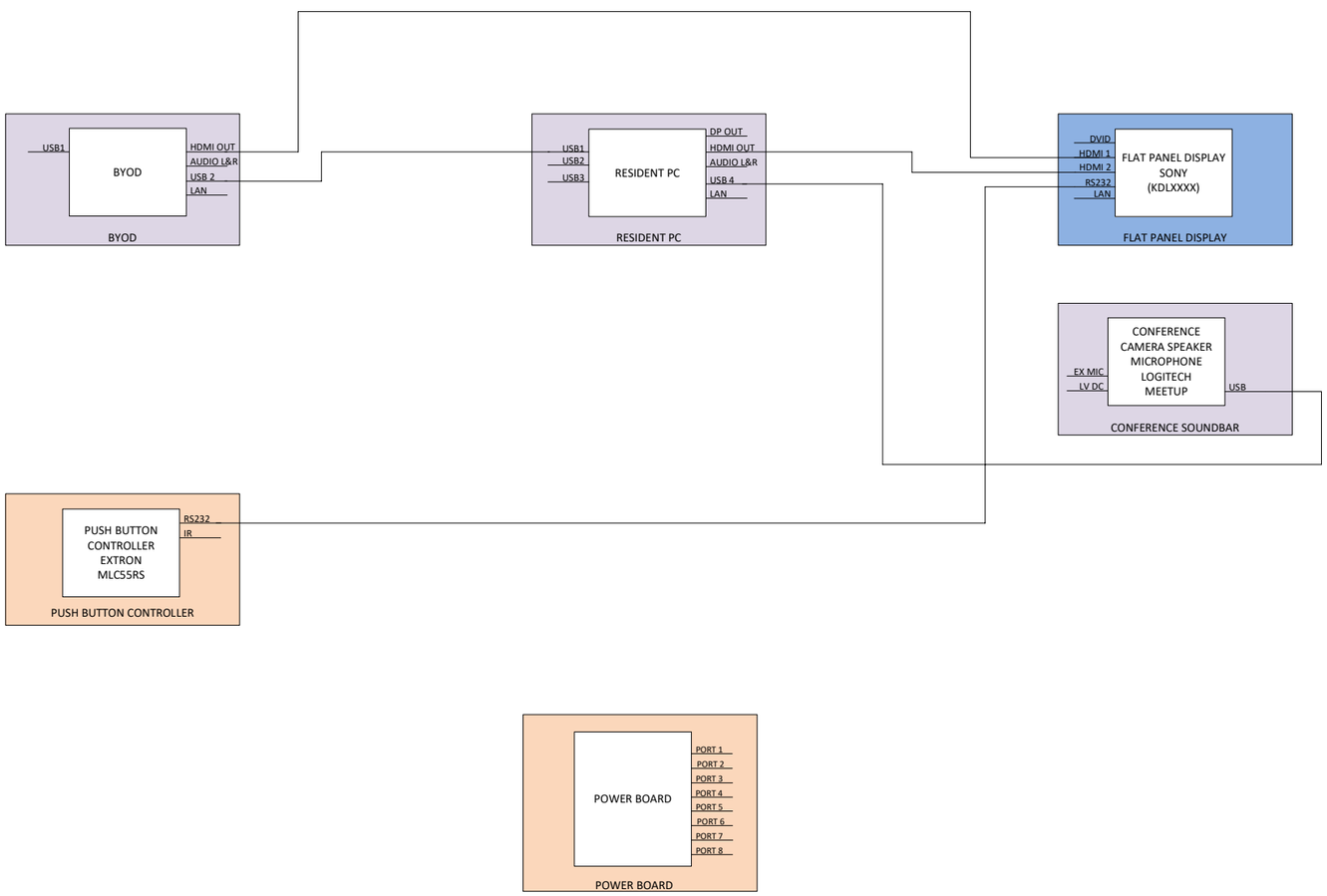
project name	FLAT FLOOR TEACHING & LABORTORY BUILDING
file name	MOCOW V1.0.vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	**page**	**created**	**revised**
A1	1 OF 4	09/02/2021	09/02/2021



