



A/V and Video Conference Standards for Teaching and Learning Rooms

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Glossary

AMX	A supplier of control equipment used to facilitate the controlled switching, selection and powering up of AV devices such as projectors, displays and audio equipment.
AETM Guidelines	An AV standards document developed by the Association of Educational Technology Managers to provide design guidelines which can be shared with the wider community.
Admin VC space	A meeting space which can be booked by schools or divisions which has been fitted with a Polycom Video Conference unit to enable connection to with remote attendees.
Basic Space	An space that contains AV equipment which is part of a larger AV system or is stand alone for use locally.
BVT Space	A large teaching space which has been fitted with a Polycom Video Conference unit which enables the presentation from a local presenter to be broadcast to a remote site. In a BVT space audience interaction is not facilitated given the size of these spaces is usually 200 to 450 attendees.
Classroom Space	A Classroom space is a flat floored teaching space which has been fitted with an AV system to allow presenters to deliver a presentation to groups of between 20 to 100 attendees.
Huddle Space	A small meeting room which has been fitted with a large screen monitor, USB camera and tabletop microphone to allow for participants to connect to booked meeting or create adhoc meeting allowing others to join.
IVT Space	A teaching space that has been fitted with a Polycom Video Conference unit which enables the presentation from a local presenter to be delivered to a remote site. In an IVT session the audience at both ends is able to participate and ask questions during the presentation if required. IVT spaces have a capacity of between 10 to 120 attendee.
Laboratory Space	A science lab fitted with an AV system to allow presenters to deliver a presentation to groups of between 600 to 300 attendees. These spaces will generally have a requirement for a microscope or camera images to be displayed through the system to enable students to observe experiments or microscope slide.
Lecture Space	A lecture space is a tiered space with fixed seating fitted with an AV system to allow presenters to deliver a presentation to groups of between 50 to 250 attendees.
RMS-E	A remote monitoring tool used by support staff to ensure AV equipped spaces are operational without having to check the space locally.
Specialist Space	A space which is fitted with specialist equipment which is outside the current CSU AV standard. Specialist spaces will generally have the basic CSU AV standard installation plus additional equipment or functionality. These spaces are create to meet user requirement which are developed during a consultation process.

Overview

The following room specifications represent the minimum standard that all meeting and teaching rooms must comply with when audio visual equipment including videoconferencing equipment is to be installed. These specifications are reviewed periodically as required. Specific information regarding equipment manufacturer and model are available on request.

Design Principles

The publication “AETM Design Guidelines for Tertiary Teaching Spaces” (latest Edition) is to be the overarching reference for all teaching space design and all architects employed by CSU and their relevant sub-contractors shall base their building designs on this publication. This document is currently online here: <https://www.aetm.org/av-design-guidelines/>

The following points shall also be adhered to for all new spaces. Where more information is required please refer to the AETM Design Guidelines as above.

1. The minimum distance from the teaching wall to the first row of students shall be twice the screen height.
2. The maximum distance to the last row of seats shall be 5.3 times the screen height.
3. The minimum height from the floor to the bottom of the screen or whiteboard is to be 1200mm. Smartboards™ may be mounted as low as 800mm.
4. All air conditioning ducting is to be kept away from the teaching wall to allow for the maximum amount of screen and whiteboard space. Air ducts shall not be positioned where they can blow air on to pull down screens.
5. In all videoconference enabled spaces allowance must be made for a suitable size screen at the rear of the room for far end view. If this is not possible then allowance must be made for a suitable size flat panel screen to be located within the acceptable viewing distance from the lecturing position.
6. Allowances are to be made for a minimum of 2 x 100mm ducts or conduits to the lecturing position from the teaching wall as well as suitable ducting or conduits to the projector mounting positions or to bio box if provided. Additionally each projector will require a minimum of 50mm conduit (as necessary) to carry the signaling cabling.
7. Room lighting shall be dimmable in switched banks across the room such that it will be possible to switch off the bank of lights immediately above the teaching position. It is preferable that all lighting or dimming is controlled by the room controller (AMX). Room lighting specifications are detailed in the latest edition of the Audio Visual Design Guidelines referred to above. CSU specification for lighting control interface is listed in Appendix 1 of this document.
8. If windows are absolutely necessary they will be confined to the sides and placed towards the rear along the side walls. Windows at rear or front compromise cameras where used and affect general lighting to the teaching location. All windows will be also supplied with blinds or louvers to control external lighting and such that they are capable of full black out.
9. Ceiling space shall be provided to allow for installation of projectors, microphones, speakers and wireless antenna systems. If the ceiling space height is too large then suitably reinforced mounting points may be required for the projector/s to prevent movement from air conditioning systems etc. Ceiling access points 300mm x 300mm are to be allowed for at each projector mounting point.

