



Deakin eSolutions – Information Technology Services Division

ICT Volume 2: Audio Visual Standards

ICT 2.1 2013 Audio Visual Room Standards

Audio Visual and Networks Unit

Document Version 3.5 *Final*

Abstract

This purpose of this document is to clearly define a standard set of functional audio visual room configurations for meeting rooms and teaching spaces.

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ICT 2.0 Addenda and Updates

ICT 2.1 Room Standards

ICT 2.2 Technical Design Standards

ICT 2.3 Videoconferencing Standards

ICT 2.4 Signoff and Commissioning Checklists

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ICT 2.6 Detailed Design Specifications

ICT 2.7 Design Calculators, Tools and Resources

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1 General Instructions

1.1 Standards Brief

This standards document, and the collection of standards to which it belongs, is aimed at providing clear guidance to contractors and staff engaged to undertake audio visual works in University teaching spaces and meeting rooms. The objectives of the standards documents are to ensure consistent interpretation of technical requirements, and consistent delivery of functioning and maintainable spaces.

This document should be used when planning refurbishments or any new work for audio visual installations throughout the University. This document defines a standard set of room configurations that will allow the University to have common teaching spaces on all campuses that are easy to use, easy to support and highly reliable. This will allow a common user experience – the same look, feel and operation of audio visual and IT equipment – across rooms on all of the University's campuses.

1.2 Policy

This standard applies to all AudioVisual systems throughout Deakin University and associated locations managed by Deakin eSolutions.

1.3 Standard Document Access

All Deakin University DeS staff and contracted personnel are provided access to this document.

Designers, installers and contractors must ensure they have the most current version of all standards prior to engaging in any work.

The most recent version can be found on the web at:

<http://www.deakin.edu.au/ict/standards/active.php>

and associated resources at:

<http://www.deakin.edu.au/ict/standards/resources.php>

1.4 Related Documents

Many aspects of the system design requirements are specified in other companion documents within Volume 2 of the Deakin ICT Standards. All documents within Volume 2 must be read together to constitute the complete Standard.

In addition, *2.0 Addenda and Updates* must also be read in conjunction with this document, it contains important incremental updates and additional information.

1.5 Conflict of Information or Clarification

Whenever a conflict of information occurs or clarification of instruction is required all queries shall be made to the **DeS AV and Networks Unit Leader**.

1.6 Non-standard configurations

All non-standard implementations **must** be approved in writing by the **DeS AV and Networks Unit Leader** strictly on a case-by-case basis.

1.7 Roles and Responsibilities

The following roles are referenced in this and related standards.

Role	Responsibility
DeS AV and Networks Unit Leader	Holds responsibility for all audiovisual and network standards and their adherence, provision, maintenance and security of all audiovisual and network infrastructure. All Communications Engineers ultimately report to this role.
DeS Senior Communications Engineer (AV/Networks)	A staff member with significant technical experience whose role is to provide architectural design and quality control of audiovisual and network fitouts.
DeS Communications Engineer (AV/Networks)	A staff member with technical experience whose role is to audit, provision and maintain audiovisual and network infrastructure.
Project Manager (DeS)	<p>Responsible for ensuring DeS-supplied deliverables agreed to by formal project board are delivered on time, to budget and within agreed quality parameters while managing project communication, dependencies and reporting.</p> <p>Defects with an audiovisual or network fitout will be reported to the Project Manager (DeS) by DeS Communications Engineer (AV/Networks).</p>
Project Manager (FSD)	<p>Responsible for ensuring FSD-supplied deliverables agreed to by formal project board are delivered on time, to budget and within agreed quality parameters while managing project communication, dependencies and reporting.</p> <p>Defects with an audiovisual or network fitout for which FSD have project management responsibility will be reported by the Project Manager (FSD).</p>
External supplier	A company such as a third party audio-visual or integration vendor, or network cabling provider, contracted by Deakin University to provide specified products and/or services.
Subcontractor	A company or other agent hired by an external supplier to provide all or some products or services required to fulfil a contract the external supplier holds with Deakin University

2 Installation standards and conditions

This document does not replace, supersede or override formal contractual terms and conditions between the parties. This section draws suppliers' attention to some important requirements.

2.1 Variation Agreements

Any deviation from the Standard specification must be agreed to in writing by **DeS AV and Networks Unit Leader** prior to commencement of any work or as an addendum during the construction process.

Any building features such as:

- Plasterwork
- Ceiling tiles
- Carpet tiles

that are altered during the installation process must be restored to original condition, to the satisfaction of the site supervisor.

2.2 DeS site inspections

The contractor shall agree to regular site visits from DeS project representatives and have in place a means of communication and escalation between senior technical staff within both organizations prior to commencement of work.

2.3 Contractor to fully self-inform

The contractor shall fully self-inform and not rely on representations.

2.4 Fit-for-purpose

Solutions shall be fit-for-purpose.

2.5 Commissioning procedures

2.5.1 Video codec

Video codecs shall be commissioned according to the required DeS process (refer *ICT Volume 2.7 Design Calculators, Tools and Resources* for details).

2.5.2 Radio microphones

Each radio microphone shall have its own dedicated radio channel allocated, such that the channel does not clash with any other channel in the venue or in any other venue within range. Allocated channels shall be recorded in the Deakin radio microphone channel allocation Mic Map register. Channels shall be allocated and recorded according to the required DeS process (refer *ICT Volume 2.7 Design Calculators, Tools and Resources* for details).

3 Audio visual configuration packages

This document provides an overview of the functional requirements of the various standard types of audiovisual system configuration.

Each standard room within the University equipped with audiovisual systems is classified into a category which describes its level of audio visual functionality. For example, a room classified at AV01 has minimum audio visual equipment, while a room classified at AV08 has extensive capability.

