



University of
South Australia

Audio-Visual Standards & Specifications

Revision 2.0



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1.0.0 – Introduction

The purpose of this publication is to ensure that audio-visual facilities within the University of South Australia (UniSA) are designed and constructed to a consistent standard proposed by the unit of Information Strategy and Technology Services (ISTS).

These guidelines should be used as the standard to which the facilities will be designed. Where for any reason, these standards cannot be met, consultation during the design stage, prior to the commencement of any construction works, should be undertaken with ISTS.

The task of defining the use for a space is beyond the scope of this document. When designing a space, its functionality should be specified in the early stages of the project, prior to the AV system design.

This publication details the physical requirements for the audio-visual equipment to be used in spaces such as classrooms, meeting rooms, PC labs and lecture theatres. Major building works are managed by the Facilities Management Unit (FMU) and their approval must be received before any work is performed for these projects.

ISTS notionally endorses the AETM AV Guidelines as a companion document subject to the specifics of the University of South Australia's AV Specifications.

1.1.0 – Revision 2.0 Changes

Revision 2.0 of the UniSA Audio-Visual Standards & Specifications is the first major shift in the UniSA's specification and expands on user requirements within spaces, specialized specifications, and new AV room standards. The AV03 and AV05 are being transitioned to a larger number of more specific standards to allow coherent transition from space design to deployment and decreasing variation in design, a breakdown of which can be found in section 2.0.2.

Revision 2.0 breaks the universities AV requirements into several sections;

- **Section 2** describes the AV space standards, surround our standard room deployments.
- **Section 3 to 5** cover the broader specification on cabling, installation, and equipment for UniSA.



1.2.0 – Revision History

Released	Version	Notes
Aug 2013	1.0	Initial Publication
Sep 2013	1.1	Minor Revisions incorporating feedback from FMU
Oct 2013	1.2	Revised AV03 Template – Appendix A
Nov 2013	1.3	Revised AV05 Template – Appendix B & C
Nov 2013	1.4	Revised AV03 & AV05 Templates – Appendix A, B & C Removed
Jan 2014	1.5	Updated templated to current hardware models
2020	2.0	Major overhaul of AV standards.

1.3.0 – Glossary of Terms

Term	Definition
UniSA	University of South Australia
ISTS	Information Strategy and Technology Services
TT	Teaching Technologies
CS	IT Campus Support
NS	Network Services
CMK	Communications and Marketing Unit
FMU	Facilities Management Unit
AETM	Association for Audio-visual & Education Technology Management
AV	Audio-Visual
FTR	Flexible Tutorial Room
CTS	Collaborative Teaching Space
CoW	Computer on Wheels
IR	Infra-red
RF	Radiofrequency
AVPC	Audio visual PC
BYOD	Bring your own device



2.0.0 – AV Space Standards

This section of the document is broken up into several sections;

- Section 2.0.1 - AV Standards Comparison
- Section 2.0.2 - AV Standards Structure
- Section 2.1.x - Standards User Requirements
- Section 2.2.x - Standards Technical Requirements

2.0.1 – AV Standards Comparison

The previous use of AV03 and AV05 will be slowly transitioned from 2020 onwards as to reflect the current environments that are being deployed in UniSA. Below is a table outlining the expansion of AV standards.

Known Standard	Description	New Standard	New Description
AV03	Computer on Wheels	AV11	Computer on Wheels
	Student Project Room	AV12	Project Space
	Meeting Room	AV13	Small Meeting Room
		AV14	Medium Meeting Room
	Tutorial Room	AV23	Tutorial Space
AV05	Lecture Theatre	AV25	Lecture Space
AV05+VC	Video Conference Lecture Theatre	AV26	Video Conference Lecture Space
CTS/FTR	Collaborative Teaching Space – Type 1	AV31 AV32	Collaborative Space -Type 1
	Collaborative Teaching Space – Type 2		Collaborative Space - Type 2
	Flexible Tutorial Room - Hardware		
DS	Digital Signage	AV51	Digital Signage



Spaces that didn't previously have a designated standard name include;

Known Space Description	New Standard	New Description
Large Campus Meeting Room	AV15	Large Meeting Room
Green Screen Room	AV41	Video Production Suite
Personal Recording Suite	AV42	Personal Recording Suite
Collaborative Laboratories	AV35	Collaborative Laboratories

2.O.2 – AV Standards Structure

The new AV space standards are broken into 4 main groups, each with space specifications. Standard naming conventions are explained further in Appendix A.

AV1x – Meeting Spaces

- AV11 Computer on Wheels (CoW)
- AV12 Project Space
- AV13 Small Meeting Room
- AV14 Medium Meeting Room
- AV15 Large Meeting Room

AV2x – Traditional Teaching

- AV23 Tutorial Space
- AV24 Video Conference Tutorial Space
- AV25 Lecture Space
- AV26 Video Conference Lecture Space

AV3x – Experimental/Collaborative Teaching

- AV31 Collaborative Space Type 1
- AV32 Collaborative Space Type 2
- AV35 Collaborative Laboratory

AV4x – Capture/Recording Spaces

- AV41 Video Production Suite
- AV42 Personal Recording Suite

AV5x – Signage

- AV51 Digital Signage



2.O.3 – Special Purpose Spaces

For spaces that do not fit into the AV standards stated in section 2.0.2, the generic term of “Special Purpose Space” is given. These spaces do not have a set of standard requirements however still follow the Equipment, cabling and installation specifications outlined in sections 3 through 5.

Examples of these spaces include:

- Media walls
- Student Lounges
- Large Hybrid-use Spaces (e.g. Pridham Hall)
- Foyers
- Specialised Laboratories



2.1.0 – Standards - User Requirements

Each UniSA Audio-Visual specification is built around the requirements of the user group.

2.1.1 – AV11 Computer on Wheels (CoW)

- Viewing capacity of up to 8 users.
- 55 to 65” display on trolley with Automatic display control
- Installed AVPC provided for UniSA staff on trolley
- Inclusion of Software Video Conferencing (for Skype, Zoom, Teams) via USB soundbar.
- BYOD connectivity via an included HDMI cable.

Options

(CTP) = Control pad

- Manual keypad control

(USB) = USB Switching for BYOD [Requires CTP option]

- Allowing use of the USB Soundbar with a BYOD device.

2.1.2 – AV12 Project Room

- Viewing capacity of up to 6 users.
- Up to a 65” display on wall with automatic control.
- Installed AVPC provided for UniSA staff and students.
- BYOD connectivity via included HDMI cable and power point in table box.

2.1.3 – AV13 Small Meeting Room

- Viewing capacity of up to 6 users.
- Up to a 75” display on wall with automatic control.
- Installed AVPC provided for UniSA staff with included Video Conferencing Soundbar.
- BYOD connectivity via included HDMI cable, either in table or on wall plate.

Options

(CTP) - Control Pad

- Addition of manual keypad control.



2.1.4 – AV14 Medium Meeting Room

- Viewing capacity of up to 16 users.
- Up to an 86” display on wall with automatic control.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable and power point, either in table or on wall plate.
- USB Microphones and Pan-Tilt-Zoom Camera for software video conferencing.
- Room speakers (ceiling or front of room) for content playback.
- IR Hearing Augmentation

Options

(CTP) - Control Pad

- Addition of manual keypad control.

(USB) = USB switching

- Allows use of the USB Video Conferencing equipment with a BYOD device.

(TCH) = Touch LCD Display

- Swaps out the standard LCD for a multi-touch LCD on height adjustable mount.



2.1.5 – AV15 Large Meeting Room

- Viewing capacity of up to 32 users.
- 100” or larger HD projection.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable and power point, either in table or on wall plate.
- USB Pan-Tilt-Zoom Camera and Ceiling Microphones for software video conferencing.
- Full control of the AV system from a touch control panel.
- Room speakers (ceiling or front of room) for content playback.
- IR Hearing Augmentation.

Options

(MDD) – Multiple Displays

- Addition of displays (LCD or Projectors) to allow greater visibility of content for users.

(CRS) – Crisis Room System

- Adds printers, phones and television feed to the room to allow for crisis management.



2.1.6 – AV23 Tutorial Space

- Viewing capacity of up to 40 users.
- 100” or larger HD projection.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable on wall plate.
- Mobile, height adjustable AVPC monitor cart with keyboard and mouse.
- Full control of the system from a Button Control Panel.
- Video & Audio processing
- Room speakers (ceiling or front of room) for content playback.
- IR hearing augmentation

Options

(MIC) – Microphone Speech Reinforcement

- Addition of wireless microphones to reinforce speech in room.

(TCH) – Touch LCD Display

- Swaps out projection for a multi-touch LCD on height adjustable mount.

2.1.7 – AV24 Video Conference Tutorial Space

- Viewing capacity of up to 40 users.
- 100” or larger HD projection.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable on wall plate.
- Mobile, height adjustable AVPC monitor cart with keyboard and mouse.
- Full control of the AV system from a touch screen control panel.
- Pan-Tilt-Zoom Camera and Wireless Microphone System for software video conferencing from the AVPC.
- Video & Audio processing.
- Room speakers (ceiling or front of room) for content playback.
- IR hearing augmentation.

Options

(CMA) – Ceiling Microphone Array

- Replaces the wireless microphone system with an intelligent in-ceiling microphone array.

(TCH) – Touch LCD Display

- Swaps out projection for a multi-touch LCD on height adjustable mount.



2.1.8 – AV25 Lecture Space

- Viewing capacity of up to 600 users.
- 100” or larger HD projection.
- Fixed lectern with AVPC monitor & gooseneck microphone integrated.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable either in lectern retractor box or on wall plate.
- Flatbed document camera with feeds to AVPC and projection system.
- Mobile, height adjustable AVPC monitor cart with keyboard and mouse.
- Full control of the AV system from a touch screen control panel.
- Lecture Recording System with video and audio capture.
- Wireless Microphone System for in room speech reinforcement and recordings,
- Advanced Video & Audio processing.
- Large format speakers (ceiling or front of room) for content playback.
- IR hearing augmentation.



2.1.9 – AV26 Video Conference Lecture Space

- Viewing capacity of up to 600 users.
- Dual 100" or larger HD projection.
- Fixed lectern with AVPC monitor & gooseneck microphone integrated.
- Installed AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable either in lectern retractor box or on wall plate.
- Flatbed document camera with feeds to AVPC and projection system.
- Mobile, height adjustable AVPC monitor cart with keyboard and mouse.
- Full control of the AV system from a touch screen control panel.
- Lecture Recording System with video and audio capture.
- Hardware video conferencing system capable of audio, video and content connections to other UniSA video conferencing enabled Lecture Spaces.
- Ceiling microphones for audience participation capture for the video conferencing system.
- Wireless Microphone System for in room speech reinforcement and recordings,
- Advanced Video & Audio processing.
- Large format speakers (ceiling or front of room) for content playback.
- IR hearing augmentation.