10. As a minimum a dual GPO shall be supplied to the teaching location in addition to adequate GPOs for use in the AV rack. A dual GPO shall be supplied to the ceiling space adjacent to any projector installation. All GPO's shall share a common earth and that they remain on the same circuit to minimise any possibility of hum on audio or video systems. Electric screens shall be on a separate circuit to the AV systems. If possible an additional GPO should be provided at the AV rack location for future use.
11. Lecterns shall be located to one side of any screens to allow for maximum viewing by the audience.
12. The video conference screen is to be closest to the lecturing position
13. A room phone (VoIP) shall to be provided either on the wall adjacent to the lecturing position or on the lectern where provided. This phone will be powered via POE provided by the network. No POE injectors are to be used.
14. All new teaching spaces shall be controlled via AMX and will be added to the RMS server for monitoring and management.
15. Each room system that contains AV facilities with projectors shall also contain a PIR/s such that without movement in the room for a pre-determined period of time (2 hours) the AV facilities will shut down. PIR sensitivity must be set to accommodate minimal room movements as could be expected from a discussion group where physical movement may be minor. If an AMX Touchpanel is installed within the space then the PIR of this device should also be enabled. Any PIR to control energy management and provided by other areas of CSU shall be integrated with the AV facility.
16. Where Smartboards™ or Interactive white boards are a requirement thought needs to be given to who the users will be and consequently the height from the floor. Typically, these boards will be mounted slightly lower than standard whiteboards with mounting starting no lower than 800mm above the floor. DIT recommends the SB685 16:9 board or low sheen whiteboard with a short throw Epson 16:9 projector. To accommodate a variety of heights it may be necessary to have the Smartboard™ or Interactive white board on a continuously variable height arrangement.
17. Whiteboards are to be ceramic, have diffused switchable lighting that will not cause hotspots on the writing surface and be mounted a minimum of 850mm above the floor. For further detailed specifications refer to the publication "AETM Design Guidelines for Tertiary Teaching Spaces" (latest Edition)
18. Wireless microphones are now a CSU requirement and will be required in addition to any fixed microphones in all teaching spaces. These wireless microphones will be the main source of audio capture for CSU Replay recordings. Wireless microphones supplied must be able to operate on multiple frequencies between 520 MHz – 694 MHz
19. Network outlets are to be terminated to wall plates inside the lectern and comply with the divisions current standards. These standards can be found here:

<http://www.csu.edu.au/division/dit/eal/standards.htm>
20. VoIP phones are to be wired internally to the lectern or rack and fixed to the lectern or rack. Powered via network POE, No POE injectors are to be installed

Division of Information Technology – Room Specifications

21. Unless specifically stated in this document all CSU supplied PCs for teaching rooms shall be supplied with a wired keyboard and mouse. Suitable cable extensions will be supplied for smaller spaces to allow for flexibility of use. Exceptions requiring wireless devices will be authorised on a case by case basis only.

Charles Sturt University Standard Room Types

Classroom Spaces

Small, Medium and Large Classroom Spaces

Small Classrom Space - Panopto– seats up to 25 people, simple AV facilities, fixed lectern, loose tables and seating and contains a Panopto capture dongle and Delcom recording status light.

Medium Classrom Space – Panopto – seats between 25 to 50 people, extensive AV facilities, fixed lectern, loose tables and seating and contains a Panopto capture dongle and Delcom recording status light.

