

P.A.

FROM THE PA MATTHEWS AUDIO MUSEUM

THE HISTORY OF PA SYSTEMS IN NSW STATE SCHOOLS

WHY don't NSW schools have PA systems, when other Australian interstate schools do?

Well like most things in life, we have to go back into history to answer this one. And like both death and taxes, it's all about *politics.. and money!*

Back in **the early 1950's**, "Radio" was seen as the new "must have" educational tool in schools. The Federal Government (through the ABC) commissioned a number of educational radio programs, intended for use in all Australian schools.

Problem was, most schools back then didn't actually *have the technology required to receive those broadcasts!*

So by the **late 1950s**, the Australian government had begun to provide grants to the states in order to allow them to buy radios for their schools. Initially these were just normal radios available on the domestic market. However it was soon realised that these did not meet the needs of the education sector. They were also *way too expensive* to be able to buy multiple units with one for each classroom.

So instead, the states used the Federal money to set up a dedicated electronics division inside their existing state owned "public works" departments (PWD's). Each electronics division was charged with finding the most cost effective way to equip state schools with radio receiving equipment so that the National ABC broadcasts could be heard in class rooms and then used as part of the education curriculum.



Above : An early Philips PA unit (1952) recovered from a primary school in the Illawarra region, NSW. This appears to have been manufactured locally using an imported radio module and a locally produced valve amplifier. Unit will be restored to static display condition.



Above : A 1959 locally made "Audio Engineers" Radio / PA unit recovered from a primary school in Western Sydney. This unit is in perfect working, original condition.

"Audio Engineers" appears to have been the first example of a local radio maker winning a state contract to supply radio equipment under the Federally funded programme.

The switches on the right hand side are speaker zone switches.

The most cost effective way to do this in the 1950's was to buy one high power radio / PA unit for each school and then install speakers in each class room. Wiring would then be installed to connect speakers back to the master radio unit in the front office.

In a method that was customary for the day, government tenders were then let for the supply of the equipment. The tenders were invariably answered by small local electronics manufacturers. A suitable unit would then be designed and added to their existing production line. Back in those days, import duties on electronic equipment imported from overseas was prohibitively high. So a locally manufactured option was always the most favoured.

The annual Federal grant money was split. Around 40% would go to the ABC for production of educational radio programmes. The rest would filter down through the state PWD's and into local manufacturers in each city. The PWD's would then maintain a small team of electronic trades staff with vans. These then plied the state installing the PA / Radios and speakers in the schools along with the cabling that linked them together.

Before long of course, it was discovered by many school principals that these "radio systems" were useful for far more than just piping ABC broadcasts into classrooms! By adding outdoor horn speakers and a microphone, these "installations" created a very capable and useful School PA system!



Above : Views of the 1959 “AE” unit. The locally developed chassis coupled a typical five valve receiver design with a push pull pair of EL84 output tubes developing about 35 watts into a 70 volt line transformer. This unit would have cost a small fortune in it’s day, around \$8,000 in 2015 dollars!



Typically a large switch panel would be included. This was originally designed so that a particular broadcast could be switched to selected rooms. It didn't take long for office staff to work out that with a microphone they could use the same switch board to send messages to individual rooms from the office.

Addition of an outside microphone permitted the system to be used for an Assembly PA every morning. Adding a simple tone generator and timer meant the PA system could also then be used for signalling bells.

By the early 1970's, most medium and large primary schools in NSW had these systems installed and were using them daily.

Above : An unrestored “Flett Electronics” School PA unit circa late 1960’s. These were by far the most popular unit supplied with most schools in the state receiving at least one of these units under NSW Government contract. A four valve AM receiver module (which was likely manufactured as a sub assembly in another factory) is coupled with a 40w transistor PA amplifier design (quite revolutionary for the time). The zone switch panel can be seen at the top.

The NSW experience.

By the **mid 1960s**, the NSW Education Department (NSWDofE) had begun to include a specification into its building designs for new school buildings (both Primary and High) to include provision for PA.

In most cases this included a “PA blank plate” installed in each class room, linked by conduit and draw wire back to the nearest electrical distribution board. A set of additional underground “PA” conduits would then be specified to link buildings together and link into the administration office.

Although this provision for PA was generally included in all NSW DofE buildings since about 1967, there was never any guarantee that a *PA system would actually be installed... oh no no!*

In many cases the installation of the PA system itself would depend on how much money was available, how busy the PWD were in installing them and even.. *how much noise the Principal made in the ear of their local member!*



Above : Typical 3 watt, 70v line “Flett Electronics” room speaker from the early 1970’s. The 5 step control underneath was a local volume control.



Above : A compact 40 watt PA amplifier from “Flett Electronics” circa mid 1970’s These Government Contract units quickly found their home in school halls and offices right across the state.

Right : Rear view of the speaker box on the previous page. All 100% Sydney manufacture, even down to the magnet on the speaker and the line transformer.

