Room Design Guide

Meeting room guidelines for Hangouts Meet hardware and Jamboard.

February 2019











Head online on desktop or mobile devices to check out the full version of the Room Design Guide.



g.co/cloud/roomdesignguide







Resources

Ξ Contents

Introduction

The room is key to a good meeting setup, this is the toolkit for getting the room fit for purpose.



Room Layout:

Following a few simple guidelines can make a huge difference for remote and local participants.

Equipment Locations:

We've tuned and tweaked the hardware. Now position it correctly to unlock the best performance.

Furniture & Lighting:

Make your meeting room look and feel inviting with simple decorative and lighting tips. Appropriate lighting helps both local and remote participants have a great experience.

Acoustics:

Services:

A low background noise level is important, to ensure good speech intelligibility and avoid unwanted noise.

Room planner:

Need to size up your room? All the best practices in this guide are used here to help you pick the equipment and recommended room size for the occupancy you need.



3

Poor acoustics is a common downfall of video conferencing spaces. The right allowance of acoustic finishes can help make speech clear and audible, and adequate isolation helps avoid interruptions.

Contents

Resources

Resources

Introductions

(i)

To complete the toolkit, we've also created some extra resources as well as some key hints to help you along the way.

Key Hints



Look out for 'Key hints' for some extra tips and information.

Favourites



Look out for the 'Star icon'; these are the items that we've found to be the most fundamental. Where your options are limited, these are the ones to aim for.

Room planner & Downloads



Remember to head online to check out the full room planner tool, as well as access to CAD and PDF downloads to help you with your meeting room projects. We've included some snippets here to get you started.



Get in touch



Have any questions? Follow the contact us links on the website and let us know how we can help.





Following a few simple guidelines to best arrange the room for video conferencing can make a huge difference for remote and local participants.





Good Viewing Area



★ Good Viewing Area

Room Layout

Keeping seating within the 'GVA' ensures everyone can be seen on camera and has a comfortable view of the screens.

O Key Hint: This is a common challenge when designing conferencing rooms. Room capacity might become a trade off, but a poor view can really diminish the experience and effectiveness of video conferencing!



To calculate the 'GVA' we use the horizontal camera field of view along with the minimum and maximum viewing distances to the display screens.

It is important that everyone can be seen on camera, to pick up facial expressions and gestures. The closest participants should be placed to ensure they are within the cameras HFOV (Horizontal field of view.)

Good Viewing Area

Furthest Viewer



To ensure comfortable viewing of images and content, the distance from the furthest viewer to the screen should be no more than 8x the screen height.

X \mathbf{O} 1.5x

For comfort, the closest viewer should be no closer than 1.5x the screen height.

Closest Viewer

Viewer Angle



The horizontal viewing angle to the screen should not exceed 45 degrees. This is measured from the perpendicular of the outer screen edge.

viewer distances: 48" Screen: 0.9 - 4.8m 55" Screen: 1.0 - 5.5m 65" Screen: 1.2 – 6.5m 75" Screen: 1.4 – 7.5m 85" Screen: 1.6 - 8.5m



```
• Key Hint: As a starting point, here are some typical
     screen sizes and corresponding closest and furthest
```

Conference Room



★ Which camera?

The wide field of view of the Huddly GO camera works best in rooms with up to 4m in length. Longer rooms are better served with the optical zoom of Logitech PTZ Pro 2 camera.





Logitech PTZ Camera



Which Screen?



Place participants within the camera field of view (120 degrees in this case)

Place participants within the camera field of view (70 degrees in this example)

Take a look at the equipment section and make use of the room planner for information on recommended screen size to suit the room size and occupancy.

Jamboard



★ Joining Meetings

The Jamboard can be used as a standalone video conferencing tool, using the built in camera, microphones and speakers.



Typically two seated users need to be at least 1m (40") away from the Jamboard and no further back than 1.8m (71") to get in shot.

useful examples.



The recommended clear space around the Jamboard to allow effective collaboration is a semicircle of radius 60" (1.5m) in front of the Jamboard.

The Jamboard camera has a built-in downtilt to get users in shot. Typically coverage works best with the Jamboard camera at 1.85m (72") from the floor.

The horizontal field of view is 73 degrees. The vertical field of view (at 15 degree downtilt) is 43 degrees.

