

# NETWORK

Newsletter  
Issued by  
PROSOUND

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## EDITORIAL COMMENT

Have you ever had to put 2100 letters into envelopes. 2100 address stickers onto envelopes, lick 2100 envelopes (we only had 1 roller damper), and more. DON'T! You get blisters on your tongue, warts on your fingers and general insanity.

You will notice certain changes in this the second issue. We hope it will make Network more attractive and more readable. A big thanks to Joe Sack, editor of "Orchestra World and International Auditorium" for his valuable input and recommendations - his enthusiasm was that great that he forgot to charge us!

One other change. Network will be issued every TWO months and not every month as previously advertised. As it is a total in-house effort (bar the typesetting and printing) there's just too much to attend to. Quality before mediocrity.

The good news is that we have AN IMPORTANT ANNOUNCEMENT: (we hope to have a few repeats of this worn-out title).

*Studio Sound*, the most widely read professional audio magazine in Europe and England have allowed us to reprint all articles of which they own the copyright. Thank you *Studio Sound*. Those interested in subscribing to this magazine can write to The Subscription Dept., Studio Sound, Link House, Dingwall Avenue, Croydon CR92TA, Great Britain.

Finally, thank you for all the letters we received. The response was heartening and we value your support and suggestions. Unfortunately we will never be able to answer all the questions through Plugstrip, but don't let that stop you from writing! We look forward to hearing from you. Meanwhile, enjoy Network. . . .

### FACES BEHIND THE FOUNT

Dennis Feldman: director - Editor of Network (Say no more!)

Terry Acres: director - will report on all things technical (if we can sit him down long enough) starting with a review on broadcast interface.

Simon Oates: general manager - responsible for Plugstrip and general chaos around the office.

Retha Olivier: Administration controller, invaluable, irreplaceable Girl Friday, without whom Network - and Prosound - just wouldn't be the same.

Hendri Smit: Man Friday - compiler of Network who has to turn everybody's ideas into reality, which often proves to be unreal.

### Prosound Personnel



1st Row (L to R) Dennis Feldman, Retha Olivier, Terry Acres  
2nd Row (L to R) Elias Ramela, Hendri Smit, Sue Costi, Joyce Cohen, Eunice Nxumano  
3rd Row (L to R) Josiah Ndlovu, Joseph Masilo, Marcus Kekana, Jostina Nxumano, Tim Lockhart  
4th Row (L to R) Boy Magnussen, Peter Mononela, Simon Oates, Samson Qosa, Amos Thwala,  
Philip Sogwanga, Douglas Mba, Reginald Macingwane  
Insert Graham Rooke Absent Steve Moss

## PROSOUND AT AVEX

The Audio, Video and Consumer Electronics Fair staged at Milner Park Show Grounds, Johannesburg from 14 - 17 July, was designed to show the man in the street what was available, and new, in those fields. The emphasis was definitely on video with a few hi-fi representatives and the odd disco supplier displaying their wares. Joe Public could relate to most of that, but was totally overawed by the SABC Outside Broadcast unit and the Prosound stand. Professional audio equipment is, after all, a totally different ball game. Both these displays attracted a lot of interest though: people could see the various items on display at the Prosound stand, and see it in operation in the OB van. Photographs showing Prosound's installation at Ellis Park drew as much interest, and comment.

Once again the reaction of the public made it clear to us that very few people realize what we do at Prosound, and underscored our belief that it was necessary to publish this newsletter.

As kids pointed out microphones they've seen on TV, and dad had time

to page through brochures, many found that they could actually use of our equipment in their homes; that the annual office party or small convention can happen without feed-back or distortion, or that the Chairman's speech doesn't have to sound like Mickey Mouse with laryngitis. As there are cars and cars, there are sound systems and sound systems. For the hi-fi boffin the principle is the same: not everybody can afford - or needs - a Rolls Royce. But if he cares about real quality and makes the effort to save long enough, he'll be able to purchase an excellent vehicle that will last him a

long, long time.

Avex afforded many people the opportunity to meet us face to face and ask countless questions. As a result, a lot more people now understand what is meant by 'professional audio' as opposed to 'consumer audio', and as is the case with most other things in life, they're not so scared of it anymore, now they have an understanding of how it works.

Network should be regarded as a sort of Avex-by-mail: write to us with your questions and queries, and let's try and understand each other better.

