Required Functions:

- Separate sounds for Evacuate, Lock Down, Lock out. Sounds able to be changed i.e. MP3 files
- Period Bell – as a changeable MP3 file.
- Line Up Music – as a changeable MP3 file.
- Automatic Bell Timer, 2 channel (control both bell and line up music).
- Simple controls, easy to use.
- Self resetting – if power is removed and restored, the system works.
- Critical functions do NOT rely on a PC to work.
- Bell times and MP3 Files able to be updated or altered by using a PC.
- MUST be clearly heard throughout the ENTIRE school both inside and outside *and in noisy environments.*
- Sectored system – allows certain parts of the school (such as the Hall or groups of rooms) to be isolated from bells (for exams) but still automatically receive signals in an emergency.
- 10~20 year Main Equipment life span, with options to upgrade.
- 30~40 year Infrastructure (Speakers and Cabling) life span.
- Independent of existing data cabling and telephone infrastructure.
- Single power point operation (System only needs to be powered at one location in the school) facilitates UPS (Un interruptible power supply)
- Standard, ex. stock components from reliable, reputable suppliers.
- Low installation cost.

History:

The PA Matthews Audio "High School PA Communications System" has been developed over many years of practical use in real, working NSW State High Schools. With over 20 years' experience in these systems we know what works – and what doesn't. We dump bad things that don't work and develop good things that work well.

The result is our new premium rage of high quality, affordable and extremely agile High School PA Systems.

The importance of being heard:

"PA" stands for "PUBLIC ADDRESS". The ideal PA system should be "heard everywhere" i.e. EVERYONE hears it, no matter where they are in the school.

Sound does not travel very well through closed windows, doors or solid walls. So the *ideal* solution which allows a PA system to be heard *everywhere* is one which places a speaker in *every* internal room and covering *every* outdoor area.

The limitation on doing this is of course *cost of installation,* as high school campuses are generally a very large complex of buildings consisting of literally hundreds of rooms and dozens of outdoor and common areas of differing uses.

Whilst 20 years ago it might have been feasible to put a few horn speakers around the school in playgrounds and corridors and call this a school PA system, this approach is no longer suitable. This is because modern high school campuses now contain many specialist (often air conditioned) sound proofed spaces for Arts, TAS, Trade school and sports uses. These spaces are not only acoustically isolated but many are also *high noise environments.*

It is cost prohibitive to install speakers in *every single room* in *every* building. The best solution is to install a speaker in every <u>teaching space</u>. It's the noisy *teaching spaces* which contain most of the people most of the time. Smaller, quieter store rooms and staff rooms (which generally open onto teaching spaces) will adequately hear the system from adjacent rooms or common areas.

It is imperative to develop a system design which treats a complete campus based on *room use and design,* not just location. The metalwork trades room and music rehearsal rooms for example, will need a lot more system power than will say, the library.

PA Matthews Audio spend considerable time to visit your school and develop a design for a system that will be heard everywhere but not cost the earth. Nothing is left to chance. You get a complete design and plan showing which rooms need treatment and where the speakers will go.

Our systems work properly from the first day they are commissioned. They stay working. In the unlikely event that they stop working the conventional technology used means the systems can be repaired easily. Our full set of "as installed" plans and comprehensive system instruction manual means that your system is equipped for the future.

<u>The Hard Wired solution:</u>

Many competing suppliers are offering solutions for high school PA systems. Some of these use wireless technology. Others rely heavily on the school's existing computer data systems. However the only way to ensure a PA system works and stays working for decades to come – is to <u>hardwire it.</u>

Wireless systems sound like a great idea.. until you realise that power doesn't travel via wireless. Radio based systems need a power supply *at every receiver point.* In a typical campus this could mean dozens of points where a power point needs to be installed to power wireless receivers. This also invariably means dozens of places where standby power (in the form of batteries) must also be provided, in order to keep the system working in the event of a power failure.

Once these issues are taken into account, the perceived benefits of wireless quickly evaporate. The cost of installing and maintaining power to the many receivers quickly exceeds the cost of simply hardwiring the system in the first place. The complexity of wireless systems renders them difficult to repair. Critical components quickly become obsolete. This all means that wireless systems are unlikely to have a life span of more than 6~8 years in service. Wireless solutions represent a poor investment over time and are really not much cheaper to install than a properly designed conventional hardwired system.

Systems which connect to and rely upon the school's existing data infrastructure significantly complicate the operation of these systems. A failure in the data system (such as power being lost at a data switch in a remote building) will affect the PA system in that building. PA systems which use a school's data network are needlessly complex. It significantly increases the challenges facing school IT staff who use, modify and maintain these networks. Loss of a single experienced staff member can render an entire system useless because nobody else remembers how it works.

The topology of a high school data network is such that it changes regularly with room use and with frequent technology upgrades. Conversely, the topology of a typical PA system rarely needs to change unless the actual space changes. Any PA system reliant on school data network infrastructure is likely to become inoperative whenever staff make changes to that data network.

These problems will invariably require the attention of highly trained experts to resolve problems that arise through no fault of the PA system itself. This all takes time. Time during which the PA system remains unavailable for use, which significantly impacts on the whole school. The alternative is to keep these networks separate, making sure that changes to one network will not adversely affect the other. This means the school IT staff do not need to be trained in the operation of the PA system and PA contractors need not fiddle with the school's data networks when working on the PA.

High School PA Systems - Installation :

Ease of installation of a PA system in your school depends on the age of your buildings and how many times they have been renovated.

Depending on the size of the student population in the school it may be necessary for work to be scheduled into a school holiday period. Installation of these systems requires access to just about every room, door and lock in the school as works progress.

