

PRODUCT AND APPLICATIONS BULLETIN

FILE: Section 4 [Applications]

PRODUCTS: Nexia® VC – Videoconference DSP
Nexia® SP – Speaker Processing DSP
daVinci™ – Control Software

APPLICATION: Training / Observation Rooms with monitoring and intercom system.

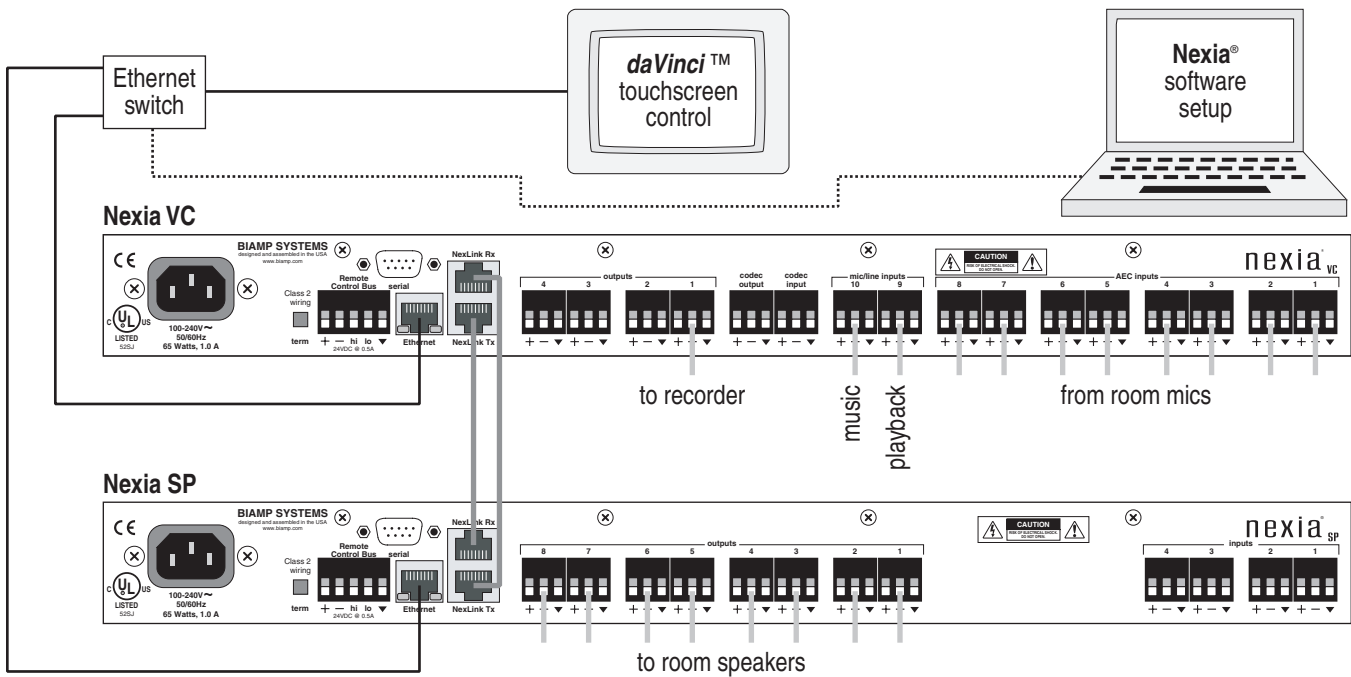
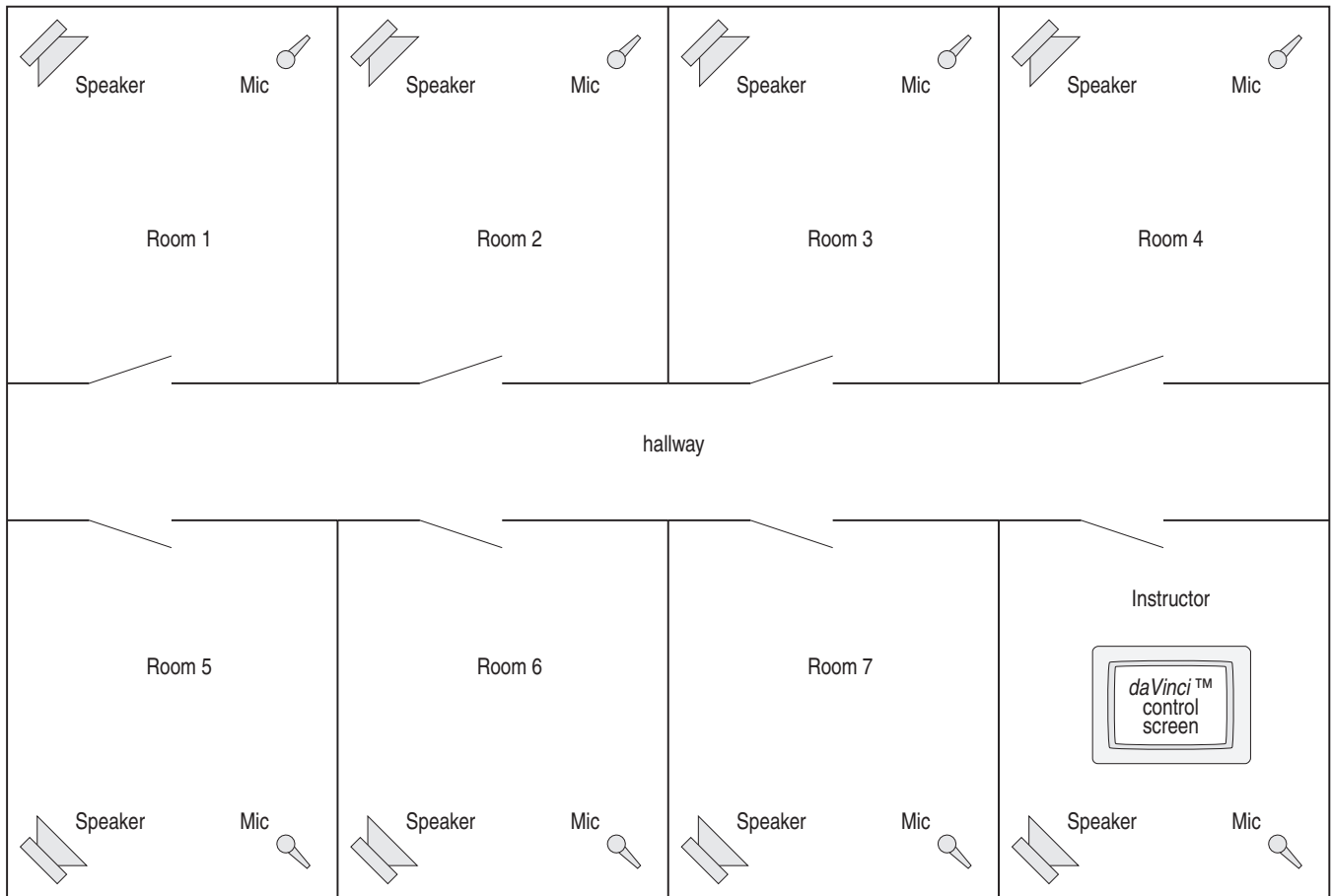
REQUIREMENTS:

- Instructional area with selectable monitoring of training rooms
- Two-way communication between instructional area and selected rooms
- Recording and playback of training sessions, plus background music

PRODUCT OVERVIEW:

Nexia VC is a digital signal processor with 8 wide-band acoustic echo canceling (*AEC*) mic/line inputs, 2 standard mic/line inputs, 4 mic/line outputs, and a codec interface. Nexia SP is a digital signal processor with 4 line inputs and 8 independent mix outputs. Nexia software includes a broad selection of audio components, routing options, and signal processing. The internal system design is completely user definable via PC software, and can be controlled via dedicated software screens, RS-232 control systems, and a variety of optional remote controls. Multi-unit Nexia systems can be created utilizing Ethernet and NexLink digital audio linking.

daVinci is a free software program, designed to allow the creation and use of customized computer control screens with Nexia digital audio systems. The function and appearance of the graphic control interface can be tailored to the exact needs of the user. Individual or grouped sets of controls may be placed and assigned to specific system functions...or...component objects can be copied directly from the system design file into *daVinci* software, producing completely pre-assigned control surfaces. An array of drawing tools is provided for extensive graphic manipulation of controls, backgrounds, and labeling. Control screens can be created with the ability to easily navigate between multiple pages of operation. Once created, a control file is downloaded into the system, where it can then be accessed by multiple network computers running *daVinci* software. *daVinci* cannot alter the system design, and control access to the system may be password protected. System control may be provided using a combination of *daVinci* software, hardware control panels, and third-party RS-232, simultaneously.



APPLICATION EXAMPLE:

This application represents a complete audio monitoring and intercom system for observation/training in classrooms. Video monitoring and camera selection can be easily incorporated into this same system. To the left is a diagram of the physical layout, as well as a system diagram. An example design file and custom control screen can be seen on the back page. This system allows an instructor to select a specific training room for monitoring. Two-way communication is automatically enabled between the instructor and the selected training room. The instructor has a touchscreen which provides complete control of the system, including room monitoring selection and instructor's microphone activation, as well as source selection for a training session recorder and routing of selected program material to the rooms.

Nexia VC was chosen for this job because of the acoustic echo cancellation (*AEC*) on inputs 1~8. This wide-band AEC allows two-way communication between the instructor and selected training room, without the annoying echo associated with having both room mics and speakers active simultaneously.

A microphone and speaker are placed in each room, including the instructor's room. The mics are connected to the AEC inputs of the Nexia VC. Output 1 of the Nexia VC is feeding a recording system, intended to document individual training sessions or lectures from the instructor. Playback from the recorder and background music are connected to standard mic/line inputs on the Nexia VC. The Nexia SP has been added to provide the additional outputs required for the room speakers. The speakers are self-powered, but could instead be driven by a Biamp MCA8050 multi-channel amplifier.