Large Classrom Space – Panopto – seats from 50 to 150, advanced AV facilities, fixed lectern, fixed seating with flat, raked or stepped floor and contains a Panopto capture dongle and Delcom recording status light.

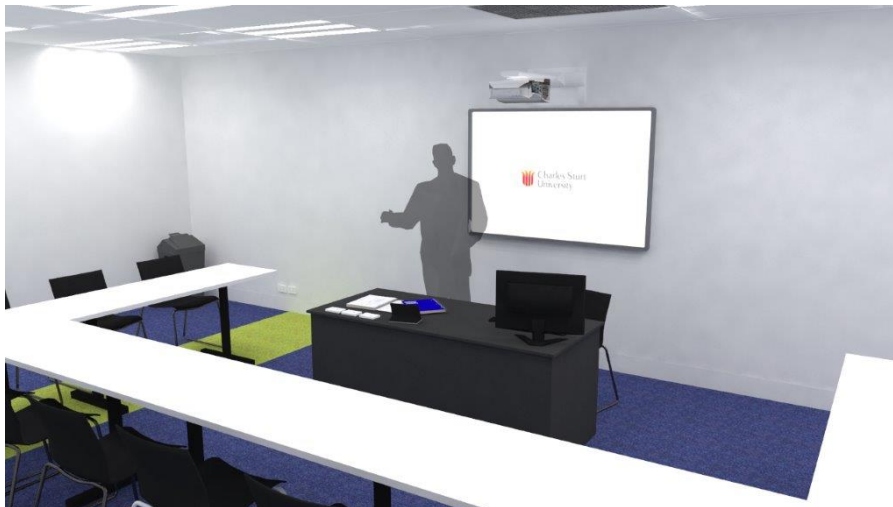
- A ceiling mounted data projector using universal mounting hardware or wall mounted display panel if installed in a small classroom.
- Projector to display on to a painted wall surface projection area or an electric 16:9 Screen if wall projection is not possible. Refer General Design Principles Item 1 & 2 for size.
- HDMI UTP extender kit to projector
- Wireless lapel microphone system with charging station
- IR Hearing Augmentation Tx
- Equipment Rack
- Scaling presentation switcher with HDMI output
- D Class amplifier with either ceiling mounted speakers or program speakers located either side of screen
- Teaching Lectern/Desk with equipment rack to house the AV equipment
- Document camera mounted on the Lectern/Desk
- CSU AV PC, wired keyboard and mouse
- Input plate with HDMI connector
- Input plate with USB socket wired back to main PC if PC is not user accessible
- AMX Met Pad/Touchpanel mounted on the Lectern/Desk
- AMX room controller mounted in the rack with ceiling mounted PIR
- Magewell HDMI to USB3 Converter
- Room lighting control will be provided to the lectern by the electrical contractor
- Network points – 4 in rack
- Dual GPO located adjacent to input plates
- VoIP phone located on the Lectern/Desk



