



SOLUTION GUIDE

LECTURE HALLS

Audio Visual System Solutions for Education



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!

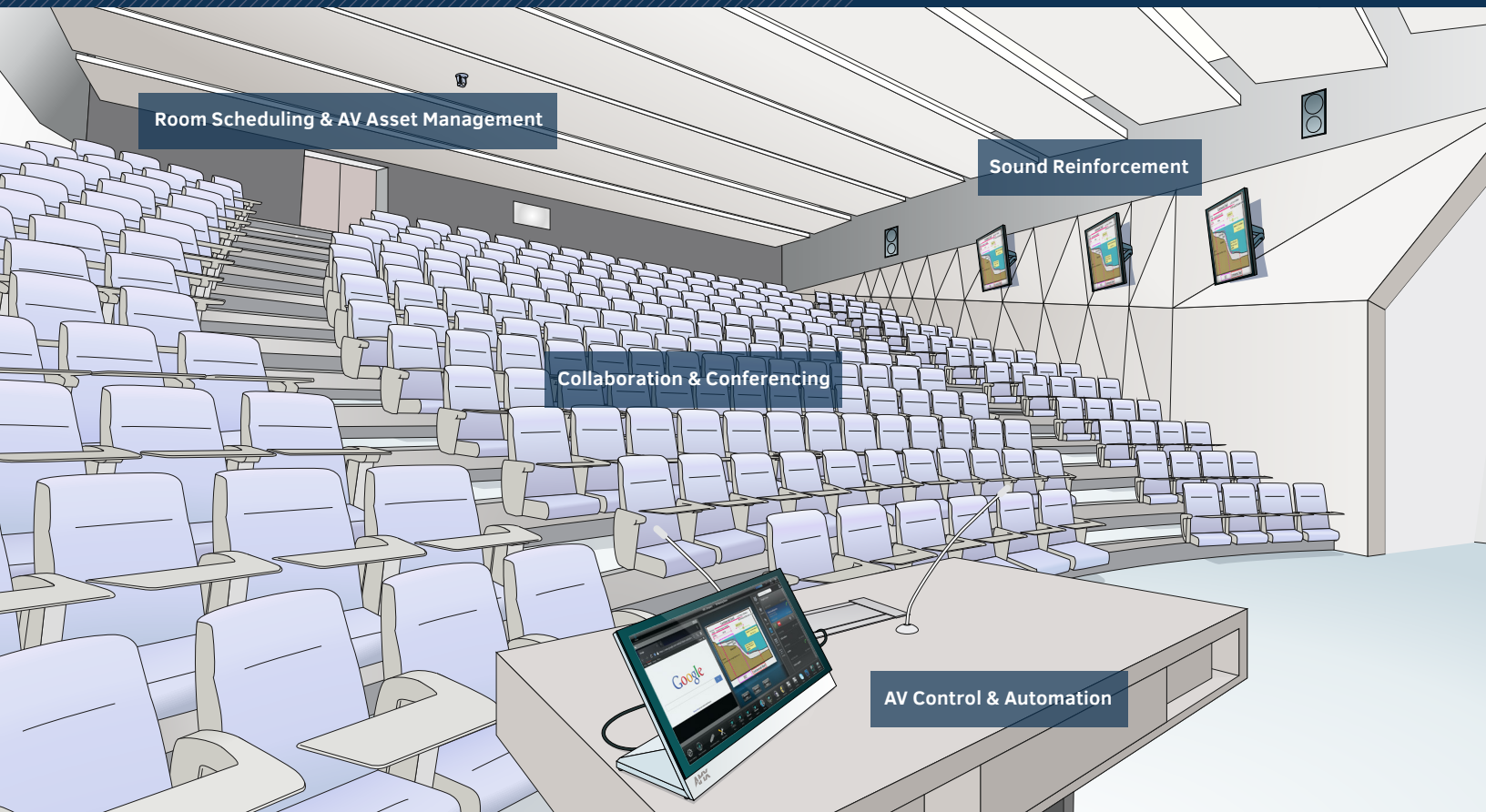


COMMON ACTIVITIES

- 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 CORE BUILDING BLOCKS OF AN AV CONTROL & AUTOMATION SYSTEM WITH AMX BY HARMAN



Modero®
Touch Panel

Massio™
ControlPad

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.