Refer: When installing these rooms the installer shall refer to all other documents in Volume 2 in particular the "ICT 2.2 Audio Visual Technical Design Standards" document for detailed technical standards.

Standard types of space:

- AV01 = Digital display space
- AV02 = Personal office with videoconferencing
- AV03 = Meeting room
- AV04 = Videoconference room
- AV05 = Small class room
- AV06 = Standard class room
- AV07 = Standard Lecture Theatre
- AV08 = Tele-teaching Lecture Theatre

Sub-types:

- AV01-S = Digital signage display
- AV01-T = IP-TV display (in particular in Student Residences)
- AV03-A = Meeting room (LCD)
- AV03-B = Meeting room (SmartBoard)
- AV03-C = Meeting room (Projector)
- AV04-Ax = Videoconference room (LCD)
- AV04-Bx = Videoconference room (Projector)
- AV04/6-H = Hybrid meeting/seminar videoconference room
- AV05-A = Small class room (Projector)
- AV05-B = Small class room (SmartBoard)
- AV06-V = Standard class room with videoconferencing
- AV06-C = Collaboration classroom with videoconferencing

Default types:

- for Meeting room: AV03-A (LCD)
- for Videoconference room: AV04-AA (dual LCD / C20+)
- for Small class room: AV05-B (SmartBoard)
- for Medium/Large class room: AV06 (dual Projector / no videoconference)
- for Lecture Theatre: AV07 (dual Projector / no videoconference)

Custom types:

Custom (i.e. non-standard) room types are sometimes required, based on the above standard types and sub-types. Please refer to Section 4.6 below for details.

The matrix below lists the standard set of functional configurations for each standard type.

Equipment/Services	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Primary Display (LCD/Projector)	Y	Y	E	Y	E	Y	Y	Y
Second Display (matching first)	-	O	-	O	-	Y	Y	Y
SMART Interactive Board	-	-	E	-	E	-	-	-
SMART Interactive Tablet	-	-	-	-	-	O	O	O
Video Conferencing	-	Y	-	Y	-	O	-	Y
Document Camera	-	Y	O	-	Y	Y	Y	Y
Local Laptop Inputs	-	Y	Y	Y	Y	Y	Y	Y
Desktop Computer	-	Y	Y	Y	Y	Y	Y	Y
Program Audio	O	Y	Y	Y	Y	Y	Y	Y
Vocal Reinforcement	-	-	-	-	-	O	Y	Y
Wireless Microphones	-	-	-	-	-	O	Y	Y
iLecture recording	-	-	-	-	-	O	Y	Y
Hearing Augmentation *	-	-	-	-	-	(*)	Y	Y
Presentation desk	-	-	-	-	Y	Y	Y	Y
Eduroam WiFi	Y	Y	Y	Y	Y	Y	Y	Y
BYOD power	O	O	Y	Y	Y	Y	Y	Y
VoIP phone	O	O	E	Y	Y	Y	Y	Y
VoIP voicepoint	-	-	E	-	-	-	-	-
IPTV/DMP STB	Y	-	-	-	-	-	-	-
IR Remote Control	(T)	-	-	-	-	-	-	-
Touch Panel Control (System-integral)	-	Y	-	E	-	-	-	-
Keypad Control System (Novara)	-	-	(#)	-	Y	-	-	-
Touch Panel Control (AMX)	-	-	-	E	-	Y	Y	Y
Integrated Lighting Control	-	-	-	-	-	Y	Y	Y

Legend: Y = Mandatory, O = Optional, E = Either (not both)
“-” = No (room shall not have this feature)

(*) required in rooms greater than 100 m² and in all Lecture Theatres and where required by the BCA

(#) required for rooms with projectors and/or motorized blinds; not provided otherwise

(T) AV01-T only

All lecture theatres and teaching spaces (AV06, AV07, AV08) shall utilise an AMX touch panel with integrated lighting control. AV05 teaching spaces shall utilize an AMX Novara keypad control system. Videoconference meeting rooms (AV04) shall utilize Cisco/Tandberg system integral controller, (Touch-8 touch panel) or AMX touch panel in specific circumstances, as set out in *ICT 2.3 Videoconferencing Standards*.

4 Room standards

All spaces shall be evaluated to determine what type of functionality they require and which category of audiovisual fit-out they are capable of being provided with.

Once this is completed the evaluator will need to consult with the customer to decide which standard room configuration is to be installed keeping in mind what will be best suited to the room's environment and condition.

Refer: Any spaces requiring videoconferencing shall further refer to "ICT 2.3 Videoconferencing Standards" document for detailed technical standards.

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Digital Display Space	Y	-	-	-	-	-	-	-
Personal Office	-	Y	-	-	-	-	-	-
Meeting Room	-	-	Y	Y	-	-	-	-
Teaching Space	-	-	-	-	Y	Y	-	-
Lecture Theatre	-	-	-	-	-	-	Y	Y

4.1 Digital display space

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Digital Display Space	Y	-	-	-	-	-	-	-

4.1.1 Digital signage display – AV01-S

Digital signage may be installed in areas such as public spaces, building entrances and reception areas. Digital signage installations consist of LCD panel and digital media player (DMP) connected to power and network outlets.

Content is developed by the local area to which the installation belongs. Where no specific content is available or produced, centralised Deakin University content will be displayed.

All digital signage installations must be connected to the central digital signage server.

4.1.2 IP-TV display – AV01-T

IPTV displays are installed throughout on-campus Student Residences, and occasionally in other locations, e.g. staff tea-rooms.

Content is provided by Deakin's internal IPTV distribution service, comprising local free-to-air channels, selected international satellite channels, and potentially Deakin produced content.