2.1.10 – AV31 Collaborative Space Type 1

- Front of room 100" projection system.
- Fixed lectern position with multiple breakout display locations throughout space.
- One AV source to all display capability with full video and audio processing.
- Wireless microphones system for in room speech reinforcement and software video conferencing.
- Ceiling Pan-tilt-zoom camera for software video conferencing.
- Ceiling speakers for content playback.
- IR hearing augmentation.

Lectern Location

- Fixed lectern with AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable either in lectern retractor box or on wall plate.
- Document camera with feeds to AVPC & AV system.
- Full control of the AV system from a touch screen control panel.

Breakout Locations

- Wall mounted LCD display.
- Single AVPC provided per table with BYOD connectivity via included HDMI retractor box.
- Control pad allowing control of individual display.

Options

(MDT) – Mobile Display Trolleys

- Moves the breakout LCD displays onto mobile trolley units.

(TCH) – Touch LCD Capability

- Swaps out breakout LCD displays for multi-touch LCD displays on height adjustable mount.



2.1.11 – AV32 Collaborative Space Type 2

- Front of room 100" projection system.
- Fixed lectern position with multiple breakout display locations throughout space.
- One AV source to all display capability with full video and audio processing.
- Wireless microphones system for in room speech reinforcement and software video conferencing.
- Ceiling Pan-tilt-zoom camera for software video conferencing.
- Ceiling speakers for content playback.
- IR hearing augmentation.

Lectern Location

- Fixed lectern with AVPC provided for UniSA staff.
- BYOD connectivity via included HDMI cable either in lectern retractor box or on wall plate.
- Document camera with feeds to AVPC & AV system.
- Full control of the AV system from a touch screen control panel.

Breakout Locations

- Wall mounted LCD display.
- 3x AVPC provided per table with single BYOD connectivity via included HDMI retractor box.
- Control pad allowing control of individual display.

Options

(TCH) – Touch LCD Capability

- Swaps out breakout LCD displays for multi-touch LCD displays on height adjustable mount.



2.1.12 – AV35 Collaborative Laboratory

- Fixed teaching position at end of one student benches, feeding large displays at each end of student benches.
- One AV source to all display capability with full video and audio processing.
- Wireless microphone system for in-room speech reinforcement and software video conferencing.
- Ceiling pan-tilt-zoom camera for software video conferencing.
- Ceiling speakers for content playback.
- IR hearing augmentation.

Teaching Location

- AVPC in AV Rack with local Monitor, Wired keyboard, and mouse.
- BYOD connectivity via included HDMI cable in retractor or wall plate.
- Document camera with USB feed to AVPC and HDMI to AV system.
- Full control of AV system via touch screen control panel.

Bench Locations

- Large LCD display at each end of bench, mounted on bench joinery or from ceiling.
- Optional Optical Instruments (Microscope, Spectroscope, etc.) with USB and/or HDMI connectivity.

Options

(PRJ) – Front of Room Projection System.

- Adds a 100" projection system at the front of room for didactic teaching.



2.1.13 – AV41 Video Production Suite

- Green screen backdrop with controllable video studio lighting.
- Pan-tilt-zoom camera for video capture.
- AVPC with monitor for content capture.
- Teleprompter PC & display with footswitch.
- BYOD connectivity via included HDMI cable from wall plate.
- Direct-to-USB recording and Streaming from video mixer system.
- Full control of the AV and lighting system from dual touch screen control panels.
- Dual LCD Displays for AVPC and Output preview.
- Wireless microphone system for speech capture.
- External/Internal automatic recording light system.
- Physical acoustically treated surfaces in room to optimize audio experience.
- Portable Lectern with castors.

2.1.14 – AV42 Personal Recording Suite

- AVPC with standard monitor.
- USB Studio microphone on Anti-shock boom arm mount for audio capture.
- USB HD Camera for video capture.
- Front-fill LED lighting for enhanced video experience.
- Physical acoustically treated surfaces in room to optimize audio experience.

2.1.15 – AV51 Digital Signage

- 40" or greater LCD display mounted in landscape or portrait.
- Dedicated digital content signage player
- Content managed by UniSA Communications and Marketing Unit.

Options

(TCH) – Touch Wayfinding Display

- Swaps out LCD display for a multi-touch LCD for wayfinding usage.



2.2.0 – Standards - Technical Requirements

2.2.1 – AV11 Computer on Wheels (CoW)

Display

LCD Display

- **LCD Display - Non-touch**
 - 55" to 65" diagonal display size.
 - Automated power and input sensing & control.
- **LCD Display Trolley - COW**

Sources

AVPC

- **AVPC**
 - Micro form factor with mount.
 - Mounted to trolley behind display.
- **USB - UC Soundbar**
 - USB Connected to AVPC

BYOD

- **BYOD HDMI Cable**
 - 5m cable.

Control

CTP Option - Control Pad

- **Control Pad - Small**
 - RS232 control of display.
 - Trolley Mounted.
 - PoE injector powered.

USB Option - USB switcher [Requires CTP Option]

- **Switcher - USB**
 - RS-232 Control from Control Pad.



2.2.2 – AV12 Project Room

Display

LCD Display

- **LCD Display - Non-touch**
 - 40" to 65" diagonal display size.
 - Automated power and input sensing & control.
- **LCD mount - Fixed**

Sources

AVPC

- **AVPC**
 - Micro form factor with mount.
 - Mounted behind display.

BYOD

- **BYOD - Gravity fed**

2.2.3 – AV13 Small Meeting Room

Display

LCD Display

- **LCD Display - Non-touch**
 - 55" to 75" diagonal display size.
 - Automated power and input sensing & control.
- **LCD mount - Fixed**

Control

CTP Option - Control Pad

- **Control Pad - Small**
 - IP control of display.
 - Wall mounted near display.

Sources

AVPC

- **AVPC**
 - Micro form factor with mount.
 - Mounted behind display.

BYOD

- **BYOD - Gravity fed**
- **ORBYOD - Wall plate**

Video Conferencing

- **USB - UC Soundbar**
 - USB connected to AVPC.



2.2.4 – AV14 Medium Meeting Room

Display

LCD Display

- **LCD Display - Non-touch**
 - 75" to 86" diagonal display size.
 - Automated power and input sensing & control
- **LCD Mount - Fixed**

TCH Option - Touch LCD Display

- **LCD Display - Touch**
 - 75" or greater diagonal display size.
 - Touch USB wired to AVPC.
 - For USB option, touch USB wired to UC Hub.
- **LCD Mount - Height adjustable**

Control

CTP Option - Control Pad

- **Control Pad - Small**
 - IP control of display
 - Wall mounted near display

USB Option - USB Switching

- **Switcher - USB**
 - RS-232 Control for CTP Option.
 - Mounted behind display.

Sources

AVPC

- **AVPC**
 - Micro form factor with mount.
 - Mounted behind display.

BYOD

- **BYOD - Gravity fed**
- **ORBYOD - Wall plate**

Video Conferencing

- **USB - UC Hub**
 - Mounted behind display.
- **Camera - USB PTZ**
 - Connected to UC Hub USB.
- **Microphone - Ceiling Pendant Array**



Audio

Speakers

- **Speakers – Ceiling mounted passive**
 - Connected to UC Hub.
- **ORSpeakers – Wall mounted passive**
 - 5.25" to 6.5" speaker size.
 - Connected to UC Hub.

Hearing Augmentation

- **Hearing Augmentation – IR Transmitter**

2.2.5 – AV15 Large Meeting Room

Display

Projection

- **Projector – Medium**
- **Projector Ceiling Mount**
- **Projector Screen – Motorised**
 - 100" or larger.

MDD Option - Multiple Display Devices

- **LCD Display – Non-touch**
 - Quantity determined by requirements.
- **AND/OR Projector – Medium**
 - Additional quantity determined by requirements.

Control

Control Processor

- **Control Processor**
 - Minimum IO of 2x RS-232 and 6x Relays.

Touch Panel

- **Touch Control Panel**
 - Table-top variant mounted on table.

Sources

AVPC

- **AVPC**

BYOD

- **BYOD – Retractor**

Video Conferencing

- **Camera – USB PTZ**



Video

Video Distribution

- **Switcher - Video**

Audio

Speakers

- **Speakers - Ceiling mounted passive**
- **Audio Amplifier**

Audio DSP

- **Audio DSP - Small**

Microphones

- **Microphone - Ceiling Room Array**

Hearing Augmentation

- **Hearing Augmentation - IR Transmitter**

Architectural / Security

AV Rack

- **Rack - Joinery**

Network Switch

- **Network Switch**
 - 8 network ports.
 - Supplied by UniSA ISTS Network Services.

Power Distribution Unit

- **Power Distribution Unit**

Crisis Room

CRS Option - Crisis Room System

- **Document Printer**
 - UniSA ISTS provided.
- **Desktop Phone**
 - 2x units provided by UniSA ISTS.
 - Connected over UniSA network.
- **MATV DVR set top box**



2.2.6 – AV23 Tutorial Space

Display

Projection

- **Projector – Medium**
 - Video and control transmit via HDBaseT.
- **Projector Ceiling Mount**
- **Projection Screen – Manual**
 - 100" or larger.

TCH Option – Touch Display

- **LCD Display – Touch**
 - 85" or larger.
 - Video input via 2x HDMI (AVPC & BYOD).
 - Audio output via 3.5mm Stereo audio.
 - Replaces Projector from system.
 - Removes Presentation Switcher from system.
- **LCD mount – Height adjustable**

Control

Control Pad

- **Control Pad – Small**
 - IP control of devices.
 - Wall mounted near teaching position.

Audio

Speakers

- **Speakers – Wall mounted powered**
- **OR Speakers – Ceiling mounted passive**
 - Audio Amplifier required.

Hearing Augmentation

- **Hearing Augmentation – IR transmitter**

MIC Option – Microphone Speech Reinforcement

- **Microphone – Wireless System**
 - 2x channels – 1x Handheld & 1x Lapel.
- **Audio DSP – Small**

Video

Presentation Switcher

- **Switcher – Video**

HDMI Distribution Amplifier

- **Distribution Amplifier – HDMI**
 - 2x HDMI Outputs.



Sources

AVPC

- **AVPC**
 - Mounted in AV rack.
- **AVPC Monitor**
 - Mounted on monitor trolley.

BYOD

- **BYOD – Wall plate**

Architectural / Security

AV Rack

- **Rack – Small**
 - Positioned front of room.

Monitor Trolley

- **Monitor Trolley**

Signage

- **Signage**



2.2.7 – AV24 Video Conference Tutorial Space

Display

Projection

- **Projector - Medium**
 - Video and control transmit via HDBaseT.
- **Projector Ceiling Mount**
- **Projector Screen – Manual**
 - 100" or larger.

