LECTURE HALLS

Lecture halls are large spaces, often with tiered seating, that serve high-capacity classes with department-specific needs. While each room is unique in its seating arrangement and architecture, they are alike in their need for a variety of AV technology that must be easy to use and manage. There are often multiple displays, different podium positions, sound systems, video systems and the demand to integrate all types of mobile and personal devices into the AV system. The system must be designed so professors feel comfortable operating it, and every student in the room can see and hear the information being delivered. After all, the goal is to create a positive learning experience!

COMMON ACTIVITIES

- Lecture and engage in Q&A sessions
- Connect computers to one or more displays to view multimedia content
- Wirelessly transmit multimedia content from tablets, phones or laptops
- Adjust lighting and temperature controls
- Video conference with other sites
- Record lectures for online learning
- Stream audio and video to overflow locations
- Receive support from an AV help desk with real-time equipment monitoring
HARMAN has a diverse portfolio of AV technology for lecture halls

HARMAN is the leader in professional audio, video and control technology that builds comprehensive AV systems for lecture halls. Our technology integrates seamlessly, combining different systems under one platform that can be centrally managed to ensure the room is ready when the class starts.

Types of AV systems our technology can build

- AV Control & Automation System
- Sound Reinforcement System
- Collaboration & Conferencing System
- Room Scheduling & AV Asset Management System
WHAT IS AN AV CONTROL & AUTOMATION SYSTEM?

In a lecture hall, the AV Control & Automation system is where all the magic happens. This system serves to centralize the input and output signals from different audio, video and computer devices. It simplifies the selection and operation of various sources, so faculty and students feel comfortable operating the room's technology and confident that it supports the lessons for their classes.

THE USER INTERFACE
The User Interface (UI) is the remote control for the AV system. A UI can be as simple as a keypad to as sophisticated as a full-color touch panel. The purpose of the UI is to simplify the operation of the AV system with an intuitive visual display and automated common functions (such as powering on/off several devices simultaneously or changing lighting presets). AMX has a wide variety of UIs, including Modero Touch Panels (ranging in sizes from 4.3 inches to 22 inches) and the Massio ControlPad.

ARCHITECTURAL CONNECTIVITY
Connecting to an AV system in a lecture hall requires many different types of cables. The AMX HydraPort consolidates all of the cables and ports needed to connect to the AV system inside a sleek, surface-mounted enclosure. HydraPorts are customizable with swappable input modules, power outlets, keypads and retractable cables.

SWITCHING & CONTROL
The Audio Video Switcher and Master Controller are the central hub of the AV system. The AV Switcher brings in all audio and video sources, manages the signals, automatically scales the video to the optimum resolution and routes them to displays or other devices. The Master Controller is the brain of the system, which coordinates functionality with the user interface and communicates to other AV devices. The AMX Enova DVX series of AV Switchers combines the Master Controller, video scaling, microphone mixer and AV Switcher into one box, making it the perfect core for an AV system.
TIPS FOR DESIGNING THE AV CONTROL & AUTOMATION SYSTEM

• Make a list of all the necessary source devices in the AV system, including each device’s inputs and outputs. This defines the minimum size of the Audio Video Switcher and Master Controller needed to serve the room.
• Determine the required functions users need to operate each source device in the system. This determines the minimum number of buttons the user interface requires and the presets to program.
• Decide where users connect their devices to the switcher. Will it be a HydraPort in the lectern or an AV plate in the wall? Consider the cable types needed for connectivity, the length of these cables and any potential tripping hazards.
• Do you want to have the help desk accessible from the user interface? Being able to call the help desk directly from the user interface alleviates the user’s fear when the system has an issue.

For more resources on AV Control & Automation Systems, please visit www.amx.com/education.

AMX AV CONTROL & AUTOMATION SYSTEM CONCEPT FOR LECTURE HALLS

RAPID PROJECT MAKER HELPS YOU BUILD THE PERFECT AV CONTROL & AUTOMATION SYSTEM

RAPID PROJECT MAKER

Rapid Project Maker, or RPM, is a cloud-based software application that guides you through the process of selecting, configuring and connecting your devices, such as switchers, touch panels and displays. With RPM, you can program your AV controller and create an elegant user interface with no programming skills, and save hours of time versus traditional code-based programming. This software is free to our registered users.

To learn more about RPM, visit www.amxrpm.com.
WHAT IS SOUND REINFORCEMENT IN A LECTURE HALL?

The Sound Reinforcement (or Public Address) system is a means to control the volume of speech or music and distribute the sound, so it can be heard intelligibly by the audience. In a lecture hall, this system can be simple or moderately complex, based on the need and/or the challenges presented by the room itself. What do the users really need?