Discrete IPTV STB units are provided in this (AV01-T) room type ONLY – all other room types (AV02..08) access Deakin's IPTV service via the provided house-PC.

4.2 Personal Office

Personal office installations consist of a personal Cisco/Tandberg EX90 desktop videoconference appliance. An audit of the room must be conducted by an **DeS Communications Engineer (AV)** to assess suitability prior to ordering and installation.

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Personal Office	-	Y	-	-	-	-	-	-

4.2.1 Personal office with videoconferencing – AV02

Functionality includes:

- Single display LCD screen (optional dual LCD screen);
- Dedicated PC with DVD drive;
- Local laptop input;
- Program Audio;
- Personal videoconference unit
- with Inbuilt Document Camera

4.3 Meeting rooms

Two types of meeting rooms with audiovisual functionality are available:

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Meeting Room	-	-	Y	Y	-	-	-	-

4.3.1 Meeting room – AV03

Functionality includes:

- Single display or SmartBoard;
- Dedicated PC with inbuilt DVD drive;
- Local laptop input/s;
- Autoswitcher;
- Program audio;
- VoIP phone or VoIP voicepoint;
- BYOD power in table-box

4.3.2 Meeting room with videoconferencing – AV04

Functionality includes:

- Dual display **videoconferencing system**
(or Single display option for small rooms of up to 6 seats);
- Dedicated PC with inbuilt DVD drive;
- Local laptop input/s;
- Autoswitcher (where dedicated PC provisioned);
- Program audio;
- Videoconference system-integral (touchpanel) controller;
- VoIP phone on credenza complete with long lead;
- BYOD power in table-box

4.4 Teaching spaces

Teaching spaces mainly consist of tutorial rooms and laboratories. It should be noted that the standard describes audiovisual functionalities and a more detailed investigation may need to take place to ensure the appropriate equipment is provisioned in each room. As a guide, the AV05 small teaching space standard is generally less than 30 seat capacity.

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Teaching Space	-	-	-	-	Y	Y	-	-

Hearing augmentation system shall be provided:

- as required by the BCA, and
- as a minimum: in any teaching space greater than 100 m² floor area.

4.4.1 Teaching space (small) – AV05

Functionality includes:

- Single projector (AV05-A) or SmartBoard (AV05-B);
- Dedicated PC with inbuilt DVD drive;
- Local laptop input;
- Document camera;
- Program audio;
- AMX Novara keypad controller;
- VoIP phone for presenter;
- BYOD power at convenient locations for students

4.4.2 Teaching space (medium to large) – AV06

Functionality includes:

- Dual projector displays;
- Dedicated PC with inbuilt DVD drive;
- Local laptop input;
- Document camera;
- Program audio;
- Touch panel control;
- VoIP phone for presenter;
- Vocal reinforcement (Optional);
- Hearing augmentation as required by BCA;
- Videoconference system (Optional);
- iLecture recording system (Optional);
- BYOD power at convenient locations for students

4.5 Lecture theatres (LT)

Two types of lecture theatres are available. Type AV07 is a standard lecture theatre with dual projector. Type AV08 includes dual projectors and videoconferencing.

Area	AV01	AV02	AV03	AV04	AV05	AV06	AV07	AV08
Lecture Theatre	-	-	-	-	-	-	Y	Y

All lecture theatres shall include hearing augmentation system.

4.5.1 Lecture theatre (LT) – AV07

Functionality includes:

- Dual projectors;
- Dedicated PC with inbuilt DVD drive;
- Local laptop input;
- Document camera;
- Program audio;
- Voice reinforcement system;
- Gooseneck microphone;
- Wireless microphones (lapel and handheld);
- Hearing augmentation system;
- iLecture recording system;
- Touch panel controller;
- VoIP phone for presenter;
- BYOD power at convenient locations for students

4.5.2 Lecture theatre (LT) with videoconferencing – AV08

Functionality includes:

- Dual projectors;
- **Videoconferencing system;**
- Dedicated PC with inbuilt DVD drive;
- Local laptop input;
- Document camera;
- Program audio;
- Voice reinforcement system;
- Gooseneck microphone;
- Wireless microphones (lapel and handheld);
- Hearing augmentation system;
- iLecture recording system;
- Touch panel controller;
- VoIP phone for presenter;
- BYOD power at convenient locations for students

4.6 Custom (non-standard) rooms

Custom (i.e. non-standard) room types are sometimes required. The flexibility to support custom room configurations is an important part of these standards, so as to meet the diverse and varying business needs of the University.

Custom rooms **shall always** be based on a similar standard type or sub-type, generally by *removing* components from the relevant standard design. In some circumstances, the custom solution may be developed by *substituting* or *adding* components to the standard design.

Custom rooms must always be approved by the **DeS AV and Networks Unit Leader** **strictly on a room-by-room basis**, prior to commencement of procurement, and using the appropriate form (refer *ICT Volume 2.7 Resource 2.7.1 AV Custom solution approval and waiver form*).

Standard rooms **must be configured exactly** as specified in this and all related Standards in *ICT Volume 2*. All departures from these Standards must be processed as a Custom Room, as set out in this Section.

