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JULY/AUGUST 1985 VOLUME 19 NO. 4

FEATURES

COLUMNS

DEPARTMENTS

ON THE COVER

• Featured on the cover this month is a unique Steinway C grand piano owned by Nathan Kreiner. For a full story see the article on page 40.

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Letters

RAVING ABOUT REINFORCEMENT

TO THE EDITOR:

Thank you for the inclusion of Ed Learned's fascinating article, "Sound Reinforcement In Asia" in your February 1985 issue. The feature gave a fascinating glimpse of an area of sound reinforcement about which little is ever published.

DAVID SCHEIRMAN

COMMENT ON "SPEECH AND PRIVACY"

TO THE EDITOR:

The article in your February, 1985, issue, "Speech and Privacy and Noise Masking Systems," is a generally good introduction to this subject. As you conclude, there is a lot more to it than you could put into this quick review. In particular, the room acoustics must first be made satisfactory for an open-plan office.

But you imply that the masking noise system should produce an octave band sound spectrum like that of an NC (noise criteria) curve (your FIGURE 2). Such a spectrum would be both too "boomy" and too "hissy." A better spectral shape is shown in the accompanying FIGURE 1. Notice that this is similar to the spectral shape of the RC (room criteria) curves advocated by ASHRAE.

O.L. ANGEVINE

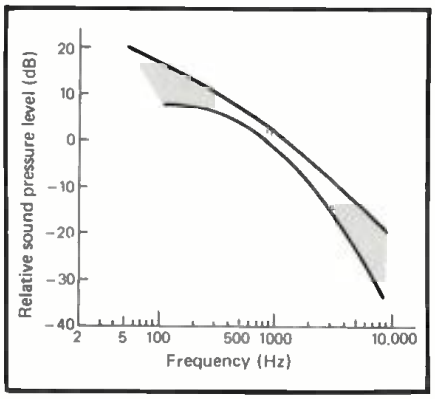


Figure 1. Octave band spectrum for random background noise in open-plan offices.

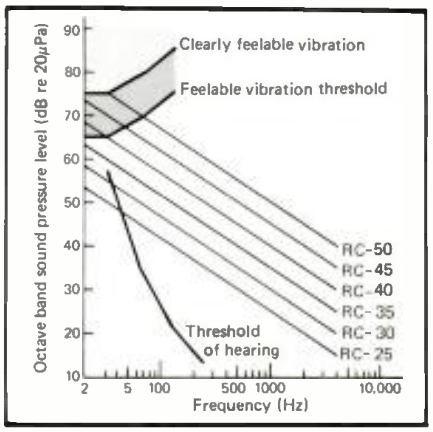


Figure 2. Family of RC curves advocated by ASHRAE.

BARRY BLESSER

Economics

• The entrance of digital audio equipment has introduced the audio profession to a new level of cost. Perhaps it is now time to consider this aspect of the problem. Economics is an intrinsic part of any technology, since without the money limit, one can build the best possible equipment. There are many ways to understand the way in which money plays a role in technology.

There are two distinct ways of looking at the price issue: sales basis and cost basis. The sales view point is a determination of a price based on what the purchaser is willing to pay. Some kinds of products have an inelastic relationship between the number of sales and the price of each sale. This means that the sales quantities are insensitive to the price.

Changes in price do not change the rate of sales. For example, a 10% increase in price might result in only a 1% drop in the sales rate. In contrast to this example, we could have a 10% increase producing a 20% drop in sales. That would be called an elastic relationship. Because sales are generally not part of the engineering department, these issues are usually not presented to the engineer. The management of the product simply tries to maximize the company profit by finding the optimum price. The sales manager may also consider other factors in determining the price. A high price may invite other companies to develop similar products which would then compete. The matrix of price issues is very complex and most engineers neither understand nor care to understand.

The other aspect of price is the cost basis. A company has to understand what a product costs to make. Clearly it is not interesting to sell a product at a price which is less than the cost to make. Hence, the first place in which the sales and engineering staff have formal contact is over the question of cost.

You would think that the cost of a product is a formal computation which is as specific as any other computation. Unfortunately, this is not the case. Moreover, the question of cost actually impacts the design in a large number of non-obvious ways. The engineer, if he is competent, can not escape this question even at the beginning of the design process. We are placing this discussion in the context of digital audio because digital audio changed some of the rules in the computation of cost.

COST ELEMENTS

The first step in the consideration of cost is the categories which need to be evaluated. The first category is direct cost. We will define this as the manufacturing cost of each product. This is composed of the materials (electronic circuits, printed circuit boards, mechanical cases, fabrication, etc.). To this we generally add the labor to assemble and test the finished unit. At the end of the computation we have a cost per unit.

There is a second category of costs called indirect. This might include the research cost that went to create the idea, the development of test systems, the engineering cost, the cost of general staff not specifically related to the product, etc. This category is a complex group which is a fixed cost since the totals do not go up dramatically as the number of products made goes up. It is this area which becomes especially interesting for digital audio. Specifically, the issue of design and testing can be an extremely large number. When we convert this large total into a per unit cost we must divide by the total number of a given product. Thus we see that a development cost of $500,000 become $500 per unit if we will manufacture 1,000 units but it becomes only $100 per unit if the total were to be 5,000 units. To change the cost per unit, all we need to do is change our assumptions! As a reader, you may still be thinking that this is an accounting or sales function which has little to do with the engineering department. Strictly speaking, that is correct.

ENGINEERING IMPACT

We are now ready to consider the engineering impact. Let us assume that we are an engineer who is about to develop a digital audio reverberation system and that we are planning to use the latest microprocessor for that task. As the first step, we might try to get an approximate idea of the complexity of the product and make a crude estimate of the kinds of parts we will need and their approximate cost. We add up the parts cost and find that the total is on the order of $140 for the processor's function. We then add the usual extras for connectors, power supply, case, front panel, etc. and come up with a total of $320.

We contact the sales department and they indicate that with the usual mark-up for indirect cost, the final sales price might be on the order of $1,500. This is the traditional way of doing things. Now comes the question.

The engineer starts to lay out a plan of development. He decides that he first must buy a mini-computer in order to do his software development; he has to write a specialized cross-assembler to make the programming easier; then he has to build a down-loader to transfer the results of the program to the microprocessor; when he begins experimenting, he realizes that he needs a hardware debugging-trap system to see what is going on in the microprocessor. After finding some difficult hardware problems, he realizes that he needs to test programs and some test hardware must be custom built. The process continues and the engineer realizes that 90% of his effort has been devoted to creating "support" systems to aid in the design. The budget for such a set of activities starts getting very large. It would not be out of the question to come up with numbers on the order of $200,000 to $800,000 for these support activities.

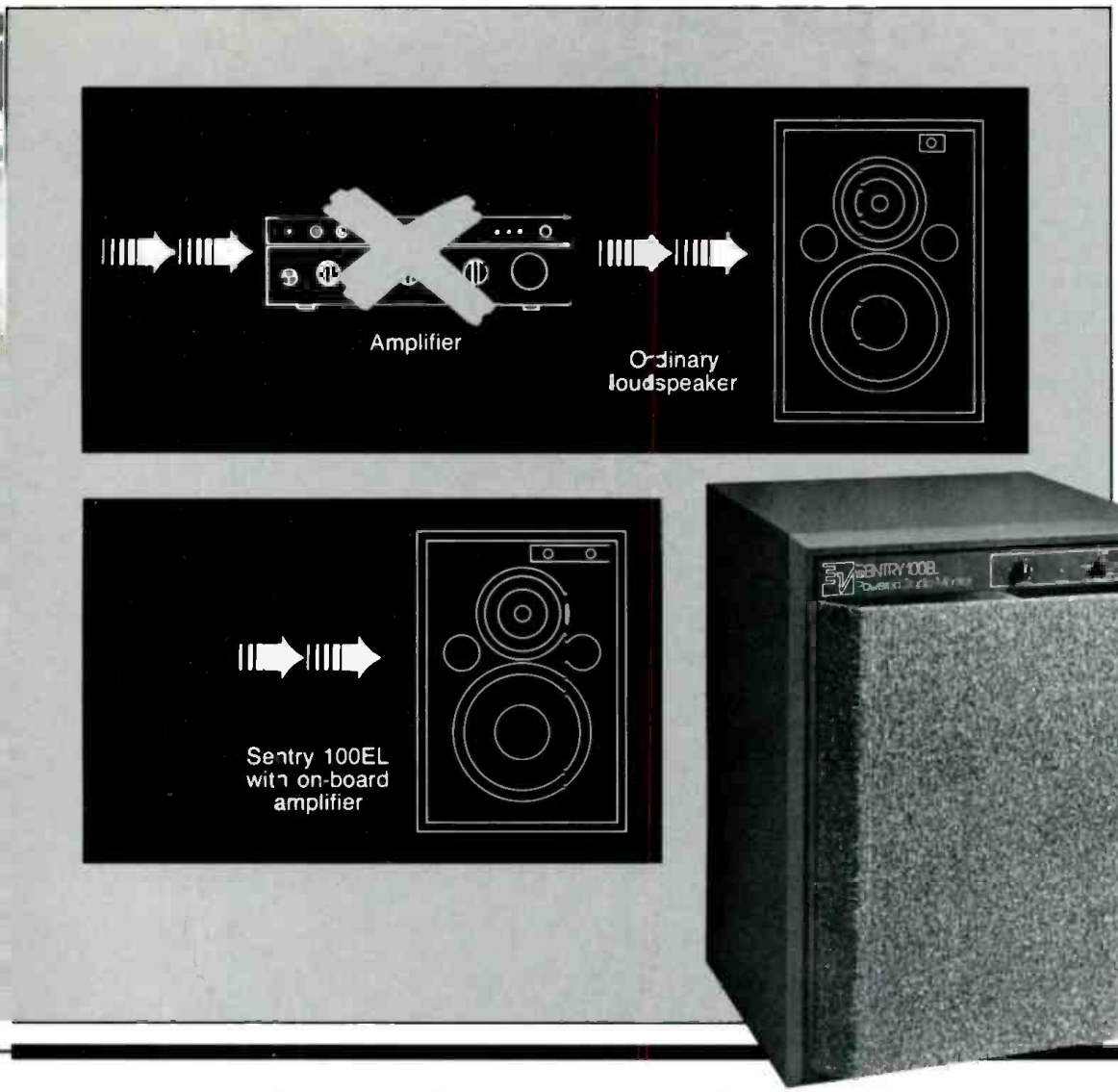
When we divide this number into the expected sales rate, we find that this part of the cost can actually dominate the hardware cost. Assume a worse case of $800,000 and a sales of 5,000 units. This gives us a cost of $160 per unit. Notice that this number is actually larger than the cost of the parts which were to be used in the manufacturing context.

Let us assume that we wish to cut this cost. We can do with less support activities and build less development equipment; but the likely result is that we will use more labor and that the time to do the development will become much larger. Thus, instead of taking 12 months to create the new product, it might take 24 months. During that time other companies may come out with the same product and we may never sell our predicted 5,000 units. We could also go the other way by increasing the support development and trying to sell more units.

ACCOUNTING GAMES

At this point we usually find that some of the players become very emotional. The engineer may, for example, really want to build the full support system and he must therefore come up with very creative arguments for the economics. One such accounting game is the following. The engineer makes the assertion that this support system will be good for many other products beside the one that they are currently developing. It will be used for the next generation of products as well as the current one. Therefore, the correct assumption is that the cost should be divided over 20,000 units not 5,000. He has just decreased the cost per unit to only $40.

Let us assume that he is believed. The sales department can now price the product at a much lower price and, instead of selling 5,000 units, they sell 8,000. Everybody is happy, the product was successful, the company made a profit. After 18 months, the company begins the second generation of development. Because technology has moved fast, the support systems which had been



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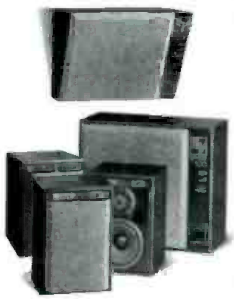

With speaker and amplifier in one compact, rack-mountable package, this monitor system solves problems like limited rack space, equipment transport on remotes or cramped spaces in video editing booths.

Also, by requiring less hardware—fewer cables and connectors—the 100EL keeps setup simple and reduces potential interconnect problems. And there's no possibility of power loss caused by resistance from a lengthy speaker cable.

The on-board amplifier in the 100EL makes it ideal for single-channel monitoring. Why buy one speaker and an extra amplifier channel, when the Sentry 100EL does the job all by itself? And because amplifier power is perfectly matched to the speaker system, there's no chance of damage from inadvertent signal overload.