O Key Hint: You can still supplement the Jamboard with a speakermic if you feature a table in the room. Take a look at the room planner section for some





Chromebase



The chromebase is ideal for small 1–2 person microhuddle rooms, or as a personal device on a desk or home office.

Chromebase Cam



Place participants within a 82 degree horizontal field of view.

• Key Hint: Don't forget to consider space for accessibility, as described in the space planning section.



h Space Planning

Entrance

Space Planning

Orientation



Orientating the room lengthways with the screen wall on the short side of the room will provide the best capacity. The wall should be a flat, even surface.

Clearance Space



Accessibility for all users is important. A turning circle of at least 1500mm (60") is required for wheelchair access. Assuming a door at the rear – this almost always makes the minimum distance between the table and rear wall 1500mm (60").



Ensure easy access around seats. We recommend at least 1200mm (48") clearance around fixed furniture to ensure good accessibility.

O Key Hint: Having a Jamboard at the side of the room might increase the clearance you need around the table. See the Jamzone guidance in the equipment section for more information.



Space Planning Entrance

f Entrance

Door Location



Remember to consider how remote participants see people enter and leave the room. It's good practice to position the door in camera view so that everyone on the call can see who's left or entered the meeting room.

Visibility and Privacy



It's good practice to allow people to see when a room is busy and avoid interruptions. However you may consider using obscured sections of glass to maintain privacy of participants and screen content. Blinds or drapes can be added for full privacy.



h Space Planning

Entrance





We've tuned and tweaked the hardware. Now position it correctly to unlock the best performance.



Room Design Guide 13 Version V2.0

Speakermics



† Placement

Q

The speakermic unit should be placed as evenly as possible amongst seated participants.

Up to 11 people: 🕓 🕓 Up to 16 people: 🕓 🕓 18 people or more: 🕓 🕓 Up to 6 people: 🕓 As a guide: 1 speakermic 2 speakermics 3 speakermics Q 4 speakermics



Room Design Guide 14 Version V2.0

 \mathbf{Q}

For best audio quality, ensure users are no further than 1500m (60") from the speakermic. One speakermic typically provides good coverage for up to 6 people.

When using more than one speakermica good rule is to place them evenly with 1500-2000mm (60"-80") between each speakermic.

O Key Hint: Each room is different, the key is even coverage for all participants, try different speakermic positions to get the setup that works best for the room.



Screens



★ Screen Size

As described in the room layout section-viewing distances are key to selecting the best screen size. (Screen height should be at least an 8th of the distance from the screen to the furthest viewer).



Version V2.0

Screen Location



Screens should be mounted centrally to the table. The screen height should allow for comfortable viewing, as a guide keep the bottom of the screen less than 1100mm (44") from the floor.

Dual vs Single Screens



Single screens work well for everyone in the room. Dual screens can also be used, but care should be taken to ensure both screens can be seen for all participants.



Mounting Height



Mount the camera as close to seated eye level as possible. When mounted on top of the screen the Huddly go camera is usually optimal at ~1400mm (55") from the floor. This usually puts the bottom of the screen at around 800mm (30") from the floor.

Mounting Position



You can either place the camera on top of the display, or use a suitable mount/surface under the display.

Dual Screens



In dual screen setups the camera is best mounted between the screens and central to the table.

• Key Hint: Camera's mounted at a high angle is a very common problem for conferencing. Remote participants can be made to feel detached from discussion. It's better to have everyone looking straight into the camera.



Chromebase

Jamboard

Volume 7 Joinery & Boards



Writing Surfaces

It is best to place a writing surface in the view of the camera. If using a sidewall, try to keep it within the camera field of view.







The Chromebox can be mounted on the rear side of the display screens, in a cabinet below the screens if you have one, or alternatively under the table.



To keep cabling neat and easy to install, a slim cabinet underneath the screens can be an ideal addition.

O Key Hint: Be wary of impacting room acoustics, large whiteboards and glazing in the same room can limit available space for absorption.

Jamboard



Location

In conferencing rooms the side walls are generally the best locations for a Jamboard, so that users in the Jamzone can be seen on the conference camera. Mounting the Jamboard 1m from the floor to the bottom of the screen is ideal.

O Key Hint: The Jamboard can also be used with its built in camera and loudspeakers as a standalone video conferencing tool. Take a look in the room layout section for more info.



Chromebase



The recommended clear space around the Jamboard to allow effective collaboration is a semicircle of radius 60" (1.5m) in front of the Jamboard.



