

CAMPUS PUBLIC ADDRESS

When considering campus communications, all institutions have something in common. They utilize either a telephone system or radio system for two-way communications, and most have both. Most campuses use telephone as a communication medium between offices, buildings, dorms, and remotely installed emergency call box telephones. Some campuses elect to use RF (radio frequency) communications between their emergency call boxes and campus security, but the telephone system infrastructure still exists at all other locations. Similarly, most (if not all) campuses utilize a radio system for security communications. This system typically includes a security office base radio, mobile radios in vehicles, and portable radios carried by security guards.

Public address, a method of broadcasting one-way, voice announcements via loudspeakers, is not something typically considered when designing a communication system for campuses. It is a very useful tool for providing general announcements or for providing information during emergency situations, yet it is often overlooked. Most campus cabling used for the telephone system has been in place for many years and the cost of installing new cable for new systems is a very strong deterrent when considering upgrades. Although many institutions are currently considering adding public address to their facilities, they are faced with a self-imposed dilemma; how do they install a public address system infrastructure in a cost-effective manner? The answer is simple, **the infrastructure more than likely already exists.**

GAI-Tronics' Public Address broadcast assemblies, the Addressable Amplified Speaker (AAS), Stanchion Broadcast Assembly (SBA), and Stanchion Broadcast Module (SBM), are designed to provide public address announcements from inputs provided by either telephone or radio systems. Generating announcements from a radio system simply requires that the appropriate broadcast assembly be equipped and programmed for an existing, licensed radio frequency. The only wiring required is to a 120 Vac power source (solar power can be used for the AAS). Generating announcements from a telephone system will also require connections to a 110 Vac power source and two (2) spare telephone pairs. One pair is designated for audio (600 Ohm, 0dBm) and the other for a circuit activation contact closure.

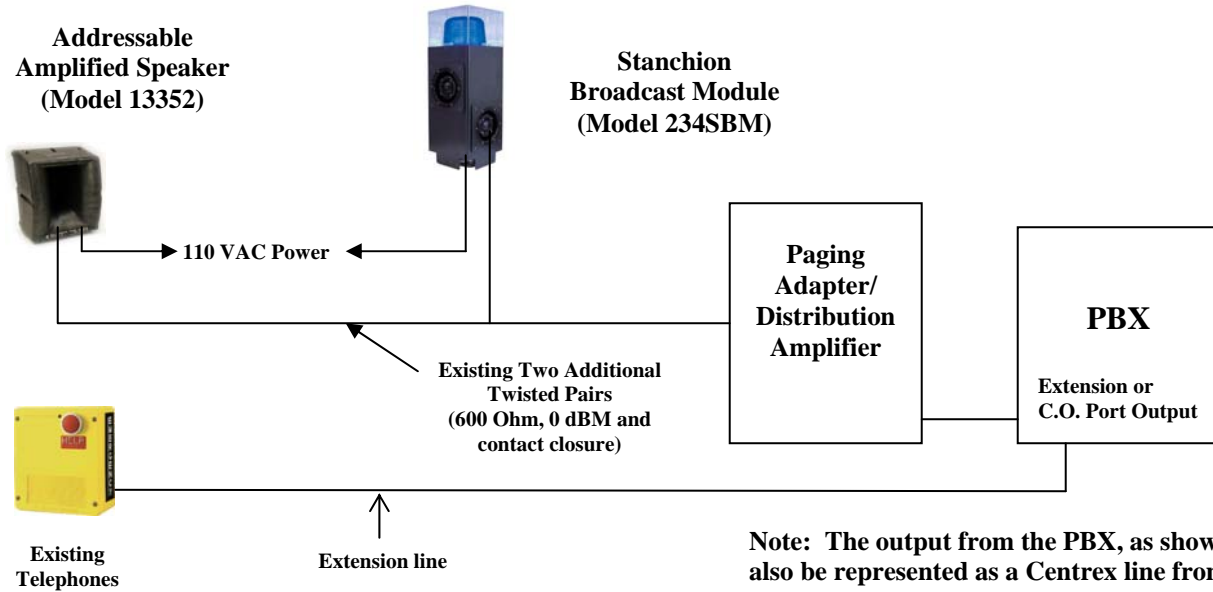
The Stanchion Broadcast Assembly (234SBA) is a full sized, 108"H, 234 series stanchion that is configured for public address speaker (1 to 4) installation. The Stanchion Broadcast Module (234SBM) is an 18"H module that is also configured for public address speaker (1 to 4) installation. It installs on the top of an existing, standard 234 series stanchion.

Public Address from a Telephone System

Most telephone cable installations provide at least two additional pairs of unused wires at each existing telephone location. With appropriate power connected to the AAS, SBA, or SBM, an audio input from the PBX will generate an audio output from the broadcast device. The output from the AAS is 85-116 dB SPL @ 4 feet on axis and the output from the SBA/SBM is 85-110 dB SPL (in each speaker direction) @ 4 feet on axis. The PBX will be required to provide a page port output of 600 Ohm, 0 dBm and a dry contact closure. This can also be obtained from a paging adapter if a page port is not available within the PBX.