HydraPort®

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.



Enova® DVX

SWITCHING & CONTROL

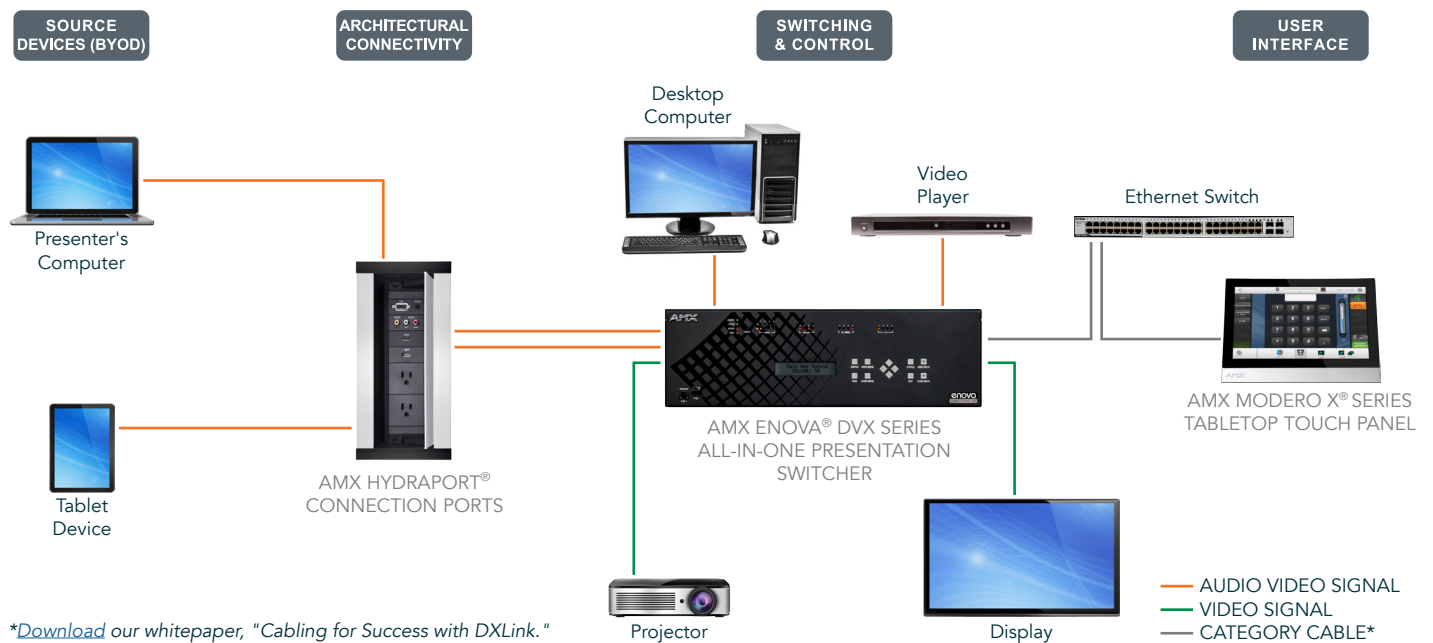
The Audio Video Switcher and Master Controller are the central hub of the AV system. The AV Switcher brings in all audio and video sources, manages the signals, automatically scales the video to the optimum resolution and routes them to displays or other devices. The Master Controller is the brain of 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.

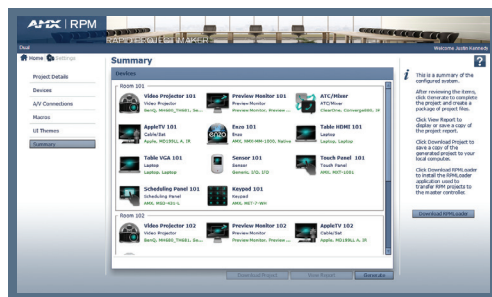
For more resources on AV Control & Automation Systems, please visit www.amx.com/education.

AMX AV CONTROL & AUTOMATION SYSTEM CONCEPT FOR LECTURE HALLS



*Download our whitepaper, "Cabling for Success with DXLink."

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.