TCH Option – Touch Display

- **LCD Display - Touch**
 - 85" or larger.
 - Video input via 2x HDMI (AVPC & BYOD).
 - Audio output via 3.5mm Stereo audio.
 - Replaces Presentation Switcher from system.
 - Replaces Projector from system.
- **LCD mount – Height adjustable**

Audio

Speakers

- **Speakers – Wall mounted powered**
- **OR Speakers - Ceiling mounted passive**
 - Audio Amplifier required.

Hearing Augmentation

- **Hearing Augmentation - IR transmitter**

Microphone Speech Reinforcement

- **Microphone - Wireless System**
 - 2x channels – 1x Handheld & 1x Lapel.
- **Audio DSP – Small**

CMA Option - Ceiling Microphone Array

- **Microphone - Ceiling Room Array**

Video

Presentation Switcher

- **Switcher - Video**

HDMI Distribution Amplifier

- **Distribution Amplifier - HDMI**
 - 2x HDMI Outputs.

Control

Control Processor

- **Control Processor**

Touch Panel

- **Touch Control Panel**



Sources

AVPC

- **AVPC**
 - Mounted in Rack.
- **AVPC Monitor**

BYOD

- **BYOD – Wall plate**

Ceiling Camera

- **Camera – Video PTZ**

Architectural / Security

Network Switch

- **Network Switch**
 - 8 network ports.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack - Small**
 - Positioned front of room.

Power Distribution Unit

- **Power Distribution Unit**

Signage

- **Signage**

Monitor Trolley

- **Monitor Trolley**



2.2.8 – AV25 Lecture Space

Display

Projection

- **Projector - Large**
 - Video and control transmit via HDBaseT.
- **ORProjector - Medium**
 - Video and control transmit via HDBaseT.
- **Projector Ceiling Mount**
- **Projector Screen - Motorised**
 - 100" or larger.

Control

Control Processor

- **Control Processor**
 - Minimum IO of 2x RS-232 and 4x Relays.

Touch Panel

- **Touch Control Panel**
 - On top of lectern.

Audio

Speakers

- **Speakers - Wall mounted passive**
- **ORSpeakers - Ceiling mounted passive**
- **ORSpeakers - Line array**
- **Audio Amplifier**

Microphones

- **Microphone - Gooseneck**
- **Microphone - Wireless System**
 - 2x channels - 1x Handheld & 1x Lapel.

Audio DSP

- **Audio DSP - Medium**

Hearing Augmentation

- **Hearing Augmentation - IR transmitter**

Video

Presentation Switcher

- **Switcher - Video**

HDMI Distribution Amplifier

- **Distribution Amplifier - HDMI**
 - 2x HDMI Outputs.

Lecture Recording Appliance

- **Lecture Recording Appliance**
- **Lecture Recording Indicator Lights**



Sources

AVPC

- **AVPC**
 - Mounted in Lectern or rack.
- **AVPC Monitor**
 - Mounted on top of Lectern.

BYOD

- **BYOD - Retractor**
 - Mounted in Lectern top.
- **ORBYOD - Wall plate**
 - Mounted to Lectern top.

Document Camera

- **Document Camera - Flatbed**

Architectural / Security

Network Switch

- **Network Switch**
 - 12 network ports.
 - Supplied by UniSA ISTS Network Services.

AVRack

- **Rack - Joinery**

Power Distribution Unit

- **Power Distribution Unit**

Signage

- **Signage**



2.2.9 – AV26 Video Conference Lecture Space

Display

Projection

- **Projector - Large**
 - 2x Projectors
 - Video and control transmit via HDBaseT.
- **OR Projector - Medium**
 - 2x Projectors
 - Video and control transmit via HDBaseT.
- **Projector Ceiling Mount**
 - 2x Ceiling Mounts.
- **Projector Screen - Motorised**
 - 2x Screens.
 - 100" or larger.

Confidence Display

- **LCD Display - Non-touch**
 - 65" to 75" diagonal display size.
 - Rear wall mount.

Control

Control Processor

- **Control Processor**
 - Minimum IO of 2x RS-232 and 6x Relays.

Touch Panel

- **Touch Control Panel**
 - On top of lectern.

Audio

Speakers

- **Speakers - Wall mounted passive**
- **OR Speakers - Ceiling mounted passive**
- **OR Speakers - Line array**
- **Audio Amplifier**

Microphones

- **Microphone - Gooseneck**
- **Microphone - Wireless System**
 - 4x channels - 2x Handheld & 2x Lapel.
- **Microphone - Ceiling Analog**

Audio DSP

- **Audio DSP - Large**

Hearing Augmentation

- **Hearing Augmentation - IR transmitter**



Video

Presentation Switcher

- **Switcher - Video**

HDMI Distribution Amplifier

- **Distribution Amplifier - HDMI**
 - 2x HDMI Outputs.

Lecture Recording

- **Lecture Recording Appliance**
- **Lecture Recording Indicator Lights**

Video Conferencing

- **Video Conferencing Appliance**
- **Camera - Video PTZ**
 - Mounted in rear of room.
- **Camera - HVC PTZ**
 - Mounted in front of room.

AV Extension

- **Extension - HVC Camera**
- **Extension - HDMI**

Sources

AVPC

- **AVPC**
 - Mounted in Lectern or rack.
- **AVPC Monitor**
 - Mounted on top of Lectern.

BYOD

- **BYOD - Retractor**
 - Mounted in Lectern top.
- **ORBYOD - Wall plate**
 - Mounted to Lectern top.

Document Camera

- **Document Camera - Flatbed**



Architectural / Security

Network Switch

- **Network Switch**
 - 24 network ports.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack - Joinery**

Power Distribution Unit

- **2x Power Distribution Unit**

Signage

- **Signage**

2.2.10 – AV31 Collaborative Space Type 1

Displays

Breakout location displays

- **LCD Display – Non-touch**
 - Quantities determined by space requirements.
- **LCD mount – Fixed**

TCH Option – Breakout touch displays

- **LCD Display – Touch**
 - 85” or larger.
 - Replaces non-touch LCD displays.
- **LCD mount – Height adjustable**

MDT Option – Mobile display trolleys

- **LCD Display trolley – Collaborative COW**
 - Replaces LCD mount and moves display and control pad onto Mobile trolley unit.

Front of room projection

- **Projector – Medium**
- **Projector Ceiling Mount**
- **Projector Screen – Manual**

Sources

AVPC

- **AVPC**
 - All in one form factor mounted upon Lectern.
 - Micro form factor mounted behind each breakout display or in each table.
 - Wired keyboard & mouse.

Document Camera

- **Document Camera – Ceiling**



- **OR Document Camera - Flatbed**
- BYOD*
 - **BYOD - Retractor**
 - Mounted in Lectern top.
 - **AND/OR BYOD - Wall plate**
 - Mounted in Lectern top.
 - 1x mounted in each breakout table.

Video

Video Transport

- **Video Distribution – AV over IP**
 - Encoder for lectern location.
 - Encoder per breakout location.
 - Decoder for each display location.
- **Switcher – Video**
 - 2 HDMI inputs.
 - LAN Connectivity.
 - One per breakout table location.

Ceiling USB Camera

- **Camera – USB PTZ**
- **Extension – USB**

Audio

Audio DSP

- **Audio DSP – Medium**

Microphones

- **Microphone – Wireless System**
 - 2x channels – 1x Handheld & 1x Lapel.

Hearing Augmentation

- **Hearing Augmentation – IR Transmitter**

Speakers

- **Speakers – Ceiling mounted passive**
- **Audio Amplifier**

Control

Control Processor

- **Control Processor**

Touch Panel

- **Touch Control Panel**
 - Mounted to or near lectern.

Control Pads

- **Control Pad – Small**
 - One at each breakout display location.



Architectural / Security

Network Switch

- **Network Switch**
 - Sufficient ports for all AV and AV over IP endpoints.
 - Multicast segregation from UniSA Network.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack - Small**

Power Distribution Unit

- **Power Distribution Unit**

Signage

- **Signage**

2.2.11 – AV32 Collaborative Space Type 2

Displays

Breakout location displays

- **LCD display – Non-touch**
 - Quantities determined by space requirements.
- **LCD mount – Fixed**

TCH Option – Breakout touch displays

- **LCD display – Touch**
 - 85” or larger.
 - Replaces Non-touch LCD displays in breakout locations.
- **Switcher - USB**
 - One unit for each breakout display location.
- **LCD mount – Height adjustable**
 - Replaces fixed LCD mounts at each breakout display location.

Front of room projection

- **Projector – Medium**
- **Projector Ceiling Mount**
- **Projector Screen – Manual**



Sources

AVPC

- **AVPC**
 - 1x Mounted upon Lectern.
 - 3x Mounted upon each breakout table.
 - Wired keyboard & mouse.

Document Camera

- **Document Camera – Ceiling**
- **OR Document Camera – Flatbed**

BYOD

- **BYOD – Retractor**
 - Mounted in Lectern top.
- **AND/OR BYOD – Wall plate**
 - Mounted in Lectern top.
 - 1x mounted in each breakout table.

Video

Video Transport

- **Video Distribution – AV over IP**
 - Encoder for lectern location.
 - Encoder per breakout table location.
 - Decoder for each display location.
- **Switcher – HDMI**
 - 4 HDMI inputs.
 - LAN Connectivity.
 - One per breakout table location.

Ceiling USB Camera

- **Camera – USB PTZ**
- **Extension – USB**

Audio

Audio DSP

- **Audio DSP – Medium**

Microphones

- **Microphone – Wireless System**
 - 2x channels – 1x Handheld & 1x Lapel.

Hearing Augmentation

- **Hearing Augmentation – IR Transmitter**

Speakers

- **Speakers – Ceiling mounted passive**
- **Audio Amplifier**



Control

Control Processor

- **Control Processor**

Touch Panel

- **Touch Control Panel**

Architectural / Security

Network Switch

- **Network Switch**
 - Sufficient ports for all AV and AV over IP endpoints.
 - Multicast segregation from UniSA Network.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack - Small**

Power Distribution Unit

- **Power Distribution Unit**

Signage

- **Signage**



2.2.12 – AV35 Collaborative Laboratory

Displays

Bench displays

- **LCD display – Non-touch**
 - Quantities determined by space requirements.
 - 55-65" Displays.
 - Mounted at end of benches from ceiling.
- **LCD mount – Fixed**
 - Ceiling mounted.

PRJ Option – Front of room projection

- **Projector – Medium**
- **Projector Ceiling Mount**
- **Projector Screen – Manual**

Sources

AVPC

- **AVPC**
 - All in One form factor mounted at teaching location.
 - Micro form factor mounted behind each breakout display or in each table.
 - Wired keyboard & mouse.

Document Camera/Instrument

- **Document Camera – Flatbed**
- **OR Document Camera – Ceiling**
- **AND/OR Scientific Instrument**

BYOD

- **BYOD – Retractor**
 - Mounted at teaching location.
- **ORBYOD – Wall plate**
 - Mounted at teaching location.