But convenience and trouble-free operation are only part of the package. Like all Sentry designs, the 100EL offers uncompromised accuracy. So you can be certain of quality sound.

The Sentry 100EL - with the power to make your job easier. For more information, write Greg Silsby at Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107.

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developed no longer really matches the next generation of microprocessors. These require new support systems. Therefore we must go back to the original product and recompute the real profit/loss. We must divide the $800,000 development cost into 8,000 unit and we end up with a cost of $100 per unit. A very large percentage of the profit has been destroyed.

AVERAGING

In the bad old days, a company might have a product line of 20 different products and the above computation was done on each product. The task was only to make the averages come out right and one did not have to worry about each specific computation. With digital audio, the size of each product relative to the company size increased dramatically so that the computations could not easily be averaged over a large number of products.

In fact, a really bad computation on a very large development could kill a company completely.

TESTING

Another completely different aspect of the same kind of questions comes up in the area of testing. In the bad old days, we assumed that most components used in electronics worked. With modern electronics, the cost of making an integrated circuit is almost zero. The cost of testing is the only real cost. It is not uncommon for manufacturers of integrated circuits to ship components with a 5% failure rate. Consider a 64k memory IC. One can purchase it for only about $2.00. This is a very low price. There may be 32 such ICs in a product. If 3% are bad, then there will be one bad memory IC per product at the time of construction.

None of the products will work as built and they all must be tested. How do you test ICs? There are specialty companies which will test them for you, but not all tests are equal. There are static tests, dynamic tests, tests over temperature, tests after burn-in, life tests, tests after power cycling, etc. The testing process can be arbitrarily extended. We can see the issue in the fact that most IC companies also sell a line of "military-tested" components which cost 10 to 100 times the untested components.

The cost of testing must therefore be added to the cost of the components. And, one has to make a judgement about the amount of testing.

Even if all the components are fully tested, the final assembled product may still not work. It is not unusual to have a 30% failure rate on products which have been built using fully tested components. The reason for this is two-fold. The testing never really matches the way in which the component is used. And, there are other kinds of failures such as hair-line cracks in the printed circuit boards. Remember that a complex digital board could have 2,000 interconnection wires. The manufacturer cannot afford to throw away 30% of the product run due to such defects. Yet, it is often difficult to trouble shoot these boards using inexpensive labor.

The art of dealing with the testing at manufacturing is based on the economics of being able to build special test systems. These systems can become very large. The difficulty of testing is universal to modern electronics. Even the integrated circuit companies, which test one IC at a time, may spend $2,000,000 just for one test system. Primitive systems are much less expensive but they will not sucessfully find most of the problems.

In considering the testing issue, the cost of the equipment is very much like the cost of the development support equipment. The cost must be divided into the total product run. Again we find a cost item which depends very strongly on the accounting assumptions.

POSITIVE FEEDBACK

When we look at the design and manufacture of digital audio, we can begin to see the pattern which must emerge. A more successful company which sells more of a given product than the competition will have a larger sales volume in which to do the accounting write-off of development and test equipment. Hence, the cost per unit is less.

They can therefore afford to charge less on each sale and the volume goes up still further. On the next product generation, they can start with a high assumed volume and they then make the decision to invest more money in the development equipment and test methods. The introductory price is lower because they have had the experience of the higher volume. The price is lower to the customer.

In contrast, the less successful company assumes a lower volume and they charge more for the same equipment. Their volumes are low. On the next generation of product they do less development equipment and the product takes longer to come to market. In addition, it appears at a much higher price. In the limit, the small production volumes are hand built and the product has the feeling of being a craft rather than a technology.

This process will be taking place in digital audio. We have already seen this dynamic in the personal computer market. IBM's success is a clear indication of the question of volume. Similar things will take place in digital audio. It is unfortunate that the smaller companies have a greater burden now than they did in the early days of audio. With equipment in the 1960s, very little development equipment was required and the testing issue could be done with inexpensive labor. The large companies with their larger sales volumes did not have much advantage; especially, when you include the difference in quality of dedicated staff characteristic of smaller companies.

Life goes on and nothing remains the same. ■

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JOHN EARGLE

Line Arrays and Sound Columns, Part 2

• Going far beyond the simple concept of the basic line array, a number of acoustical consultants are presently designing large, articulated arrays for high-level speech and music reinforcement. FIGURE 1 shows details of such a design. Richard Negus of Purcell + Noppe + Associates, Incorporated, of Chatsworth, CA, was the design engineer.

The center channel is shown at A. In this side view, we note that the lower portion of the array covers the rear of the house, while the upper portion of the array covers the front of the house. The nature of the articulation, or splaying, of the mid-frequency components is apparent at B. The splaying is adjusted for the exact horizontal coverage required in the particular section of the house covered by that portion of the array.

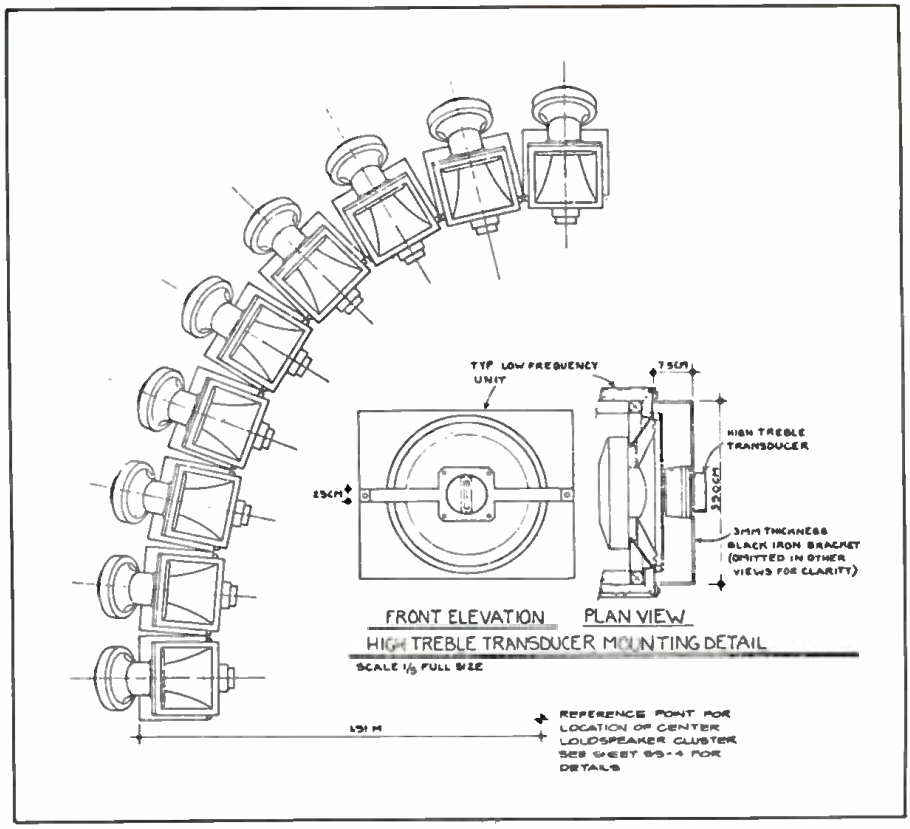
This three-channel system is placed over the proscenium. The left and right channels are similar, except that they have been skewed for their particular coverage requirements.

Acoustically, the array is a three-way design, providing sufficient power bandwidth to match any requirements in the house. Ultra-high-frequency transducers are mounted concentrically with the low-frequency transducers, and their horizontal coverage angle is wide enough so that no splaying is required. In this system, electrical requirements are met through feeding each section of the array by individual amplifiers.

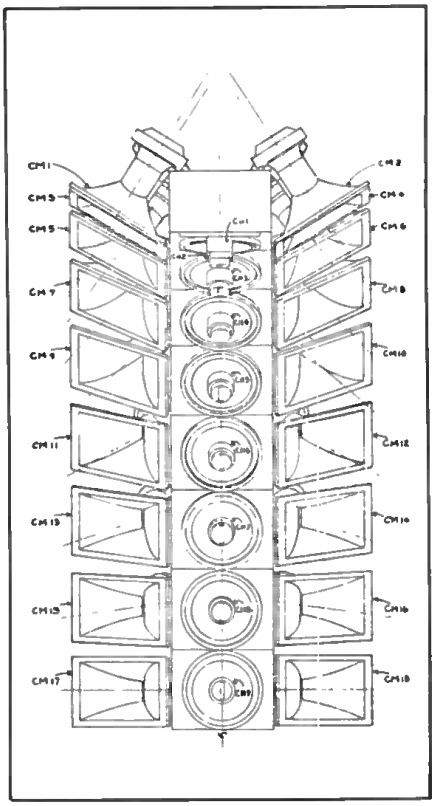
In laying out such arrays, the designer draws from experience as well as certain modelling techniques. Small-scale models can be made of cone components, and measurements made at frequencies scaled by wavelength relationships. Where new components are being specified for the first time, some designers prefer to actually set up the array in their laboratories and make the required measurements. Through computer modelling, many of these uncertainties and laborious procedures can be circumvented.

In the coming years, we will probably see more such designs specified for large theaters and entertainment complexes. Among the advantages of such arrays are:

1. High power handling capability with low distortion.
2. Wide power bandwidth.
3. Extremely smooth power response.
4. Extremely smooth coverage tailored to the performance space. ■



A. Side View



B. Front View

Figure 1. An articulated line array (Joong Ang, Daily News Building; Welton Becket Associates).

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There are five basic UniPoint models to cover almost every application. For the podium, our double-gooseneck AT837 adjusts to any height or angle with just a touch. The AT857QM has similar dimensions but wider range and plugs directly into any surface-mount XLRF-type connector. No sag. No slip. No stand noise.

To top off a standard desk or floor stand, our AT855 is ideal. A single fixed bend puts the microphone out where it's needed. The cable is hidden inside the tube, exiting just above the stand coupler for a neat, professional appearance.

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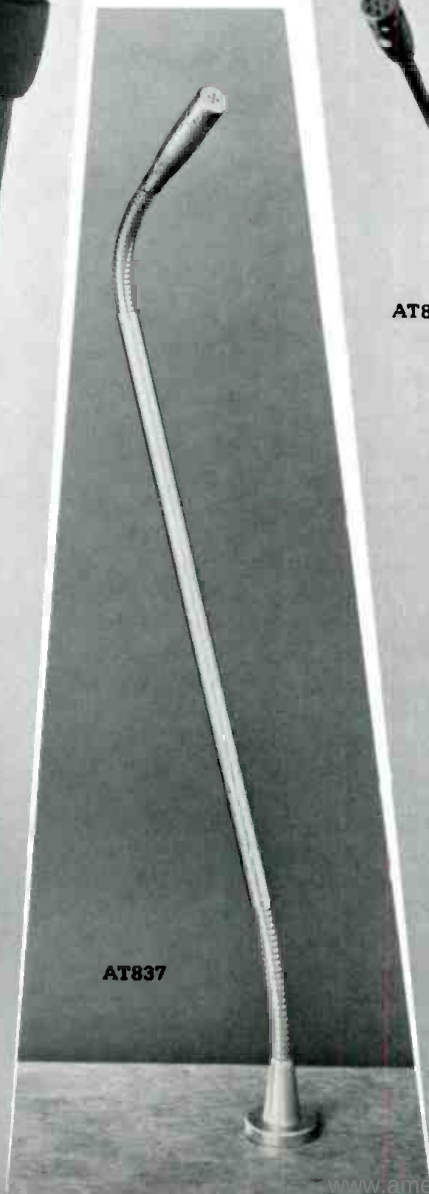
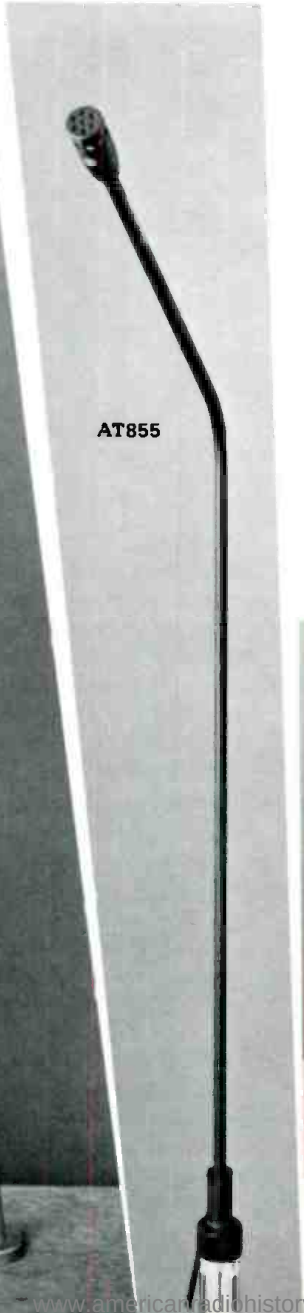
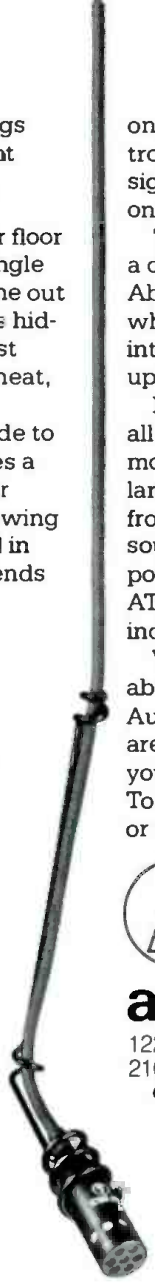






Scenes From Europe:

JOHN BORWICK

• The 77th AES Convention held in Hamburg during March 5-8 was the 15th in an unbroken line of such events organized annually in Europe.