5 Functional requirements

5.1 Common requirements, all deployment types

- Energy efficiency: Systems (including LCD and projector displays and other components) shall power up/down (or leave/enter stand-by mode) when commanded at session-start and automatically after session-end
- Remote management: All features to be able to be remotely monitored, controlled, configured and updated from a central management system, including the ability to remotely reboot and power-cycle individual components
- Lighting: Minimum 2-way split system so that presentation display area (FoH) lighting and audience area lighting can be separately controlled (not required for AV01, AV02):
 - AV03, AV04, AV05: *minimum* controls:
 - FoH: 2-position Off/On (default = Off)
 - Audience: 3-position Off/Half/Full
 - AV06, AV07, AV07: *minimum* 3-way split-system with controls:
 - FoH: continuously variable (default = Off)
 - Audience: continuously variable
 - Presenter highlight: continuously variable (no light bleed from spotlighting onto presentation surfaces – barn doors as required)
- **No** direct light (either natural or artificial) onto any presentation surfaces or panels
 - Minimum light bleed from audience lighting onto presentation surfaces or panels
- Widescreen: 16x10 (all projectors including SmartBoard, and AV02 LCD) or 16x9 (all other LCD)
- Minimum resolution 1280x720 although WXGA, Full-HD or WUXGA (best) are preferred

- Aspect ratio of preview monitors **MUST MATCH** that of the main displays (i.e. 16x9 with 16x9; 16x10 with 16x10; **NOT** 16x9 preview with 16x10 main)
 - Note: Projectors and SmartBoards are typically 16x10; LCD display panels are typically 16x9 – check individual display technology device on a type-by-type basis for determining correct preview monitors
- LCD panels: Fluorescent backlit LCD panels are to be used
 - Due to their poor colour balance (harsh / blue accentuated) LED backlit LCD panels (so-called LED panels) are **NOT ACCEPTABLE**
- House PC to be provided
 - House PC provides inbuilt DVD and IPTV player functionality
 - Therefore: discrete DVD player or IPTV STB **NOT** to be provided
 - *Exception:* Student Residences TV (AV01-T) has DVD and IPTV STB and no PC.
- **No** RF TV cabling, receiver or decoder to endpoint applications anywhere at Deakin (IPTV distribution over Ethernet shall always be used)
 - Where available, house PC is to be used to render IPTV, **NOT** a separate IPTV STB
 - Where IPTV is required, system PC is to be fitted for all standard (AV0x) room types
 - IPTV STB is **ONLY** to be used where no PC available, i.e. student residences TV (AV01-S)
- Pull down screen/s (either manual or motorized) shall **NOT** be used anywhere at Deakin, except where absolutely unavoidable, e.g. existing sub-standard room/window layout
 - as with any other non-standard configuration, use of pull-down screen (either manual or motorized) **MUST** be approved by **DeS AV and Networks Unit Leader** strictly on a case-by-case basis
 - otherwise projection shall always be directly onto an **expansive** (larger than maximum image size) **MATT** (zero-gloss) **WHITE** wall only, with **NO** defined borders (e.g. whether painted or by any other means), so as to seamlessly accommodate varying image sizes and aspect ratios
 - exception: SmartBoard comes with its own screen and borders
- Manual (either fixed pull-down or portable) projection screens shall **NOT** be used
- Hearing augmentation, to the extent required by the BCA
- Maximum **one** AV user control device (touch-screen, keypad, or handheld remote-control)
 - Exceptions: in some cases, some secondary (non-AV) systems may be separately controlled, e.g. lighting, blinds, HVAC
 - However: full integration of lighting and motorized blinds/curtains is always required for AV06, AV07, AV08
 - Full integration of motorized projection screens (where fitted) is always required (motorized projection screens are non-standard special cases as above)
 - Multiple handheld remotes shall **NEVER** be deployed
 - **MUST** be eliminated, i.e. replace by automatic controls or integrated control system
- The following interactive display products (Figure 1) shall be used:

FIGURE 1 – INTERACTIVE DISPLAY TYPES

Application – required image size	Solution
<165 cm (<65")	Mitsubishi touch LCD
221 cm (87"), where sightlines allow SmartBoard	SmartBoard with UST projector
221 cm (87"), where sightlines do not allow SmartBoard	Smart Podium with projector
>221 cm (>87")	Smart Podium with projector

All model numbers are as defined in Appendix B of *ICT Volume 2.2 Technical Design Standards*

5.2 Digital display space (AV01)

5.2.1 Digital signage display (AV01-S)

- Wall-mounted LCD panel
- Visibility to extended range, through the use of larger fonts
 - Viewing range at least 1H to 10H
- Primary objective is high brightness, contrast and power efficiency
 - Therefore LED backlit LCD panels (so-called 'LED' panels) are acceptable in this application (AV01) only
 - Due to poor colour balance (harsh / blue accentuated) LED backlit LCD panels are **NOT ACCEPTABLE** in any other application
- Widescreen (16x9)
- Minimum resolution 1280x720, although Full-HD (1920x1080) preferred
- Display of content, via IP, from central content distribution system only
- No local content input devices (e.g. PC, USB, DVD)
- No local RF TV cabling, receiver, STB or IPTV decoder (IPTV via central content distribution system is always used)
 - No IPTV STB to be installed – all content via Digital Signage STB only
- No local vision source switching
- No end-user accessible controls; no control panel device
- *Generally:* No sound reproduction (no speakers), except in conjunction with touchscreen display
- No user-accessible controls, except for:
 - *Optional:* Touch interface
- Remote manageable, including remote reboot and power-cycle

5.2.2 IP-TV display (AV01-T)

- Wall-mounted LCD panel with inbuilt stereo speakers
- IPTV STB
 - STB to be mounted either behind LCD with IR extender or immediately above or below LCD as appropriate
- DVD player