Rolling mounts are also available, allowing the jamboard to be moved easily between teams.



Chromebase

Chromebase



Chromebase for meetings is an all-in-one touchscreen video conferencing device. The Chromebase is ideal for small rooms and micro-huddles with 1 or 2 people.

Mounting



The chromebase comes with a stand, but can also be used with an articulating VESA mount.

O Key Hint: Mounting on an adjustable arm from the desk is a great setup and allows users to adjust to their comfort.



Chromebase





Lighting



- Finishes
- Windows
- **्रि** Furniture





Make your meeting room look and feel inviting with simple decorative and lighting tips. Appropriate lighting helps both local and remote participants have a great experience.





+ Lighting



★ Face to Background Ratio

A light ratio of 2:1 hitting participants' faces vs the background directly behind their face is desirable.

Face Light Level

Average vertical illumination on participants' faces should be around 400 lux. Avoid levels any higher than 500 lux on people's faces and ensure luminaires are low glare.

General Light Level

Or Key Hint: Lighting level on the working plane should still be within CIBSE guidelines.



Good visual comfort and uniformity is paramount, below are some general guide parameters:

```
Target Uniformity
           ~0.6Uo
    Colour Temperature
        ~4500 kelvin
Colour Rendering Index (CRI)
            ~80+
```

Finishes

★ Light Surfaces



Tables with light-coloured surfaces help illuminate participant faces and boost the face to background light ratio. Ideally table surface should be ~50% reflective.

Room Graphics



Avoid very bright surfaces or intricate patterns, especially any striped patterns falling in the camera shot. It can distract remote participants. Neutral and light, subtle colours are the most effective for camera, but avoid white washed walls where possible, as it can reduce colour appearance on camera.





Windows

External Windows



Blinds or curtains should be provided on all external windows to control the room light levels and prevent glare, which can affect camera performance.

Internal Windows



Blinds or curtains should also be considered on all internal glass walls or windows. It ensures privacy can be achieved and improves acoustics.





Table Depth



Table legs should not restrict seating or leg movement. Generally a depth of at least 750mm (30") should be provided for each user.

O→ Key Hint: Bigger chairs, especially with larger backs may require a little more clearance space for circulation.

Table Shape



The table should help participants orientate around the screen, for larger rooms tapering the table can improve sightlines to the camera.

Chair Types & Table Space



Chair features such as height and armrest adjustment will improve participant comfort. Take care to ensure there is 1200mm (48") circulation space around fixed furniture for ease of access. Generally each user should have a table width of at least 700mm (28").









Adjacencies





- Finishes
- \sim Noise





1



Separation



Wall Rating

Target Acoustics Wall Ratings.

will be needed.

Walls with a Door



The ability of a partition to prevent sound transfer from an adjacent space is measured as an NIC rating. Where louder or more noise sensitive spaces adjoin a meeting room the wall will require a higher NIC rating.

The NIC ratings are dependent on the adjacent space. Where a partition adjoins a noisy space a higher rating

Where a door features in a wall, the highest achievable rating is limited by the rating of the door, so there is little value in rating the wall any higher.

• Key Hint: The Noise isolation Class (NIC) rating is a single-number rating that describes the degree of airborne sound separation between two adjacent spaces afforded by a partition, door, and window or floor-ceiling assembly. You may also see (STC) sound transmission class used which is the same principle but a lab rating which is typically 5 points higher than NIC.





★ Wall Height



Partitions should be full height. Half height partitions can create a noise path between the rooms and introduce unwanted noise from adjacent spaces.



Glazing is great for open plan office spaces, but it can increase reverberance. Try to limit glazing to the wall with the entry door, and avoid placing glazing between meeting rooms. Doors



Doors are generally a acoustic weak link as the gaps allow sound to flank around and under the door. Insulated metal doors are preferred, followed by solid wood doors. Generally swing doors perform better than sliding doors. Perimeter acoustic seals will aid the sound separation performance and should be considered for any meeting room.





What is that Noise?



Be strategic about adjacencies, think about where meeting rooms are in relation to predictably noisy and other noise sensitive spaces, including vertically! Noisy spaces above and below meeting rooms are a common problem. **Duct Routing**



Short ductwork between spaces are a common cause of unwanted sound transmission. When designing new spaces consider duct routing to minimize this concern.

