



## Overview

Universities are centers of research as well as institutions for higher learning. Campuses feature multiple buildings with classrooms, offices, computer centers, lecture halls, and auditoriums. They are also leaders in the use of technology to enhance the learning experience, and providing instruction to remote areas and satellite locations.

## Needs Assessment

### Staffing

Professors, adjunct professors, guest lecturers, and student assistants are the typical users of the audio-visual systems on a university campus. A centralized control and equipment room allows component and system monitoring for usage and security purposes. Centralized control also enables multicasting video content for distance learning, assigning classrooms for overflow usage, and providing access to resources that are in remote locations.

### Display and Audio Requirements

Display and audio requirements within classrooms, lecture halls, and conference rooms vary, depending on the AV functions in each location. Video signals at resolutions up to 1920x1200 and stereo audio must be transmitted between the control room and all displays.

### Multi-Building Connectivity

Classrooms, conference rooms, and video conference areas must allow routing to a central control room located in a separate building. Fiber optic cabling between buildings will provide connectivity to the equipment room.

### Control Interface

A control system within each classroom will allow operation of the equipment located within the classroom environment.

### Special Requirements

Distances between buildings on campus will potentially exceed 2 kilometers (6,500 feet), requiring the use of singlemode fiber optic cables to connect to the centralized control room. Multimode fiber can be used within the classrooms, as well as for connecting rooms within the building that houses the control room.

## System Design Solution

### Display Systems

Room display systems include projectors and LCD displays. Sizes, types, and quantities depend on the application within each room. The required resolution to be delivered to each room from the central control room is 1080p. Signal processing is handled by the equipment within each room.

### Sources and Connectivity

Sources include video feeds from classrooms, lecture halls, video conference systems, and conference rooms. Additionally, there are shared resources from the centralized control room. All signals are scaled to 1080p.

### Switching and Signal Management

The Extron **FOX Matrix 320x** Modular Fiber Optic Matrix Switcher provides signal distribution and routing of all fiber optic AV signals. The I/O boards for the matrix switcher include both singlemode and multimode versions. The multimode boards are used to connect rooms within the same building as the control room. Singlemode boards are used to transmit signals between campus buildings.

The FOX Matrix 320x can switch any input to one or more outputs, including any combination of singlemode and multimode signals, providing a complete non-blocking distribution solution. The FOX Matrix 320x can receive a signal on a multimode input, and route it through a singlemode output to a distant location.

### Signal Distribution and Extension

Extron **FOXBOX Tx HDMI** Fiber Optic Transmitters are used to send high resolution computer and Blu-ray Disc signals from the classrooms, lecture halls, auditoriums, and conference rooms to the centralized control room. By routing signals to the control room, each is available throughout the campus.

For independent processing and routing of audio signals in the fiber optic AV distribution system, the Extron **FOX AEX 108** Eight Port Fiber Optic Audio Extractor provides analog stereo audio signals to support local audio processing equipment. It then re-transmits the original signal to the FOX Matrix 320x.

The pan, tilt, and zoom — PTZ cameras within the rooms use Extron **FOXBOX Tx VGA/YUV** Fiber Optic Transmitters to send high resolution video signals to the control room for use by the lecture capture systems and video teleconference — VTC hardware.

Extron **FOXBOX Rx HDMI** Fiber Optic Receivers installed in the classrooms, conference rooms, auditoriums, and lecture halls convert optical signals from the control room into 1080p HDMI video with embedded audio for the various display devices.