Video

Video Transport

- **Video Distribution – AV over IP**
 - Encoder for teaching location.
 - Encoder for PTZ camera.
 - Decoder for each display location.
- **Switcher – HDMI**
 - 4 HDMI inputs.
 - LAN Connectivity.

Ceiling PTZ Camera

- **Camera – Video PTZ**
 - HDMI AV Output.



Audio

Audio DSP

- **Audio DSP – Small**

Microphones

- **Microphone – Wireless System**
 - 2x channels – 1x Handheld & 1x Lapel.

Hearing Augmentation

- **Hearing Augmentation – IR Transmitter**

Speakers

- **Speakers – Ceiling mounted passive**
- **Audio Amplifier**

Control

Control Processor

- **Control Processor**

UI Control

- **Touch Control Panel**
- **ORControl Pad – Small**

Architectural / Security

Network Switch

- **Network Switch**
 - Sufficient ports for all AV and AV over IP endpoints.
 - Multicast segregation from UniSA Network.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack – Joinery**
- **ORRack – Small**

Power Distribution Unit

- **Power Distribution Unit**

Signage

- **Signage**



2.2.13 – AV41 Video Production Suite

Displays

LCD Display

- **LCD Display – Non-touch (x2)**
 - 42” to 55” diagonal display size.
 - Automated power and input sensing & control.
- **LCD mount – Fixed (x2)**
- **LCD Display – Teleprompter**
 - 22” to 32” monitor with in-built image mirroring.
 - Camera enclosure within one-way mirror.

Sources

AVPC

- **AVPC (x2)**
 - Micro form factor mounted in AV rack.
- **AVPC Monitor**
 - Mounted on top of rack or front table.

Camera

- **Camera – Video PTZ**
 - Black chassis colour.
 - SDI and USB Video transport connectivity.

Video

Video Transport

- **Switcher – Video**
- **Vision Mixer**
 - Chroma key with fine adjustment.
 - Picture in picture functionality.
- **Recorder – Media Streamer**
 - IP Control.
 - Internal HDD & external USB recording capable.
 - Network live streaming via RTSP.

Audio

Audio DSP

- **Audio DSP – Small**

Microphones

- **Microphone – Wireless system**
 - 2x channels – 2x Lapel.
- **Microphone – Ceiling Studio**
 - 2x Ceiling mounted on boom arms.



Control

Control Processor

- **Control Processor**

Touch Panel

- **Touch Control Panel**

Teleprompter Foot Switch

- **USB - Foot Switch**
 - Connected to Teleprompter AVPC.
- **Extension - USB**

Architectural / Security

Network Switch

- **Network Switch**
 - 12 network ports.
 - Supplied by UniSA ISTS Network Services.

AV Rack

- **Rack - Small**

Power Distribution Unit

- **Power Distribution Unit**

Mobile Lectern

- **Mobile Lectern**
 - Mounted on castors.
 - Matte black finish.

Video Backdrop

- **Backdrop**
 - Even green material or painted surface.
 - Coverage on entire rear room surface.

Physical Treatment

- **Lighting - Video LED**
 - Front and Rear lights.
 - PDU managed.
 - Ceiling mounted on lighting bars using barrel clamps.
- **Acoustic Room Treatment**
 - Acoustic panelling and treatment to improve the acoustic room conditions.
 - Minimum of 60% coverage on walls and ceilings.
 - AV rack to have additional noise isolation.



2.2.14 – AV42 Personal Recording Suite

USB AV

Camera

- **Camera – USB Webcam**
 - Mounted on top of AVPC monitor.

Microphone

- **Microphone - USB**
 - Mounted on Anti-shock boom arm.

Sources

AVPC

- **AVPC**
 - Mounted on tabletop.
- **AVPC Monitor**
 - Mounted on tabletop.

Architectural / Security

Physical Treatment

- **Lighting – Video LED**
 - Mounted to tabletop.
 - Tuned colour temperature to match room lighting.
- **Acoustic Room Treatment**
 - Acoustic panelling and treatment to improve the acoustic room conditions.



2.2.15 – AV51 Digital Signage

Display

Display

- **LCD Display – Non-touch**
 - 40" to 65" diagonal display size.
 - Automated power and input sensing & control.
- **LCD mount – Fixed**

TCH Option – Touch LCD Display

- **LCD Display – Touch**
 - 40" or greater diagonal display size.
 - Touch USB wired to Digital Signage Player.

Digital Signage

Digital Signage Player

- **Digital Signage Player**
 - ONELAN platform compatible.



3.0.0 – Cabling Specification

Cable Management & Dressing

Securing of cabling shall be with hook & loop or other suitable reusable fixture for the looms.

Cable ties are not to be used in any UniSA audio visual installation.

Non-interfering cables should be loomed together where they follow the same cable path. 240V power cabling should not be closely loomed to cables where it is likely to interfere with other signals.

All cabling in racks should be tied to either rack supports or frame and/or lacing bars with sufficient cable length to allow movement of rack.

All rack build cabling shall also conform to Cable installation & paths specification.

Any externally accessible cable looms must be concealed by a cable sleeve. The cable loom must be reusable and serviceable with variable diameter adjustment. (similar to Techflex Grip Wrap) Ends of cable sleeve shall be secured to ensure no fraying.

Cable Labelling

Cables should be labelling in accordance with INFOCOMM F501.01 Cable Labelling for Audio-visual Systems Standard.

Label text content shall indicate near (N) and far (F) end connections of the cable. For example;

- At the projector end of a HDMI cable connected to HDMI 1 input of a projector from a switcher output 2 should be labelled;
"N: Proj HDMI1 / F: Swt Out2"
- Conversely, the other end (connected to switcher output 2) of the same cable should read;
"N: Swt Out2 / F: Proj HDMI1"

Use of tape label machines (like Dymo) are not permitted for cable labelling, unless specifically approved by UniSA ISTS TT staff.

Labels must have a clear layer on top of any printed text to reduce wear.



Audio Cabling

Substitute cabling shall not be accepted unless written permission with relevant data sheet is supplied to ISTS before installation.

Unbalanced Line-Level Audio

Unbalanced line audio is to be run over 2 conductor cabling (25AWG or thicker) with foil shield and drain wire integrated. Outer jacket colour should be either black or grey.

Balanced Audio

Balanced audio shall be run over 2 pairs of twisted conductors (21AWG or thicker) cable with braided shield. Outer jacket colour should be either black or grey.

Speaker – Constant Voltage

For 70v or 100v speaker cabling, a double insulated figure 8 wiring shall be used. 18AWG or thicker gauge should be used, with the gauge appropriate to support the systems required speaker and amplifier configuration. Individual polarity marked conductor insulation should be used for easy polar identification.

Speaker – Low Impedance

For Lo-z speaker cabling, a double insulated figure 8 wiring shall be used. The conductor gauge should be appropriate to support the systems required speaker and amplifier configuration. Individual polarity marked conductor insulation should be used for easy polar identification.



Control / Low Voltage Power (up to 100v)

Low voltage and control cabling are to be run using shielded + 2 core cable for RS-232 connectivity between devices, relays to screens and Lecture Recording lights.

Control

Where possible, the shield or drain wire is to be used as the common ground between devices either via Phoenix or DB-9 connectors.

24 AWG or thicker gauge cable to be used. Breaks in the cable or joins are prohibited, except where a wall plate connector is required.

Low voltage power (1-48v)

Only soldered and heat shrink joins of low voltage power are allowed. No screw terminals or tapes to be used. Breaks in the cable or joins are prohibited, except where a wall plate connector is required.

HDBaseT & Shielded Twisted Pair

All cables used for HDBaseT shall be a minimum of Cat6A rating.

Must be capable of passing 10.2Ggbps over their length and transmission lengths greater than 70m under normal operating conditions.

All installed cables must use shielding, foil, or both (i.e. SF/UTP).

If the cable is too rigid to make required bend radii in racks or at equipment, then a fixed termination and suitable shielded patch lead should be installed.

Cabling shall NOT be white, blue, or red in colour.

Network Cabling

Any Network cabling is to comply with the UniSA FMU Technical Standards Section L Telecommunications Infrastructure.



Video Cabling

HDMI

- All HDMI cabling shall be capable of transmission of at least 4K @ 60Hz with a 4:4:4 colour space.
- Total sink to source cable lengths shall be no greater than 10 metres. Where lengths exceed 10m, STP or HDBaseT extension is required.
 - o For a cable run with no breaks in cable, cable length shall not exceed 10m.
 - o For a cable run with multiple breaks, no single cable should exceed 7.6m in length. There should be no more than 4 cable breaks in a cable run.
- All HDMI cabling shall be compatible with HDCP 2.2, EDID and CEC control.
- All HDMI cabling shall be passive type only unless otherwise specified by ISTS Teaching Technologies.
- Where required to convert signal to other digital formats, a short 20-30cm cable adapter shall be used.

DisplayPort

- All DisplayPort cabling shall be capable of transmission of at least 4K @ 60Hz with a 4:4:4 colour space.
- Sink to source cabling lengths should be no greater than 3 metres with no breaks in the cable.
- Where required to convert signal to other digital formats, a short 20-30cm cable adapter shall be used.

USB-C

- Video transport over USB-C shall utilise USB-C ports with DisplayPort Alternate Mode (DP Alt Mode)
- Cabling shall be capable of video transmission of at least 4K @ 60Hz with a 4:4:4 colour space.

DVI

- Where other digital video standards cannot be utilised, DVI to HDMI/DP adapters should be used.
- DVI cabling shall utilise the DVI-I single link or DVI-D single link connectors.
- Where required to convert signal to other digital formats, a short 20-30cm cable adapter shall be used.



Interconnections (Wall plates, Patch bays)

Suitable AV input plates shall be provided as specified by ISTS. The Contractor may supply an alternative manufactured version of this plate type, with approval from ISTS required.

All specified input types on the plate must be printed/engraved in contrasted text above connector.

For non-standard wall plates, with permission from ISTS, label printing machine labels may be used in place of on plate printing/engraving.

Standard BYOD wall plates shall be single gang Clipsal 2000 plates, with connector type (ie "HDMI") printed/engraved above the connector.

Standard analogue audio patch points (e.g. I/O for lectern mics, field recorders, live streaming, TIU videographers, external audio mixer, etc.) shall use Neutrik XLR surface rear mounted connectors, with the mounting plate printed/engraved with the purpose of each connector clearly labelled,

e.g. "Line Output", "Lectern Mic Input", "Line Input", etc.

The audio level type (Mic, Line) of the expected signal must form part of the wording. Large patch fields must be arranged in a logical manner in order of patch point and function, with similar I/O grouped in clusters.

Rack mounted patch bays must include sufficient space for printed patch numbers above each connector. Additionally, a laminated patch sheet must be provided with the installation. The patch sheet must include diagrammatic and tabulated lists of all patch points and patch plates/fields, at the near and far ends.

Wall plates for speaker-level outputs shall be fitted with speakON 4-pole connectors, and must be clearly labelled as "Speaker Output".