**THE PRESENTER** needs a hands-free wireless microphone to wear while lecturing, so he or she can move about freely. Additionally, presenters need the ability to connect their laptops or audio devices to play multimedia or a video player (like Blu-Ray) to play high-definition movies.

**THE AUDIENCE** depends on the Sound Reinforcement system to hear their presenter, especially when seated farther away. When Q&A is part of an event, the audience appreciates when a wireless handheld microphone is used for responses. The use of a listening assist system is important for ADA compliance.

**TECHNOLOGY MANAGERS** want a Sound Reinforcement system that is “set it and forget it.” These managers depend on a setup that can’t be tampered with and know when a dedicated sound engineer is required to operate the system.


THE CORE BUILDING BLOCKS OF A HARMAN SOUND REINFORCEMENT SYSTEM

**MICROPHONES**

In a lecture hall, a Wireless Clip-On (or lavaliere) microphone is traditionally used for the presenter, a Wireless Handheld for audience responses and a Gooseneck mic for speaking at a lectern. AKG by HARMAN is a leading manufacturer of high-quality microphones.

For more information, visit [www.akg.com](http://www.akg.com).

**MIXING CONSOLES**

For special activities, such as guest panels or conferences where multiple microphones are needed, a mixing console is the perfect companion for centralizing all of the input sources for an engineer to mix and monitor. Soundcraft by HARMAN is a leading manufacturer of professional mixing consoles.

For more information, visit [www.soundcraft.com](http://www.soundcraft.com).

**DIGITAL SIGNAL PROCESSORS**

The Digital Signal Processor (DSP) aids in pre-configuring the loudspeakers in the room. DSPs can effectively replace the need for a mixing console by providing automatic mixing and presets for different playback requirements. BSS Audio by HARMAN is a leader in DSP technology.

For more information, visit [www.bssaudio.com](http://www.bssaudio.com).

**AMPLIFIERS**

To power passive loudspeakers, you need a reliable amplifier. Crown by HARMAN manufactures a broad range of two-, four- and eight-channel amplifiers, which include models that are networkable and have onboard DSP.

For more information, visit [www.crownaudio.com](http://www.crownaudio.com).

**LOUDSPEAKERS**

A lecture hall may have several different loudspeaker requirements, such as ceiling speakers for distributed audio, front of house speakers for music/voice and surround speakers for movie playback. JBL by HARMAN is trusted by professionals around the world for manufacturing high-quality, installed sound loudspeakers.

For more information, visit [www.jblpro.com](http://www.jblpro.com).
TIPS FOR SOUND REINFORCEMENT SYSTEMS IN LECTURE HALLS

- Wireless microphones should be available for Presenters and the Audience. Gooseneck microphones should be mounted onto the AV furniture (if applicable).
- Loudspeakers should provide high intelligibility and thorough coverage for all seated listeners.
- Basic control of volume and audio source selection should be available to users.
- Assisted Listening System should be compatible with the system.
- Emergency Paging System should be capable of muting room PA system.
- System should be expandable to provide future input and output connections.

For more help on finding resources for HARMAN audio brands, visit http://info.harmanpro.com.

HARMAN SOUND REINFORCEMENT SYSTEM CONCEPT FOR LECTURE HALLS

LOUDSPEAKER PLACEMENT IDEAS

- Distributed Loudspeakers
  Ceiling mounted for middle and rear seating

- Surround Loudspeakers
  Wall mounted for cinema applications

Use our speaker selector tool online!


Front of Hall (FOH) Loudspeakers
Left - Center - Right
WHAT IS A COLLABORATION & CONFERENCING SYSTEM?

Collaboration and Conferencing Systems facilitate a presentation through screen mirroring of wireless devices, access to cloud-based services, file sharing and web conferencing.

FOR PRESENTERS, the presentation system provides secure access to content. When a class concludes, the presenter can easily share content via a QR code, removing the need for handouts. Conferencing systems allow presenters to connect their classes with people in distant locations or on other campuses.

STUDENTS benefit from the presentation system, because it empowers them to collaborate proactively with the rest of the class through their own wireless devices, using screen mirroring. Thanks to QR code sharing, students can instantly pull down presentation content from the presenter to their devices for independent study.

TECHNOLOGY MANAGERS like collaboration systems, because they can replace the room PC. This reduces energy use, software license costs and maintenance/startup time. The collaboration system can also be managed remotely through the help desk.

THE CORE BUILDING BLOCKS OF A HARMAN COLLABORATION & CONFERENCING SYSTEM

CONTENT SHARING PLATFORM
Enzo by AMX is a PC replacement that allows users to present directly from their devices through wireless screen mirroring. Enzo includes onboard web-based applications, like a web browser, Skype, Mirror Op and document viewers.