Installation of a complete PA system in a typical NSW High school should generally take a team of 3~4 trades people around 6 to 12 work days depending on access arrangements.

NSW state High schools built before 1985 : These were generally built with spare conduits in place between buildings and running into each room specifically intended for a PA system. These usually aggregate in boxes adjacent to the electrical switchboards. The older the school, the more likely it is that these conduits may have been either damaged by renovation works or have been used by other trades such as for security or telephone systems.

Some schools in this category may also have obsolete multi pair "PAX" telephone cabling in place which can be redeployed for use with a PA system.

Schools built before 1970 tend to have generous "in roof" and "under floor" accessible building spaces meaning that even if conduit availability is limited, installation is not normally a problem. Schools built between 1976 and 1985 have very limited building spaces but conduit infrastructure is generally very good.

NSW State High Schools built between 1985 and 1997 : Schools built in this period present the greatest challenge. They are "the worst" and represent a very "austere" period of NSW Govt. building design when everything was built down to a price. They were built before standard "Cat 5" computer data cabling became the norm but well after it was decided to cut costs by eliminating provision for PA in school designs. These schools therefore have limited spare conduit capacity between blocks and often none at all in to the rooms. In some cases there may be redundant MATV network conduits which can be re used for PA.

Costs for installation into these schools is likely to be higher and will in some cases will require external conduits. (see also "Data Networks" below.)

NSW State High Schools built between 1997 and 2005: Schools built after 1997 generally included "Cat 5" style data networks. It is feasible to use one existing "cat 5" data cable per room (or in some cases per few rooms) to provide PA. The Cat 5 cabling generally aggregates at separate points, away from electrical switchboards. In most cases the conduits congregate at the Library (not the main office) which means it is often necessary to add capacity between the Library and the Office to install a PA.

NSW State High Schools built after 2005: Modern schools comply with the Departments' standards for 12 x Cat 5 data points per room with two of these to be located on the ceiling of each room. In most cases one of these is used for a wireless presence point. The other can therefore easily be used for PA simply by installing a surface speaker on top of it. Modern schools normally have sufficient data conduit capacity between blocks to enable installation of PA cabling within existing data conduits with minimal disruption and at low cost. Installing external speakers however does pose some challenges.

Retrofitted Data Networks: Most NSW state schools now feature retrofitted data networks which bring older schools up to the Department's current data cabling standards. In many cases (especially for 1997-2005 schools) these were installed using large amounts of professionally installed surface conduits

and ducts. PA can often be installed alongside these networks by using this common conduit and duct capacity.

Control Options :

The PA Matthews Audio High School PA range keeps control of the entire system where it belongs - at the top. The complete control system occupies less than 9RU of rack space. This "Main Equipment" can be located either in the main office or within any existing data hub rack. In the event that the M/E is to be located anywhere else than the front office, a separate mimic panel can be provided so that emergency functions such as Evacuation and Lock down can be controlled from the office without having to go to the equipment rack.

Zoning : Our system offers control from 8 to 16 zones with one to four paging microphones. These can be located anywhere in the office or school where there is a Cat 5 data point. Typically small systems will have one microphone while larger ones will have additional microphones in the Principal's and Deputy's office. Any microphone can be used to page any combination of zones or a single button "all call" can be used.

Zones where Bells and Line Up Music are to be heard are simply selected using a group of 16 zone switches on the front of the main control unit. Normally all of these are turned "on", however specific zones can be easily be switched off when it is necessary to isolate certain areas for exams such as the hall or one floor of a classroom block.

If an emergency evacuation or lock down is activated it will be automatically heard in all zones regardless of any switch settings.

The system uses either the Australian Monitor Zoner 16 (max. 1 mic) or Redback A2085 (max. 4 mics). Both are used in a single amplifier configuration. Because the system is used regularly for school bells, any malfunction or fault in the system is swiftly noticed and can be quickly rectified. This minimises the chance of the evacuation or lock down system being found to be faulty in the event of an emergency.

Timers & Tone Playout : Our standard system uses a reliable two channel, 7 day timer (Theben TR622top2) with one channel used for bells and the other controlling the line up music. A deluxe TR642top2 model is also available which is a full 365 calendar day timer. This option is recommended for high schools having complex bell times which differ on a weekly or term basis.

Timers can be programmed either directly from the timer face or via an easy to use Windows program running on any PC with a USB interface. The computer does not connect directly to the timer.

Tone and Music playout is provided by a Redback A1740 "ten spot" SD/MP3 player. All tones (including evacuate and lock down) are stored on a standard 2GB SD card in universal MP3 format which can be changed by any PC with

an SD card interface. <u>The playout system itself does not connect to a computer.</u>

A range of tones are provided as standard. For an additional fee, PA Matthews Audio can also provide professionally produced Evacuation and Lock down routines tailored to your specific campus. These announcements can clearly instruct people exactly what to do and where to go in the event of an emergency.

PA Matthews Audio has installed this successful, reliable combination in over 50 schools since 2009.

Power : Our systems always use a single amplifier which is sized according to the system load installed in the school. 480w is the most commonly used size in high schools.

Standby Power : Our systems use standard 240v power. Standby capacity is easily added by running the entire system off a standard 1200VA Uninterruptible Power Supply (UPS). This can provide around 30 minutes of system operation in the event of power failure. Larger UPS systems are also available.

It should be noted that while our Main Equipment systems are engineered for a 10 year reliability envelope, UPS systems will generally require replacement batteries every 2~3 years to remain reliable.

PA Matthews Audio recommend that schools consider carefully their need to include a UPS option. We have found that in many cases, a poorly maintained UPS can adversely affect the overall reliability of the PA system to the extent that it would be better to have not installed the UPS at all.