For a more in-depth discussion on Sound Reinforcement systems design, we recommend [AUDIO ENGINEERING FOR SOUND REINFORCEMENT](#), by John Eargle and Chris Foreman. Find more information on this textbook here: http://www.jblpro.com/press/audeng_book/book.html.

THE CORE BUILDING BLOCKS OF A HARMAN SOUND REINFORCEMENT SYSTEM



WMS Series
Wireless Mic
Systems

DAM Series
Gooseneck Mic
Systems



MICROPHONES

In a lecture hall, a Wireless Clip-On (or lavalier) 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.



Soundcraft Si Performer Series
Digital Mixing Console



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.



Soundweb London Series DSP



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.



DriveCore™ Install Series Amplifiers



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.



CBT Series Column Array Loudspeakers



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.

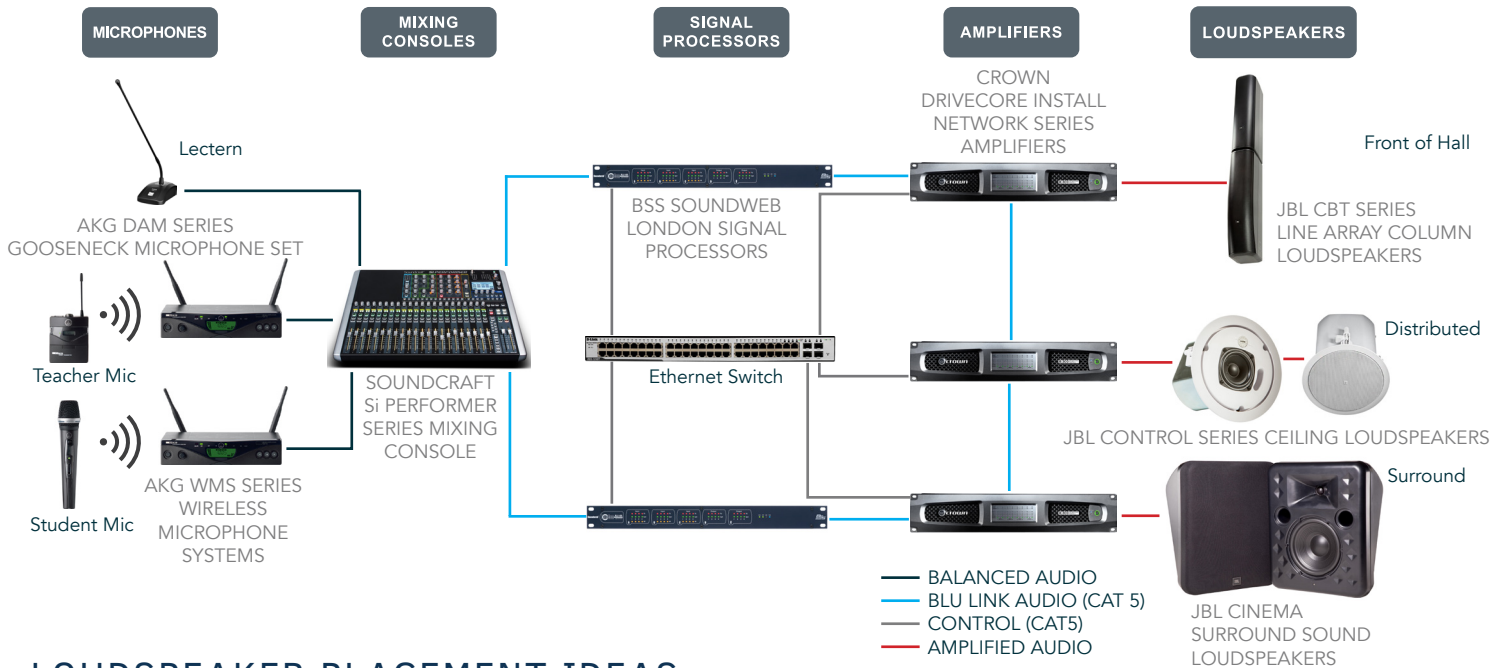
For more information, visit www.jblpro.com.

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>.