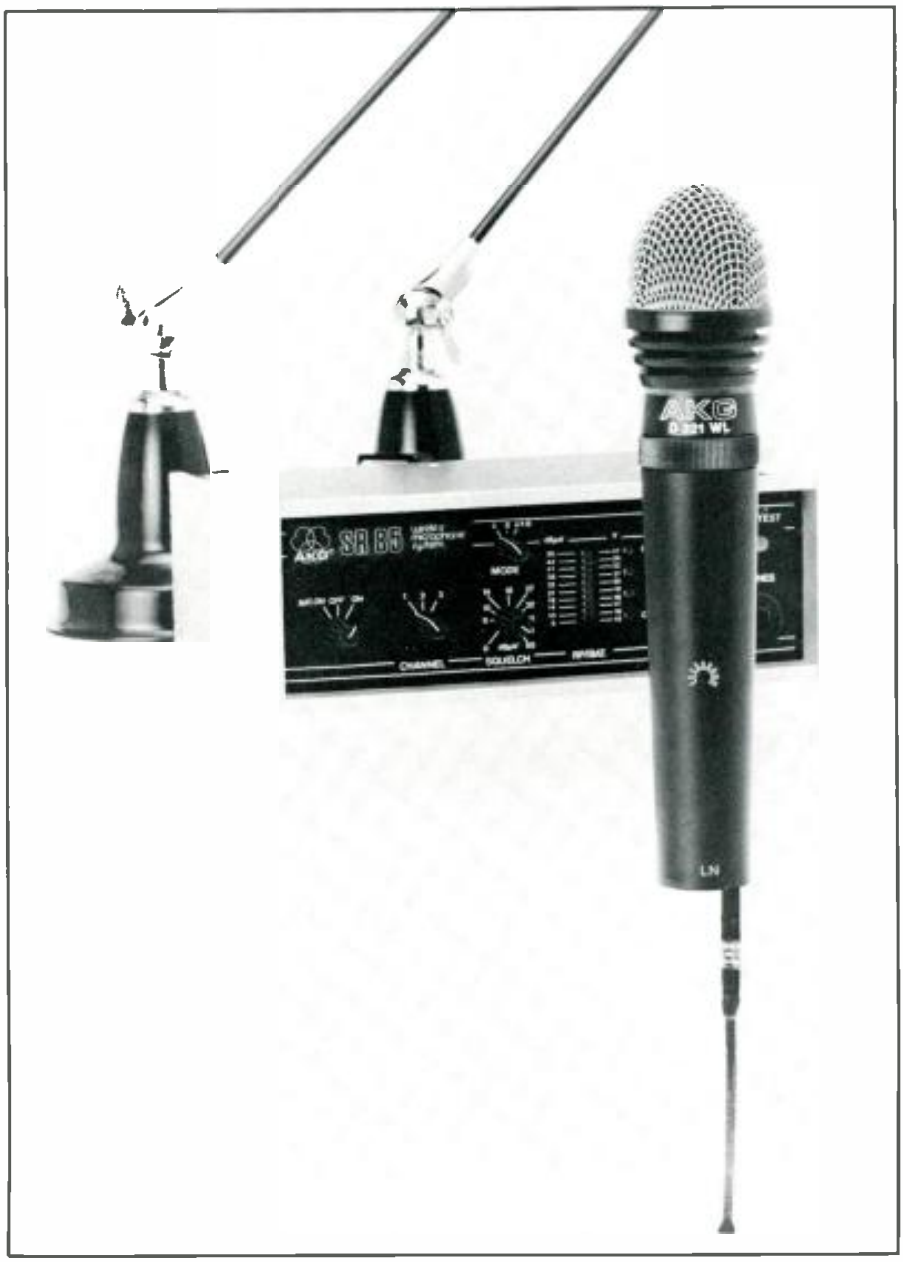
After this year, when the Society settles down to a schedule of just one Convention in the US per year (alternately East Coast and West Coast each Fall), the importance of these European shows will be even more evident. This was, in fact, the third time that Hamburg's huge Congress Centre had been chosen as the AES venue, and its splendid facilities including seventeen conference halls and the adjoining Plaza Hotel would be hard to beat anywhere in the world. Venues for 1986 and 1987 are to be Montreaux and London respectively.

These European AES Conventions have been getting bigger every year, with more papers, more exhibitors and more attendees—and Hamburg 1985 was no exception. As a result, different events were often taking place at the same time, making it difficult to attend everything. So with apologies to anyone I missed, let's begin with some of the fringe activities.

TAPE NOSTALGIA

One afternoon was given over to a celebration of the 50 year anniversary of the first commercial demonstrations of magnetic tape recording by BASF and AEG at the 1935 Berlin Radio Show. The session was rather poorly attended because of simultaneous technical tours to such attractive places as the broadcasting studios, film studios, the Steinway piano plant, a cassette duplicating plant, the Synchroton research centre, etc.

The first speaker was Heinz Thiele who remembered visiting the 1935 Exhibition as a student, and joined AEG in 1937. He recalled that the original tape exhibit was destroyed by a fire on August 19th, but was quickly replaced by other prototype Magnetophon machines from the AEG laboratories. The move from steel and wire magnetic recorders to paper-backed tapes had come about through a number of coincidences, including the presence in Dresden of a cigarette-paper manufacturer who was persuaded to deposit a magnetic (iron) coating on his paper using a technique he had developed for producing genuine gold-tipped cigarettes. Early photographs and recordings illustrated the talk (and formed a display during the whole Convention) including part of the famous Sir Thomas Beecham 1936 concert recorded on Magnetophon



AKG D-321 wireless microphone system.

tapes at the Feirabendhaus in Ludwigshaven.

Friedrich Engel of BASF then took up the story and described the changes from paper base to cellulose acetate, and from carbonyl iron powder to magnetite Fe_3O_4 (1936) and iron oxide Fe_2O_3 in 1939. Lothar Martin of AEG-Telefunken described the evolution of magnetic recorders up to the present day. Rudolf Muller of Agfa-Gevaert showed a fascinating series of test measurements using the latest techniques on tape samples from the full 50 years of magnetic tape recording—and suggested how tapes might develop in the future. Joseph Dormer of Studer related the changes in recorder techniques he had seen during 30 years of research and development.

The final speaker was Peter Hammer, Consulting Curator, Ampex Museum of Magnetic recording, California. He used unique photographs, recordings and video clips to recount the post-war spread of magnetic recording worldwide—starting with the oft-told tale of how the allied forces became intrigued by such German wartime broadcasts as late-night orchestral music (not to mention speeches by Adolph Hitler) which seemed too good to be recordings, and yet seemed unlikely to be 'live.' When the war in Europe ended, the German Magnetophon tape machines were discovered—and the rest is history.

TWIN DASH

Another fringe meeting actually took place on Monday, March 4th, the day before the Convention was officially opened. It put us all in the right frame of mind by immediately striking a controversial digital note.

The meeting was called by Sony, Studer and Matsushita, the three companies who formed a Committee in 1983 to agree on a DASH (Digital Audio Stationary Head) format. Most people welcomed their move towards reducing the proliferation of different incompatible digital recorders entering the market. Though they had been unable to persuade all recorder manufacturers to join their DASH Committee (notably Mitsubishi)—and you cannot establish an international standard without a consensus of all interested parties—the three companies were able to unveil prototype 2-track ¼-inch DASH machines at the Paris AES Convention in March, 1984.

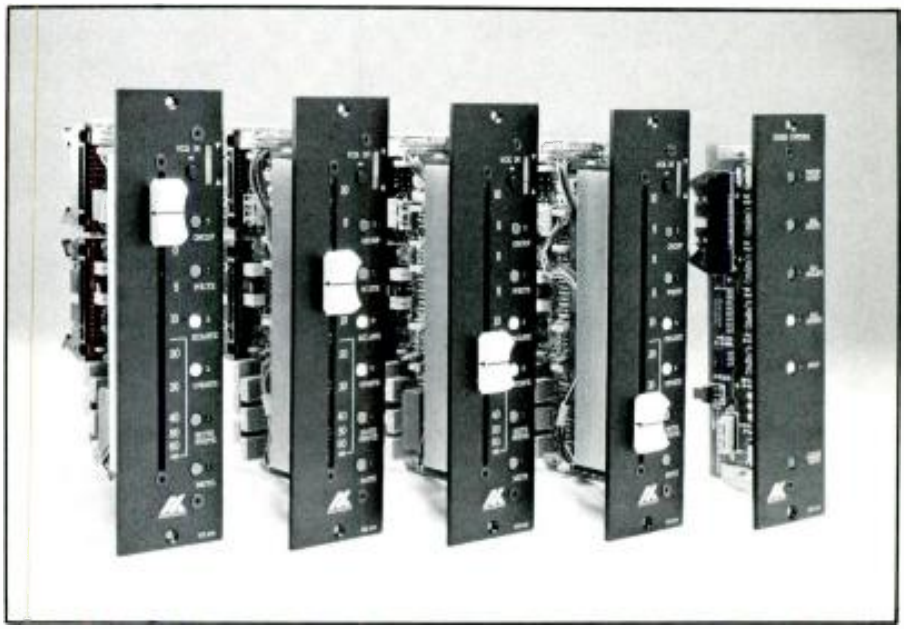
Now, just a year later, a panel of Sony, Studer and Matsushita representatives informed us that a new improved version was being launched at the show.

It seems that user trials had revealed problems with error correction when the first DASH machines were used for tapecut editing—a requirement insisted upon by nearly all users. Of course splice editing does cause gross interruption of the recorded data stream, and the original DASH format has a sophisticated scheme of offsetting odd and even samples, plus combining crossfade with interpolation across the damaged zone to give a high measure of error correction. This easily dealt with the usual problems of dust, drop-outs and data damage—and tapecut edits made under test conditions.

However, the DASH Committee had been advised by SPARS and other individual users that a more robust error correction spec was needed to cope with edits made under studio or location recording pressures, and possible problems with fingermarks and jointing tape. They had therefore decided to develop a Twin DASH format running at 15 ips and offer this alongside the original 7.5 ips models. The marketplace itself could then decide between the robust tapecut error correction on 15 ips machines or tape economy at 7.5 ips.

The bad news, which produced many reactions from the audience, was that tapes made on the two formats are not compatible (i.e. interchangeable). This strikes me as specially unfortunate with two-channel recorders. Studios with incompatible 24-track digital machines will not have major problems as they seldom exchange tapes: but the 2-channel digital tape is often the definitive mix-down edited version of an album or soundtrack and may indeed need to be sent around to other agencies or processors.

Both Sony and Studer were showing new Twin DASH recorders at the Convention. Of course they look very similar to normal ¼-inch analogue recorders superficially (the Studer D820X was shown alongside the analogue version). The stereo digital signals occupy the inner 8 tracks out of 12, flanked by two pairs of tracks for fast and slow (analogue) cueing and rock-and-roll editing by ear, time code, reference and auxiliary data—for example, the possible on-tape recording of subcode information for Compact Disc mastering.



Audio Kinetics VCA faders.