Where Clear-Com style intercom patch points form part of a wall plate or patch field, the XLR connectors must be clearly labelled "Intercom".



4.O.O – Installation & Infrastructure Specification

General Requirements

It is expected that this section is read in conjunction with all sections of the UniSA Technical Standards, to achieve a fully comprehensive understanding of the University requirements.

Accessibility & Equity (Building Code & DDA)

All AV devices and control panels must comply with several Australian Standards with regards to physical location and accessibility, being:

- Disability Discrimination Act 1992 (DDA)
- Disability (Access to Premises - Buildings) Standards 2010
- Building Code of Australia

The following specifics apply, unless superseded by the current government documentation:

- Control panels, switches and other operable control devices/surfaces must be at a nominal height of 1m +/-100mm above finished floor, with no impediments within 400mm which would prevent wheelchair access.
- Control panels should be as near as practicable to the primary display in rooms with no lectern or teaching station, located near the door side of the display wherever possible.
- Lectern-mounted control panels must be wheelchair accessible.
- Hand-Held wireless remote controls must be stored in such a way as to be wheelchair accessible.
- Loose equipment accessible for use by general users, such as wireless microphones, keyboard/mouse, must be wheelchair accessible.
- Hearing augmentation must provide coverage of 95% of the audience seating area of the room.
- For Hearing Augmentation systems requiring receiver units, the following applies:
 - If the space accommodates up to 500 persons, 1 receiver for every 25 persons, with a minimum of 2 receivers is required.
 - If the space accommodates between 500 and 1,000 persons, 20 receivers, plus 1 receiver for every 33 persons.
 - If the space accommodates between 1,000 and 2,000 persons, 35 receivers, plus 1 receiver for every 100 persons.

Hearing Augmentation receivers shall be kept at FM Assist locations on each UniSA campus.

- Signage indicating the existence of hearing augmentation technology and receivers for the room must be placed near the door(s) and on or near the lectern, featuring the approved ear icon denoting hearing augmentation, as



per Premises Standards Part D3.7(2)(a). Signage shall state the location of any available receivers for IR augmentation systems.

- AV racks must be able to be fully turned or be removed from cavity for serviceability using castors, in-built slide or spin functionality without user bearing rack weight.
- LCD Touch display accessibility
 - Touch-enabled LCD's must include a height-adjustable mounting bracket with the top of the screen to be no more than 1.75m above the floor with the mount in the lowest position.
 - The vertical movement must be either motorised, with DDA-compliant control switches on the side of the panel or on the wall nearby, or a counterbalanced non-motorised mechanism with feather-touch movement such that the user does not bear the weight of the panel when moving it.
 - The panel shall have an accessible zone in front of it sufficient to accommodate a wheelchair.
 - There shall be no protrusions in front of the panel, such as cameras, pen trays, etc which might impede access to the touch surface.
 - The panel's travel must allow the bottom edge of the panel to be viewable by all seated room occupants regardless of the panels adjusted height.



Cable Installation & Paths

See also Cabling Specifications. Cable installation and materials must comply with the Australian Building Code, Telecommunications Standards, and the International Standards Organisation.

All cables should be run with Catenary wiring or in cable trays where possible.

- This is mandatory in new build, building overhaul and major upgrades where building works are taking place.

Where possible, all cabling is to be installed within wall cavities as to reduce and or eliminate the usage of ducting.

If ducting is to be used, all ducting must be secured to the wall and all cabling placed into the ducting.

Where a rack is used and can be moved, a tail of 2-3 meters must be left for -ALL- Cabling.

This must be placed in a cable sock and not internally bound for ease of service and neatness.

Cables entering a rack are to be firmly secured to cabinet casing at the cable entry point for tension relief.

Cables are to be secured with Velcro ties every 300mm or less to the rack or appropriate lacing bars. Cable terminating to equipment should have sufficient additional length to be able to move the equipment within rack if necessary.

Cables must have 2m of slack at each piece of field equipment where possible (i.e. Speaker or Projector). Slack shall be hidden in ceiling/wall/joinery where possible.

At least 1 x draw cable / wire shall be installed from the rack to the ceiling for future additions.

Any data cabling installation is to comply with the UniSA FMU Technical Standards Section L Telecommunications Infrastructure.

The labelling of AV Cables must be done in accordance with the UniSA labelling standard, as specified in the Cabling Specification.



Code, Programming & Configuration

· The Contractor must supply the following to UniSA for approval prior to installation commencing;

- Touch Panel layouts
- MAC Addresses (ANDI Document)
- DSP Configuration file

Upon project hand-over from Integrator, the following shall be handed back to UniSA ISTS for record, storage and use;

- Any programming files in an unencrypted/unprotected format, inclusive of any Touch panel, Audio DSP, and Control processor files. The following folder structure should be used:
 - Root folder - Control processor files.
 - "UI" - Any touch panel or user interface files.
 - "Modules" - Any separate equipment control modules.
 - "DSP" - Any audio DSP configuration files.
- All programming must be able to be edited and changed.
- Any proprietary control/configuration software
- Product/serial/enablement software keys
- Passwords, Key combinations, or lock codes.

Lighting & Blind Control

Any lighting requirements are to be completed by the UniSA Facilities Management Unit.

For a control system to interact with a lighting system such as C-Bus, the following must be provided to UniSA ISTS;

- A LAN interface to the local or building C-Bus Network; OR
- An RS232 interface to the local or building C-Bus Network. Interface to be located near to the AV rack or equipment location.

The following information must be supplied to UniSA for programming purposes;

- Channel Groups, Names, and corresponding fixtures.
- Channel types (i.e.: On/Off, Dimmable, Blinds Open/Close).
- Pre-sets/scenes and descriptions.

Where projection system(s) exists, any lighting fixture above or near the projection surface should be on a separate circuit or control unit. Little to no lighting spill shall be present on the projection surface. Where possible, systems should adhere to AVIXA specification ANSI/INFOCOMM 3M:2011 - Projected Image System Contrast Ratio regarding environmental projection interference.



For high-priority, larger presentation and public event spaces, theatre grade lighting with colour temperature and beam (iris, shutter, barn doors, focus, etc.) control is required to allow consistent and controlled lighting of the presentation area without spill onto projection surfaces.

Physical Security

All valuable devices that are assessed to require a high level of anti-theft security must be equipped with a Kensington security lock or wire rope with pad lock provided by UniSA ISTS.

The risk assessment for requiring additional physical security shall consider the value of the equipment, its location and the means with which it is mounted.
e.g. LCD Monitors within standing reach in public thoroughfare areas (such as digital signage) are considered high risk and thus require an additional locking mechanism.

Any equipment that is mobile and unable to be locked or secured in location should have identification check-out procedures associated (e.g. game controllers, lab equipment).

All AVPCs in UniSA spaces should utilise Kensington security locks or lock down mechanisms.

AVPC Monitor trolleys utilised in tutorial style spaces shall be tethered to the AV rack or wall using a long wire rope, attaching to the main trolley upright strut. All USB, video and power cabling to the monitor should be padlocked together to prevent theft of equipment (e.g. keyboard or mouse)

All AV racks should utilise the standard UniSA key pattern on all lock barrels, unless otherwise stipulated by UniSA ISTS. Standard key pattern available to AV integrators upon request.



Project Documentation

For projects that are complex in scope and/or are estimated to be greater than \$10,000 in total project costing, UniSA ISTS will provide documentation to AV Integrators during the scope process including:

- RFQ (Request for Quotation) Document which includes full Scope of Works and Terms & Conditions.
- RES (Returnable Equipment Schedule) Document outlining required equipment and quantities.
- Any photographs of project specific spaces or equipment.

During project deployment the following documentation will be utilised:

- WHS28 Form (Contractor Safety Site Induction Checklist) for on-site works.
- Where applicable, an ANDI (AV Network Device Information) Document will be used to exchange network device information between UniSA and the AV Integrator.
- Where applicable, GUI layout capture should be provided to UniSA ISTS by the AV Integrator for approval prior to installation.
- Where applicable, room elevation drawings, system schematics and other technical documentation should be provided to UniSA ISTS by the AV Integrator for approval prior to installation.

Upon project hand-over from Integrator, the following documentation shall be handed back to UniSA ISTS for record;

- Where applicable, a completed ANDI document.
- 'As Built' documentation, such as system line diagrams, elevation mark-ups and/or schematics.
- Any programming files as per the Code, Programming & Configuration section.

For projects under \$10,000 in total project costing or simple in scope, the documentation requirements above may be used but are not required if there is no space functionality or infrastructure change.

Projects over \$100,000 in total project costing or highly complex in scope will likely utilise custom documentation based off the documents above. UniSA ISTS will provide the necessary project documentation when and where it is required.



Room Acoustics

All rooms should be designed with speech acoustics in mind, this is particularly important for spaces used for teaching where speech intelligibility is critical to the room operating successfully. This applies to both rooms with and without speech reinforcement systems (i.e. Microphones). Minimum expected STIPA values for different room types can be found in the table below, these scores provide a measure of how intelligible speech is within a space.

UniSA Teaching Technologies will complete a STIPA test of rooms using an NTI XL2 STIPA Analyser and NTI Talkbox in-line with the best-practice process from NTI Audio.

Band	STI Range	Examples of typical uses	UniSA Spaces
A+	> 0.76	recording studios	Green screen rooms, recording booths, etc.
A	0.72 - 0.76	theatres, speech auditoria, parliaments, courts	Lecture theatres (target)
B	0.68 - 0.72	theatres, speech auditoria, parliaments, courts	Lecture theatres (minimum)
C	0.64 - 0.68	teleconference, theatres	Meeting rooms
D	0.60 - 0.64	class rooms, concert halls	Tutorial rooms

There are two major components to achieving these STIPA values in a space.

- The room should be designed using materials on surfaces that allow sound to be absorbed, minimising the use of hard materials which tend to reflect sound and cause resonant frequencies. This is particularly important in rooms which use speech reinforcement as tuning out resonant frequencies greatly affects speech intelligibility and reflections limit overall volume.
- The audio system (microphones, processing, and speakers) in a room must allow for vocal frequencies to be accurately and clearly amplified. This includes the use of professional quality microphones and speakers, and an audio DSP system allowing precise control over the audio through filtering, level adjustment and PEQ.



Signage

All signage in AV spaces relating to AV systems shall be printed on metal/acrylic backed vinyl or laminated paper stock where applicable.

Where a hearing augmentation system exists, signage shall comply with:

- Building Code of Australia (BCA) – 2011 – Section D3.6 and Specification D3.6
- Australian Standards 1428.1 – 2009 Amdt 1, Clause 8.2.2 and Figure 12

For IR transmission hearing augmentation systems, signage shall also state the location of any available IR receivers.

Where a Lecture Recording System exists, ISTS provided signage shall be placed in room to denote content and audio recordings will take place in room. Signage shall also describe the recording light status.