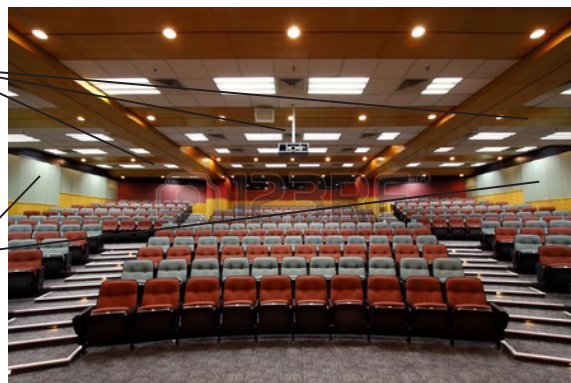
HARMAN SOUND REINFORCEMENT SYSTEM CONCEPT FOR LECTURE HALLS



LOUDSPEAKER PLACEMENT IDEAS

Distributed Loudspeakers
 Ceiling mounted for middle and rear seating

Surround Loudspeakers
 Wall mounted for cinema applications



Front of Hall (FOH) Loudspeakers
 Left - Center - Right

Use our speaker selector tool online!

<http://www.jblpro.com/www/product-support/speaker-selector>

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



Enzo®

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.



Sereno™

VIDEO CONFERENCING CAMERA

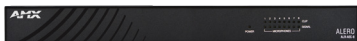
Using a Sereno at each student table can be a cost-effective option for individual web conferencing, where a Pan-Tilt-Zoom Camera is cost prohibitive. The Sereno has a 120-degree field of view, a retractable shutter and USB connectivity.



H.264 Encoder

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



Alero

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 Microphone Gooseneck Microphone

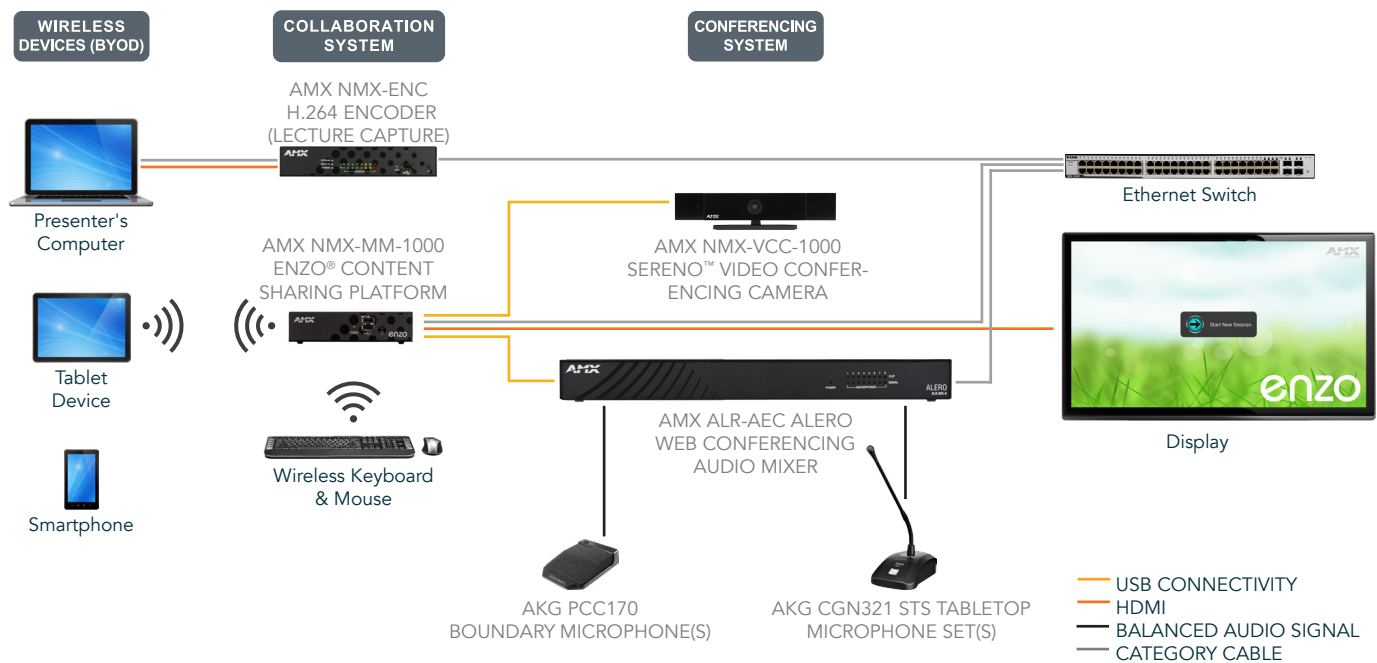
BOUNDARY & GOOSENECK MICROPHONES

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



COLLABORATION & CONFERENCING SYSTEM RESOURCES:

ENZO by AMX: <http://www.amx.com/products/NMX-MM-1000.asp>

SERENO by AMX: <http://www.amx.com/products/NMX-VCC-1000.asp>

ALERO by AMX: <http://www.amx.com/products/ALR-AEC-8.asp>

H.264 Encoder by AMX: <http://www.amx.com/products/NMX-ENC.asp>

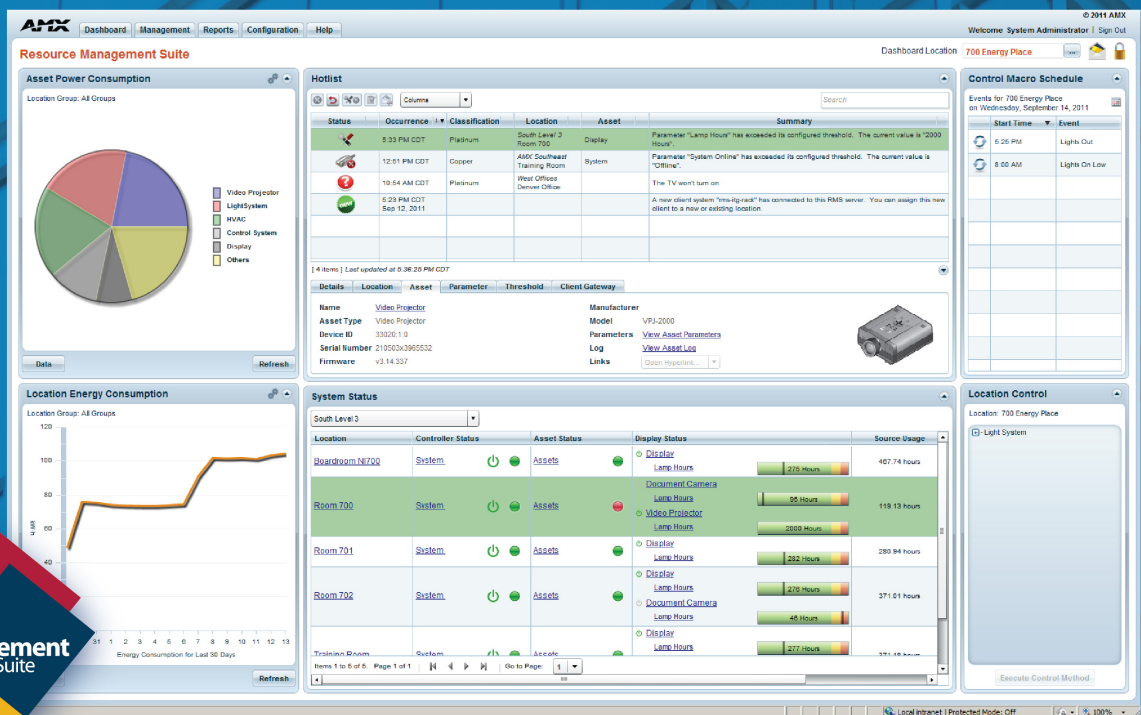
AKG Conferencing Microphones: <http://www.akg.com/pro/microphones/speech-spoken-word/boundary-layer-microphones>

AKG Gooseneck Microphones: <http://www.akg.com/pro/microphones/speech-spoken-word/gooseneck-microphones>

RESOURCE 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.



The RMS Dashboard

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.

RESOURCE MANAGEMENT FOR LECTURE HALLS: SCHEDULE MANAGEMENT

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 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.



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.