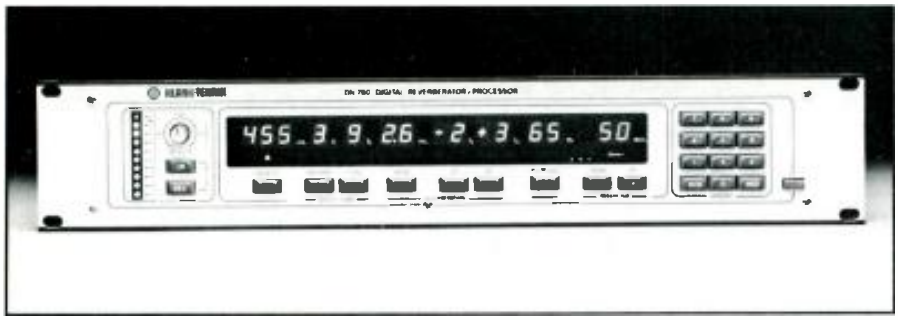
THE PAPERS PROGRAMME

The 44 technical papers were presented in eight sessions, with digital audio occupying the whole of the first day. Digital editing was a recurring theme. John R. Watkinson of Ampex spoke on "Splice Handling Mechanisms in the DASH Format"; P. S. Gaskell of the BBC described "A Hybrid Approach To the Variable-Speed Replay of Digital Audio" which makes the programme audible at all speeds from standstill to up to

20 times normal; another BBC team explained how a random-access floppy disc could assist "Digital Audio Editing"; and JVC engineers tackled the problem of interfacing digital audio on NTSC 525-line video tapes with PAL/SECAM based pictures—and were demonstrating their new synchroniser throughout the Convention.

A highlight for me in the Acoustics session was a detailed paper by Ludwig Klapproth of Blaupunkt on "Acoustic Characteristics of the Vehicle Environment." All hi-fi manufacturers could learn from this paper (preprint No. 2185) now that all forecasts suggest that the in-car market is taking over from domestic hi-fi in volume of sales.

From the Measurements session I can strongly recommend the paper on "Signal-to-Noise Ratio Requirements for Digital Transmission Systems" by Gerhard Spikofski (preprint 2196). His main finding was that we need 75 dB S/N for loudspeaker reproduction and 80 dB for headphones.



Klark-Teknik DN 780 digital reverberator/processor.

EXHIBIT JOTTINGS

There follow brief alphabetical extracts from my exhibit tour notebook concentrating on European products (country of origin in brackets).

AEG-Telefunken (Germany) revealed a new compact PCM digital recorder alongside their prestigious analogue machines.

AKG (Austria) announced the formation of a US subsidiary company in Stamford, Connecticut under Richard Ravich as Vice President. They had new products in two fields. The D321 vocal stage mic is a dynamic hypercardioid which is noise and shock resistant, with built-in pop filter and the coil is fitted into a groove in the diaphragm for extra stability. It is also available in a new wireless microphone version. Also new is the AKG, TDU 8000 digital delay unit, with 20 kHz bandwidth, 120 dB dynamic range and delay time variable in 0.1 ms steps up to 1 second, then 1 ms steps to 650 ms stereo or 1.3 s mono.

AMS/Advanced Music Systems (UK) showed several new digital sound processors. Newest was a prototype AudioFile storage device based on hard discs. Files of sound effects or other material can be recalled manually or by audio input, an events controller or the built-in SMPTE timecode reader/generator. AudioFile can also be used for up to 30 minutes of multitrack recording.

Audio Design Calrec (UK) introduced an AD-MIX digital fader to be used with their modified (Sony) PCM 701ES Professional digital processor, now available with Sony 1610 interface. The Calrec Soundfield microphone and Ambisonic mastering system were on show, with multitrack mixdown demonstrations in a demo room.

Audio Developments (UK) as well as their battery portable ENG recorders showed a new series of 8 "A" boxes including mic/line amplifiers, compressor/limiter, filters and telephone adaptor.

Audio Kinetics (UK) launched a brand new Eclipse editor to work with their latest Q-Lock synchroniser, giving full four-machine capability.

The VDU display shows 20 lines of status, timecode and menu information, and there are 100 loop memories. The Audio Kinetics Mastermix console automation system, floppy-disc based, can be fitted to consoles from MCI, Harrison, Studer, Amek, Angela, etc. They also showed a new high-spec VCA fader.

Audix (UK), almost 40 years in the business, gave me a detailed rundown on two interesting developments. Their new assignable mixing system uses microprocessor control and solid state memory, with the option of floppy disc for long-term storage of control settings—up to 20 'whole desk' set-ups. Another newcomer was Access, an all-digital 60-channel communication system with modular outstation terminals connected by a single coaxial cable or fibre optic link. Customers already include the BBC and Heathrow Airport (for the new Terminal 4).

Floppy disc software can be custom-supplied for versatile programming or made on site, e.g. for TV station intercom/talkback.

Beyer Dynamic (Germany) moved away from dynamic-only microphones with a new MC740 condenser mic having five switched directional patterns.

C-Tape (UK) have been doing good business with their flexible tape-on microphone/contact transducers. New versions come in several lengths, with and without electronics, for saxophone, percussion, keyboards, etc.

Denon/Nippon Columbia (Japan) have been in PCM audio as long as anybody (since 1972) and showed a new DN-039R professional 4-channel digital recorder/processor. Also on demonstration was the DN-1102F multiple CD player giving random programming of up to 100 discs or 1,500 music items.

EMT-Franz (Germany) were demonstrating their EMT445 digital delay unit, variable from 1 ms to 10.9 s, and the EMT448 Unimatic giving short-duration recording on to a Winchester drive.

Fane (UK) have been making loudspeaker drive units for many years, and their two current ranges—Studio Series for sound reinforcement, and Crescendo M Series for musical instruments—have been chosen by an impressive list of clients.

Genelec (Finland) specialise in active monitoring speakers and their latest Triamp Model 1022A with three 150-watt amplifiers sounded very good in the demo room.

Klark-Teknik (UK) sprang a surprise with a new version of their DN780 digital reverberator/processor. This "added density" design uses 32-bit VSLI circuitry to give an infinite number of reflections. A programme library of up to 89 non-volatile memory locations covers all kinds of reverb or effects situations, and the user has 50 extra memories for his own store of chosen settings. The display shows current settings of

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Sony PCM 3102 2-track DASH recorder (l.) and the PCM-3324 & RM 3310 24-track digital recorder and remote controller.

the 7 parameters, pre-delay, reflection pattern and level, reverb decay LF and HF, and room size. The demonstrations used a new Klark-Teknik loudspeaker, the System 2.1, a two-way active bass-reflex rated at up to 115 dB SPL.

Keith Monks (UK) showed his Record Cleaning machines and a new range of Public Address equipment, the active speaker line now includes a version to run off 12 volts DC as well as mains.

Neumann (Germany) are best known for their condenser microphones, including the newest transformerless TLM1701, and disc-cutting lathes for which a new SX84 stereo cutter-head was on show for Direct Metal Mastering on copper blanks. In addition, their mixing console range now includes an intriguing assignable design with micro-cassette storage of desk set-ups.

Neutrik (Liechtenstein) had added new modules to their compact series of Audiograph measuring instruments. I was particularly interested in the Phase Module 3332 which gives a digital display of phase angle in degrees and radians, and the latest Synchro-Module 3360 for automatic testing of record-players, tape machines and delay units.

Neve (UK) were proudly announcing their first sale of the DSP all-digital sound mixing system outside the UK (see my article in the March/April issue of **db**). The latest DSP desk has been specified by West German radio for the new 2.000-seat concert hall being built in Cologne, with an option for 5 more DSP desks in the rest of the new complex. Fibre-optic transmission of digitised microphone signals from the stage to the mixer has been ordered. Neve's exhibit and demonstrations were centred on their versatile Necam 96 automation system.

Quad/Acoustical Manufacturing (UK) do a sizeable business in professional studios with their

Soundcraft Series 600 console.

domestic hi-fi amplifiers, and now offer professional 510 and 520 rack-mounting models with excellent specs. Their even more famous ESL63 electrostatic loudspeaker has long been used for monitoring by Philips and DG recording engineers, and Quad were showing a special professional version which will particularly attract the attention of classical music engineers and producers.

Schoeps (Germany) had expanded their range of high quality microphones to include not only the Colette series of studio condensers, with twelve different capsules to use on the CMC preamplifiers, but also the BLM3 boundary layer type. CMO3 clip-on condenser and a new MK2S pressure transducer.

Sennheiser (Germany) were majoring on their top quality wireless microphone system using diversity reception techniques, companding, etc. to give security of performance in complex location or studio situations. They also showed a neat M8 modular portable mixer and a new MKH400 cardioid condenser for SPLs up to 134 dB or 142 dB with attenuator.

Solid State Logic (UK) needed a very large area to show their range of automated consoles including such additions to their Studio Computer System as the Integral Synchroniser. Master Transport Selector (a five-machine synchroniser) and console-mounted SSL Programmable Equaliser. Much interest, however, centred on the relatively compact SL 5000M audio production console—having features aimed directly at the US multi-channel TV development.

Sony (Japan) had taken a huge demonstration suite to allow separate hands-on displays of their many professional products, each with a trained demonstrator. The PCM-3102 2-channel DASH recorder already mentioned was there, as well as the 24-track PCM-3324 and a new RM-3310 remote controller/auto locator. CD production equipment included a new DTA-2000 digital tape analyser and DMR-2000 digital audio (helical scan) recorder. New microphones and analogue recorders with centre timecode track were also in evidence.

Soundcraft (UK) put on an impressive display with the large TS24 in-line console taking pride of place and equipped with the Audio Kinetics MasterMix automation system already mentioned. Alternatively the TS24 can utilise two other automation methods, Soundcraft's own tape-based format or a new technique developed in collaboration with George Massenburg Labs. Other Soundcraft introductions were a range of power amplifiers and the CD201 high-speed (up to 17 times) in-cassette duplicator.

Studer D 820X twin DASH recorder.

Soundout /Soundtracs (UK) were using a personal computer link to command routing and muting on their CM 4400 Mk II console. Configurations include 16-8-16, 24-8-24 and 24-12-24.

Stellavox (Switzerland) demonstrated a new rack-mounted multi-standard open-reel analogue recorder, the TD9, designed for ¼-inch, ½-inch and 16mm perforated tape recording. Features include synchronisation with or without timecode and mains or battery supply.

Studer (Switzerland) were demonstrating their new D820X 2-channel Twin DASH recorder already referred to, as well as the Mark IV versions of their ABO VU analogue recorders up to 24-track. The Studer 961/962 console range too seemed very attractive for mobile use, with compact 30mm module width and versatile features.

Tannoy (UK) ran continuous demonstrations of their newest monitoring loudspeakers, which now feature SyncSource that is claimed to align the high and low frequency sources in their famous Dual Concentric drivers. A range of Tannoy Wildcat sound reinforcement speakers was also on show and the SR840 power amplifiers.

Turbosound (UK) showed their new high-level sound reinforcement loudspeakers based on two patented devices. TurboBass and TurboMid. Compactness had been combined with high efficiency, to suit the stacking of multiple arrays for controlled dispersion. There are four models in the range. ■

MICHAEL PETTERSEN

Broadcast Applications For Voice-Activated Microphones

When 47 mics are open at the same time annoying feedback can occur. How can an engineer ride gain on 47 channels at once? Here, the author explains how automatic microphone systems can be applied to broadcast.

BROADCAST ENGINEERS face the same problems as recording and sound reinforcement engineers when it comes to open microphones. Leakage, excessive ambient noise, and even feedback can plague remote and studio productions. And, in most cases, the only solution is keeping the minimum number of microphones open that can satisfactorily handle the program audio. Nothing new there; every neophyte audio engineer quickly learns this lesson the first time he tries to set up a feedback-free 4-channel PA system in his junior high gymnasium.

Recording engineers often rely on noise gates to reduce leakage, and sound reinforcement engineers have voice-gates or automatic mixers to help them control large numbers of microphones. Within the last few years, an increasing number of broadcast engineers have been employing voice-activated microphones to dramatically improve the audio quality of television and radio programs. This article describes 5 broadcast setups, from a simple 4-microphone radio talk show to a complex 47-microphone television remote production.

ENGINEER-LESS TALK SHOW

Public affairs programming can be a problem for radio stations. Taping of interviews or panel discussions often has to be done at inconvenient times when engineering personnel are in short supply. Ron Turner, chief engineer of WCLR (102.9 FM, Chicago) decided to dedicate a small studio to public affairs and design it to be used at any time without the need for an engineer.

In the center of the studio, Turner placed a round table that could comfortably accommodate 4 people—a program host and up to 3 guests.

To handle the mixing for the studio, Turner chose the Shure Automatic Microphone System (AMS). (For more information, see db Magazine's Test Report on AMS, June 1983 issue.) Two particular features of the AMS made it an excellent choice for this application.

The first feature is the direction-sensitive gating principle inherent in the AMS design. An AMS microphone will activate only when a sound source is located within a 120° acceptance window. This window is ±60° from 0° on-axis. (See FIGURE 1.)