All telephone pairs connected to the speakers will terminate at a common location at the PBX (punch-down blocks), allowing a single output to operate multiple speakers. A multi-line, distribution amplifier may be necessary to maintain the 600 Ohm line balance. See Figure 1 for typical interconnection.

Audio Distribution Amplifier Connection to AAS, SBA, or SBM



Note: The output from the PBX, as shown, can also be represented as a Centrex line from the telephone company.

Figure 1

Public Address from a Radio System

Each RF version of the AAS, Models 13372 (UHF) and 13362 (VHF), includes a built in radio receiver with internal antenna. The SBA and SBM are offered with an optional Radio Access Electronics Package, Models 84508-002 (VHF) and 84508-003 (UHF). The VHF models' frequency range is 154-174 MHz and the UHF model's frequency range is 450-470 MHz. As previously stated, most campuses already utilize a radio system for security and/or maintenance. If radio communications already exist between the transmitting location and the location at which a broadcasting device is to be installed, then receiving the RF signal should not be an issue. This can be verified by communicating via handheld radios between the two points. In any RF system, the antenna system is extremely important. If "line of sight" exists between these points, there will be no issues. If there are obstructions between these points and communications can not occur between two radios, then an external antenna and possibly a radio repeater may be needed. This can be determined by the institution's radio contractor.

See Figure 2 for a typical radio broadcast system interconnection.

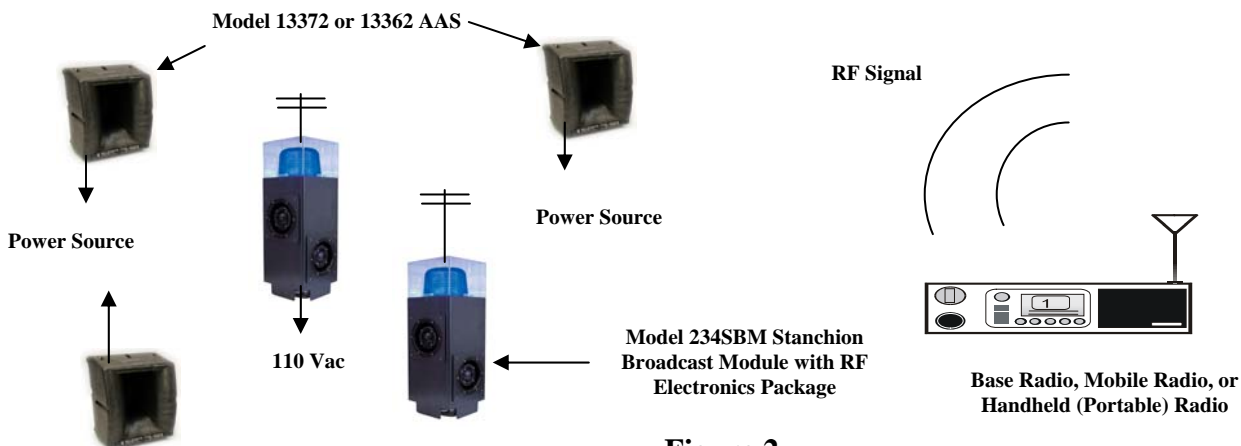


Figure 2

If properly equipped, any of the broadcast units can be accessed from both the telephone system and the radio system. It would simply be a matter of combining Figures 1 and 2. If necessary, the PBX or paging adapter output can be interfaced to a base radio for RF transmission. This can be useful when the primary (or only) point of transmission is via the telephone system and it is not possible to run telephone cable to a specific broadcast location. See Figure 3.

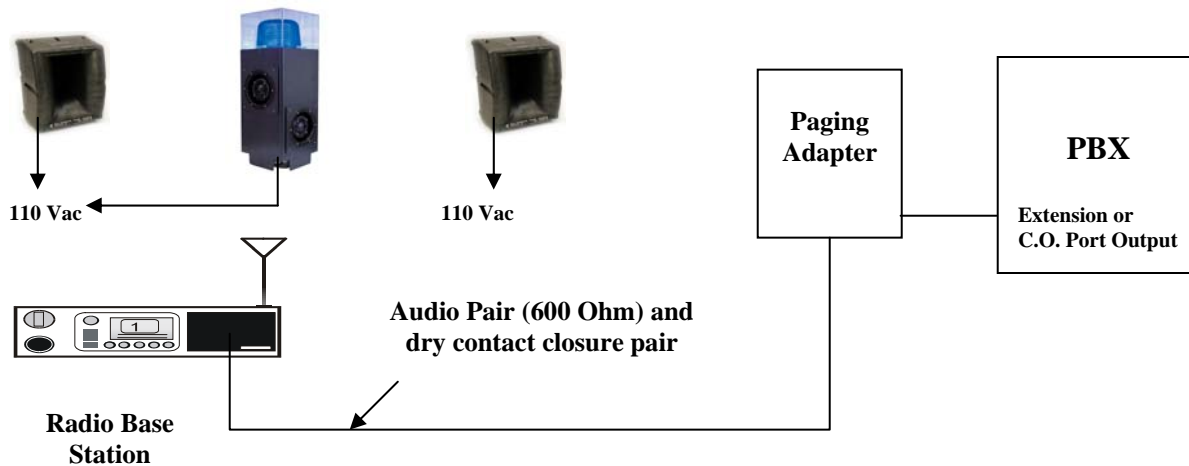


Figure 3

Generic Radio Operation

Any of GAI-Tronics' broadcast units can be programmed for Generic operation. This simply means that every unit will broadcast any audio received on its audio line or on its intended operating frequency. A broadcast can then be generated from any security radio that has access to the programmed frequency or from any telephone (paging adapter number must be known).