All control pads shall have ISTS provided signage mounted close by the control pad. Standardised control pad layouts to reflect signage are available on request to ISTS Teaching Technologies staff.

Thermal Management & Joinery

Enclosed AV Joinery

At a minimum, enclosed joinery must have ventilation apertures in the lower and upper portions of the doors directly in front of the AV rack. Joinery for racks greater than 18RU shall include an additional ventilation aperture section at the mid-point.

In addition to front ventilation, where AV rack joinery interfaces with the ceiling, it should vent into the ceiling cavity using active thermostat control fans.

Joinery must have a minimum of 150mm internal clearance on all sides and top of the AV Rack. For floor standing racks, floor should be level for ease of servicing. Where rack is required to sit above floor level, rack should be mounted using integrated sliding/spinning mechanism.

Joinery depth shall be sufficient to allow the AV Rack and all cabling service loops to be fully pushed back into the cavity without placing stress on the cables or rear connections, whilst maintaining a minimum clearance of 50mm between the front most portion of the AV Rack and the inside face of the joinery doors - including any knobs, switches or protrusions of equipment.

Joinery cavities for AV shall not be shared with other building services/storage.



Joinery for AV equipment shall be keyed to the FMU-approved BiLock key for AV/ISTS on each campus.

Bench Top Cable Pass-thru Provisions

Where pass thru of cable are required in credenzas or lecterns, a suitable cable grommet or cable cubby must be installed to reduce ingress of debris.

AV Rack Access

Where visual access to AV equipment front panel displays is required by general users, the AV joinery doors shall feature either a transparent glass or plastic section, or an open aperture aligning with the specific device.

Where direct physical access to a device is required by general users (example: AVPC), an open aperture aligning with the device shall be provided.

AV Racks shall be keyed to the FMU-approved AV key for AV/ISTS.

AV Rack Thermals & Noise levels

Joinery and AV rack layouts should be designed such that the ambient temperature should not surpass 40 degrees Celsius.

Joinery should be designed such that the noise generated by the rack under full load is no more than 35dB(C) (measured 1m in front of the joinery doors).

Wall Reinforcement & Structure

It is up to the AV integrator to advise if a wall structure does not seem suitable for supporting the load.

If a wall needs to be assessed or reinforced, UniSA will arrange suitable works through an engineer/builder to occur prior to installation.

All building or structural works shall be completed by a competent person and meet any applicable building codes.



5.0.0 – Equipment Specification

Where specified, required, or mandatory makes, and models shall be adhered to for all UniSA projects and orders unless stipulated prior by ISTS Teaching Technologies staff or where provided as an alternative solution.

5.1.0 – Standard Equipment

Audio DSP – Small

Technical Requirement

- Full digital audio signal processing capability with 24-bit depth and 48KHz sampling rate at minimum.
- LAN control.
- At least 4 analogue inputs with Acoustic Echo Cancellation (AEC) capability.
- At least 4 analogue outputs.
- All analogue inputs and outputs to be line and mic level compatible.
- USB connectivity with class compliance and a minimum of 2 input and 2 output channels.
- Open architecture type digital audio processing software.
- Mounted in AV Rack using standard 19" RU rail system.
- Dante/AVB support where required by other equipment.

Required Manufacturer / Preferred Model

- Biamp
- Tesira Forte AVB VT4



Audio DSP - Medium

Technical Requirement

- Full digital audio signal processing capability with 24-bit depth and 48KHz sampling rate at minimum.
- LAN control.
- At least 12 analogue inputs with Acoustic Echo Cancellation (AEC) capability.
- At least 8 analogue outputs.
- All analogue inputs and outputs to be line and mic level compatible.
- USB connectivity with class compliance and a minimum of 2 input and 2 output channels.
- Open architecture type digital audio processing software.
- Mounted in AV Rack using standard 19" RU rail system.
- Dante/AVB Support where required by other equipment.

Required Manufacturer / Preferred Model

- Biamp
- Tesira Forte Ci

Audio DSP - Large

Technical Requirement

- Full digital audio signal processing capability with 24-bit depth and 48KHz sampling rate at minimum.
- LAN control.
- Flexible card input and output configurations with Acoustic Echo Cancellation (AEC) capability.
- All analogue inputs and outputs to be line and mic level compatible.
- Capable of USB connectivity with class compliance and a minimum of 2 input and 2 output channels.
- Open architecture type digital audio processing software.
- Mounted in AV Rack using standard 19" RU rail system.
- Dante/AVB Support where required by other equipment.

Required Manufacturer / Preferred Model

- Biamp
- SERVER-IO (IO cards as required)



Audio Amplifier

Technical Requirement

- Average power handling of 30 Watts per speaker or greater.
- Class D amplifier with 100v and low-z (capable of 4ohm continuous) mono or stereo output.
- Mounted using standard 19" RU rail system.
- Amplifier total power requirements equal to no more than 90% of speaker rated output.

Preferred Manufacturers

- Lab Gruppen
- Crown

AVPC

Technical Requirement

- To be procured via UniSA ISTS.
- Device specification to be current standard AVPC model unless there are specific room/space requirements.
- AV output via native HDMI connection.
- Onboard NIC.
- Analogue audio input may not be available as-standard. A USB audio interface is preferred and may be required.

AVPC Monitor

Technical Requirement

- To be procured via UniSA ISTS.
- Standard issue PC 23-24" monitor.
- AV input via HDMI connection.
- 16:9 1080p (1920 x 1080 pixels) resolution or greater.
- Mounted using standard VESA mounting or provided desktop stand.

BYOD - Wall plate

Technical Requirement

- 3m HDMI fly lead provided for user BYOD device.
- Wall plate colour (white/black) should most closely match the mounting surface colour.



BYOD - Gravity Fed

Technical Requirement

- HDMI Cable fed through (gravity feed style) in table cable management box.
- Cable must be at least 2m from aperture to device.
- Power outlet module installed in table cable management box where applicable.
- Shielded Twisted Pair extension may be required where cable length is greater than 7.6m.

BYOD - Retractor

Technical Requirement

- Replaceable HDMI Cable retractor in table cable management box.
- Extended cables must be at least 2m from retractor aperture to device.
- Power outlet module installed in table cable management box where applicable.
- Shielded Twisted Pair extension may be required where cable length is greater than 7.6m.

Camera - HVC PTZ

Technical Requirement

- 1080p 25fps minimum video capture.
- Image pan and tilt of 35° minimum. 10x image zoom minimum with no degradation of image quality.
- On-ceiling and on-wall mounting options.
- In-built image flip capability.
- Control and Video transmission via HDCI connection to Video Conferencing Appliance.

Camera - USB Webcam

Technical Requirement

- USB 2.0 video transport compatible.
- 1080p 30fps minimum video capture.
- Requires Auto-focus and Auto-exposure functionality.
- Monitor and/or tripod mounting option required.
- Camera connection should be UVC compliant.

Preferred Manufacturer/Preferred Model

- Logitech Brio



Camera - USB PTZ

Technical Requirement

- USB 2.0 speed video transport compatible.
- 1080p 30fps minimum video capture.
- Image pan and tilt of 35° minimum. 3x image zoom minimum with no degradation of image quality.
- On-display, on-wall and/or tripod mounting options.
- Camera connection should be UVC compliant.
- 80° diagonal field of view minimum.

Preferred Manufacturer / Model

- Logitech PTZ Pro 2

Camera - Video PTZ

Technical Requirement

- USB 2.0 speed video transport compatible.
- Camera USB connection should be UVC compliant.
- NDI Capable (or capable with licence upgrade option)
- HDMI Output
- 1080p 50fps minimum video capture.
- Image pan and tilt of 35° minimum. 10x image zoom minimum with no degradation of image quality.
- On-ceiling, on-wall and/or tripod mounting options.
- 80° diagonal field of view minimum.
- LAN and/or RS-232 Controllable.

Preferred Manufacturer / Model

- Panasonic
- AW-HN38H or AW-HE38H

Control Pad - Small

Technical Requirement

- 6 programmable backlit buttons.
- Customisable button labels.
- At least 1x RS-232 Serial connection.
- PoE/PoE+ power compatible.

Required Manufacturer / Preferred Model

- AMX
- Massio series



Control Processor

Technical Requirement

- LAN connectivity.
- Mounted using standard 19" RU rail system (where possible).
- RS-232 Serial connection appropriate for control of specified AV system.
- Relay control appropriate for control of specified AV system.

Required Manufacturer / Preferred Model

- AMX
- NX series processor

Control Touchpanel

Technical Requirement

- LAN connectivity with POE.
- Capable of being secured to a surface or wall.
- At least 10" screen size in landscape orientation.

Required Manufacturer / Preferred Model

- AMX
- Modero G5 series touch panel

Digital Signage Player

Technical Requirement

- HDMI Output to support at least 1080p@30Hz.
- Option for Digital and Analogue audio output.
- LAN connectivity.
- Onboard memory of at least 20 Gb.
- USB Connectivity for Touch interfaces.
- Ability to Mix video, RSS and social feeds, HTML5, live TV and IPTV streams.
- Must be compatible (without functionality restriction) with ONELAN digital signage platform.

Preferred Manufacturer / Model

- ONELAN
- NTB-HD-100F
- NTB-4K-1000F

Distribution Amplifier - HDMI

Technical Requirement

- Minimum 1080p on all used inputs
- EDID management

Required Manufacturer

- Extron



Document Camera - Portable

Technical Requirement

- USB power for device shared with data connection.
- Auto-focus and Auto-exposure capability required.
- Includes manufacturer supported viewing and control software which runs on current Windows operating system.

Preferred Manufacturer / Model

- Lumens DC125

Document Camera – Flatbed

Technical Requirement

- USB data connection and HDMI video output at 1080p
- Base backlit with additional overhead document lights.
- Cleanable base surface
- Auto-focus and Auto-exposure capability required.
- Adjustable zoom (or adjustable lens)
- Physical buttons for control of lighting and zoom functions.

Preferred Manufacturer / Model

- Lumens PS752

Document Camera – Ceiling

Technical Requirement

- USB data connection and HDMI capable video output at 1080p
- Recessed ceiling mounting options.
- RS-232 serial or LAN control capable.
- Auto-focus and Auto-exposure capability required.
- Adjustable zoom (or adjustable lens)

Preferred Manufacturer / Model

- Lumens CL510

Extension - HVC Camera

Technical Requirement

- Transmitter & Receiver Set.
- Twisted pair cable extension with range of at least 70 meters.
- HDCI camera connectivity without cable breakout.
- Powered by power supply unit at receiver end.



Extension – HDMI

Technical Requirement

- Extension of at least 70 Meters.
- Digital audio embedding.
- Capable of 4k@60 4:2:2
- Capable of at least HDMI 1.4 with HDCP 2.3
- Remote power compatible with power supplied at either end.