For this studio, four AMS 22 microphones were positioned every 90° in the center of the table. If two people are in the studio, only two microphones will be activated, providing the participants sit in front of their microphones and thus are within the 120° window. Three people activate three microphones, etc. This solves the problem of how many microphones should be on for each interview.

The second feature is the elimination of threshold or sensitivity adjustments to determine the "microphone on" point. Each AMS microphone analyzes its local acoustic environment and will only activate for sounds 8 to 10 dB above the ambient noise. If ambient goes up, so does the gate-on point. Thus, as long as the person speaking is 8 to 10 dB above the ambient level and is sitting in the acceptance window of the microphone, the channel will gate on.

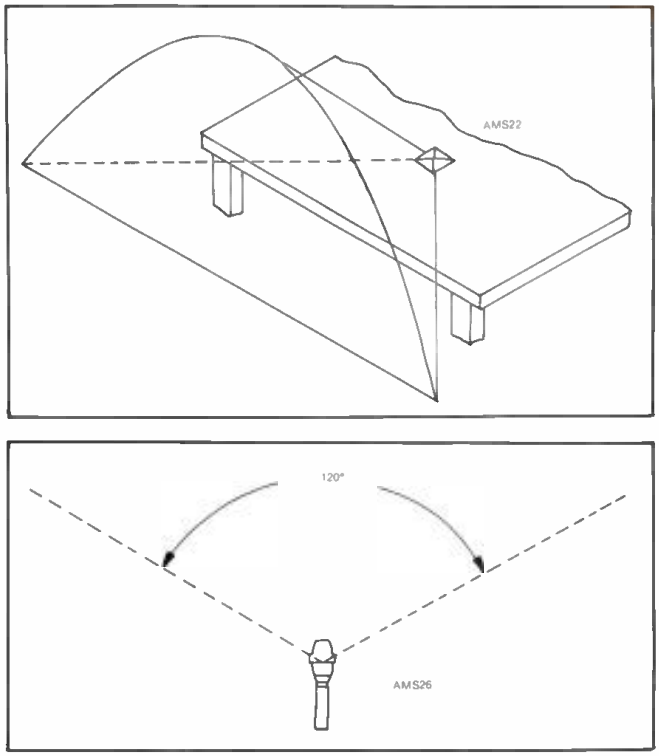


Figure 1. 120° acceptance zone for the Shure AMS26 and AMS22 microphones.

Michael Pettersen is the manager of Advanced Product Planning at Shure Bros., Inc.

A main concern for Turner was losing studio ambience if all microphones gated off during a lull in the conversation. This was solved by using the logic control terminals on the rear of the AMS mixer. By using an external transistor as a switch, the mixer was configured to activate the host's microphone if the three guests' microphones were off. With this setup, at least one microphone would be on at all times. This eliminated any possibility of ambience dropout.

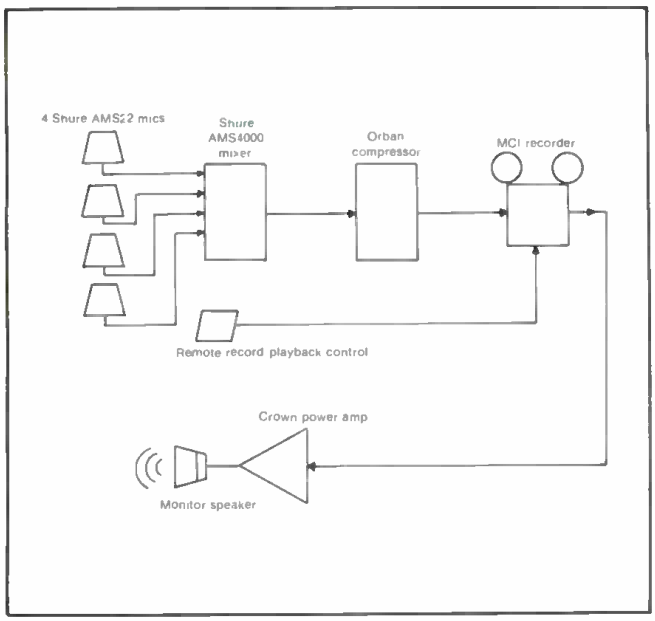


Figure 2. Audio flowchart for WCLR Public Affairs studio.

Following the AMS mixer is an Orban compressor to handle level changes and feed consistent audio to an MCI recorder. A remote recording/playback switch allows the host to control the MCI from the studio. (See FIGURE 2.) Since the studio is left powered up, all a program producer needs to do is load a reel of tape onto the MCI, go to the studio with the guest(s), and start the recorder when ready.

This studio has been in operation for over a year, and WCLR's talk shows have been going on without a hitch (and without an engineer). Everyone is satisfied with the setup, even the general manager, who noticed a marked improvement in the audio quality of the public affairs presentations.

AUTOMATIC MIXING MEETS THE PRESS

Radio Luxembourg (RTL) produces a 90-minute program live each week from its Paris studios. The program is called "Grand Jury" and the format is similar to "Meet The Press"—a panel of journalists from RTL and publications such as *Le Monde* interview a newsmaker about current events.

The studio setup is six microphones located on an oblong table. The moderator sits at one end and the newsmaker at the other. The four journalists sit along one side of the table, facing the small studio audience. Sound reinforcement is provided for the audience, and the show is also videotaped for later use on television news programs. (See FIGURE 3 for studio layout.)

RTL decided to try the Shure AMS in an attempt to ease the burden of the audio engineers. Until the voice-activated system was installed, the engineer had to ride gain on all microphones to avoid feedback, reduce leakage, and eliminate paper shuffling noise. This became an impossible task as discussions heated up, which they invariably did.

The direction-sensitive gating principle of the AMS allows the microphones to be placed so that adjacent participants will not activate each other's microphones. In addition, paper shuffling noise is reduced as the AMS26 microphones are positioned well above the table

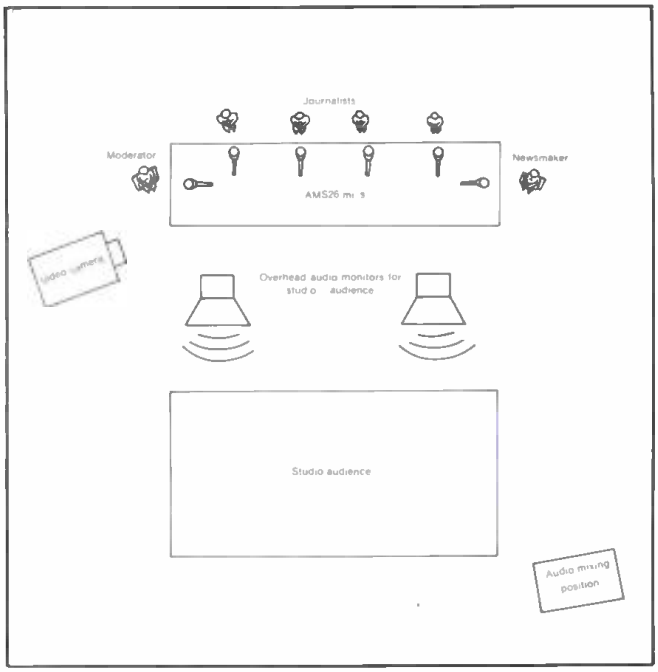


Figure 3. Studio layout for Radio Luxembourg's "Grand Jury."

surface, and any paper noise originates outside the gating acceptance window of the microphones. The result is a consistently clean, feedback-free production under less than ideal studio conditions.

TELEVISION TALK SHOW IN THE ROUND

When WTBS (Turner Broadcasting System) decided to produce a public affairs program dealing with current economic and cultural problems of blacks, Bill Tullis, chief audio engineer, faced an unusual problem. The set was to be a round table large enough to seat 14 participants. A camera was placed every 90° behind the participants and was hidden by thin black scrim and selective lighting technique. Mixing audio was going to be a problem as there was no one spot where the audio engineer could see the faces of all the participants, and leaving 14 microphones open was, of course, unacceptable. Also, the show was an unrehearsed and open forum, so quick verbal exchanges were a distinct possibility. Tullis decided to use the Shure Automatic Microphone System.

An AMS22 microphone was placed between every two participants and located several feet from the edge of the table so that the 120° acceptance window would encompass both people. (See FIGURE 4.) Using a surface microphone design made the set look "cleaner" and enhanced the output of each channel by using the 6 dB of sound pressure increase that occurs at any large acoustical boundary such as a table surface.

The channel LEDs that illuminate on the AMS mixer

whenever a microphone gates on were useful to Tullis and the director. Tullis knew immediately what volume control to grab if he needed to ride gain. And the director used the channel-on LEDs to assist him in determining what camera to call up when someone new started to speak.

WTBS now routinely uses the AMS to handle the audio portion of public affairs programming. Automatic mixing has relieved the audio engineer of trying to predict who will speak next. More attention can now be paid to proper levels and the overall quality of the mix.

RADIO REMOTES WITH AUTOMATIC MIXING

WCAU, CBS Radio in Philadelphia, regularly features call-in talk shows originating from remote sites. Jack Miller is the technical operations manager for WCAU. He decided to try voice-activated mixing to help control echo problems that result from satellite transmission and acoustic delay.

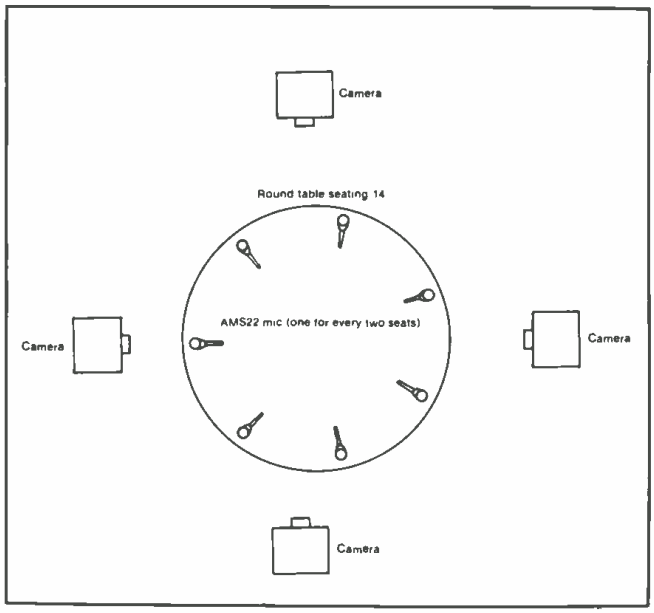


Figure 4. Mic and camera positions for WTBS talk shows.

The cause of the echo problem was the acoustic loop that existed at the remote site between the PA system and the talent microphones. (See FIGURE 5.) If the microphones were left open, the listeners in Philadelphia would hear an echo. A caller's voice would be broadcast in real time and sent to the remote site via telco. The caller's voice would go out over the PA system and would be picked up by any open talent microphone. This caused a short acoustic delay.

In addition, the caller's voice would be sent back to WCAU via satellite and would be rebroadcast ¼ second later as a distinct echo because of the satellite transmission time. The solution was to keep the talent microphones off when they were not needed. This would break the loop between the PA system and the remote audio signal.

Miller had considered a conventional automatic mixer but rejected the idea because of the time-consuming threshold adjustments that are normally necessary. He decided to try the AMS when he learned that there were no thresholds to adjust and that the gating principle was direction as well as level sensitive. The dedicated system concept of special microphones and mixers also would make setup for remote faster and easier.

The AMS has been used for WCAU remotes for over a year. According to Miller, the echo problems have been eliminated and remotes with call-in questions are now "duck soup."