# NEW PRODUCT BULLETIN

General Electric (U.S.) Professional Large Screen Television Projectors are now available in South Africa. It is the most economically priced system of its kind on the market, and applications for this versatile unit (available in both black and white and colour) include the following:

- 1) **Education.** command and control centres.
- 2) **Business** – management information centres, sales, shareholders' meetings etc.
- 3) **Situation Display** – defence, aerospace, industrial
- 4) **Simulation Training.**
- 5) **Entertainment.** It is a portable, professional and rugged unit for specialised appli-

cations and should not be confused with consumer orientated projection.

For more information please telephone 37-6556/9 or write to Prosound P.O. Box 261458 Excom 2023.

## Note:

*General Electric Company, USA, is not connected with the English company of a similar name.*

## ELLIS PARK : APOCALYPSE, WOW!

Ellis Park has been – and will be – a talking point for some time yet. Since it's first "public performance" on May 15, the sound system, like the stadium itself, has always drawn favourable comment. We are not going to quote all the newspaper reports on "superb sound" or "hi-fi for 80 000": you have no doubt seen those in the local press yourselves. Instead, we will elaborate on how we got the system installed there, and what happened when we finally switched it on.

The main point to contend with (other than the specs, of course) was the aesthetics of the stadium. We have always felt that too many people did not put enough emphasis on, and thought into, the sound system to be installed in a new building, and subsequently such a system normally got added as some form of afterthought. The result was (is?) almost always the same: it looked terrible, sounded worse, and nobody was happy.

With Ellis Park, we were consulted in time, and could therefore plan trunking and conduit runs into specially provided positions. But of course, that was not the end of it. To hide a length of conduit in a seam or a corner is one thing: to make a speaker cluster of approximately 1m x 1m x .75m appear "inconspicuous" is a different story altogether.

Ellis Park's seating design works on steep angles to maximise sight lines and still keep the spectators close enough to the action. All very well, except that speakers had to be mounted **underneath** the roof and balcony overhangs. Since Man has not yet mastered a feat that is second nature to every fly – namely walking upside-down on the ceiling (without falling on your head) a plan had to be made. "Get a boom crane" someone suggested; "build a scaffolding tower" someone else piped up. Which is all very well if you don't have to do it yourself. The rake, seating, railings, balustrades, height and other equally inconsequential obstacles ruled out scaffolding. Boom cranes tend to take up space, and the number of subcontractors in the stadium reminded one of Durban's south beach in mid-July. In addition

they cost a good few Rand per hour, and the installation would take a few months. . . . .

Maar nou ja, 'n boer maak 'n plan, so we figured if we took a boer, added a German, an Englishman, an Austrian, a Zimbabwean, included some beers and locked the lot in the workshop, something was bound to happen. Something did. Some days and many beers later, they wheeled out this cross between a castle drawbridge and a baby's car seat. The Mad German – who featured in the photograph in the first "Plugstrip" column – battled the thing onto a truck and charged off down Commissioner Street like Atilla the Hun, ready to conquer the world. A few huffs and puffs, and Prosound's electricians were suspended over the front of the balcony and walking out under the overhang – the right way up. (No flies on us!) In this way we were able to move right around the stadium without stepping on anybody's toes.(!)

Of course there was still the little matter of getting the speakers mounted under the roof, and on the columns on the open stands, but more about that next time.

## PROSOUND PROGRESS

From time to time we will include details on both hire and permanent installations we've done over the years. Space will never enable us to mention each and every gig, but some of the bigger projects are well worth mentioning. We have already said a lot about SABC in this issue, and few people realize that while their business is obviously broadcasting – albeit radio or television – they do not have facilities for live shows. Subsequently we have provided the necessary PA, monitoring and sound desks for the Artes and Sarie Awards Ceremonies from 1977 right through to 1981.

Parents and young people alike will remember Rabbitt – and Prosound was there from their first concert to their last, including their tour with 5000 Volts. This association with Rabbitt's manager, Mike Fuller, continues to this day with his current artists like Hotline, Margaret Singana, Matisson Brothers and the Rockets.

Tom Jones, Cy Zentner, John Paul Young, Dutch Swing College Band, Timmy Thomas, Heintjie, B.J. Thomas, Pedlars and Albert Hammond were all among the big names we catered for in the early days of Prosound. Cliff Richard was so enamoured by what we did that he now endorses Electro-Voice.



Part of the crowd enjoying "Keep it Country" at Milner Park, April 1982.