Required Manufacturer / Preferred Model

- Extron
- DTP HDMI 4K 230 Tx/Rx

Extension - USB

Technical Requirement

- USB 2.0 capable with specific extension to support USB device specified.
- Remote power compatible with power supplied at either end.
- Capable of extension without signal degradation of up to 100 Meters.
- USB Direct passthrough without requirement of drivers/software.

Preferred Manufacturer

- Icron

Hearing Augmentation - IR Transmitter

Technical Requirement

- Infra-red style Hearing augmentation transmitter.
- 2.3 and 2.8MHz carrier frequencies.
- Coverage of at least 95% of usable floor space in the room.
- Mounted to ceiling or wall using adjustable bracket.
- Latency within audio system from source to transmitter should be no more than 25ms.
- 3.5mm or RCA unbalanced input.

Preferred Manufacturer / Model

- Williams AV
- IRT1 or IRT2



LCD Display – Non-touch

Technical Requirement

- 16:9 4K (3840 x 2160 pixels) resolution or greater.
- 350nit brightness or greater.
- 170° viewing angle or greater.
- 2x HDMI inputs minimum.
- Display requires IP control with feedback capability.
- Feature and User control lock out ability for anti-tamper.
- VESA standard mounting system.
- 16-hour, 5-day rated commercial operation duration warranty or greater.
- 3-year warranty coverage or greater.

Preferred Manufacturers

- Sony, Philips, Samsung, NEC, LG

LCD Display – Touch

Technical Requirement

- 16:9 4K (3840 x 2160 pixels) resolution or greater.
- Integrated touch interface without use of overlay.
- 350nit brightness or greater.
- 170° viewing angle or greater.
- 2x HDMI inputs minimum.
- Display requires IP and/or RS-232 control with feedback capability.
- Feature and User control lock out ability for anti-tamper.
- VESA standard mounting system.
- Display should have driver-less USB touch connectivity functionality.

Required Manufacturer / Preferred Models

- Clevertouch
- Pro High Precision or UX Pro

LCD Display - Teleprompter

Technical Requirement

- 16:9 (1920 x 1080 pixels) resolution or greater.
- Integrated 22-32" display utilising one-way mirror mounted to PTZ camera enclosure.

Required Manufacturer / Preferred Models

- Prompter People
- RoboPrompter



LCD Display Trolley - Collaborative COW

Technical Requirement

- Capable of carrying display size of 55" to 75".
- At least one front equipment shelf.
- At least 4 castors rated for greater than total trolley load rating.
- Adjustable side mounted handles.
- Front controller cut out for control pad fitment.
- Black powder coated finish.
- Internal vertical post cable and device management area.
- Vertical post to be at least 1200mm high.

Required Manufacturer / Model

- All Metal Magic
- Model: unisa2

LCD Display Trolley - COW

Technical Requirement

- Capable of carrying display size of 55" to 75".
- At least one front equipment shelf.
- At least 4 castors rated for greater than total trolley load rating.
- Adjustable side mounted handles.
- Black powder coated finish.
- Internal vertical post cable and device management area.
- Vertical post to be at least 1200mm high.

Required Manufacturer / Model

- All Metal Magic
- Model: unisa *OR* unisa65 (large displays)

LCD Mount - Fixed

Technical Requirement

- Load rating to be capable of exceeding weight of specified display to be mounted.
- Black powder coated finish.
- Where tilt adjustment required, tilt capable of up to 15 degrees.
- Anti-theft or anti-tamper proof mechanism on board.

Preferred Manufacturer

- Vogels
- Venturi



LCD Mount - Height Adjustable

Technical Requirement

- Load rating to be capable of exceeding weight of specified display to be mounted.
- Black or grey powder coated finish.
- Up to 400-650mm of vertical travel.
- Counter-balanced and dampened for feather-touch operation.
- Anti-theft or anti-tamper proof mechanism on board.

Preferred Manufacturer / Model

- Balance Box 400 or 650

Lectern - Mobile

Technical Requirement

- Metal framed lectern with black powder coat finish.
- Fitted with locking castors.

Preferred Manufacturer / Model

- Lectrum Classic Series

Lecture Recording Appliance

Technical Requirement

- Panopto certified AV capture device.
- Dual HDMI input capture card fitted.
- Mounted in AV Rack using standard 19" RU rail system.
- LAN and RS232 connectivity.
- Stereo analogue audio input.
- 60GB or greater capacity for local short term storage.

Required Manufacturer / Model

- Seneca
- Panopto Capture Appliance

Lecture Recording Indicator Lights

Technical Requirement

- Connected to Control processor relays with 12v Power supply in line.
- 12v Red LED to be used.
- Mounted within room to allow visibility to seated participants and presenters.



Lighting - Video LED

Technical Requirement

- LED panel with flexible mounting options for barrel or ceiling installation
- Manual (DMX optionally) LED brightness control.
- Manual (DMX optionally) LED colour temperature control.
- CRI Ra value of greater than 80.
- 100 watt or greater power output maximum.
- Passive silent cooling.
- Barn door and lightbox accessories compatible with LED panel.

MATV DVR Set Top Box

Technical Requirement

- Compatible with Australian Digital terrestrial television.
- Ability to record MATV to external USB device or internal memory.
- Control of device functionality using RS-232 control.

Microphone - Ceiling Pendant Array

Technical Requirement

- Ceiling mounted with adjustable cable drop length.
- Cat6 cable connectivity between UC Hub and microphone.
- Minimum of two ceiling mounted microphone beam-steering arrays.
- Echo and Noise Cancellation on board.
- 360° microphone pickup per unit of at least 3m diameter.
- Black or white chassis to match the ceiling colour most closely.

Preferred Manufacturer/Model

- Biamp Devio DCM-1

Microphone - Ceiling Room Array

Technical Requirement

- AVB Transport to AVB Capable DSP
- Minimum of two ceiling mounted microphone beam-steering arrays.
- Echo and Noise Cancellation on board.
- 360° microphone pickup per unit of at least 3m diameter.

Preferred Manufacturer/Model

- Biamp Parle Series



Microphone - Ceiling Analog

Technical Requirement

- Ceiling mounted with adjustable cable drop length.
- Cardioid pickup pattern type capsule.
- In built pre-amplifier with 48V Phantom power required.
- 70Hz to 17Khz frequency response minimum.
- Black or white chassis to match the ceiling colour most closely.
- At least 80% coverage of seated area for all ceiling microphones.

Preferred Manufacturer / Model

- Shure MX202

Microphone - Ceiling Studio

Technical Requirement

- Ceiling mounted with adjustable articulated magic arm, single-lock clutch to lock all axes of movement.
- Must sit at approximately 12-15" above the mouth of presenter, slightly forwards of them and aimed at the chest.
- Hyper-cardioid pickup pattern type condenser pressure gradient capsule (for normal ceilings up to 3m)
- In built pre-amplifier with 48V Phantom power required.
- 70Hz to 17Khz frequency response minimum.
- Self-noise 13dBA or better
- Sensitivity -30dB or better
- Small diaphragm (1/2") pencil condenser for ceilings around 2-3m
- Shotgun (line gradient interference tube principle) for ceiling heights 3m+

Preferred Manufacturer / Model

- Shure VP89
- AKG C480 B



Microphone - USB

Technical Requirement

- Desktop mounted with adjustable spring-loaded articulated arm, must clear other items on desktop such as laptop, LCD monitors, speakers, etc.
- Cardioid pickup pattern type condenser pressure gradient capsule, 1/2" minimum
- In built pre-amplifier with 48V Phantom power required.
- 70Hz to 17Khz frequency response minimum.
- 14dB self-noise or better.
- Inbuilt USB 2.0 Class-compliant UVC bi-directional multiplex audio interface.
- 44.1 and 48kHz 16 bit minimum sampling resolution.
- PC Audio return with volume control.
- Headphone output with volume control.
- Blend control for PC Audio return vs direct mic signal.

Preferred Manufacturer / Model

- Rode NT-USB

Microphone - Wireless System

Technical Requirement

- RF wireless microphone receiver.
- IP control/feedback interface.
- Handheld microphone with built in wireless transmitter compatible with wireless microphone receiver.
- Belt pack wireless transmitter compatible with wireless microphone receiver.
- Lapel microphone with clip for belt pack transmitter with compatible connector.
- Wireless receiver antennas to be mounted in room.
- Outputs via Dante network or analogue balanced outputs to Audio DSP.
- Handheld and belt pack units to have rechargeable batteries compatible with desktop charger.
- Desktop microphone charger with enough slots for each transmitter unit.
- LAN connectivity to both Microphone receiver and charger.

Required Manufacturer / Model

- Shure
- ULXD Series



Microphone - Gooseneck

Technical Requirement

- 18"-inch gooseneck microphone.
- Recessed anti-shock mounting hardware.
- Cardioid pickup pattern type capsule.
- In built pre-amplifier with 48V Phantom power.
- 70Hz to 17Khz frequency response minimum.

Required Manufacturer / Model

- Shure MX418

Monitor Trolley

Technical Requirement

- Standing position style trolley with castors. Height adjustable.
- Shelf for Keyboard and Mouse at approximately 800mm from floor.
- Monitor mounted to arm with VESA standard mount.
- 5m cable loom from AV Rack to Monitor Trolley with easy to access cable wrap.

Network Switch

Technical Requirement

- Supplied by UniSA ISTS Network Services.
- Managed switch with RJ45 and SFP trunk ports.
- PoE+ available on all ports.
- Mounted in AV Rack using standard 19" RU rail system.

Power Distribution Unit

Technical Requirement

- 8 individually controllable power outputs rated for at least 10A, 240VAC at 50Hz.
- Surge protection of at least 4kV.
- Controllable via LAN using IP, Telnet or TCP/UDP.
- Mounted in AV Rack using standard 19" RU rail system.

Preferred Manufacturer

- Packedge



Projector Ceiling Mount

Technical Requirement

- Universal mounting system for projector.
- Powder coated colour to match projector chassis.
- Load rated to greater than the weight of the projector.

Preferred Manufacturer

- LP Morgan
- Vogels

Projector - Medium

Technical Requirement

- Laser based light source.
- FHD (1920 x 1080) resolution or greater.
- 5,000 ANSI Lumen brightness or greater.
- Discrete IP, HDBT or RS232 Control capable.
- 16:9 aspect ratio display capable.
- Lens capable to fill screen with shift and zoom capability.
- HDMI and HDBT inputs.

Required Manufacturer / Preferred Model

- Epson - EB-L610
- Sony

Projector - Large

Technical Requirement

- Laser based light source.
- FHD (1920 x 1080) resolution or greater.
- 7,000 ANSI Lumen brightness or greater.
- Discrete IP and RS232 Control capable.
- 16:9 aspect ratio display capable.
- Interchangeable lens capable to fill screen with motorised shift and zoom capability.
- HDMI and HDBT inputs.