TELEVISION REMOTE WITH 47 AUTOMATIC CHANNELS

In October, 1983, ABC News-Washington used a 47-channel Shure Automatic Microphone System to

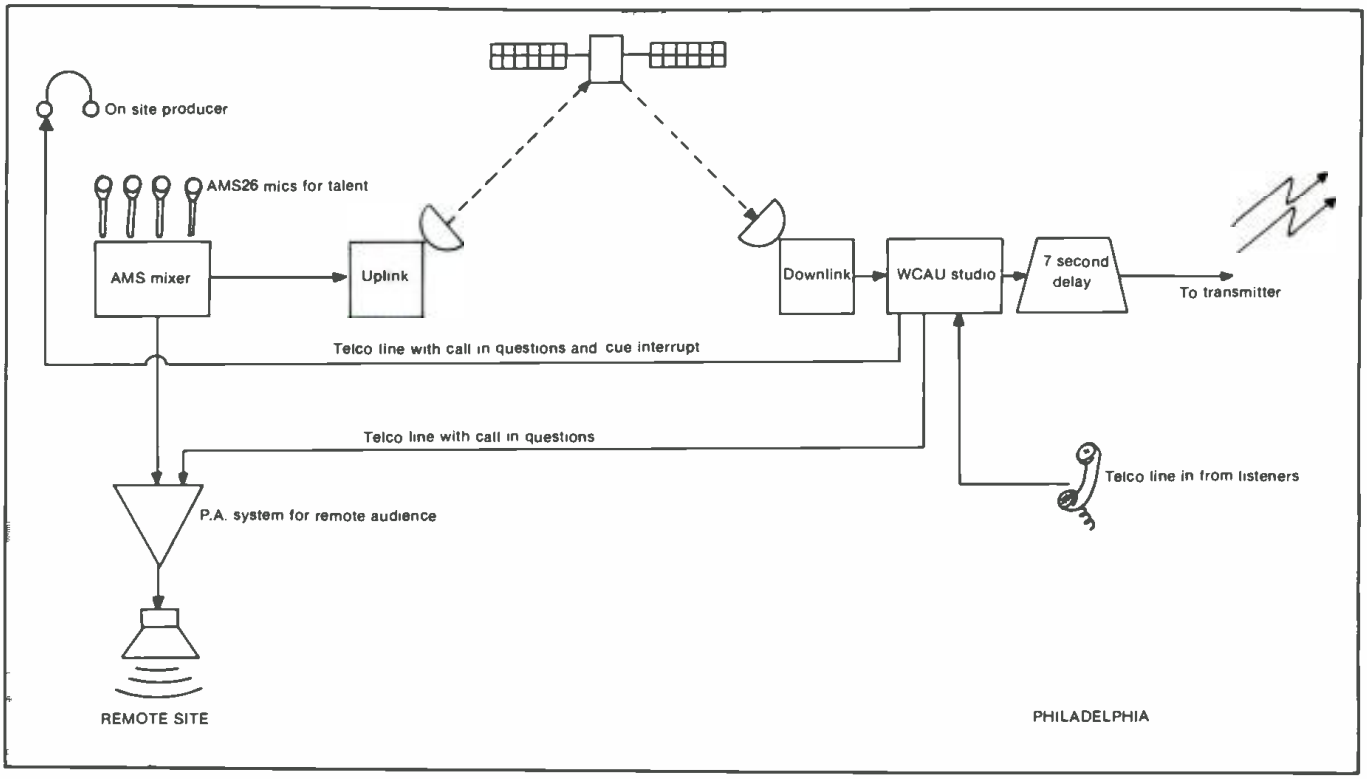


Figure 5. Diagram for WCAU radio remote.

facilitate the taping of a news special. "Voting For Democracy" documented an important symposium on current American voting practices. The program was co-sponsored by ABC News and Harvard University's Kennedy Institute of Government.

The symposium brought 47 politicians and academicians together in a caucus room of Washington's Russell Senate Office Building. Participants included former Presidents Ford and Carter. Panelists were seated around an imposing oval table, where they presented papers and discussed at length the various problems of participatory government. ABC taped 15 hours of discussion, which were edited down to a one-hour special.

Because of the program's open format, the unusual oval set, and the large number of participants, the audio portion of the symposium presented considerable problems. Marc Drazin, ABC technical coordinator for this program, decided that voice-activated microphones would be the answer, but it wasn't quite that easy.

First, there would be no rehearsal, so it was not feasible to use a conventional automatic mixer as 47 different threshold controls would have to be set. Second, the participants would be seated tightly together, and it was very likely that several microphones would be activated when someone spoke if sound pressure level was the only criteria for gating. Drazin decided to use the Shure AMS because of its direction-sensitive gating that eliminates the need for threshold controls and confines the microphone activation area to 120°.

Each participant was seated in front of an AMS26 microphone mounted 8-in. above the table surface. As each person had a 100-page briefing binder, the microphone needed to be elevated so that paper noise would originate outside of the gating acceptance window. With this setup, the participant could not gate on the microphone by shuffling paper or turning pages.

The 47 microphones were divided into 3 subgroups, each of which was sent to one of three separate mix locations. (See FIGURE 6.) At each mix location, two Shure AMS8000 mixers were linked together to control the microphones, with the combined output feeding a Yamaha 2000 console. For redundancy, the direct output of each AMS channel fed an individual console channel. These redundant feeds were never used, as the automatic gating operated without a problem. According to Drazin, "The mixer's electronics switched silently, swiftly, and correctly every time. No one was upcut or clipped at any time."

Two of the Yamaha consoles fed a third master console, which also controlled a subgroup of AMS microphones. The output of the master console supplied audio for the remote recording truck, the microwave transmitter to

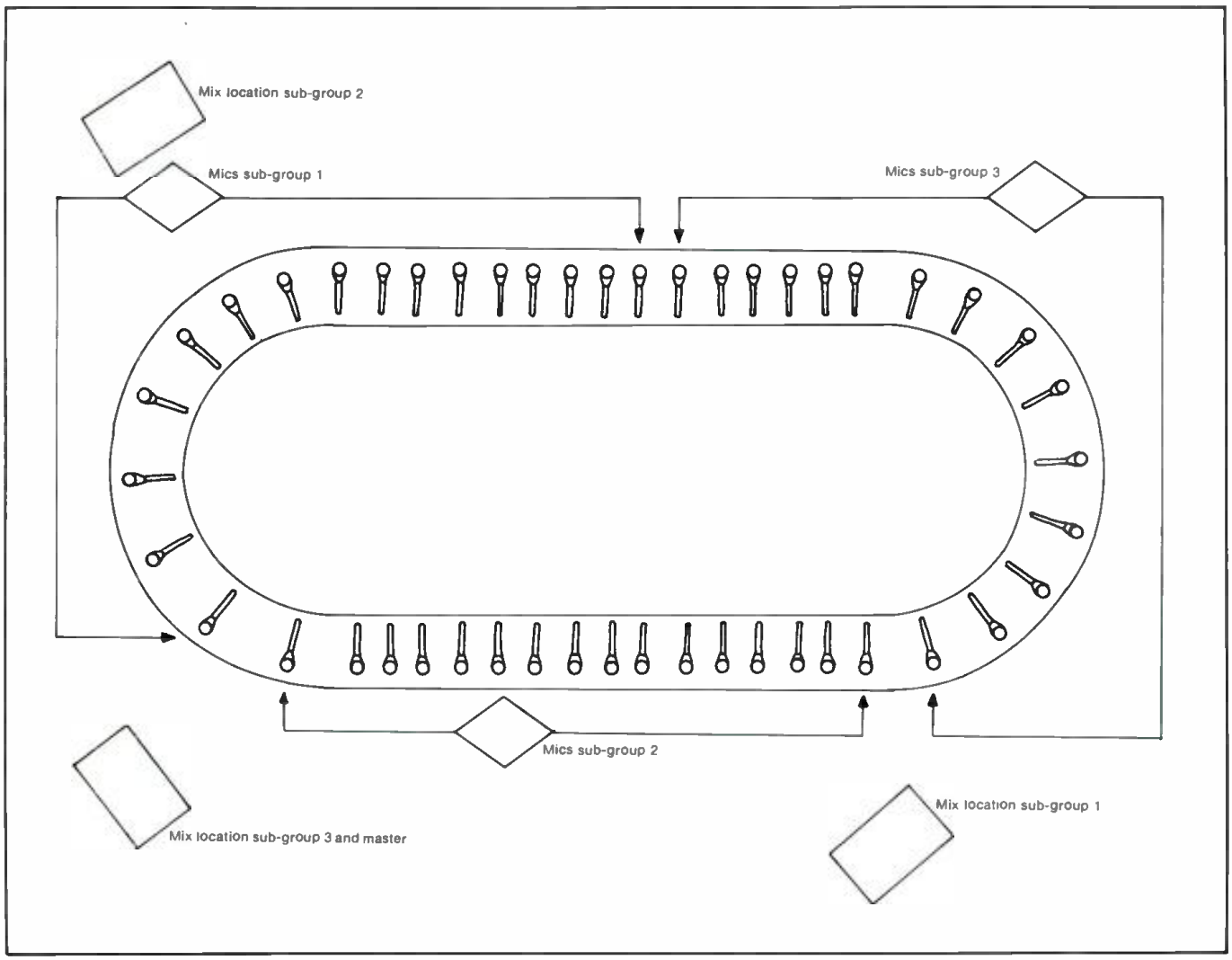


Figure 6. Setup for ABC-TV's symposium.

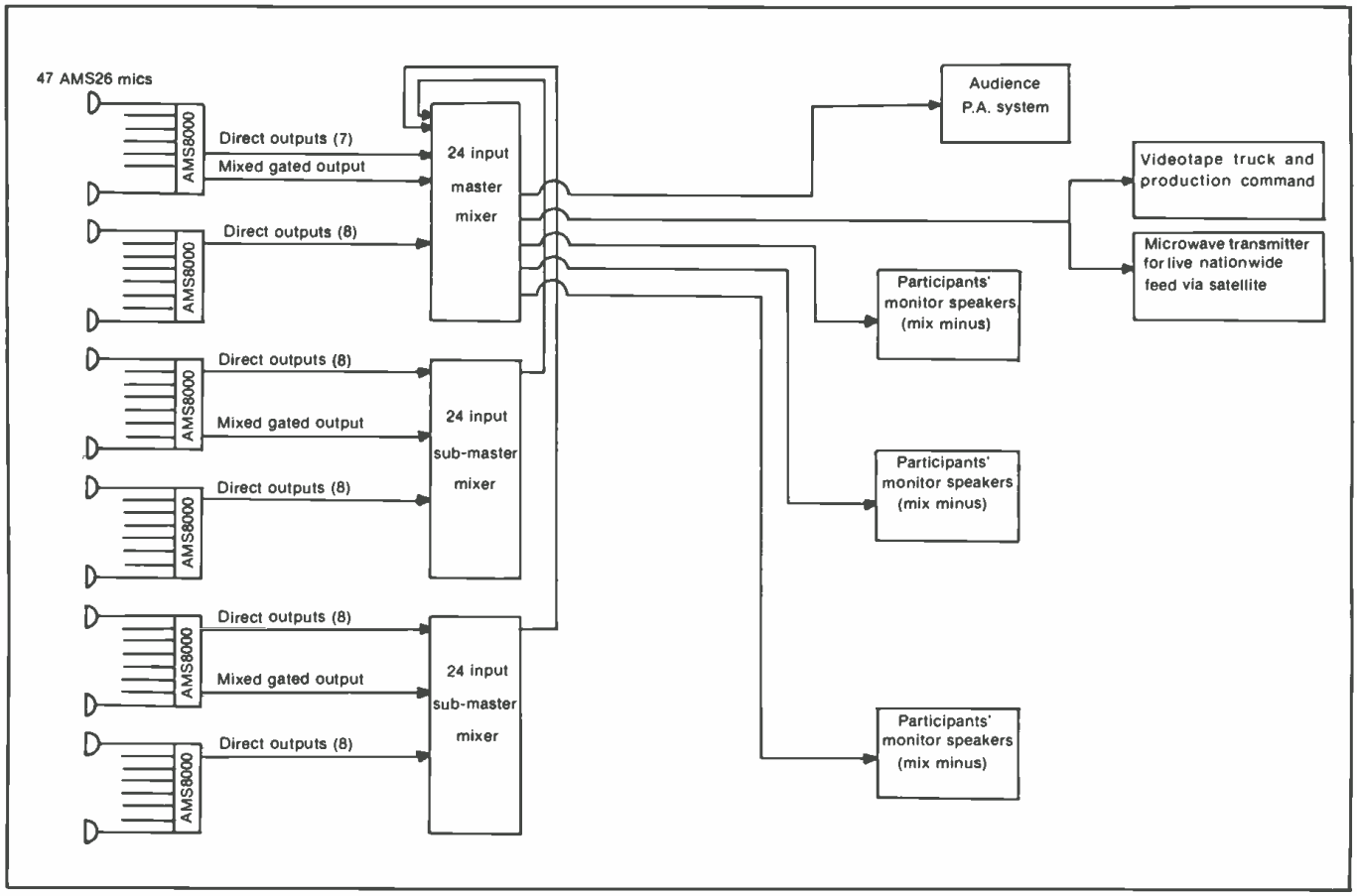


Figure 7. Audio flowchart for ABC-TV's symposium, "Voting For Democracy."

the satellite uplink, the audience PA system, and the participants' monitor speakers. (See FIGURE 7.) The monitor speakers were placed inside the opening of the oval set and hidden by plants. A mix minus was used to avoid feedback, e.g., subgroup 1 microphones were fed to subgroup 2 and 3 monitors, but not to subgroup 1 monitors. This worked well, as it was easy for participants sitting in each subgroup to hear each other without monitor reinforcement.