DTMF Selective Operation

Each broadcast unit (AAS, SBA, or SBM) is, in fact, addressable. Each unit can be programmed to activate only upon receiving the appropriate, preprogrammed, DTMF code, providing an extra level of security to system access. This DTMF access is available whether the unit is accessed via a telephone line or an RF transmission. Each unit is capable of storing up to eight different DTMF codes, allowing the person initiating the broadcast to select a specific speaker, groups of speakers, or all speakers simultaneously. In this mode of operation, each Addressable Amplified Speaker's individual volume can be controlled remotely. The SBA and SBM speaker volume can also be adjusted remotely, as a group or cluster.

In telephone operation, the person initiating the broadcast will simply enter the code on the telephone keypad upon receiving the "go-ahead" splash tone from the PBX or paging adapter, and then speak into the handset microphone. In radio operation, a transmitting radio equipped with DTMF encode (keypad on the radio) is required. The radio operator will press the DTMF code into the keypad while pressing the Push-to-Talk switch, and then speak into the radio's microphone.

All Addressable Amplified Speakers are available with an optional Battery Back-up Kit, Model BB133. If a power failure occurs, this kit will provide two hours of continuous operation at full output for the 13352 and 13372 speakers. It will provide 75 minutes of continuous full output for the 13362 speaker. The SBA and SBM are each equipped with a battery back-up system that includes a single 18 Ah battery to provide a minimum back-up of 30 minutes of continuous full output. A second battery is available to extend the back-up time.

Siren System to Voice/Audio System Comparison

In light of recent events involving campus communications, an unusually large number of emergency warning system specifications have surfaced. Most of these specifications are written without the input from anyone familiar with communications and/or public address systems and many are written around a “siren” system. A siren system is exactly what it states, a loud siren typically generating a sound output level of 150 dB SPL or higher (jet engine level). These types of systems are typically viewed as a “quick fix” approach to public address because they require relatively little investment in system design. Many of these systems are actually laid out using Google Earth®, due to the lack of detail required. Simply plant a pole with a speaker cluster at 1, 2, or 3 different locations on the campus and the campus is covered. Or is it?

These siren speaker clusters are intended to be heard for long distances but provide no means of instruction to those intended to hear it. Since the siren “horns” are typically clustered on top of poles (usually 30 feet high) and placed in a few strategic locations, the intended method of penetrating buildings and structures is to simply try and generate a loud enough audible signal to do so. This type of system usually includes a general plan for all personnel to move to a pre-designated muster (gathering) point upon hearing the siren or, as of recent technology, check their voice or email. Specific live instructions are intended to be provided at the muster location. If the person providing those instructions is not present, campus personnel have no idea of what they are to do next. If the siren is intended to signal students to check voice or email, it may require them to first turn on their cellular telephones, possibly costing valuable time. If a student is in an area that can not receive the cellular signal, then there is even more reason for concern. Additionally, visitors to the campus would need specific training to understand the warning signals.

Another type of system uses the same horn clusters and extremely loud outputs to broadcast voice messages and tones. Although specific instructions can be broadcast from the speakers, the approach here is to also set the outputs loud enough to penetrate structures. This is not as easy as simply hearing a loud siren and the ability to understand the broadcast while inside buildings is liable to be lost. Again, the sound level directly beneath the speaker clusters is somewhat deafening and the audio could carry for quite a distance in the open air. Voice audio broadcasted at this volume level is often distorted and difficult to understand.

Both of these types of siren systems are typically used in and around chemical and nuclear facilities to warn surrounding communities in an emergency. They serve a very useful purpose at these locations, intended to warn surrounding communities, but we are discussing a college campus. Thirty foot poles with speaker clusters don’t naturally fit into a campus setting and could raise a few interesting questions from visiting parents and students alike.

GAI-Tronics’ experience in the design of public address and paging systems spans many decades. Our approach with the Addressable Amplified Speaker, the Stanchion Broadcast Assembly, and the Stanchion Broadcast Module is to distribute the speakers, indoors and outdoors, providing intelligible voice instructions to the masses. A distributed speaker system will require a greater design effort and more individual speakers than will a centralized speaker location system (as described above) but the speakers, and their associated volume, are more discrete and the level of reliability is extremely high. Additionally, most campuses exist within established private communities. Existing sound ordinances may already prevent systems with extremely high sound levels from being installed. Being able to operate a public address system at reasonable volume levels, while still getting the message across loud and clear, will definitely help keep the peace.



**Model 234SBM Stanchion
Broadcast Module**



**Model 13352, 13362, or
13372 Addressable
Amplified Speaker**