Back to Back Equipment



Avoid orienting adjacent meeting rooms 'back to back' (screen wall to screen wall). This presents more risk for noise paths between meeting rooms.

Key Hint: Bad adjacencies or Inadequate acoustic separation risks a lack of privacy, and frequent noise interruptions. Even small distracting noises can be enough to throw attention away from the task at hand!





Reverb

Finishes Noise

Reverberation Time



★ Sorry, What Was That?

To make sure participants on each side of the call are clearly heard the room needs to provide a good level of speech intelligibility. The key is to control reverberation time and eliminate any unwanted reflections.



Target RT Time

The following are suggested target reverberation times for meeting rooms:

Solutions

RT60 of 0.45s Small meeting rooms (up to 8 people)

RT60 of 0.6s Medium rooms (up to 11 people)

RT60 of 0.7s

Larger rooms (up to 20 people)

To achieve these targets, acoustic treatment in the room will be required. In existing spaces this might be limited to adapting the wall and floor finishes.

O Key Hint: Reverberation Time (RT) is a measure of the rate of decay of sound, helping us quantify how lively or reverberant a room is. RT60 is the time in seconds for a sound to decay by 60dB. A too larger RT time, will hinder speech communication between occupants in the room and for remote participants.

M Acoustic Finishes

★ Wall Treatment



The total area of acoustic wall treatment should equal at least 50% of the total floor area of the room plus an additional 5m², using treatment with an NRC of at least 0.7.

Key Hint: NRC (Noise reduction coefficient) is a measure of how much sound energy is absorbed when striking a surface. Measured from 0-1, a good benchmark is to allow for at least 50mm (2") thick treatment for the walls to achieve NRC 0.7.



Adjacent Walls



Acoustic treatment on wall areas should ideally feature on two adjacent walls to reduce the risk of parallel reflections forming between two opposite reflective surfaces.



Key Hint: Multiple treatment options exist for walls that should be considered. Some options include felt, fabric wrapped panels, pinnable soft treatments, stretched fabric systems with concealed absorption. This will all depend on the desired look and feel for the room.

Treatment location

Wall treatment should ideally start just below seated head height approximately 1m (40") from the floor, continuing to ceiling level.

Acoustic Finishes

Ceiling Treatment



Ideally the entire ceiling should feature acoustic treatment to at least NRC 0.7. Suspended ceilings (ACT), are the most common solution, but other solutions such as suspended fabric wrapped panels or an acoustic spray treatment could also be considered.

Floor Treatment



Soft flooring, such as carpet or carpet tile, is the preferred floor finish for all meeting rooms. Hard floor finishes are a common culprit for poor acoustics in meeting spaces. Area rugs and soft furnishings should be considered in rooms where carpet is not feasible.

Room Shaping



provide acoustic benefits.





You can look to take advantage of unusually shaped spaces, such as angled, or non parallel walls as they can



~~ Background Noise

Background Noise



Speech intelligibility is key for a good meeting room environment, to ensure easy communication. Aside from reverberation, a low background noise is another key ingredient to good speech intelligibility.

От Key Hint: Speech intelligibility can be measured and is most commonly seen as Speech transmission index (STI). Reverberation time and background noise are two key components to a good STI.



A noise criterion rating of NC 30 is recommended for small and medium sized rooms.

Small & Medium Rooms

Larger Rooms



from each other.



Larger rooms should aim for a better rating of NC 25 to assist intelligibility, mainly as people are further away

Key Hint: Background noise is measured by using single number rating (In this case NC rating) that describes the steady state background noise levels within a space due to mechanical, electrical and plumbing systems. The lower the rating the quieter the room. This criteria will most directly inform the design of the mechanical services system.







Power & Cabling



A low background noise level is important, to ensure good speech intelligibility and avoid unwanted noise on microphones. The main culprit is often poor attention to mechanical services.





Air Handling

Mechanical Equipment

Variable air volume systems 4.5m from unit to first diffuser

Fan Coil unit systems 6m from unit to first diffuser

While dependent on the size of the equipment and individual constraints, aim to allow for the following distances from HVAC units (Heating, Ventilation and Air conditioning units) to diffusers in the meeting room.

Ventilation Rates



Consider air velocities and diffuser selection to minimise noise from HVAC systems as much as possible. Cost is always a factor, but ensuring a low background noise in meeting rooms will massively help the speech intelligibility in the room.