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


For more information about Resource Management Suite, please visit: <http://www.amx.com/resourcemanagementsuite/>

BRINGING TOGETHER THE HARMAN LECTURE HALL AV SYSTEM

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:

 <http://www.ags.com/pro/microphones/speech-spoken-word>
<http://www.ags.com/pro/wireless/wireless-microphones>

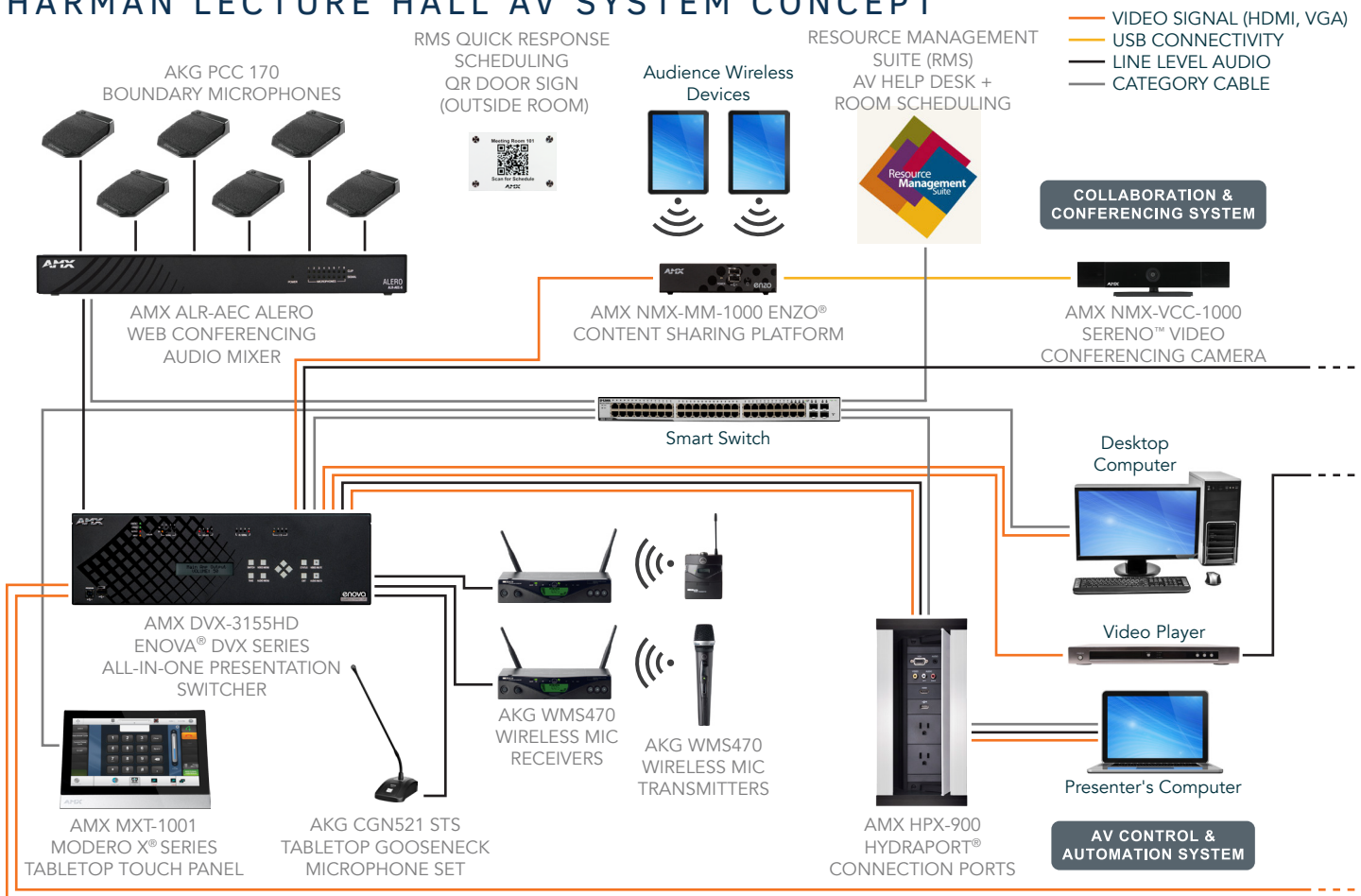
 <http://www.amx.com/productinfo/>

 http://bssaudio.com/en-US/product_families/soundweb-london

 http://www.crownaudio.com/en-US/product_families/drivecore-install-series-network