VIDEO CONFERENCING CAMERA
Using a Sereno at each student table can be a cost-effective option for individual web conferencing, where a Pan-Tilt-Zoom Camera is cost prohibitive. The Sereno has a 120-degree field of view, a retractable shutter and USB connectivity.

LECTURE CAPTURE ENCODER
The AMX H.264 Encoder connects directly to sources, including PCs, cameras and set-top boxes, and provides the onramp to stream video on a network. Once video is on a network, it can be played back in a variety of situations, such as on displays throughout a building, in a window within a digital signage message or used with a network media solution, like AMX’s Vision 2. Connect an H.264 Encoder to a camera to capture lectures, make them available live and record them for future playback. Users can also stream lectures to students watching live throughout the world on conference room displays, PCs or mobile phones. These robust encoders offer standardized, bandwidth-efficient encoding for SD and H.264 Encoder

WEB CONFERENCING AUDIO MIXER
The AMX Alero Web Conferencing Audio Mixer is a dedicated microphone mixer for up to eight microphones, designed specifically for web conferencing applications, such as Lync or Skype. It also supports video teleconferencing (VTC) and audio conferencing systems.

BOUNDARY & GOOSENECK MICROPHONES
Boundary microphones and Gooseneck microphones are excellent choices for audio conferencing applications. Boundary microphones provide a wide pickup pattern for picking up multiple people seated close to each other. Gooseneck microphones are preferred for individuals who require their own microphones. They provide excellent isolation between seats. AKG by HARMAN has a diverse offering of Boundary and Gooseneck microphones that
TIPS FOR COLLABORATION & CONFERENCING SYSTEMS IN LECTURE HALLS

- Provide at least one boundary microphone for every two seats.
- If using a camera for video conferencing, note line-of-site issues.
- Provide a button on or near the boundary microphone for a presenter to push if using a Pan-Tilt-Zoom camera, so the camera can zero-in on their location.
- Plan network permissions before installing Enzo, so presenters and students have access to files and can use the onboard applications.

COLLABORATION & CONFERENCING SYSTEM CONCEPT FOR LECTURE HALLS

- **Wireless Devices (BYOD)**
  - Presenter's Computer
  - Tablet Device
  - Smartphone

- **Collaboration System**
  - AMX NMX-ENC H.264 Encoder (Lecture Capture)
  - AMX NMX-MM-1000 ENZO® Content Sharing Platform

- **Conferencing System**
  - AMX NMX-VCC-1000 SERENO™ Video Conferencing Camera
  - AMX ALR-AEC ALERO Web Conferencing Audio Mixer

- **Microphones**
  - AKG PCC170 Boundary Microphone(s)
  - AKG CGN321 STS Tabletop Microphone Set(s)

- **Display**
  - Ethernet Switch

COLLABORATION & CONFERENCING SYSTEM RESOURCES:

- **AKG Conferencing Microphones:** [http://www.akg.com/pro/microphones/speech-spoken-word/boundary-layer-microphones](http://www.akg.com/pro/microphones/speech-spoken-word/boundary-layer-microphones)
- **AKG Gooseneck Microphones:** [http://www.akg.com/pro/microphones/speech-spoken-word/gooseneck-microphones](http://www.akg.com/pro/microphones/speech-spoken-word/gooseneck-microphones)
RESOURCES MANAGEMENT FOR LECTURE HALLS: AV ASSET MANAGEMENT

It happens far too often. The institution invests in AV equipment, only to find that they are constantly chasing issues due to the lack of a centralized system for monitoring and managing the equipment. Even more frustrating, support personnel must visit each room in person to troubleshoot problems, since they have no way to communicate remotely with the AV equipment.

Resource Management Suite (RMS) Enterprise is scalable client/server-based software for IT and AV managers that provides remote management and scheduling capabilities for AV assets and building systems. The software features a user-friendly dashboard, making it easy to centralize the management and monitoring of AV equipment, lights, HVAC and other building functions. This allows IT and AV managers to proactively maintain AV displays before a bulb burns out and receive immediate notification when a device goes offline.

**WIDGET-BASED GUI**

RMS Enterprise includes a fully customizable dashboard layout for each secure user, including visual bar graphs, user-defined status and notifications, and hotlists displaying all current system exceptions and issues.

**CENTRALIZE THE AV SUPPORT DESK**

Centrally monitor AV technology problems right from your IT support desk and remotely control AV devices in the lecture hall when instructors call in for help.

**GO GREEN WITH ENERGY MANAGEMENT**

Save money and the environment by remotely turning off equipment when the lecture hall is empty or on weekends. Track and run reports on energy usage for monitored assets.