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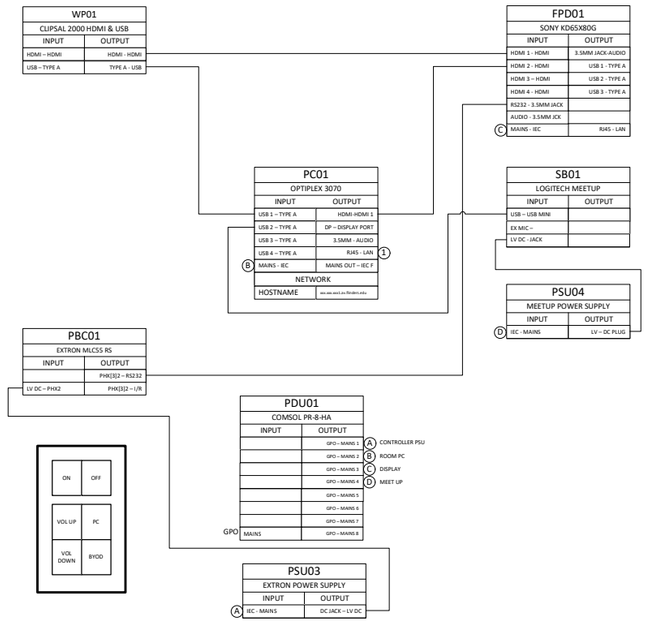
project name	MOCOW
file name	MOCOW V1.0.vsd
drawing name	AVBB
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	2 OF 4	09/02/2021	09/02/2021



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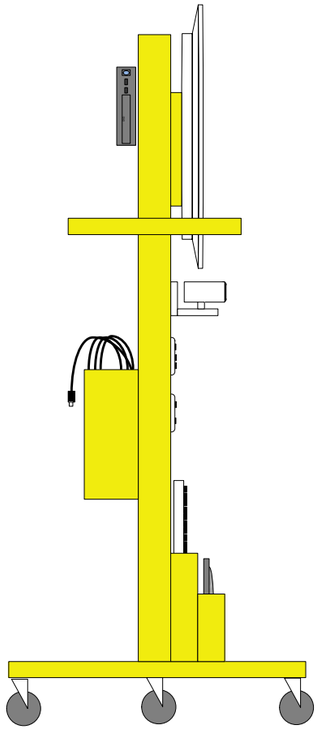
project name	MOCOW
file name	MOCOW V1.0.vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	3 OF 4	09/02/2021	09/02/2021



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project name	MOCOW
file name	MOCOW V1.0.vsd
drawing name	LAYOUT
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