 <http://jblpro.com/www/products/installed-sound/cbt-series>
<http://jblpro.com/www/products/installed-sound/control-40-series>
<http://jblpro.com/www/products/cinema-market>

HARMAN LECTURE HALL AV SYSTEM CONCEPT

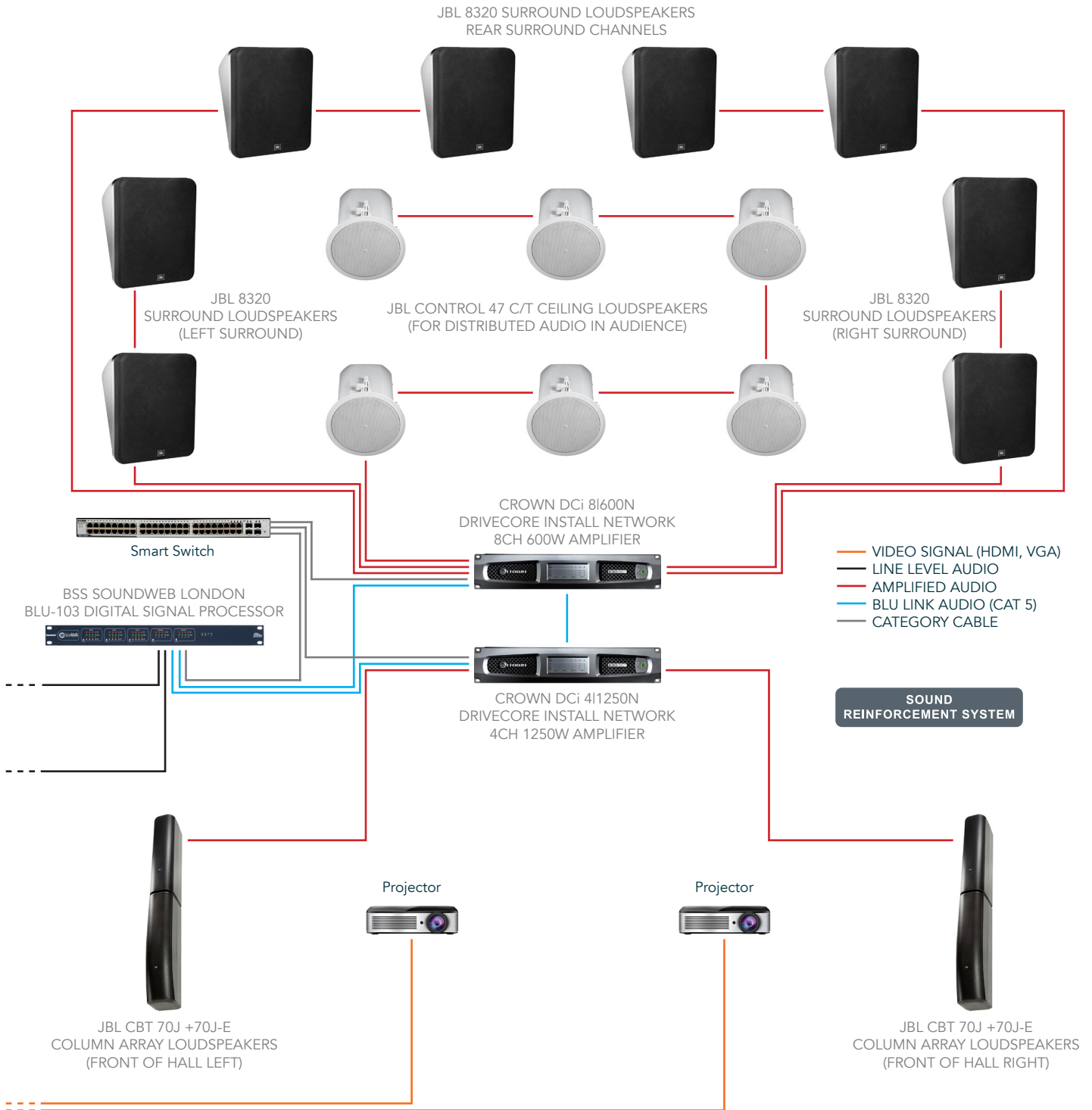


FOR MORE INFORMATION

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)





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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