Classroom Space with Interactive Display/Whiteboards

Interactive Classroom Space

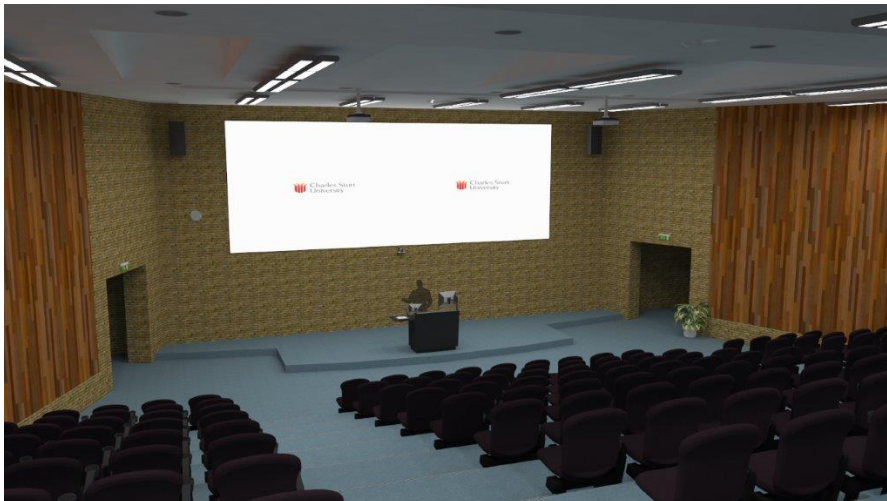
- A wall mounted data projector or interactive display panel mirrored through the ceiling mounted projector
- Projector to display on to low sheen whiteboard or painted wall screen surface depending on design mentioned above
- D Class amplifier with either ceiling mounted speakers or program speakers located either side of screen
- Wireless lapel microphone system with charging station
- IR Hearing Augmentation Tx
- Equipment Rack
- Teaching Lectern/Desk with equipment rack to house the AV equipment
- Document camera mounted on the Lectern/Desk
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- AMX Met Pad/Touchpanel mounted on the Teaching Lectern/Desk
- AMX room controller mounted on the Teaching Lectern/Desk with ceiling mounted PIR
- Magewell HDMI to USB3 Converter
- USB extension to projector or interactive display
- Room lighting control will be provided to the lectern by the electrical contractor
- Dual GPO located adjacent to input plates
- Network points – 4 in rack
- VoIP phone located on or near rack



Lecture Theatre Space

Small, Medium and Large Lecture Theatre Spaces

- A bio box or ceiling mounted laser projector (may require long throw lens) and mounted using universal mounting hardware
- Projector to display on to a painted wall surface projection area or an electric 16:9 Screen if wall projection is not possible. Refer General Design Principles Item 1 & 2 for size
- Lectern mounted microphone (depending on theatre size)
- Wireless lapel microphone system with charging station
- IR Hearing Augmentation Tx
- Equipment rack
- D Class amplifier located in equipment rack with ceiling mounted speakers
- A programmable Digital Signal Processor (DSP)
- Equipment rack in Lectern (possible second rack in bio box)
- A three bay lectern with document camera shelf
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- Input plate for USB socket wired back to main PC (if PC is not user accessible by user)
- Document camera mounted on lectern shelf
- AMX 10" Touchpanel
- Scaling presentation switcher
- AMX controller with ceiling mounted PIR room control
- Magewell HDMI to USB3 Converter
- Room lighting control will be provided to the lectern by the electrical contractor. (See separate lighting control standards documents)
- A Dual GPO located adjacent to input plates on lectern
- VoIP phone located on lectern
- Network points – 10 (2 spare) in lectern



Laboratory Space

Lab Projector and Dual LCD, Dual Projector or Multiple LCDs

Lab Projector - Dual LCD – Panopto – seats less than 100 but in addition to a data projector contains dual flat panel displays, has simple AV facilities and a Panopto capture dongle and Delcom recording status light.

Lab – multiple LCD – Panopto – similar to above without a data projector but with multiple flat panel displays and a Panopto capture dongle and Delcom recording status light.

Lab – Dual Projectors – Panopto – similar to above but with dual projectors and a Panopto capture dongle and Delcom recording status light.

- A ceiling mounted laser projector using universal mounting hardware and wall/ceiling mounted dual LCD's, or multiple LCD displays mounted (wall or ceiling), or dual ceiling mounted laser projectors using universal mounting hardware
- Projector to display on to a painted wall surface projection area or an electric/fixed 16:9 Screen if wall projection is not possible. Refer General Design Principles Item 1 & 2 for size
- D Class amplifier located in equipment rack with ceiling mounted speakers
- Wireless lapel microphone system with charging station
- IR Hearing Augmentation Tx
- Equipment Rack
- A programmable Digital Signal Processor (DSP)
- Two racks for AV equipment are to be allowed for. There will not normally be a lectern with this type of installation
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- Input plate for USB socket wired back to main PC (if PC is user accessible)
- Document camera mounted at teaching location
- AMX 7" Touchpanel
- Scaling presentation switcher
- AMX controller with ceiling mounted PIR room control
- Magewell HDMI to USB3 Converter
- Four (4) dual GPO's located adjacent to equipment locations
- VoIP phone located adjacent to input plates and touch panel
- Network points – 8 (4 at each rack location)



IVT Teaching Spaces

Small Medium and Large IVT Teaching Spaces

Small IVT TS – Panopto – Seats up to 25. Similar AV to Large VC TS but with twin flat screen monitors, no far end screen and single camera.