Somewhere along the line we had to reach a compromise with the architects. Aesthetics play a vital part, sure, but by the same token the system was designed to perform a specific duty, working from certain predetermined points to give maximum coverage and efficiency. It took some very diplomatic explaining to convince the powers-that-be that a speaker or cluster simply could NOT go into the hole or recess right next to or behind it. Looking back on what followed during installation however, that was child's play.

# PROSOUND AND THE BROADCAST INTERFACE

Going back to the early days of television in South Africa Prosound has been involved in supplying, installing and operating in-house sound systems for live and taped broadcasts.

The simplest interface, and most regular, is a line-level feed of the Sound Reinforcement System (SRS) mix for a radio broadcast. Normally a buffer amp is inserted between the mixer output and a P.O. line feeding the Broadcast House. Technically this is easy but subjective drawbacks are:

- 1) The mix established for sound reinforcement generally concentrates on voices and quieter instruments which leaves a tape/broadcast mix without louder instruments.
- 2) The P.O. line has to be of the broadband, dedicated format which can be difficult to obtain.

These set-ups are often rushed with the radio engineer arriving minutes before a live show and asking for an output from the SRS mixer. (Hold thumbs that the buffer has a balanced floating female XLR input). We once rushed a feed to Radio on the opening night of John Paul Young in Durban City Hall – the mix was not checked and on transmission, which I heard in Johannesburg, the only outputs heard were a submix of voices and drums.

We twice supplied Channel 702 with complete studio facilities and an outside P.A. System to broadcast daily from the Rand and Pretoria shows. Major problems were:

- 1) The broadcast booth had no reasonable acoustic properties – producing a “boxy” sound on the microphones and;
- 2) Frantic efforts to obtain a broadband ‘music’ P.O. line.

In Radio Broadcast interfacing, probably the most successful has been the Springbok Radio ‘Keep It Country’ extravaganzas. Their success is mainly due to producer Lance James and Radio Engineer Vernon Short and his team.

On these shows we have split every microphone and in-

strument feed via isolating transformers to a multi-channel broadcast van where a mono broadcast mix is established and sent to Broadcast House via a microwave link. The O.B. van sends us a feed of canned ads and music to play over the SRS.

The difficulties encountered here are primarily the foldback (monitoring) system playing to the artists themselves. Particularly outdoors, the artists need loud, clear monitoring to pitch and balance themselves.

This level of foldback, no matter how good the loudspeakers are, and even though we use extremely close-work microphones in these applications, has the potential of developing howl-round (acoustic feedback) and at best a slight ring is ever present when listening on an isolated mix. (One is seldom aware of this edging ring on a SRS).

This situation calls for compromise from the artists to keep their sound level down so that the foldback system can be run quieter.

Moving onto TV broadcast we face all of the circumstances described with radio and more – much more! But I will elaborate on that in the next issue.



*The simplest of microphones to design and construct from the standpoint of polar pattern is the omnidirectional microphone or the “omni”. In the next issue we’ll do an article on this range and it’s applications.*

## PLUGSTRIP

### WHAT’S WATT WOT?

I’ve just received a letter from my Auntie in Wimbledon saying. . . . . give me a chance, I’ll get it right. Seriously, I feel that there is this total misconception about wattage.

In answer to several letters asking wattage-related questions, I’d like to explain in this way:

In essence, a watt is a measure for electrical or acoustical power. Well, so what? (sorry!). I’m so often asked: “What wattage is this system?” and everytime I feel the need to go into this long recital about what information the inquirer hopes to gain from such a question.

Unfortunately the “wattage” story requires far more detail than I have space for, but maybe we can dispel at least a few of the fallacies surrounding this misused and abused term.

Firstly, when you amble past your local hi-fi dealer and notice a “60 watt Sound System” what are the watts referring to? – amplifier, speaker, music power, peak, continuous or whatever? The chances are, they are referring to the amplifier and will most probably proceed to try and make you expand on your purchase by selling you an amp with 15 to 20 watts more per channel. Unfortunately, if you believe you are going to get a “louder” hi-fi – forget it.

To rate an amplifier in the most basic terms one must know at least what load (impedance) the amplifier is being driven into and what form of power, be it continuous (R.M.S.) peak or whatever. Strictly speaking only R.M.S. (root mean squared) wattage should concern you because any amp worth it’s salt will peak at least 3dB above it’s

rated continuous power. Please do remember that wattage specs. alone do not tell you all there is to know about an amplifier, intermodulation, distortion, slew rate, frequency response etc. also tell their tale.