**SOLVE TECHNOLOGY ISSUES PROACTIVELY**

With active monitoring of AV technology in the lecture hall, AV support staff can setup automatic email alerts that give them the ability to proactively respond to issues as soon as they arise.
A college campus runs on classes and events, which are allocated facility resources through a master calendar. Schedule management systems, like Exchange, Lotus Notes or Google Calendar, provide a platform to centrally create and change schedules, so campuses can efficiently manage their classrooms and lecture halls. Once this schedule is created, however, how do students and instructors know if there is a room change, time change, cancellation or if that space is available for the next hour?

AMX’s RMS Enterprise Scheduler is a comprehensive room schedule module that assists students and instructors in locating rooms by displaying the scheduled events on a touch panel adjacent to room entrances. It eliminates delays in class start times by automating the room technology, thereby eliminating the time typically spent on equipment setup.

CORE SCHEDULE SOLUTION PRODUCTS

RESOURCE MANAGEMENT SUITE

ENTERPRISE SCHEDULER
Schedule rooms from any touch panel or PC. Integrate RMS with many popular scheduling platforms and display the room schedule on touch panels.

QUICK RESPONSE SCHEDULING
An alternative to a touch panel, this sleek acrylic wall panel displays the room schedule on mobile devices by scanning a QR code. It is elegant looking and simple to

MODERO S SERIES TOUCH PANEL
Modero is a cost-effective way to display schedules outside any room. Mount on virtually any surface, including glass, and easily view red/green room availability lights to determine occupancy.
Our diverse catalog of audio, video and control technology builds comprehensive audio visual systems for lecture halls.

In this diagram, we demonstrate an approach to merging AV Control & Automation, Collaboration & Conferencing, Sound Reinforcement, and Room Scheduling & AV Asset Management systems together to create one unified system.

For more technical resources on our brands and product families featured in this diagram, we suggest the following websites:

- [www.akg.com/pro/microphones/speech-spoken-word](http://www.akg.com/pro/microphones/speech-spoken-word)
- [www.akg.com/pro/wireless/wireless-microphones](http://www.akg.com/pro/wireless/wireless-microphones)
- [www.amx.com/productinfo/](http://www.amx.com/productinfo/)
- [jblpro.com/www/products/cinema-market](http://jblpro.com/www/products/cinema-market)
FOR MORE INFORMATION

Email us: education@harman.com

To contact a member of our Education Business Development Team, visit: http://www.amx.com/automate/contactamx/

HARMAN LECTURE HALL AV SYSTEM CONCEPT (continued)

BSS SOUNDWEB LONDON
BLU-103 DIGITAL SIGNAL PROCESSOR

CROWN DCi 8|600N
DRIVECORE INSTALL NETWORK
8CH 600W AMPLIFIER

JBL 8320 SURROUND LOUDSPEAKERS
REAR SURROUND CHANNELS

JBL CBT 70J +70J-E
COLUMN ARRAY LOUDSPEAKERS
(FRONT OF HALL LEFT)

JBL CBT 70J +70J-E
COLUMN ARRAY LOUDSPEAKERS
(FRONT OF HALL RIGHT)

JBL CONTROL 47 C/T CEILING LOUDSPEAKERS
(FOR DISTRIBUTED AUDIO IN AUDIENCE)

JBL SURROUND LOUDSPEAKERS
(LEFT SURROUND)

JBL SURROUND LOUDSPEAKERS
(RIGHT SURROUND)

JBL 8320 SURROUND LOUDSPEAKERS
(LEFT SURROUND)

JBL 8320 SURROUND LOUDSPEAKERS
(RIGHT SURROUND)

CROWN DCi 4|1250N
DRIVECORE INSTALL NETWORK
4CH 1250W AMPLIFIER

PROJECTOR

VIDEO SIGNAL (HDMI, VGA)
LINE LEVEL AUDIO
AMPLIFIED AUDIO
BLU LINK AUDIO (CAT 5)
CATEGORY CABLE

SOUND REINFORCEMENT SYSTEM

FOR MORE INFORMATION

Email us: education@harman.com

To contact a member of our Education Business Development Team, visit: http://www.amx.com/automate/contactamx/
About HARMAN Professional Solutions

HARMAN Professional Solutions is the world’s largest professional audio, video, lighting, and control products and systems company. We serve the entertainment and enterprise markets with comprehensive systems, including enterprise automation and complete IT solutions for a broad range of applications. Our brands comprise AKG Acoustics®, AMX®, BSS Audio®, Crown International®, dbx Professional®, DigiTech®, JBL Professional®, Lexicon Pro®, Martin®, Soundcraft® and Studer®. These best-in-class products are designed, manufactured and delivered to a variety of customers, including tour, cinema and retail as well as corporate, government, education, large venue and hospitality. In addition, our world-class product development team continues to innovate and deliver groundbreaking technologies to meet our customers’ growing needs. For scalable, high-impact communication and entertainment systems, HARMAN Professional Solutions is your single point of contact.

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