The provision of School PA by the NSW DofE reached a high point in the **early 1970s**. By this time a whole manufacturing industry in Sydney had sprung up around providing these systems. It was led by “Flett Electronics” who had set up a factory in Villawood (NSW) specifically to meet NSW and Federal tenders for PA system equipment.

In the **mid 1970’s**, the NSW DofE had about 16 “electronics staff” on it’s books. There were about eight vans in the yard at Silverwater. These were kept constantly busy maintaining existing PA systems. Occasionally they would also be seen installing new ones in a few brand new schools in politically sensitive suburbs too!

By **1975**, some of these installation designs (particularly in high schools) were becoming quite complex and technically advanced. Following the original pattern of having “one big centrally located PA unit”, the wiring schemes used multi pair telephone style cabling. They would serve outdoor assembly areas and assembly hall stages as well as meet their original purpose as a radio broadcast receiver and even a “centralised” record player. Microphone inlets were also strategically placed around the school, using “satellite preamps” which would then send amplified signals back through the multi pair cabling to the main unit in the office.

By now, this “unit” resembled a floor to ceiling equipment rack with multiple power amplifiers, a record player, large switch panels with a switch for each room with multiple microphone inlets and knobs!

By the **late 1970s**, the original idea of installing a single PA unit to carry out multiple tasks in a school was fast becoming obsolete. Overseas import tariffs had now been slashed. The cost of consumer electronics was crashing.

It was now far cheaper just to *go to the local store and buy a truck load of new transistor radios, record players and cassette players* (one for each class room) than it was to bother with all that mucking about with a centrally controlled PA system!

However, many schools still kept their PA. By this time it was being used for far more than “just for radio broadcasts”. In fact for many schools, the original purpose of the “educational radio broadcast” scheme had by now become irrelevant.

Of course by this time the original Federal grants were also no longer meeting all the exorbitant costs of this grand scheme. Quite a significant portion of the cost of running the NSW DofE Electronics departments was now coming from “general revenue”.

The PWD books were looking very much like a sea of red ink to state treasurers!



Above : Towards the mid 1970’s the designs got bigger and more complex. This unrestored Flett unit shows how rack size had blown out to include space for multiple amplifiers, zone switches and controls. Tone generators for bell were now included (the two buttons above the MIC knob on the left).

Then came.. 1976.

And with it.. COLOUR TELEVISION!

With the launch of Colour Television in Australia, everything changed. Overnight.

A new Fraser Government (fresh from the dismissal of Gough Whitlam in 1975), decreed to the ABC that all future spending on educational programming would be for television broadcasts only.

This of course also meant huge changes to the Federal grants to the states as well. These would now be focused on provision of Television receivers in schools and installation of master antenna systems to allow for use in each class room.

THIS point is where the NSW Government of the day drew a different direction to that of it's counterparts in Victoria and Queensland.

Rather than continue to fund it's own NSW DofE Electronics division now there was no longer any federal funding for it, the NSW Government instead decided to sell off it's Electronics Division with the intent of privatising it.

In practice this took another *four years* for them to do. It wasn't until 1980.. that the NSW DofE Electronics Division became known as "Technical Repair Services" (TRS). Still wholly owned by the Government of the day, but now fully answerable as a private entity.

As such, it now began to invoice individual schools for it's services. These invoices featured prices that were very high in comparison to the services being rendered. Especially when compared to similar services available from other private contractors of the day.

Before this, TRS services had previously been available free to principals, for equipment which was seen as a state responsibility, just like most other building maintenance tasks in the NSW education system.

Of course cash strapped Principals would have none of this! When their existing PA systems failed, they were thus left with a choice:

Let the system fail, then just remove it and do without it. This ended up being the choice of about 60% of all NSW Primary schools and virtually all NSW High schools. In practice many of these systems were just switched off and left in place. A suitable cupboard or filing cabinet would then be positioned in front of them.

Pay a private contractor to fix it. This became an option for the newer systems which had been installed since about 1972 and had decent cabling and speaker infrastructure. However many schools with older systems and original dodgy aerial telephone cabling were now finding that these were reaching the end of their service life. Usually they had also been "left behind" by school development and growth. They were also at the mercy of the ability of the private contractors to actually carry out the work. Many of these were unfamiliar with these kinds of systems, particularly the multi pair cabling that they used.

As a result, by the early 1990's more than 90% of NSW Primary schools and virtually ALL the high schools no longer had a working PA system.



Above : A typical late 1970's Flett PA Amplifier—among the last to have been made at Granville. The era of Government Contract and the Department of Public Works Electronics Division was coming to a close.



Two typical examples of PA equipment in the early 1980s found in NSW schools once the "cozy government contract" with Flett had finally expired. "Auditec" (above) was a Penrith based electronics manufacturer making power amplifier modules used in other locally made equipment and finally decided to make their own PA amplifier line in 1982. "DI" (below) was a New Zealand based manufacture unit sold through Audio Telex in the early '80s and used extensively in NSW schools, replacing life expired Flett Electronics units as they aged and eventually failed in service.