Required Manufacturer / Preferred Model

- Epson - EB-L1050UNL
- Panasonic - PT-RZ790
- Sony - VPL-FHZ90L



Projection Screen - Manual

Technical Requirement

- 16:9 aspect ratio screen.
- Front projection material with black vinyl backing.
- Luminosity gain of 0.9 or greater.
- Manual pull down roller type.
- Safety auto retract mechanism to reduce damage to screen or user.

Required Manufacturer / Preferred Model

- Grandview Deluxe
- Screen Technics CinemaPro

Projection Screen - Motorised

Technical Requirement

- 16:9 aspect ratio screen.
- Front projection material with black vinyl backing.
- Luminosity gain of 0.9 or greater.
- Motorised roller type.
- Relay control of motor.

Required Manufacturer / Preferred Model

- Grandview
- Screen Technics ElectricCinema

Rack - Small

Technical Requirement

- Wall mountable with rear swing frame.
- 19" 12RU high equipment mounts.
- Black powder coated chassis with clear Perspex or glass door.
- Front panel cut-out at top of door to allow user access to AVPC front panel.
- Locks to be changed to accommodate standard UniSA AV Rack key.
- Accommodation for cable grommets in the top of rack and/or top of rear swing frame.

Rack - Joinery

Technical Requirement

- Rack frame only, no side panels.
- 19" 12RU high equipment mounts.
- Black powder coated frame chassis.
- Joinery mounted with UniSA Locks on joinery doors to secure rack.



Speakers - Ceiling Mounted Passive

Technical Requirement

- 6" woofer size or greater.
- Backcan where physical ceiling space permits.
- 100v and low-z input compatible.
- Minimum 80 degree uni-directional coverage angle.
- Co-axial woofer/tweeter configuration.
- In built seismic restraint point.

Preferred Manufacturer / Model

- Tannoy CVS series

Speakers - Wall Mounted Powered

Technical Requirement

- Self-powered, surface mounted speaker type.
- Includes adjustable bracket options.
- Stereo configuration with balanced and unbalanced stereo inputs.
- 5.25" woofer size or greater.
- Component woofer/tweeter configuration.
- Frequency Response 45Hz - 20Khz or greater.
- 30 Watts Per Channel RMS or More.
- Volume Control.
- Analogue line audio output.
- Auto Power Control capable.

Preferred Manufacturer / Model

- Kramer Tavor 6-0

Speakers - Wall Mounted Passive

Technical Requirement

- Includes flexible mounting bracket options.
- 5.25" woofer size or greater.
- Co-axial woofer/tweeter configuration.
- Frequency Response 75Hz - 20Khz or greater.
- 100v and low-z input compatible.

Preferred Manufacturer / Model

- Tannoy DVS series

Speakers - Line Array

Technical Requirement

- Includes bracket options
- Co-axial woofer/tweeter configuration.
- Frequency Response 75Hz - 20Khz or greater.



USB - Foot Switch

Technical Requirement

- Capable of discrete Forward and Backwards speed control and Play/Pause controls.
- USB connection without additional software requirement.

USB - UC Soundbar

Technical Requirement

- USB 2.0 speed audio & video transport compatible
- 1080p 30fps minimum video capture.
- 90° camera field of view minimum.
- Image pan and tilt of 20° minimum. 3x image zoom minimum with no degradation of image quality.
- Camera video connection should be UVC compliant.
- Stereo speakers on board.
- Integrated microphone with a minimum pickup distance of 3.5m diameter.
- On-display or under-display mounting option.
- Beam Steering, Echo and Noise Cancellation on board.

Preferred Manufacturer / Model

- Logitech Meetup

USB - VC Wired System

Technical Requirement

- USB 2.0 speed audio & video transport compatible
- 1080p 30fps minimum video capture.
- 90° camera field of view minimum.
- Image pan and tilt of 20° minimum. 3x image zoom minimum with no degradation of image quality.
- Camera video connection should be UVC compliant.
- Stereo speakerphone unit with microphone in built.
- Integrated microphone with a minimum pickup distance of 3.5m diameter.
- Wall or ceiling mounting option for camera unit.
- Beam Steering, Echo and Noise Cancellation on board.

Preferred Manufacturer / Model

- Logitech Group



USB - UC Wireless Speakerphone

Technical Requirement

- Single or double speakerphone pods.
- Plug and play USB 2.0 speed audio transport compatible.
- Wireless communication to USB dongle without pairing.
- Speaker on board each wireless pod.
- Integrated microphone with a minimum pickup distance of 1.5m diameter for each pod.
- Beam Steering, Echo and Noise Cancellation on board.

Preferred Manufacturer / Model

- Huddlecam Huddle Pod Air/Duo

USB - UC Hub

Technical Requirement

- Plug and play USB 2.0 speed audio transport compatible.
- USB, microphone inputs with USB & analogue audio outputs.
- Auto-room tune with Echo and Noise Cancellation on board.
- Inclusion of on-board low impedance speaker amplifier, 20w minimum.
- LAN connectivity for room monitoring.

Preferred Manufacturer / Model

- Biamp Devio SCR-20

Vision Mixer

Technical Requirement

- Adjustable Chroma key
- Picture in picture functionality in built.
- Source cross fade transition capable.
- Ability to load still frame images for holding/background.
- Multiple inputs & outputs including HDMI and 3G-SDI with built in scaling.
- Mounted in rack using standard 19" RU rail system.



Recorder - Media Streamer

Technical Requirement

- Capable of at least dual channel 1080p30 recording output at 10mbps.
- H.264 formatted Direct-to-USB, internal storage or FTP/SFTP/SMB recording capability.
- RTP/RTMP/MPEG transport streaming capability.
- Dual channel HDMI inputs capable of 1080p60 with HDMI program output.
- HDMI and analogue audio inputs.
- IP and/or RS-232 Control capable.
- Mounted in rack using standard 19" RU rail system.

Preferred Manufacturer / Model

- Extron SMP-351

Switcher – USB

Technical Requirement

- RS-232, LAN or Relay control.
- At least 2x host inputs and 1 device output.
- Auto switching capability with hot plug detect.

Switcher – HDMI

Technical Requirement

- Support for at least 2 HDMI inputs.
- Support for at least 1 HDMI output with video and audio capability.
- HDCP compliance and EDID management throughout all inputs and outputs.
- 1080p (1920 x 1080 pixels) video resolution at 60Hz refresh rate or greater.
- Input sensing/reporting.
- Discrete IP and/or control capable.

Required Manufacturer / Preferred Model

- Extron
- SW HD 4K Plus series



Switcher – Video

Technical Requirement

- Support for at least 2 HDMI inputs.
- Support for at least 1 HDMI output, and HDBT output with video, audio and control capability.
- HDCP compliance and EDID management throughout all inputs and outputs.
- 1080p (1920 x 1080 pixels) video resolution at 60Hz refresh rate or greater.
- Input sensing/reporting.
- Discrete IP control capable.
- Mounted in AV Rack using standard 19" RU rail system.

Required Manufacturer / Preferred Model

- Extron
- IN1804 D0

Switcher – Video Matrix

Technical Requirement

- Support for multiple HDMI inputs.
- Support for multiple AV outputs of either HDMI or HDBaseT formats.
- Any-to-any input output AV switching control.
- Switchable program audio output with audio breakout capability.
- HDCP compliance and EDID management throughout all inputs and outputs.
- 1080p (1920 x 1080 pixels) video resolution at 60Hz refresh rate or greater.
- Mounted in AV Rack using standard 19" RU rail system.
- Input sensing/reporting
- Discrete IP control capable.

Required Manufacturer / Preferred Model

- Extron
- DXP series



Video Conferencing Appliance

Technical Requirement

- At least 2x HDMI/HDCI camera inputs.
- At least 1x HDMI content source input.
- At least 3x HDMI outputs.
- HDCP compliance and EDID management throughout all inputs and outputs.
- 1080p (1920 x 1080 pixels) video resolution at 60Hz refresh rate or greater.
- 2x microphone array inputs supporting at least 4 arrays.
- 2x HDCI audio via camera input.
- 3x HDMI audio inputs.
- 2x RCA analogue line inputs.
- Mounted in AV Rack using standard 19" RU rail system.
- H.261, H.263, H.264 AVC, H.264 High Profile, H.264 SVC, RTV compliant.
- Discrete IP and/or RS-232 DB9 Control capable

Required Manufacturer / Model

- Poly Group 700 with Eagle Eye IV camera

Video Distribution - AV over IP

Technical Requirement

- HDCP compliance and EDID management throughout all video inputs and outputs.
- 1080p (1920 x 1080 pixels) video resolution at 60Hz refresh rate or greater.
- No more than 5 frames of latency between any two endpoints within a single local system.
- Must be capable of all to all matrix routing.
- Encoders or Decoders must be capable of being powered with PoE or PoE+.
- HDMI audio de-embedding with AES-67 and/or analogue Audio transport support on end points.
 - Where AV over IP system is used, a dedicated audio end point may be required.
- When mounted in AV Rack, endpoints must use standard 19" RU rail system (with shelf where needed).
- Segregated network switch must be utilised, with sufficient ports and PoE capacity for all AV over IP end points and devices.
- All network and bandwidth configurations on AV over IP end points shall be customisable and compatible with the current University network switch specifications.
- Any network design required for an AV over IP system, excluding point to point solutions, should be provided to and approved by Network Services prior to installation or purchase.

Preferred Manufacturer / Model

- AMX SVSI N2400 Series



5.2.O – Equipment Chassis Colour Selection

For equipment where exterior chassis colour can be chosen, the colour most closely matching the nearby finishes (walls, ceiling etc) should be used. For user interactable equipment, a matte or satin finish is preferred over gloss.

For mounting equipment (projector poles etc), hardware colour should closely match that of the equipment being mounted.



Appendix A – AV Standard Options

Options can also be added to the standards where additional equipment or functionality is required however is not included in a specification. These may be the additional of in room control, USB switching or a touch panel, for example. Variations on these options and specifications will be documented by ISTS during the design/scope stage of a project.

Typically, a shorthand version will be used as follows:

AV##[Specification#]+(xxx)[Options]...

E.g. AV13+CTP

(A small meeting room with a control pad)

For legacy reasons there is also AV standard revisions, although this will only generally be used internally by ISTS TT staff to differentiate older room installations.

The full formatting of an AV specification is as follows:

AV##[Specification].##[Revision]+(xxx)[Options]...

E.g. AV15.02+USB+LCD

(A large meeting room with USB switching and an LCD Display [Revision 2])

Appendix B – Future changes & revision notes

Below are sections/ideas regarding items that have been raised during development of revision 2.0, however were unable to be ratified due to time or resourcing restraints. These items may get addressed in future AV Standard revisions.

- Implementation of IP cameras for remote support in crucial teaching spaces.
- Addition of “standard layout and furniture” sections for each AV space standard.
- Implementation of energy management section in Install & Infrastructure specification.
- Implementation of standardised programming and configuration section.
- Removal of RS-232 in favor of LAN from AV control design,
- Addition of AV21 “Seminar Room” and AV43 “Interview/Consult Room”.