The engineer located at each mix position was responsible only for his subgroup. The job of riding gain for the participants was made much easier by the channel-on LEDs on the AMS mixers. Whenever someone spoke, the yellow LED above that channel's volume control would illuminate and act as a beacon, guiding the engineer to the right control if level adjustment was necessary. This feature was very important, considering the engineers had poor sight lines and no video monitors to assist in visual identification of who was speaking.

Voice-activated microphones are fast becoming a valuable tool to the broadcast audio engineer. As the complexity of studio and remote productions increases, the automatic microphone systems will become indispensable in providing the best audio possible. Marc Drazin of ABC sums it up nicely: "I shudder to think of the numerous problems we would have had if we had tried to cover 'Voting For Democracy' with conventional audio equipment and operators." ■

Sound Reinforcement in Europe

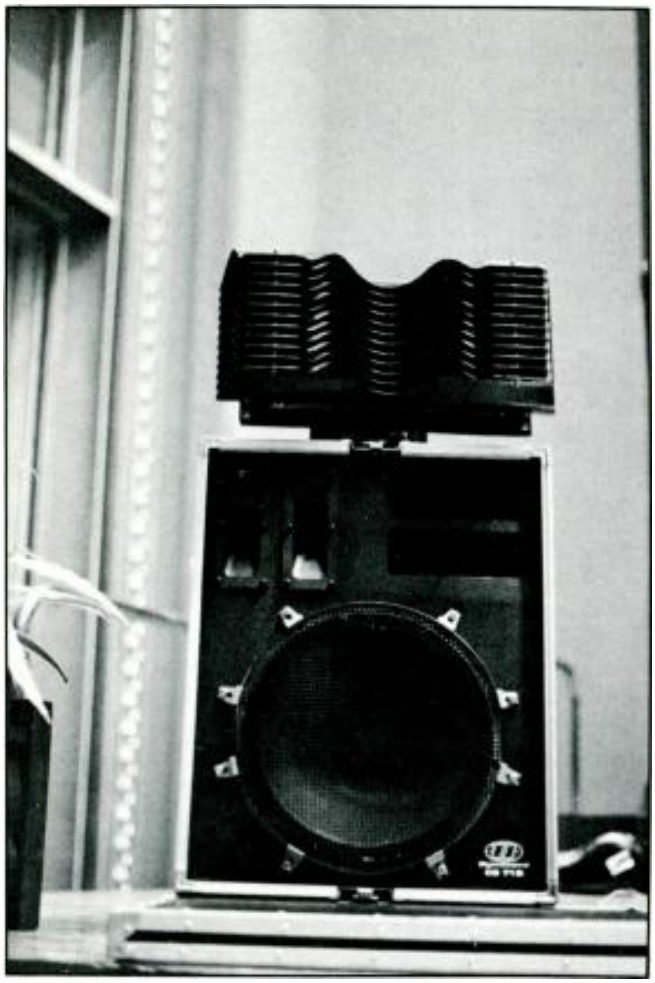
Never fear! Ed Learned is back and is now recounting his tale of a European tour. He's gone to Hungary, to Cyprus, to Turkey, to Greece & Spain, etc....Need we go on? No, but you should!

INFLATION AND TIGHT FISCAL policies have significantly affected all areas of the entertainment business in the 80s, with perhaps the largest impact on live concert production. Increased transportation, lodging, and equipment costs have led to a dizzying increase in the cost of "touring," and a decrease in the number of touring acts from the halcyon days of the 70s. In the never ending trial of cost-effective solutions to today's economic realities, many artists have gone to local or regional production contracting. A local sound company is retained for a specific tour city, or to handle several dates within their regional area. This approach can save money in transportation and crew costs over contracting one "national" sound company for an entire tour. With the rapid proliferation of modern sound companies throughout the US in the past few years, hiring locally is no longer as injurious to sound quality as it once was. Overseas touring, however, is a different matter. In the course of my travels, I'd found sound companies to be neither as numerous nor as well-equipped as in the US. To insure quality and consistency, I felt it necessary to carry a complete sound system, or contract a high-quality "national" PA company, that is if one existed. In the fall of 1984, I was to find my theories put to the test.

Joanne Brackeen, noted jazz composer and pianist, had been selected by the United States Information Agency (USIA) for a tour of Europe. From October 3 to November 13, 1984, concerts were scheduled in Hungary, Yugoslavia, Cyprus, Turkey, Greece, Spain, and Portugal. Several prestigious jazz festivals were also on the itinerary. The tour was yet another opportunity for USIA to showcase the very finest in American arts, and Joanne planned to comply. She's picked a select group of musicians to round out her quartet, an all-star group featuring Joe Henderson (tenor sax), Buster Williams (bass), and Billy Hart (drums). Each was a composer and bandleader, considered by their peers to be among the best on their respective instruments. It was going to be a special tour, and I was quite excited to be tapped as sound designer and engineer for the trip. As events unfolded, it became apparent that I was to design less than I'd anticipated!

USIA, as with many organizations handling cultural funding, had been hard hit by the monetary realities of Reaganomics. This fact, and the timing of the tour so late in the year, found the remaining budget for cultural programming stretched to the limit. I spent much time on the phone with Irene Carstones, the USIA programmer for this tour, discussing how this would affect production. It would not be financially feasible to carry a complete PA system as on past tours, but I was concerned that adequate gear might not be available at many locations. It was important that as much continuity in sound, especially monitors, be maintained throughout the tour. We agreed on a compromise plan that would enable us to carry monitor and mixing equipment while contracting house speakers and amplifiers in each individual location. Irene had extensive experience programming events in Europe, and she felt that with the proper planning adequate PA could be procured locally by USIA. Most of the venues we were scheduled to play were under 1,000 capacity, and large sound systems were already provided at the major jazz festivals. The money saved in equipment rental and transportation expense would enable us to meet the existing budget parameters.

Ed Learned is currently the house engineer for Ashford & Simpson.



PA stack for Budapest, Hungary.

Irene made arrangements to cable my proposed system requirements to all the USIA posts we were to visit, to insure that adequate equipment would be present at each concert. I chose to word my requirements along a power/speaker design basis. For halls of 500 seats or less I requested MINIMUM power of 250 watts total P.A. power; for 500-1000 seats 500 watts, and larger than 1000 seats, 1000 watts or contact me through USIA Washington. For speakers, I requested two-way bi-amped or three-way passive components capable of handling 150 watts each and reproducing 40-14 kHz. These parameters (hopefully) insured that I'd get at least some sort of high powered full bandwidth cabinet(s) and professional power amplifiers, not a large hi-fi system or a group of stacked musical instrument amplifiers. Specific requirements help prevent nasty surprises at the gig. I also requested that the PA power amp inputs be either balanced XLR (pin 2 hot) or unbalanced ¼-in. phone plug, with an input impedance of not less than 60 ohms. These input parameters gave me a broad range of compatibility, as the equipment I planned to carry would easily adapt to either balanced or unbalanced jacks, and with my supply of adapters I could handle plugs of either sex. Output line drivers on my electronics assured operation into any impedance greater than 60 ohms, so I was reasonably confident that I could hook into whatever was provided with a minimum of hassle.

To maintain sound quality under these conditions, I carried the mixing equipment and mics we were to use. As on previous tours (see db Jan-Feb '85, Mar-Apr '85) my console was a Custom Audio Electronics xpc-2 10 input console. This was a straight-to-stereo console with two-band switchable EQ and two monitor sends. I carried two E-V-Tapco 2210 equalizers, yielding four channels of octave equalization. I planned to use one channel to equalize the provided house PA, and two more channels for two separate monitor mixes. A 19 conductor 150-ft. snake was provided for mic and feed runs to the house. My microphone compliment consisted of Crown PZM 31-S condensers and Sennheiser 441s, E-V DS-35s, and AKG D-200E dynamics, with the appropriate mic stands included.

Four Aerial floor monitors, as well as a Crown DC-300A Series II amplifier housed in an Aerial amp rack, were added to provide our monitor system. Aerial had provided systems for several of my previous USIA tours, and the gear held up very well to the rigors of international travel. Two monitors paralleled on each amp channel provided two mixes of around 300 watts each. These monitors had the smooth, uncolored response required by this group of uncompromising musicians. I also knew that the monitors could be used as PA, something I'd done on previous trips. If the provided systems proved to be inadequate, I could always use two of my monitors as the house PA system in a pinch.

To complete the system, I needed to provide voltage conversion equipment. A.C. power in Europe is predominantly 220-240 volt, 50 cycle. To handle the conversion, I included a Variac multi-tap 0-280 volt 50/60 cycle transformer, shock-mounted in its own case. The input tails were 3-wire: hot, neutral, and equipment ground. The output terminated into a female U.S.-type Edison A.C. receptacle, into which I would run my monitor amp and all my mixing equipment. I carried a VIZ 120B peak reading A.C. voltage monitor, so I could monitor real-time voltage fluctuations and adjust my transformer output accordingly. The total system consisted of seven pieces and weighed 1,034 pounds.

Before leaving for NY to meet the group and attend our pre-tour briefing, I had to arrange transportation for the sound equipment. It was necessary for the PA to arrive in Budapest, Hungary by October 5, 1985, when our first performance was scheduled. As on previous tours, I contracted Pan American World Airways to freight the gear to Budapest. I dropped the sound equipment off at the Pan Am freight office at Detroit's Metro airport on Friday, September 28. The equipment was to be shipped to NY's JFK airport on Monday, October 1, and then transported to Budapest via Zurich, Switzerland. Pan Am assured me my deadline could be met, but I had encountered problems in the past. Experience had taught me to allow a MINIMUM of 5 days transit time to get shipments delivered overseas. Prebooking cargo space was another necessary detail.

NEW YORK, NEW YORK

I left for NYC on Monday, October 1, and enjoyed my first night in NY visiting many of my musician friends, some of whom had been on my previous USIA tours abroad. Tuesday's briefing, held at Joanne's Greenwich Village loft, was chaired by Carl Sharek, who was the appointed USIA escort officer for this tour. The escort functions as a "road manager," handling transportation and lodging arrangements as well as acting as a liason between the group and local USIA officials. Carl spoke several Slavic languages as well as Greek fluently, and had been stationed in several of the countries we were to

visit. He gave us a good idea of what to expect in each country with respect to customs, climate, and food. We also used this occasion to discuss the proposed tour itinerary, pinpointing possible scheduling and logistics problems and offering solutions. Everyone appreciated this opportunity to get acquainted—everyone that is except Joe Henderson, who wasn't present. Due to previous professional commitments, Joe was in San Francisco, and wouldn't join us until the next day. His flight was scheduled to arrive at 6 PM Wednesday, two hours before our flight to Munich (where we'd transfer to our Budapest flight) was scheduled to leave. Any delays could pose a major problem, and I knew Carl was very nervous about such scheduling at the start of a tour. We

Saxist Joe Henderson.

all agreed to rendez-vous at JFK by 5 PM Wednesday, so that all our baggage and musical instruments could be checked in together and travel in one container. We adjourned, and I proceeded to enjoy my last night in the US for awhile.

MAKING IT TO MUNICH

I arrived early at JFK Wednesday, and assisted Carl with the check-in of Buster's large string bass case and Billy's many drum and cymbal cases. Joe showed up at our check-in area around 6:45, much to the relief of Carl, so we were all united at last. After a slight delay, our flight for Munich departed around 8:15—on our way at last. I sat next to Joanne in the upper lounge of our 747, which gave us a chance to talk about music, her fellow musicians, and the upcoming concerts before I caught about three hours sleep. We arrived in Munich at 9:10 AM Thursday, and after a short layover boarded our Lufthansa flight for Budapest, where we arrived at noon. We were met by John Menzies of USIA and Mr. Faigel of Hungarian Radio, which was our official "sponsor" in Hungary. We were then ushered to the airport's VIP lounge while our baggage was claimed and processed. We used this time to go over the Hungarian schedule in detail. All domestic travel was via truck and van, with our longest drive about five hours. PA equipment was to be provided by Hungarian Radio, but Faigel was unable to tell me exactly what the PA consisted of, only the fact that the inputs were XLR balanced as I'd requested. He did inform me that our sound equipment had arrived, and could be cleared by customs early tomorrow morning pending the acquisition of customs releases. With these details out of the way, we were taken to our hotel to sleep off the jet lag. I opted to take a walk around Budapest, enjoying the fall colors and old world charm of this beautiful city by the Danube.