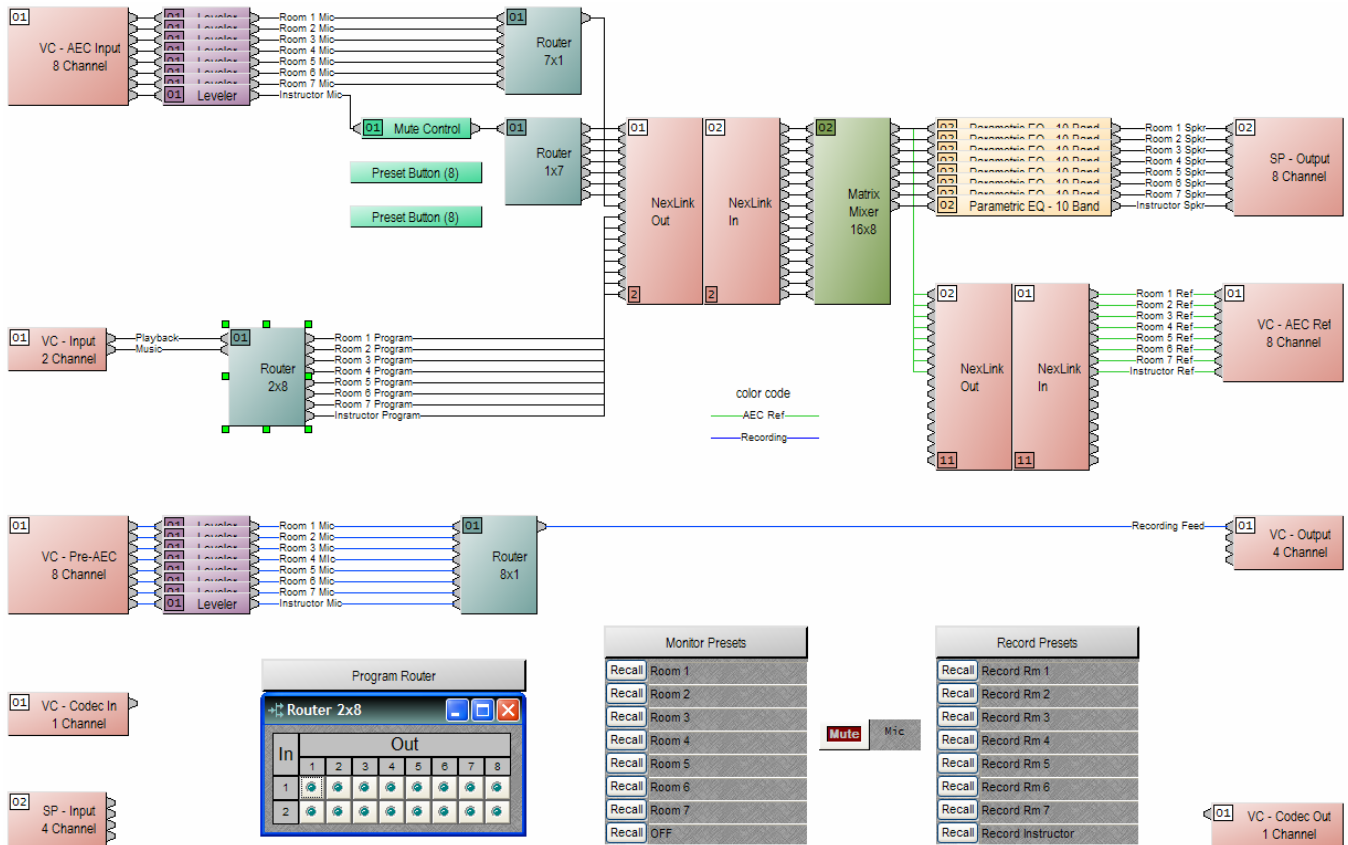
The Nexia VC and SP units are inter-connected in two ways. NexLink allows the two units to share multiple channels of digital audio with each other. Ethernet allows the units to reside on a common network, where they can be programmed and controlled as one cohesive system.

In the system design, mic signals enter the Nexia VC via two separate blocks (*AEC Input and Pre-AEC*). AEC Input signals include acoustic echo cancellation, and are used for the 'intercom' portion of the system. Pre-AEC signals do not include acoustic echo cancellation, and are used for the recording feed. In both cases, Levelers are applied to maintain consistent volume levels from the microphones. For the recording system, a Router (*8x1*) allows the instructor to select which training room (*or his own mic*) will be the source to be recorded. The Router then feeds the Nexia VC Output block (*Output 1*).

For the 'intercom' system, a Router (*7x1*) determines which room mic is sent to the instructor's speaker, and a Router (*1x7*) sends the instructor's mic to the corresponding room speaker. Presets (*which affect both Routers*) assure proper room/instructor assignment. A Mute block on the instructor's mic allows room monitoring with or without return communication. Playback and music signals utilize a Router (*2x8*) for assignment of recorded training sessions, instructor lectures, or relaxing music to any room.

All intercom related signals then pass (*via NexLink*) to the Nexia SP, and enter a Matrix Mixer (*16x8*) where microphone and playback/music signals are mixed appropriately for each room. These signals are then sent both to the room speaker outputs of the Nexia SP and (*again via NexLink*) back to the Nexia VC, where they provide the AEC Ref (*acoustic echo canceling reference*). EQ is applied at the Nexia SP room speaker outputs, to filter unnecessary frequencies and improve intelligibility.

daVinci software was used to create a custom control screen for the instructor's PC/touchscreen. The control screen includes the following selections: training room to be monitored; instructor's mic on/off; room/mic to be recorded; and playback/music assignment for individual rooms.



Monitor		Mic	Record	
	Room 1	ON		Room 1
	Room 2			Room 2
	Room 3			Room 3
	Room 4			Room 4
	Room 5			Room 5
	Room 6			Room 6
	Room 7			Room 7
	OFF			Instructor

Program								
In	Out							
	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7	Instruct
Playback								
Music								