The next little untruth is “if I have a 50 watt amplifier my speakers must be more than that i.e. 75 watts or more” – untrue. This applies far more so in a live situation where the peaks are extreme. Any decent speaker should be tested with random noise over long periods of time with spontaneous peaks being filtered in to give a continuous rating i.e. 200 watts R.M.S. should mean that the speaker is capable of short (ten millisecond) peaks of up to ten times that without failure. This all holds true as long as the signal being delivered to the speaker is clean.

Therefore, to power a 200 watt R.M.S. speaker with a 300 watt R.M.S. power amplifier does not mean that you will automatically blow your speaker, but it does mean that you are allowing the amp to peak without clipping (relative) which means the speaker can and will deliver the same.

After all this “gumph” what I am trying to put across is: don’t be dazzled by a lot of specification; remember that the only thing we are trying to achieve is SOUND – you cannot write sound on paper so beware.

## QUART OF LAW

**GRUNDMAN’S LAW** – Under the most carefully controlled conditions of pressure, temperature, humidity and other variables, the system will perform as it damn well pleases.

**KNIGHT’S LAW** – A pat on the back is only a few centimetres from a kick in the pants.

**HIDLEY’S LAW** – Nothing is impossible for a man who doesn’t have to do the work.

**DUNCAN’S LAW** – When in doubt, mumble.

## PROSOUND AND THE SABC

The Prosound column in this issue was going to deal with our involvement with SABC Outside Broadcast in their production of Symphonic Pop. However, Prosound's association with SABC goes back much further than that specific production, and we felt it opportune to highlight certain products – supplied by Prosound – that have assisted SABC in facilitating and improving their TV and radio broadcasts.

### Raindirk (U.K.):

20 Audio consoles for TV 2 and 3 and 11 consoles for TV 2 and 3 Outside Broadcast. Three more mixers were recently installed in the new radio complex being built in Pretoria, and one is on order for Nelspruit.

### Orban (U.S.A.):

The Optimod unit, designed to improve audio transmission on Radio and TV, was recently evaluated against other products. Optimod came out tops! The first unit has been installed to improve the English transmission on FM.

### Electro-Voice (U.S.A.):

SABC must be one of the largest stockholders of PL80, 635A and RE50 microphones internationally. Besides these, Outside Broadcast have bought an EV monitor system consisting of S12-2 speakers and an EV Tapco power amp.

### B.G.W. (U.S.A.):

Amplifiers to be supplied for Durban Music Studios.

Prosound Hiring has also been very active, having been involved in many Artes and Sarie Awards, the Black Artes Awards (Zia buya E'civic) and Springbok Radio's Keep It Country shows, amongst others.

Thank you SABC for your continued support!

## PA BIBLE SERIALISATION : 2

**Room Reverberation Swamps Your Voice.** Now you say, "Great, I have a good microphone, mixer, power amp, and an efficient speaker with reasonably flat frequency response and uniform dispersion." But when you use this system, people in the back of the room still can't understand the vocals or really hear the high frequencies. This involves not only the speaker but also the room in which it is operating.

Rooms have a phenomenon called "reverberation". Reverberation is the tendency for sound to continue within a room after the original sound has ceased. Outdoors, in an open field, is considered to be a "non-reverberant" environment, so this continuation does not occur. But, as you are supplying sound to a room, reverberation is occurring. The farther a listener is from the speaker, the better the chance he is in the "reverberant field" and the worse the chance he can understand what is being put out by the speaker itself. If the listener is close to the speaker, he is said to be in the "direct field" of the speaker. This is where the sound coming directly from the speaker is much higher than the reverberant sound. But, as you move away from the speaker, the sound reflected from the floor, ceiling and walls gets increasingly louder, relative to the sound coming directly from the speaker. This is where trouble begins. In a reverberant environment, there is a point away from the speaker beyond which the "reverberant field" dominates the sound heard. It is interesting to know that the SPL tends to remain constant in the reverberant field, no matter where you're standing in it. Constant SPL throughout the room is, of course, a good thing but when the reverberant field is what's doing it you can get into trouble, as we will soon see. The distance where the reverberant field begins to dominate is typically 10 to 20 feet from the speaker, and is longest for the least reverberant rooms and the most directional speakers. The distance from the loudspeaker where the direct sound and the reverberant sound are the same level is called the "critical distance".

When you are in the reverberant field part of the room, most of the sound you hear is reflected from the walls, floor, ceiling, etc., and only a small amount comes directly from the speaker.