Other States.

In contrast, the Victorian State Government decided that they would *maintain* their existing Departmental Electronics division and fully fund it from state revenue.

As such, Victoria's "radio" school PA systems persisted in service through the '80s and into the '90s. By this time school PA had now become such a normal part of school life in these systems it would be very hard for staff to do without them. Victoria DID do the same thing to their PWD and eventually privatised it. By the time they did, the rest of their PA installation industry had grown up enough to be able to provide proper competition in the market and keep prices reasonable.

NSW School PA's today.

In all fairness, it would be correct to note that many of those early original "radio" PA systems installed in NSW schools (particularly in the 1960s) used grossly inferior technology and cabling. They were never going to see a life span of more than ten years without major reconstruction.

The PWD installed PA Systems installed in the mid 1970s however fared much better. There are still some schools today with reconstructed PA systems that employ the original cabling installed by the NSW PWD back in the 1970s.

However the vast majority of NSW schools with PA today have had systems installed "from scratch". PA Matthews Audio has had more than a little hand in this process since it's inception in 1992.

Here in 2015, with over 250 NSW schools now using one of our installed systems, it's been a long hard road since the low point of the early 1990's when there would have been less than 30 NSW Primary schools with PA systems installed that still actually worked.

Regardless of the fact that forty years has gone by, the technology used in these modern systems really isn't that much different to that which was being installed in the 1970s by the PWD.

We still use the same "telephone style" multi pair cabling. We still rely on standard, vanilla 100v line PA technology to do all the heavy lifting work of getting sound to every corner of a modern school.

Why? Because *it works*. And it can be relied upon to *keep working* for decades to come, regardless of whatever other technology changes the school experiences over that long time.

The reasons behind installing school PA today are completely different from the "radio systems" of yesteryear. Today, school PA is needed because;

- Schools must be able to send different signals throughout the whole school not just for bells, but for evacuation, lock down and even line up music.
- Modern class rooms today are increasingly air conditioned. This means the old bells of yesteryear can't be heard through closed doors and windows.
- Modern class rooms have also become noisier places. With interactive white boards and audio visual technology now the norm in virtually every teaching space, it's no longer adequate to rely on a single outdoor emergency hooter or bell system to signal emergencies.



Above and Below : Typical examples of "PA Plates" commonly found in NSW School buildings constructed in the 1970's. These plates usually hide spare conduits or wiring installed during construction specifically to assist installation of a PA system.



Intercom Systems

In 2005 PA Matthews Audio began to offer the NSW education market a new option for extending the usefulness of their PA system infrastructure both old and new.

The AIPHONE TCM Intercom system works with existing (or newly installed) multi pair PA cabling and effectively replaces the “giant switch panels” of yesteryear. It allows the office to contact and message individual rooms easily but with one distinct advantage – *the rooms can now call the office back* – and a two way conversation can be held.



The PA Matthews Audio TCM systems are installed for a fraction of the price of comparable intercom and telephone systems. They are simple and very reliable. There are more than 120 NSW schools with this system in regular daily use – large and small.

Cabling a Typical School

To NSW's benefit, the legacy of those early years (and the forethought of building designers of the day) has left many NSW schools with infrastructure which makes installation of a new PA system cheaper and easier.

Buildings built before 1980 and otherwise unaltered

Most of these buildings should have PA plates and conduits installed. Some will have been used for a PA system long lost and can be revived. Some may have been used by other contractors (particularly in the early 1980s) for installation of security systems. Others may have sat there unused all this time, just waiting for one of our consultants to come to your school for a quote, identify what infrastructure is still there ready for use which saves you money on a new system install.

Buildings built between 1980 and about 1992

These buildings will likely have TV Master Antenna systems installed in to each room and a back bone MATV (coaxial) cabling scheme radiating out from the Library. These will no longer be in use, because here in 2015 all audio visual content is distributed via the schools' Ethernet data and computer networks.

However the original conduits and TV cables remain. These can often easily used to pull in our replacement PA system cabling without all that mucking about with expensive and ugly surface conduit runs.

Buildings built between 1992 and about 2000

These can be a challenge for retrofitting of PA systems as they represent a very austere period of construction history in NSW when very little provision for anything was allowed for in designs. Little or no existing cable or conduit infrastructure, flat concrete floors and inaccessible ceiling spaces.

Never the less, most of these buildings today will by now have had modern computer data cabling installed in surface conduits. Our PA cabling can normally be pulled into these existing conduits without the need for any additional surface work and without disrupting the data cabling.

Buildings built after 2000

These will generally have “Cat 5” Data sockets installed in each room, from a minimum of 4 to a more respectable 12 for anything built after about 2008. Generally we can use ONE existing cat 5 cable per two rooms to install a PA system, leaving plenty of spares. These cables are removed from the RJ45 jackfield at the relevant Building distributor and connected separately to a special sealed PA system connector box to ensure that any potential “mixing up” of the two systems is avoided.

END OF ARTICLE