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CLINICAL SIMULATION

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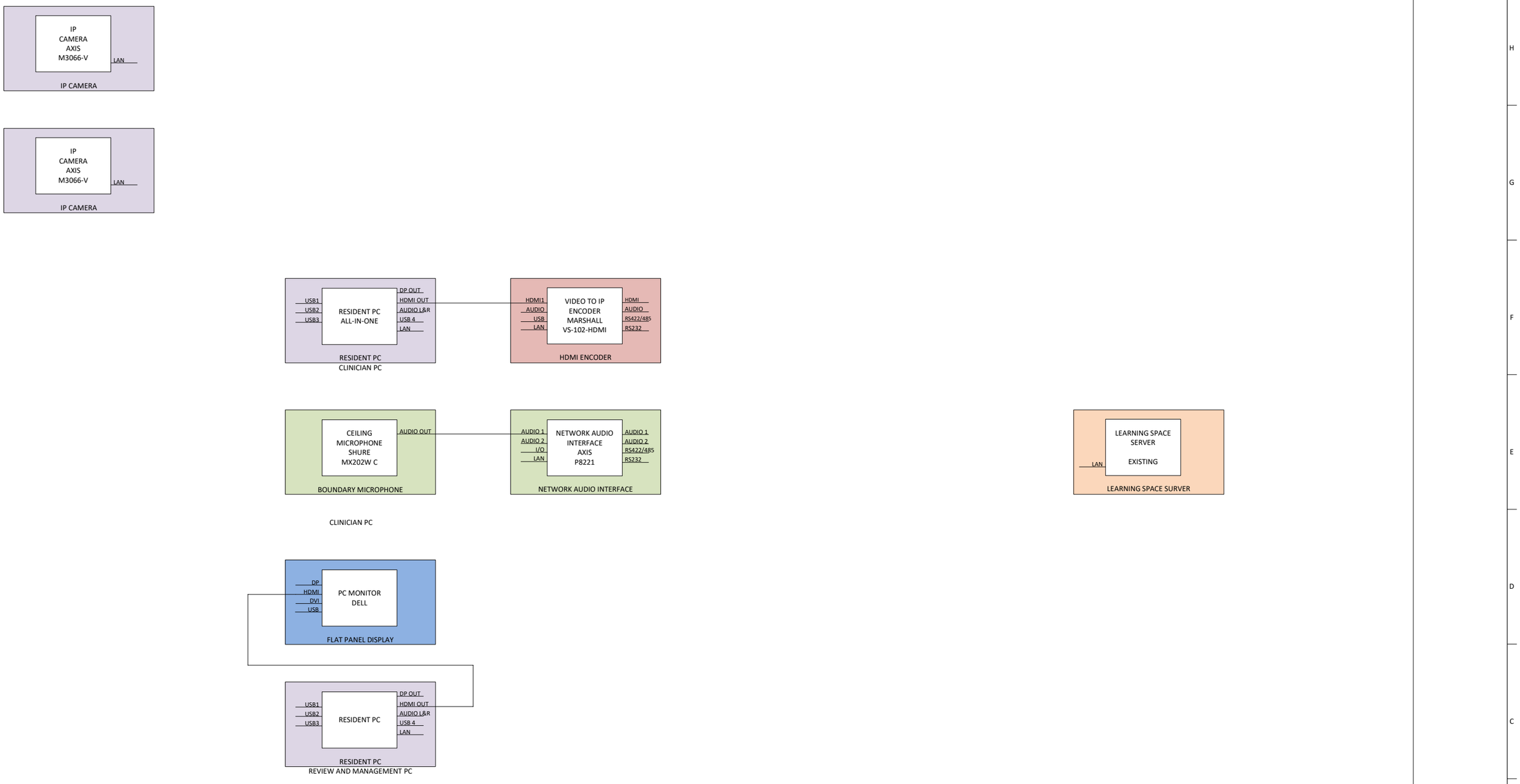
project name	CLINICAL SIMULATION
file name	Clinical Simulation V1.0.vsd
drawing name	TITLE
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	1 OF 4	09/02/2021	09/02/2021