All these reflections cause the sound to reach your ears at slightly varying time intervals, and at a higher level than the direct sound. The result is that listeners in the reverberant part of the room find it very hard to understand what is being sung, or to hear clearly the various instruments being played. The music tends to become a confused jumble of sounds. The concept of the reverberant field is one of the most important concepts to understand in this whole guide. If we had a way to sound a siren to direct your attention to a particularly important problem which affects PA's in all rooms, it would go off now! When listeners are in highly reverberant rooms or reverberant parts of a room, you're going to need to do something about it. The larger the room is, the worse the problem is. Don't let this scare you — that's why we're making this guide so the problem can be recognized and conquered! A few methods of dealing with the reverberant field problem would be:

**Make the room "anechoic," meaning "no echoes".**

This is probably not feasible and would result in a highly modified and bizarre appearing room.

**Move outdoors to a big field.** Remember outdoors is non reverberant, with no walls or other surfaces to reflect sound. This is obviously an impractical solution — especially when it rains.

**Select loudspeaker components** which have appropriate directional characteristics for the room. These characteristics are inherent in the

dispersion or coverage angle of the components. Ultimately you would want sound to go only into the area where listeners are, so none is sent to bounce off walls, etc. (Listeners are excellent sound absorbers.) This can only be approached, in actual practice, but the results of paying attention to this factor in system design can be astounding! If you are putting together a system for portable use, by all means try to figure out the system that will conquer the reverberant field problem for most of the room in which you typically play. Your audience will love you even more for it.

Let's examine the solution outlined in Item 3, above, in some detail. The reverberant field problem is the basic reason why a single speaker system cannot be the answer to all sound problems, even if it has flat frequency response, high efficiency uniform dispersion, and a big amp driving it. And it's the reason why you need to augment the single speaker with the buildingblock **components** that E-V has to offer. This is the solution to one of the problems outlined at the beginning of this guide. If you think stacking up several kind of systems you might use in a small room will work well in a large room, you are certain to be surprised and disappointed. This **will** increase the total sound pressure level, but it will probably be unintelligible in most of the room.

Large rooms require both narrower dispersion and higher efficiency than the best single speaker system can offer. For instance when the listeners in the back of the room cannot understand the sound because of reflections and reverberation, the solution is to have a **narrow** coverage system that will **aim** more direct sound at the back of the room. (Note: this also addresses the problem of reduction in SPL with distance from the speaker). It should be noted that wide or narrow dispersion does not denote a good or bad loudspeaker, providing the **system** is designed to provide proper coverage in the room or hall: There are applications where one or the other

is needed to best solve a specific sound problem.

Narrow dispersion devices are sometimes referred to as "longthrow." The term "throw" is loosely used to describe how far sound will be clearly projected by the loudspeaker. This is directly related to dispersion. To describe this principle, think of a garden hose with a variable sprayer on the end. The water in the hose is being delivered to the sprayer with a constant pressure (the speaker or driver.) The sprayer determines where the water will go (the horn). If you spray a wide pattern, it won't spray a very far; but if you clamp down on the sprayer, it will spray a narrow stream and it will (throw, project, etc.) a heck of a lot farther. This is exactly what takes place in sound. Most directradiating speaker systems are classed as medium-to-wide coverage because they have coverage zones of approximately 90° or wider. However, special devices are needed to generate high SPL, and uniform, narrow coverage angles. These devices are usually horns. It is possible to have horn woofers, horn midranges or horn tweeters. For example, a midrange driver (such as the E-V DH1012) can be coupled to a wide-angle horn (such as the E-V HR90 with 90° side-to-side coverage) for short-to-medium throw, or it could be coupled to a narrow-angle horn (such as the E-V HR40 with 40° side-to-side coverage) for long throw. By their principles of operation, long-throw devices take care of the reverberation problems of medium-to-large size rooms. By raising the sound pressure level of the direct sound at the rear of the room, program material will become more intelligible. The longthrow device is not only used to create higher sound pressure levels away from the stage but also to aim or concentrate the sound on the listeners at a distance away. The direct sound will be kept high relative to the reverberant sound, and — WOW! — you'll be saying, "Can you believe we actually understand the words way back here?"

Now we know how to get good, clear sound to all listeners on paper; but how in the world can you apply this to your specific system and problems? Good question! Obviously, this material cannot give all the answers, but with a clearer understanding of the problem, the E-V engineering data sheets, some research, and a lot of common sense you can usually come up with a system that will get the job done effectively.

The next area is where we will give you some recommendations on total component system design and application.

The Editor reserves the right to edit any letter that is published, without quoting things out of context. If we err, please tell us we'll set the record straight.