- Flexible mount arm so users can orient display position and angle as required
 - Cables loomed along arm with strain relief and of sufficient length to allow full flexible movement of arm without strain
- Visibility to extended range
 - Viewing range typically approx below 2H to above 8H
- Primary objective is ruggedness and power efficiency
 - Must be suitable for commercial-premises installation complete with manufacturer's commercial-grade warranty
 - LED backlit LCD panels (so-called 'LED' panels) are acceptable in this application (AV01) only
 - Due to poor colour balance (harsh / blue accentuated) LED backlit LCD panels are **NOT ACCEPTABLE** in any other application
- Widescreen (16x9)
- Minimum resolution 1280x720, although Full-HD (1920x1080) preferred
- Display of content from Deakin IPTV service, or local DVD player or user-supplied PC or BYOD
- AV input connections for user-supplied PC or BYOD (VGA and/or HDMI)
- **No** local RF TV cabling or inbuilt RF TV receiver
- Local vision source switching and display control via native (out-of-the-box) handheld IR remote control devices
 - AV01-T is the **ONLY** room type with handheld IR remote control devices
 - All other room types (AV02..08) must have a **touchpanel** AV controller
 - AV01-T is the **ONLY** room type with multiple control devices (e.g. one each for LCD, STB, DVD)
 - All other room types (AV02..08) must have a **single** integrated AV controller
- To prevent spurious fault reports – which have been seen to arise from residents partially unplugging system components (e.g. to reuse GPO or network outlets):
 - The entire system must be run from a **single** GPO and a **single** network walloutlet, preferably captive, and preferably in an inconvenient and concealed location behind the LCD panel;
 - Other active GPO(/s) and active network walloutlet(/s) **must** be provided for general use in the immediate vicinity;
 - Double-adaptors **must not** be used;
 - **No** end-user access to the system PDU, which must be mounted behind the LCD panel;
 - All cables to be loomed and tethered.
- No OHS or trip hazards
- Remote management not required

5.3 Personal office (AV02)

Personal office or very small meeting room with videoconferencing, as detailed in *ICT 2.3 Videoconferencing Standards*.

5.4 Meeting room (AV03)

- Single display, either LCD (AV03-A) or SmartBoard (AV03-B), or Projector (AV03-C)
- No videoconferencing
- System PC, optional
- Two laptop plugins (VGA plus stereo audio 3.5 mm mini-jack)
 - one at primary sitting positions
 - one at presenter's position
- Autoswitcher to select vision source, priority:
 1. Laptop at the primary sitting position (facing towards the screen)
 2. 2nd laptop at the presenter's position (facing towards the local audience)
 3. System PC
- Control system:
 - No handheld remote control
 - AV03-A (LCD): No control system – LCD auto-senses vision sync to power up/down from/to stand-by mode (as per AV04-A)
 - AV03-B/C (SmartBoard/Projector): Novara keypad (as per AV05-B)

5.5 Meeting room with videoconferencing (AV04)

As for AV03 but with the addition of videoconferencing, as detailed in *ICT 2.3 Videoconferencing Standards*.

- Single or dual display, either LCD (AV04-Ax) or Projector (AV04-Bx)

5.6 Teaching space – small (AV05)

- Single display, either Projector (AV05-A) or SmartBoard (AV05-B)
- **No** videoconferencing
- **No** voice reinforcement
- Presenter's System PC, mandatory
- One laptop plugin (VGA plus stereo audio 3.5 mm mini-jack)
 - at presenter's desk
- Autoswitcher to select vision source, priority:
 1. Laptop at the presenter's desk
 2. System PC

- DocCam
 - vision direct to vision switcher (manual vision source selection on Novara keypad)
 - also vision feed integrated with SmartBoard (AV05-B) via USB (USB autoswitched between System PC and Laptop, in lock-step with auto vision switching above)
- Control system:
 - No handheld remote control
 - AV05-A (Projector): Novara keypad
 - AV05-B (SmartBoard): Novara keypad
- Program Audio sound system only:
 - AV05-A (Projector): speakers affixed to presentation wall, with maximum clearance from projected image to minimize visual clutter, i.e. closer to side walls than to image.
 - AV05-B (SmartBoard): speakers affixed to SmartBoard
- **No** ceiling speaker arrays
- **No** Voice Reinforcement sound system
- Hence **No** iLecture capture

5.6.1 PC and Mac computer laboratories

Where presentation facilities are required in PC/Mac labs, AV05 is used (as above).

5.7 Teaching space – medium to large (AV06)

A common design applies to all of AV06, AV07 and AV08. The full specification is given at *ICT 2.3 Videoconferencing Standards*.

- All of AV06, AV07 and AV08 have Dual displays

Specific attributes of AV06:

- AV06 has optional Voice Reinforcement sound system (optional in smaller spaces; mandatory in larger spaces and where iLecture provisioned)
- AV06 has optional videoconferencing (AV06-V), as detailed in *ICT 2.3 Videoconferencing Standards* plus optional push-to-talk collaboration system (AV06-C).

5.8 Lecture theatre (AV07)

AV07 is the same as AV08, except with all videoconferencing functions removed.

5.9 Lecture theatre with videoconferencing (AV08)

As for AV07 but with the addition of videoconferencing, as detailed in *ICT 2.3 Videoconferencing Standards*.

6 Room layouts

6.1 Custom spaces

Although the various AV0x system types are depicted in conventional room layouts below, the same standard system designs can also be mapped into a variety of other room configurations. Some examples are described below. **See also Section 4.6 above for important rules pertaining to custom spaces.**

6.1.1 Standard solution in non-standard room layout

Sometimes a 100% standard electronic solution or sub-type (AV0x-y) may be installed into an unusually configured physical space. This is the preferred approach because it preserves the standard design.

6.1.2 Custom solution based on standard sub/type

Custom rooms are always based on a similar standard type or sub-type, generally by *removing* components from the relevant standard design. This is the preferred approach because it most closely preserves the standard design. In some circumstances, the custom solution may be developed by *substituting* components or *adding* components to the standard design.