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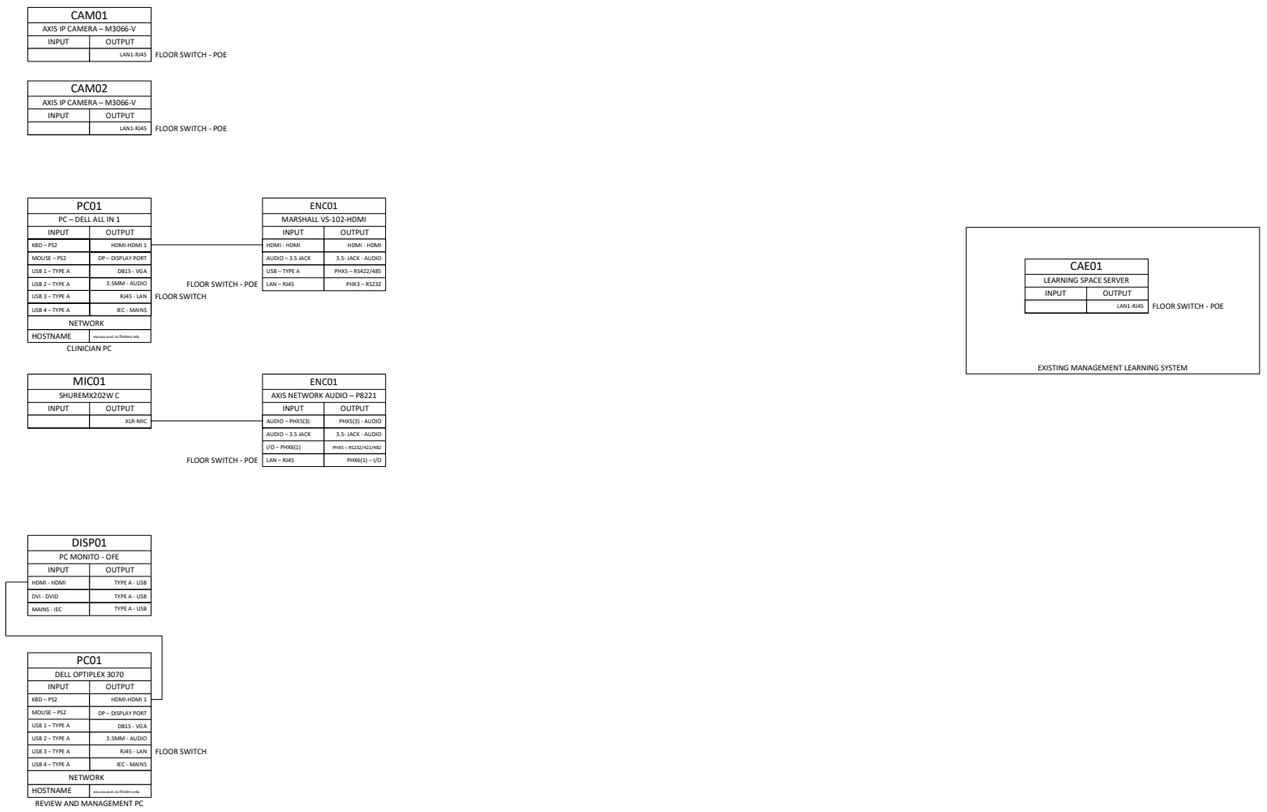
project name	CLINICAL SIMULATION
file name	Clinical Simulation V1.0.vsd
drawing name	AVBB
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
A1	2 OF 4	09/02/2021	09/02/2021



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project name	CLINICAL SIMULATION
file name	Clinical Simulation V1.0.vsd
drawing name	SCHEMATIC
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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project name	CLINICAL SIMULATION
file name	Clinical Simulation V1.0.vcd
drawing name	LAYOUT
drawn by	DEAN MCFADDEN – LEARNING BY EXPERIENCE

page size	page	created	revised
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Appendix C – AV System Integration

Place holder – Information to be populated once standardised

Appendix D – Control System Programming & Monitoring Guidelines

Control System Programming Guidelines

Flinders University will deploy AV system control code by one of the following methods:

1. **Local Code** – The integrator will be given a copy of the current version of the standard code module at the commencement of each contract. The AV integrator is responsible for the deployment and integration of the module into each control system processor.
2. **Custom Code** – For custom AV systems, that do not conform to the functionality of the existing standard code module or server-based code, custom code will be delivered as part of the project. The AV Integrator is responsible for the delivery of the custom code and integration with the deployed equipment and systems. The overall functionality will be as per detailed in the provided scope of works and where possible must have the same look, feel and syntax as all other Flinders University deployments. All works must be completed by a Flinders University approved programmer who will be engaged by the AV integrator.

Monitoring Guidelines

Place holder – Information to be populated once standardised

Appendix E – IT Services & Security for AV Systems

All IT related information will be provided by the Principal.

Audio Visual Assets Standards - Information Security & Risk

Purpose

The purpose of this section is to define requirements for the secure configuration of audio visual systems that are owned and operated by Flinders University. The effective implementation of this will minimise unauthorized access to University audio visual equipment.

Scope

Applies to all audio visual equipment that is owned and/or managed by Flinders University. This includes all controlled AV devices in teaching spaces, meeting spaces, and public areas.