Large IVT TS – Panopto – Seats more than 25 with multiple projectors for videoconference teaching.

- Two (2) ceiling mounted laser projectors (One each for data, far end view)
- Projectors to display on to a painted wall surface projection area or an electric 16:9 Screen if wall projection is not possible. Refer General Design Principles Item 1 & 2 for size
- Far end lecturers monitor fitted to lectern
- D Class amplifier located in equipment rack with ceiling mounted speakers
- Wireless lapel microphone system with charging station
- IR hearing augmentation Tx
- Lectern microphone (depending on the size of the theatre)
- A double bay lectern with document camera shelf
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- Input plate USB socket wired back to main PC (if PC is not accessible by user)
- Document camera mounted on lectern shelf
- AMX 10” Touchpanel mounted on lectern
- AMX DVX controller with ceiling mounted PIR room control
- A Polycom Group700 video conference unit enabled for People and Content
- Two (2) HD PTZ cameras
- Digital Signal Processor (DSP) unit with six (6) ceiling microphones or three (3) ceiling mounted Polycom microphone arrays
- A PC monitor located on top of the lectern
- Room lighting control will be provided to the lectern by the Electrical contractor. (See separate lighting control standards documents)
- Dual GPO located adjacent to input plates on lectern
- VoIP phone located on lectern
- Network points – 8 in lectern

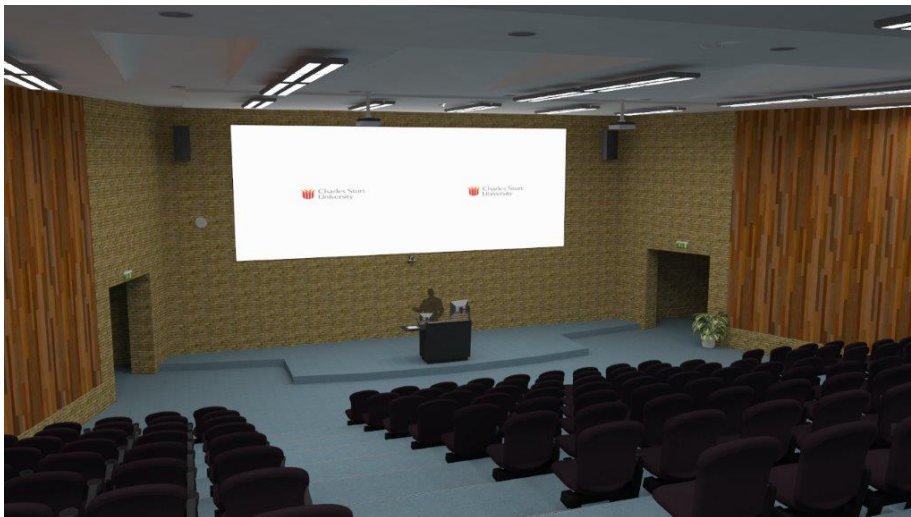


BVT Space

Large BVT Space

Large BVT TS – Panopto – Seats 150 – 100 people and is similar to the above large IVT space, but uses a single display image and no seating area microphones.