6.1.3 Flexible and Innovative Learning spaces

A number of innovative and flexible learning spaces can be supported using the standard AV0x system designs. For example:

- Multiple separate standard systems in the one space:
a number of small AV03 systems could be deployed in a large collaborative learning space.
- Multiple interconnected systems in the one space:
a number of small AV03 systems could be deployed in a large collaborative learning space, and integrated so that one vision stream could be switched to all of the displays via a custom central controller & vision switch.
- Hybrid spaces:
custom solutions that draw together features from more than one standard type, e.g. the AV04/6-H videoconference seminar room described in *ICT 2.3 Videoconferencing Standards*.

As with all non-standard configurations, approval must be obtained from the **DeS AV and Networks Unit Leader** strictly on a case-by-case basis.

6.2 Digital display space (AV01)

Any space with wall-mounted single LCD panel, subject to the following criteria:

- **No** direct sunlight on the panel at any time of day and any time of year;
- **No** artificial lighting directly onto the panel;
- LCD panel of image height H of sufficient size such that:
 - The rear of the intended primary viewing area is no greater than 8H from the panel;
- LCD panel mounted such that lower edge of display area no higher than 1.6 m AFFL
[this ensures that maximum viewing angle to top edge of display does not exceed 30° for typical standing observer at distance 2H from display]

6.3 Personal office (AV02)

Refer to "ICT 2.3 Videoconferencing Standards" document.

6.4 Meeting room (AV03)

Similar to AV04 (below) but with one display (LCD or SmartBoard) instead of two.

6.5 Meeting room with videoconferencing (AV04)

Telepresence-grade wide-format table layouts are preferred, refer details in *ICT 2.3 Videoconferencing Standards*.

Most preferred table shapes:

- Wide-format tables (wide arc, wide-U, wide-V, wide trapezoid)

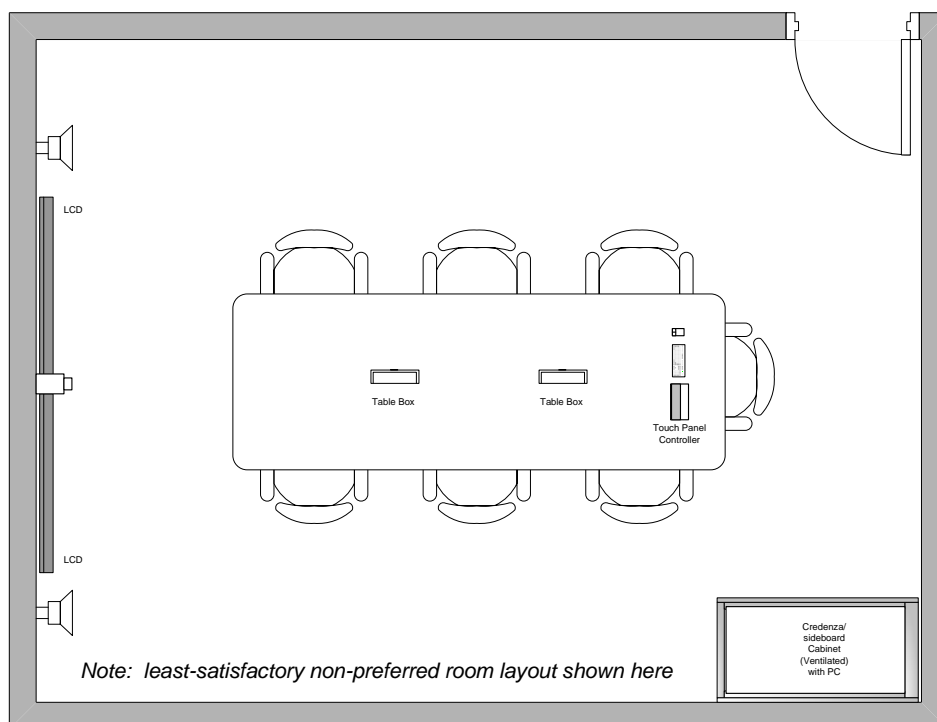
Other acceptable table shapes:

- Large square tables (with unobstructed sight lines)
- Long trapezoidal tables (with unobstructed sight lines)
- Small square, oval, round, kidney tables

Non-preferred table shapes:

- Long rectangular tables
- Configurations with obstructed sight lines, or excessively obtuse viewing angles