Definitions

Audio Visual (AV) systems are composite systems of devices that are used for projection of audio visual content. These systems are in use in teaching, meeting, mobile and public spaces throughout the University. They are often automated via a touch panel to provide a simple, consistent user interface.

Roles and Responsibilities

The following University members have specific responsibilities to adhere to this standard:

Manager, Audio Vidual Services, Digital Student & Teaching Services, Information and Digital Services (IDS) is responsible for the approval and communication of this standard.

Information Security and Risk are accountable for monitoring and enforcing compliance with this standard.

Manager, Unified Communications Services is responsible for ensuring that system administrators under their supervision fully understand this standard and comply with its requirements.

IDS Audio Visual, Simulation & Event Services& Client Computing Services are responsible for the implementation of this standard and ensuring all audio visual standards are applied to all relevant systems across the University.

Audio Visual Standards

The following security strategies must be adhered to when deploying audio visual systems. Each option may not be applicable to all audio visual systems; therefore, any deviations or exemptions to this section must identified to the Principal for approval by Associate Director, Information Security and Risk.

Configuration and Connectivity

- All AV devices that support DHCP must have DHCP enabled. IDS will create DHCP reservations and DNS entries to support all AV equipment. AV devices should be referred to by their DNS name when creating TCP/IP connections between devices.
- All AV devices will be commissioned on the University's Device Management networks to allow isolation from the general staff/student traffic.
- All Integrators of Crestron AV systems must provide the web based XPanel interface for remote management of the space. This XPanel will be uploaded to the IDS Wiki for easy access.
- Authentication must be enabled on all AV assets that support it.
- Default accounts must be removed/disabled or their passwords changed to a value unique to all audio visual systems and stored in Flinders password store.
- Guest accounts (if any) must be disabled.
- Control methods that are proprietary or manufacturer specific should not be used e.g. PJLink for projectors.
- All devices must be updated to the latest stable version of firmware at the time of commissioning.

Operations and Maintenance

- Remote access for any maintenance or troubleshooting activity must be over secure protocols, (e.g. encrypted network connections using SSH with high encryption, 128bit encryption or greater) using privileged accounts, where the device supports it).
- Where possible remote access interfaces must only be accessible to IDS support networks to prevent users from accessing such interfaces.
- Any changes or updates to the standard security plan must follow the regular change management procedures that include requirements for testing and approval.

Physical Security

See Section 5.1.9 Locks and Physical Security of the Flinders University – Audio Visual Technology Standards for further information.

Related Documents

Information Security Policy

Vulnerability and Patch Management Standards

Identity and Access Management Policy

Appendix F – Content Capture Deployment

The following information is provided to allow the AV Integrator to commission the content capture system.

The content capture recording system records lectures and events in supported venues to be made available to digitally view live lectures or events or to access the recordings at a later time. Recordings are made available to students as streaming video, via the FLO (Flinders Learning Online).

The lecture capture recording generally consists of:

Screen Capture

Ability to digitally capture any content being displayed on the room display which may include the room PC, BYOD device, document camera, wireless presenter, etc.

Please note that any digital media content that is Copy Protected may be displayed in the room however it cannot be recorded as part of content capture stream.

The video switching shall output a native 1920x1080p HDMI signal for the content capture recording.

Where more than one display device is installed the Principal will nominate which screen is to be captured by the content capture recording system.

Audio Capture

Audio recording is possible under the content recording system. A line level output containing a post fade mix of all microphone and line sources should be available under the audio switching and mixing specification.

Depending on the type of capture hardware, the audio output required maybe either a balanced or unbalanced and shall be determined at the time of installation.

Camera Provision

Where camera recording is possible under the content capture system in use, a suitable camera position shall be identified and provisioned with data and video tie lines as per the relevant schematic. The chosen position will have an unobstructed view of the entire teaching presentation area at an angle of view no greater than 15 degrees vertically and 30 degrees horizontally.

Typically, a content capture camera is PTZ with simultaneous IP and Video Streaming and IP and serial control.