- One large Bio Box/Ceiling mounted laser projector displaying on to a the painted wall at the front of the lecture theatre
- A D class audio amplifier located in equipment rack with ceiling mounted speakers
- Wireless lapel microphone system with charging station
- IR hearing augmentation Tx
- Lectern microphone
- A three bay lectern with document camera shelf
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- Input plate USB socket wired back to main PC (if PC is not user accessible)
- Document camera mounted on lectern shelf
- AMX 10" Touchpanel mounted on lectern
- AMX DVX controller with ceiling mounted PIR room control
- A Polycom Group700 video conference unit enabled for People and Content
- Two (2) HD PTZ cameras
- Digital Signal Processor (DSP) unit with six (6) ceiling microphone array or three (3) ceiling mounted Polycom microphone arrays
- A PC monitor located on top of the lectern
- Room lighting control will be provided to the lectern by the electrical contractor (See separate lighting control standards documents)
- Dual GPO located adjacent to input plates on lectern
- VoIP phone located on lectern
- Network points – 8 in lectern

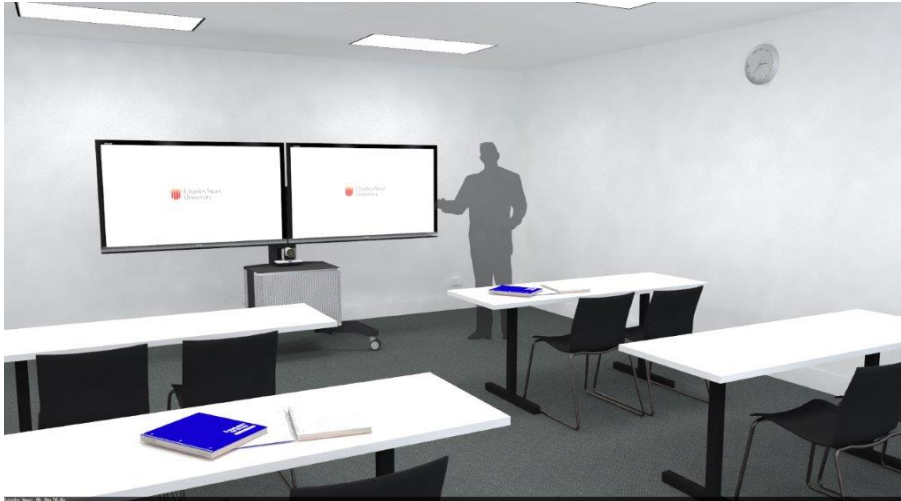


Admin VC Space

Small Admin VC

Small Admin VC – seats 10 or less people, used for meetings with video and teleconference facilities, data screen and wedge shaped table suitable for required number of people.

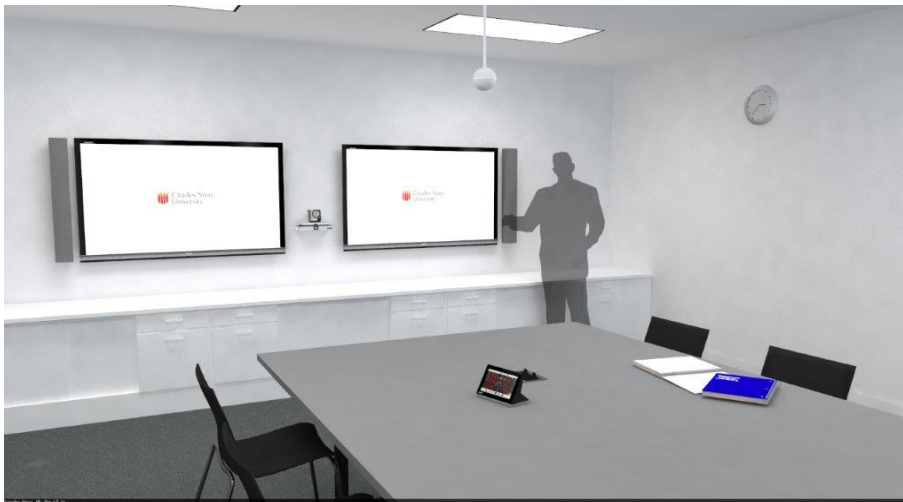
- Two LCD TVs with commercial warranty and mounting hardware
- CSU AV PC, wireless keyboard and mouse
- Input plate HDMI connector
- A Polycom Group500 video conference unit enabled for People and Content
- Polycom Touch
- A VC trolley with lockable cabinet
- 2:1 HDMI Auto-Switch
- Dual GPO located adjacent to equipment location
- VoIP phone located in the room
- Network points – 4 in room



Large Admin VC

Large Admin VC – seats 10 to 25 people, used for meetings with video and teleconference facilities, data screen and wedge shaped table suitable for required number of people.