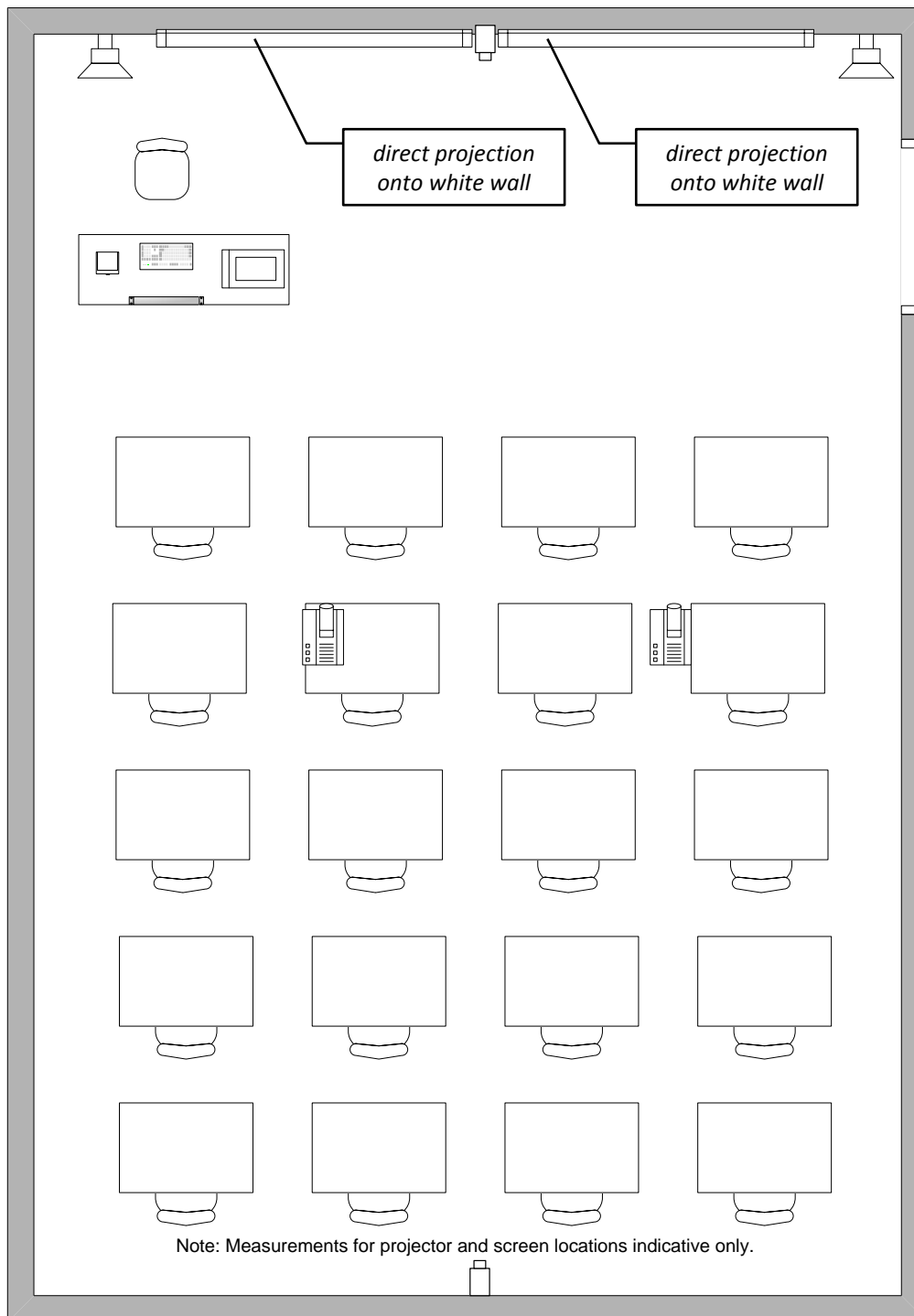
Example of non-preferred room layout with unsatisfactory sight lines and viewing angles:



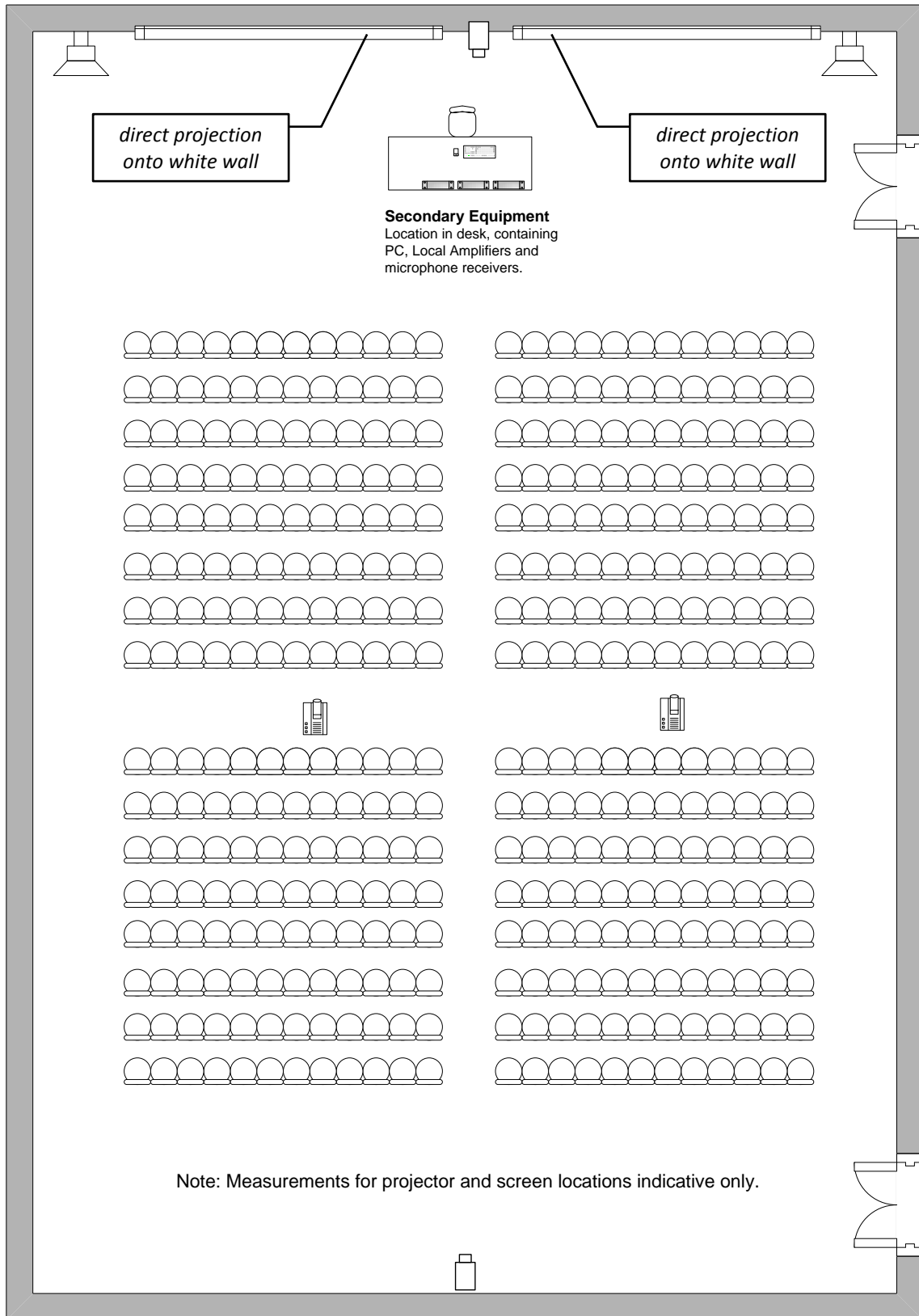
6.6 Teaching space – small (AV05)