Appendix G – Service Catalogue

Maintenance of AV Systems – Placeholder

Event Support - Placeholder

Installations of AV Systems - Placeholder

Audio Visual Room and Technical Standards - Placeholder

Audio Visual User Training - Placeholder

Content Capture System - Placeholder

Virtual Reality and Simulation - Placeholder

Appendix H – Commissioning & Defects Check List

The following check lists are included for information. Flinders University will provide Microsoft Excel copy upon request.

Commissioning Check Lists

Project Details	
Building:	
Room Name:	
Room Type:	
Technician:	
Installer	
Date:	

Projectors	
Projector 1 Model:	
Projector 2 Model:	
Projector 1 Hours:	
Projector 2 Hours:	
Technician:	
Date:	

Notes

Commissioning Checks			
Control	**Result**	**Testing Details**	**Reviewed**
System On & Off using Touch Panel			
Power off system simulating interruption and check boot up			
All devices are on the network and DHCP set in M&M			
All buttons work to corresponding command			
No Auto Powerdown set			
All functions on Selected inputs work (Advanced controls)			
Vision	**Result**	**Testing Details**	**Reviewed**
All sources correct to all outputs (Projs, FB, LC, Mediaport)			
All sources correct resolution			
PC set to Duplicate Display			
Labels on Both Monitors (Main & Content Capture)			
Projector and Monitor Colour Profile matching (Contrast, Brightness, Eco Mode OFF)			
HDCP turned off for BYOD connection and working (test with macbook if req)			
HDCP passing through and displaying content on all necessary devices including LC			
Projector Hours recorded above			
Check input/output plate (HDMIs) for passing vision			
Screen Automation and Projector Cooling Down is adequate for space			
Audio	**Result**	**Testing Details**	**Reviewed**
Audio follows all resource inputs and audio selection button (inc Wireless Presenter)			
Volume Slider on Landing page adjusts resource volume only			
Volume Slider Mute button works			
Lectern and Radio Mics do not feedback and have adequate head room for attenuation			
Check input/output plate (XLRs) for passing audio			
Test Hearing Aug that is applicable to the space			
Advanced Page DSP Control Operational			

Lecture Capture	Result	Testing Details	Reviewed
Check content capture operation on Touch Panel (Rec, Pause, Stop)			
Content capture receiving audio and vision from switcher according to resource selected			
Content capture displaying the right Layouts according to resources selected			
Content Capture Advanced Camera Positions buttons operational			
Content audio level is balanced and averaging around -10dB on SMP VU meter			
USB plate is installed and ad hoc recording tested. Place recording in OneDrive			
Web Conferencing	**Result**	**Testing Details**	**Reviewed**
Telephone installed in room & Calls direct to AV Help desk (in AV spaces)			
Web Conference audio and vision works in room. Voice only Test and Voice and			
Presentation mode works from both far and near ends with audio and vision			
Levels adequate and tested with Web Conferencing services			
Mediaport sending Camera and Audio from room to Soft Codec (Skype & Jabber)			
Mediaport receiving audio back into room from Soft Codec (Skype & Jabber)			
All buttons on camera controls work			
Defects & Handover	**Result**	**Testing Details**	**Reviewed**
All electrical items Test & Tagged			
Rack & Cables installed within Flinders Standards (Velcro, Lacing Bars, Labelling)			
Room is Clear & Tidy from Installation			
All Manuals, Retired Equip & Extron Tweakers returned to IDS AV office			
Defects Document has been filled in & Saved in Share			
QRG has been handed over or left in room			
Check Fusion Hooks in code			
Locks on Lectern are correct and recorded			
Source Code and Xpanel have been received in SharePoint			
I/O labelled on VSW and PDU			
Usernames and Passwords follow FU Standard			
Xpanel has been added to the Wiki			
Appropriate signage installed in space (WB sign, WB numbers, Content recording)			

Defects Check List

Works Commissioning & Defect Sheet

College	
Building	
Room	

Item #	Defect Description	Logged By	Date Logged	Assigned To	Notes
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
15					
16					
17					
26					
27					
28					