• Key Hint: At Google we recommend an increase from the ASHRAE 62.1 rates. 30 Cubic feet per metre of outside air per person, should be provided to conferencing rooms.

Diffuser Locations







Avoid locating intake or extract (supply/return) ductwork

above or near sensitive conferencing microphones.

Unwanted noise from air flow on microphones can cause disruptive noise on the video call.

Power & Cabling 4

Power	M&E Load	
00	Typical maximum equipment load for dual screen rooms: 0.5kW / 1705 BTU/h	
00		

Power is required to feed the display screens. This can be located in a cabinet directly below, if possible, or directly behind the screens. A second power socket is required under the table.

Key Hint: It's ideal to have a wired network connection for the Chromebox. A wired network connection usually results in better performance than connecting to wireless.

This estimate does not account for occupancy heat load, and peak heat load may be greater than this for short periods of time.

★ Cable Routes



Don't forget to consider cable routes, especially where they might be visible or cause a trip hazard! A conduit or concealed cable route behind the wall to feed the screens will help keep the install neat. If the table doesn't stretch to the wall, then dont forget a route over, or even better, under the floor.







Go Online







Phonebooth



Hedium Rooms



H+ Larger Rooms

Need to size up your room? All the best practices in this guide are used here to help you pick the equipment and recommended room size for the occupancy you need.



.



Go Online

Online Room Design Guide

Recap



Downloads & Resources



Head online on desktop or mobile devices to check out the full version of the room planner on the website. We've included some examples here to give you the idea.

You can also download PDF & DWG versions of the layouts shown in this section via the website to help you with design work on your project.



Larger Rooms





Recap: Good Viewing Area

The key to setting out your room is to ensure you can fit all your meeting room occupants within the Good Viewing Area. As described in this guide, this is calculated by the Camera field of view, and the closest and furthest recommended viewing distances to the screens.





Recap: Clearance

Larger Rooms

Recap: Camera View

It is important that everyone can be seen on camera, to pick up facial expressions and gestures. The closest participants should be placed to ensure they are within the cameras HFOV (Horizontal field of view.)



Don't forget to consider clearances required, ensuring you leave enough space for accessibility as well as any extra clearance you might need like a Jamzone.

Recap



1 Person — Chromebase



• Key Hint: Don't forget to allow for accessibility and compliance with local code, especially in the smallest room layouts.



Room Design Guide 39 Version V2.0

Larger Rooms

Recap

Smaller Rooms

2 Person — Jamboard

Key Hint: Remember the Jamboard has a fixed downtilt on the camera so take care with where you place your seating to ensure users can be seen in the vertical field of view. Typically coverage works best with the Jamboard camera at 1.85m (72") from the floor. With two users placed at least 1m (40") away from the Jamboard and no further back than 1.8m (71") to get in shot.





Larger Rooms

Smaller Rooms

3 Person Conference



• Key Hint: The Good Viewing area when using the Huddly Go camera is governed by the recommended minimum 45 degree viewing angle to the screen.



Room Design Guide | 41 Version V2.0

Larger Rooms

Smaller Rooms

5 Person Conference



• Key Hint: Remember that the 'Good viewing area' is set by the closest and furthest recommended viewing distances. 1.5x the screen height for the closest viewer, and 8x the screen height for the furthest viewer.



Larger Rooms

Smaller Rooms

5 Person Conference with Jamboard



Or Key Hint: Don't forget that when using a Jamboard at the side of the room you may need to increase space allowance to maintain accessibility as well as accommodating the recommended 1500mm (60") radius for the Jamzone.



Larger Rooms

Medium Rooms

8 Person Conference



Or Key Hint: For best audio quality, ensure users are no further than 1500m (60") from the speakermic. One speakermic typically provides good coverage for up to 6 people.



Room Design Guide 44 Version V2.0

Larger Rooms

Larger Rooms

12 Person Conference



• Key Hint: The 'Good viewing area' for rooms using the logitech PTZ Pro 2 camera is set by the 70 degree horizontal field of view.



Room Design Guide 45 Version V2.0

Larger Rooms

Larger Rooms

16 Person Conference with Jamboard



 Key Hint: In conferencing rooms, the side of the room is generally the best place for a Jamboard to feature, where users in the Jamzone can be captured in the field of view of the room camera.



Room Design Guide 46 Version V2.0

Larger Rooms