Similar to AV06 (below) but with one display (Projector or SmartBoard) instead of two.
AV05 includes those PC and Mac labs that have presentation facilities.

6.7 Teaching space – medium to large (AV06)



6.8 Lecture theatre (AV07, AV08)



7 Appendices

7.1 Appendix A: Glossary of Terms

Word or Short-form	Definition
AFFL	Above Finished Floor Level
AV	Audiovisual
AVN	AV and Networks Unit, responsible for the design installation, operation and maintenance of the University's audiovisual facilities. This group is part of the Deakin University IT Services Division
AMX	A control system used by most universities, which is manufactured by AMX Corp.
ANSI	The American National Standards Institute – a standards organisation. Commonly used in conjunction with brightness or light output of projectors.
Audio	Any audio signal in either analog or digital format
AV01-AV08	Audiovisual Room standards (refer document)
Balanced	A signal of opposite polarity to each other typically used to carry microphone signals.
BCA	Building Code of Australia
Biobox	A separate projection booth or control room at the rear of a theatre
BYOD	Bring Your Own Device
Cat6 (Category 6)	Balanced twisted-pair copper cabling specifications characterized in a frequency range from 1 to 250 MHz.
Cat6a (Category 6a)	Balanced twisted-pair copper cabling specifications characterized in a frequency range from 1 to 500 MHz.
Composite video	A method of delivering video using a single cable to carry a composite video signal
CD	The common Compact Disc audio format
CDROM	The common Compact Disc Read only memory data disc format
Codec	A device capable of encoding and decoding a digital data stream or signal
Data Projector	An electronic device capable of projecting an image from a computer or video source (e.g. Document Camera) onto a large display screen. (The terms 'data projector' and 'video projector' are generally interchangeable.)
DDA	Disability Discrimination Act
DeS	Deakin eSolutions (Deakin University's information technology services division, previously ITSD)
DSP	Digital Signal Processor
DVD	The common Digital Versatile Disc format for video, audio or data storage and playback
DVI	Digital Visual Interface – a video connection capable of delivering analog and/or digital video with resolutions up to 2048x1536
DVI-A	A DVI cable similar to RGBHV used for delivery of high quality analog video signals
DVI-D	A DVI cable used for delivery of digital video signals
DVI-I	A DVI output capable of sending both analog (DVI-A) and digital (DVI-D) signals
FOH	'Front of House' – the front of the space
Full-HD	Full High definition – resolution 1920x1080p

Word or Short-form	Definition
GPO	General Purpose Outlet for distributing 240 V AC power
HD	High Definition – a display image resolution at least 1080x720 (720p)
HDMI	High Definition Multimedia Interface – a proprietary connection used for the delivery of high definition uncompressed digital data at short distances
HVAC	Heating, Ventilation and Air Conditioning systems (includes fans)
iLecture	Deakin University's lecture capture and online media delivery system, currently migrating from Lectopia to EchoSystem4, and utilizing Echo360 brand single and dual capture appliances
IP	Internet Protocol
IPTV	Television distribution via IP network
ITSD	refer DeS
NetLinx (hardware device)	A programmable AMX AV system controller
NetLinx (programming language)	AMX proprietary C-like control programming language that is compiled and loaded into NetLinx controllers
NTSC	The 'National Television Standards Committee' system of broadcasting analog television in the USA.
OHP	Overhead Projector – an optical device for projecting transparencies onto a screen (no longer part of the Deakin Standards)
PAL	The 'Phase Alternate Line' system of broadcasting analog television in Australia and Europe
PC	A personal computer running under a Microsoft windows platform
PIR	Passive Infra-Red sensor – used to measure infrared light as a form of motion detection
RGBHV	An analog method of delivering video using five cables to carry red, green, blue, horizontal and vertical signals
RS-232	A standard for 2-way serial device communications
RS-485	A standard for multipoint communications
STB	Set Top Box
SVGA	A display image resolution of 800 x 600
S-Video	Also known as Y/C is an analog video signal that carries the video data as two separate signals, luma (luminance) and chroma (colour)
SXGA	A display image resolution of 1280 x 1024
Unbalanced	A signal being carried in a single centre conductor surrounded by a shield
UTP	Unshielded Twisted Pair – Structured Cable used by communications networks consisting of pairs of cables twisted together to varying twist ratios
UXGA	A display image resolution of 1600 x 1280
VCR	analog Video Cassette Recorder (no longer part of the Deakin Standards)
VGA	A computer image resolution of 640 x 480 pixels. In respect to cables VGA means a multi-core carrying RGBHV signals from one device to another
Video	Any video signal in either analog or digital format
WSXGA	A display image resolution of 1680 x 1050 (widescreen format)
WUXGA	A display image resolution of 1920 x 1200 (widescreen format)
WXGA	A display image resolution of 1280 x 800 (widescreen format)

Word or Short-form	Definition
XGA	A display image resolution of 1024 x 768