- Two 55-65 inch flat screen monitors wall mounted as required
- D Class Amplifier with either ceiling mounted speakers or program speakers located either side of screen
- An equipment rack
- CSU AV PC with wireless keyboard and mouse
- Input plate HDMI connector
- AMX push button panel mounted on or near the equipment rack
- AMX room controller mounted in the rack with ceiling mounted PIR
- A Polycom Group500 video conference unit enabled for People and Content
- Polycom Touch
- Two ceiling mounted microphone arrays
- Network points – 6 in rack
- Dual GPO located adjacent to input plates
- VoIP phone located on or near rack
- Wedge shaped table designed for room seating capacity



Meeting Room Space

Small or Medium Meeting Room Spaces

Small Admin VC – seats 10 or less people, used for meetings with video and teleconference facilities, data screen and wedge shaped table suitable for required number of people.

Large Admin VC – seats 10 to 25 people, used for meetings with video and teleconference facilities, data screen and wedge shaped table suitable for required number of people.

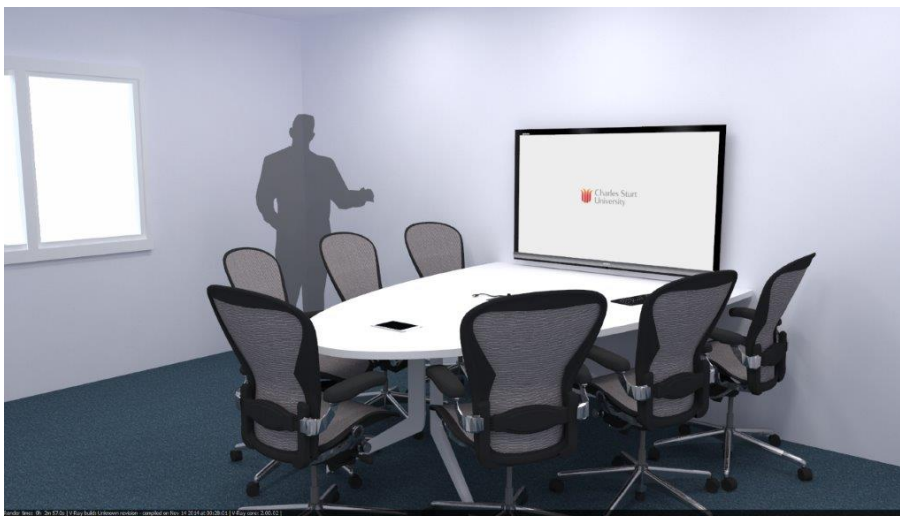
- One LCD TV with commercial warranty and mounting hardware or credenza unit (screen size will depend on size of room being installed)
- CSU AV PC, wireless keyboard and mouse (may be a SFF or MFF PC on laptop connection only)
- Input plate (HDMI) for laptop connection
- Dual GPO located adjacent to equipment location
- VoIP phone located in the room
- Network points – 4 in room



Huddle Space

Huddle Space – seats 2 to 8 people, used for meetings with video and teleconference facilities, data screen and meeting room table suitable for required number of people.

- One LCD TV with commercial warranty and mounting hardware or credenza unit
- CSU AV PC, wireless keyboard and mouse
- Input cable (HDMI) for laptop connection
- Logitech Meetup conferencing camera
- Dual GPO located adjacent to equipment location
- VoIP phone located in the room
- Network points – 6 (2 spare) in room

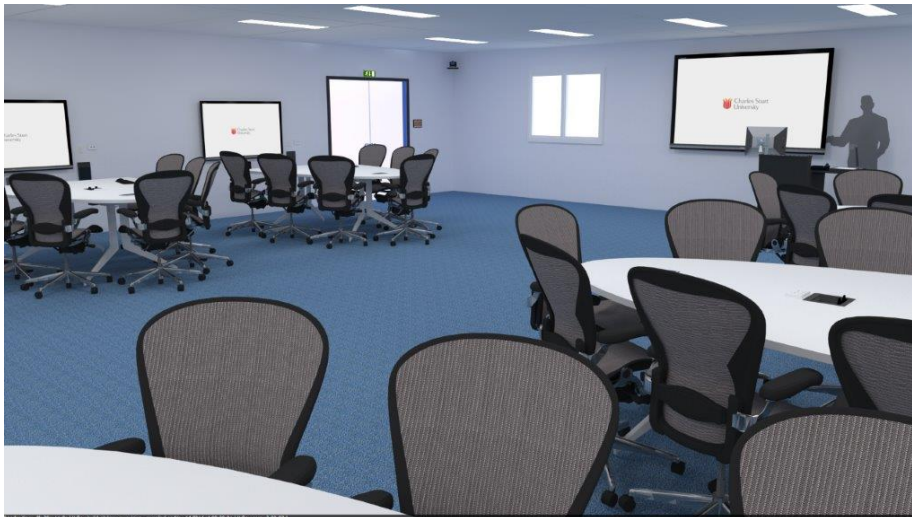


Specialist Space

There are several spaces across the university that contain “Specialist Spaces”. These spaces have special user operational requirements and are designed to suite the users requirements while also adhering to the AV standards as much as possible. These spaces are designed and fitted after user requirements have been gathered and suggested solutions have been tested by DIT. An example of a Specialists space is shown below:

Collaboration – Multiple LCD

- Four LCD displays mounted as required (wall or ceiling suspended)
- D Class amplifier located in equipment rack with ceiling mounted speakers.
- Wireless lapel microphone system with charging station
- IR hearing augmentation Tx
- A programmable Digital Signal Processor (DSP)
- Two racks for AV equipment are to be allowed for. There will not normally be a lectern with this type of installation
- CSU AV PC, wired keyboard and mouse
- Input plate HDMI connector
- Input plate USB socket wired back to main PC
- Document camera mounted at teaching position
- AMX 7” Touchpanel
- Scaling presentation switcher
- AMX controller with ceiling mounted PIR room control.
- Magewell HDMI to USB3 Converter
- Five (5) dual GPO’s located adjacent to equipment locations
- VoIP phone located adjacent to input plates and touch panel
- Network points – 10 in rack and(may require data at screen location)



Basic Space

There are several spaces across the university that contain installed equipment that is integrated into an adjoining teaching spaces or has a simple non standard function. These spaces are listed as basic spaces and could include a camera installed in an assessment area or a monitor installed in a space that displays an input from another space.

APPENDIX 1

AMX lighting/blinds Interface requirements

CBUS Interfaces:

CBUS PC5500 (preferred) is a CBUS to RS232 interface which allows communication between the CBUS and AMX systems. Spare RS232 port required on AMX controller.

Note: CBUS CNI-V2 LAN interface is not supported on the CSU network for it does not work unless all network security is disabled which is not an option.

CBUS DALI interface 5502DAL: is used to control DALI based lighting via CBUS and is to be supplied by electrical contractor if using DALI light fittings. A PC5500 is still required to communicate with AMX.

Blind Interface: electrical contractor to provide adequate blind control interfaces on the CBUS network and program accordingly

Typical Lighting Pre-sets on AMX Touch Panel:

Off-25%-50%-75%-100% and Board Light (front row of lighting On-Off)

The Electrical contractor is responsible for:

- Supply and Installation of PC5500 interface which is to be located near the AV equipment rack.
- Supply & Installation of CBUS cabling back to electrical board
- Supply and Installation of DALI interface if applicable at electrical board
- Supply and Installation of CBUs Blinds interfaces if applicable
- Supply & Installation of dedicated CBUS wall switches
- Programming of lighting
- Supply of lighting configuration to Pro AV to allow AMX programmer to mimic lighting pre-sets on the AMX touch panel

AV Contractor responsible for:

- RS232 interconnect from PC5500 to AMX Controller
- Programming of AMX Controller to mimic lighting/blinds program