Mr. Kish of Hungarian Radio picked me up at my hotel around 10 AM Friday, and we rendez-voused with the equipment truck at the customs holding area near the airport, fighting some nasty traffic on the way. Kish told me that this is common on Fridays, as many people get off work early and leave the city for weekends in the country. As a result, it's wise to allow for extra transportation time. Customs can prove quite sticky, especially when importing equipment from the West into this Eastern bloc country. However, with the special releases Kish had obtained from the Ministry of Culture, customs clearance proved to be an easy process. With a cursory look at my amp rack and snake trunk, we were sent on our way. Our equipment was delivered to the Vigado hall while I was returning to the hotel. After lunch, I walked the two minutes over to the hall for setup. Vigado Hall had quite a musical legacy: Brahms and Bartok, among others, had played many concerts there. The hall was located on an upper floor, and seated about 600 in beautiful surroundings. The polished wood floor, plaster walls, marble carvings and 40-in. high ceiling made for extremely live, "hard" acoustics, with a reverb time of just over two seconds. No house sound system had arrived yet, but I didn't prevent that from delaying the group's setup. With the help of Buster and Billy, we got the stage gear together in about an hour, formalizing the setup that we'd use for the remainder of the tour.

CONDITIONS IN EUROPE

Grand pianos were provided for Joanne wherever we went, and as conditions in Europe were more favorable towards the care of these instruments than in Asia or Africa, we anticipated better pianos than I'd encountered on my previous USIA tours. The piano's lid was opened, placed on the tall stick, and mic'ed with a Sennheiser 441 handling the low end (placed where the low and mid strings cross, angled towards the hammers about 3-6-in. above the strings), and a Crown PZM 31-S handling the high end (placed on a foam pad and taped to the side of the piano, inside, near the second sound hole). Joanne played with such a powerful touch that getting the piano audible in the mix would never be a problem, even with the piano lid open. In addition, having this type of piano level on stage allowed me to use less piano level in the monitor mixes than I'd normally provide.

Joe Henderson, one of the world's premiere tenor saxophonists, was mic'ed with an E-V DS-35 on a straight

mic stand. He used this in the conventional manner, to mic the bell of his Yamaha tenor sax. What WAS unconventional were some of his antics while playing. Joe would often wave his sax about while soloing, occasionally getting quite far off-mic. In smaller halls he might still be heard, but at the larger venues I would have to resist the temptation to tape him to his mic stand! Joe laughed when I told him this—apparently it's something he'd always done. He usually made up for any difficulties by playing A LOT of tenor.

Buster Williams carried his string bass in a special custom fiberglass case, much lighter and smaller than a standard symphony case. His instrument was a special hybrid of round back and flat back basses. He had a Barcus-Barry pickup on the bridge, but also had recently installed Fishman bridge pickups, a type I was not familiar with. He was interested in comparing the sound of the two; after a bit of experimentation, we both found the Fishman pickups superior for our use. The low end was astonishingly warm, and the sound was very even across the entire bandwidth. I'd elected to use a direct box, pre amplifier, on the bass, and these pickups provided plenty of gain. Buster had been discouraged from carrying his own bass amp, to save money on transportation costs. USIA was to provide an appropriate bass amplifier for each performance, so he would also be subjected to the vagaries of available equipment.

Billy Hart's Pearl drum set was mic'ed with a Crown PZM-31S on the bass drum, an E-V DS-35 on the snare, an AKG-200E above the mounted toms, and another PZM-31S as an overhead. Billy used both drum heads on his bass drum, with foam on the inside wedged between heads to damp the vibrations slightly. This created a tight, full-bodied sound with no troublesome overtones, and maintained the touch advantage lost when the front head is removed or ventilated. The PZM for this drum was placed on the floor directly in front of the drum. This not only captured the bass drum, but much of the snare and mounted toms as well. I added the DS-35 snare mic to the mix when Billy played brushes. The AKG-200E was placed above the mounted toms just below cymbal level, and blended into the mix to round out the tom sound, very important as Billy provided melodic accompaniment to many songs on these toms. The overhead PZM was placed over the ride cymbal side of the set as a conventional overhead. I placed the PZM in a mic clip and, using a boom stand, suspended it over the cymbals, without mounting it to a plexiglass sheet as Crown recommends. Some low end was lost as a result, but for an overhead this proved to be an advantage, not a detriment. The PZM's airy, crystalline high end proved a suitable match for Billy's sensitive cymbal stylings.

As illustrated, monitor placement was fairly basic: everybody had their own wedge. Joanne's was placed to her left, using the piano lid as a baffle between the piano mics and the monitor. Buster's was placed slightly under the piano, keeping the area between the piano and drums as clear as possible for the string bass. This could have been a source of feedback into the piano, but appropriate mix assignments prevented it. Billy and Buster, the rhythm section, received a monitor mix of loud sax, medium bass, and the tiniest amount of piano, so piano feedback problems were minimized. Joanne and Joe shared the other mix, which contained loud sax and only slightly softer piano.

Around 4 PM the radio people delivered the rest of the gear—the house PA equipment and Buster's bass amp-de-jour. The PA proved to be of German-American manufacture, a speaker cabinet topped with an attachable horn for each side. This cabinet contained a front-loaded 15-in. woofer and two tweeters. A horn/lens combination powered by a TAD compression driver clamped onto the top of the cabinet. (See photo 1.) The whole arrangement could be run either bi-amped or passive by using the on-board, patchable passive crossover network. For our performance, the PA was in passive mode, powered by a Peavey 12-channel mixer with an on-board power amp. The bass rig was a Selmer, with lots of treble and no bass response—not a good way to start the tour. I ended up giving Buster's bass A LOT more level through his monitor, as this proved to be the only way to get good tone. While the radio crew set up the PA equipment, I sussed out power for my gear. There were new European 2-pin receptacles stage left, supplying 220 volt, 15 amp power, with functional equipment grounds. Voltage proved to be very stable, so I tied in and got down to business. During sound check I noticed the left PA horn cutting in and out. I pointed this out to the sound crew, who went to work on it, but could not find the problem. As the audience began to file in, I joined in the repair effort, and located the problem: a loose capacitor in the passive crossover. A quick soldering job and we were back in business only 15 minutes before showtime. I really should start charging for house calls.

OUR FIRST EPISODE

Despite these little glitches, the first show went well. The quartet sounded like they'd played together for years—a testament to the experience of the musicians. The pacing of the set proved ideal: a mixture of jazz standards sprinkled with compositions by Joanne and Joe. Each member was featured on at least one number. And Joe immediately served notice as to HIS readiness, playing brilliantly despite problems with a few leaky sax pads. The near capacity crowd helped damp the room reverb a bit, but it proved difficult to maintain good definition between the instruments. I ended up with only piano and sax in my house mix. Our first encounter with Eastern European audiences was a happy one: they were very knowledgeable jazz fans and very appreciative of this great quartet.

OFF TO SZEGED

Saturday, October 6, was a day of travel to Szeged, about a 2½ hours drive from Budapest. I left around 11 AM with Mr. Faigel; the band was to follow with Mr. Kish later in the afternoon. Traffic thinned right out once we left Budapest proper, save occasional trucks and farm vehicles, so we made good time. I enjoyed my glimpses of the many farms and villages we passed on the way. Even the smallest homes had large gardens, with women working to get the harvest in before winter. Once in Szeged, we took the gear over to the Szeged Youth Cultural Center, the equivalent of a civic center. Our concert was held in their multi-purpose room, which seated about 450. The concert was co-sponsored by the Szeged Jazz Club, who provided the equipment for Buster and I. The PA here was a Peavey SP-1 cabinet per side powered by a Peavey CS-800 amplifier—more than enough power for this small room. The bass amp was a Peavey powering a 15-in. front-loaded speaker, a considerable improvement from the previous concert. The room had a tile floor and one wall covered with windows, but these were covered with large, thick

drapes. As a result, the room acoustics were a nice blend of live and dead rooms. The Peavey PA speakers proved a bit too bottom-heavy, so I rolled some bass out of the house system. The show was to be taped by Hungarian Radio for later broadcast, so all mic lines had to be split. By lifting the ground on all radio equipment, we were able to avoid any buzzes or hums. My equipment remained grounded, power coming from a new European 2-pin outlet located on a wall about 5-ft. from stage right. This provided 220 volt, 15 amp power, with a functional equipment ground. Voltage here was not as stable as Budapest, but still within reasonable limits. As the band showed up late, I didn't get a sound check—we just went for it. With a great band and a good sounding room, it didn't take long to get a good mix going. The place was totally packed, with people standing anywhere they could find a spot, the audience comprised predominantly of young people who were ready to enjoy a great evening of music. The result was magic—the crowd inspired the musicians and vice versa. After the show, we were treated to a Hungarian feast at a local restaurant, serenaded by gypsy violinists playing Django Reinhardt tunes. Ah, Hungary! Later, the quartet and I adjourned to Buster's room to listen to my tape of the show. I'd taped the concert using my Sony Pro Walkman and the right master output (the left output ran the PA). The group discussed several new arrangement ideas as a result of this instant analysis, and enjoyed each other's bright moments. They also complimented me on my mix and individual instrument sounds which, coming from the awesomely talented group, meant a lot. We all left that night knowing we were collectively pulling in the right direction.

Sunday we were off for Nagykanizsa, about a three hour drive due east of Szeged. The torrential rain, high winds, and the fact that only narrow, twisty secondary roads connected the two cities, contributed to stretch our travel time into 5 and ½ hours. We arrived at 4:45 PM; our concert was scheduled to start at 5 PM, so doors were held until 5:30 to allow for set up time. The Nagykanizsa Cultural Center was a proscenium-type theatre with a capacity of 700. The carpeted floor, soft seats, and acoustically-treated ceiling gave the room excellent acoustics. Power was available stage left, on new European 2-pin receptacles located about 10-ft. offstage. These provided 240 volt, 15 amp power, with functional equipment grounds. My PA proved to be the same system I'd used in Budapest, augmented by two additional full-range boxes on telescoping 6-ft. speaker stands, one per side. These contained a 12-ft. woofer and a diffraction-type high frequency horn. The bass rig here was a Marshall 100W top and a bottom containing four 12-in. Celestion speakers, two of which would rattle when Buster played certain notes; he was not pleased. Being pressed for time, we again eschewed sound check and started as soon as most of the audience was seated. We only played to half a house, no doubt due to the inclement weather, but the audience made up in enthusiasm what they lacked in numbers. My only problem was a nasty buzz in the PA, which disappeared when the house lights were switched off. Before leaving for Budapest, the hall manager toasted the group with several rounds of apricot brandy, calling the afternoon's performance "the best ever here in Nagykanizsa." It made all our day's tribulations worth it.

BACK TO BUDAPEST

Our return to Budapest took only two hours, as the weather improved, we could use a four lane divided highway, and our driver had a lead foot! Once back at the hotel, Joanne, Buster, Carl and I held a meeting to discuss equipment. The bass amp situation in Hungary had not been good, so to avoid further problems we drafted a cable with bass amp specifications that would be sent to our other destinations. Hopefully, this would prevent the problems we'd encountered here. We also requested other essential items which had not yet been provided, such as music stands and a rug for the drums. Somehow, I got elected to go to the airport at 6 AM tomorrow to see our equipment processed by customs in preparation for our Monday departure for Belgrade, Yugoslavia. Monday morning, thanks to the special customs releases obtained by Hungarian Radio, our equipment was easily cleared

Stage during setup in Nicosia, Cypress.

by customs. The problem proved to be in the shipping area. To pay for the cost of shipping, USIA issued excess-baggage coupons to the escort officer. These coupons (GEBAT) were written to cover a specific weight. I had two, one to cover sound equipment, and one to cover band equipment. Unfortunately, the band GEBAT was for 75 lbs., and the gear weighed 321 lbs. As the clerk's English wasn't too good and my Hungarian was even worse, I managed to convince him that the PA GEBAT was written for 1034 KILOS, not pounds. Somehow, I pulled this off, and both shipments were accepted on the PA GEBAT. On the flight to Belgrade, Carl and I drafted another cable to notify USIA of this problem. Hopefully, this would result in a new GEBAT written for the correct weight. Our arrival in Yugoslavia was a snap: immigration was fast, and we were met in baggage claim by USIA Belgrade staffers. Our equipment was claimed and processed quickly, and in a carryall, car, and Mercedes taxi we began the five hour drive to Skoplje. Bill Shine, head of the local USIA office, met us at the hotel when we arrived and, after a bit of recuperation, whisked us over to his home for a dinner/reception. Due to my Grand Funk tour apparel, I was immediately surrounded by most of the young people present and bombarded with questions about the state of rock, funk, and new-wave music in the US. Most of these kids spoke English fluently, and I was impressed at their grasp of American popular music. I gave my response to the "Michael Jackson is an imperialist plot" question, which led to a larger discussion of the news media on both sides of the Iron Curtain. Everyone gained from this dialogue,

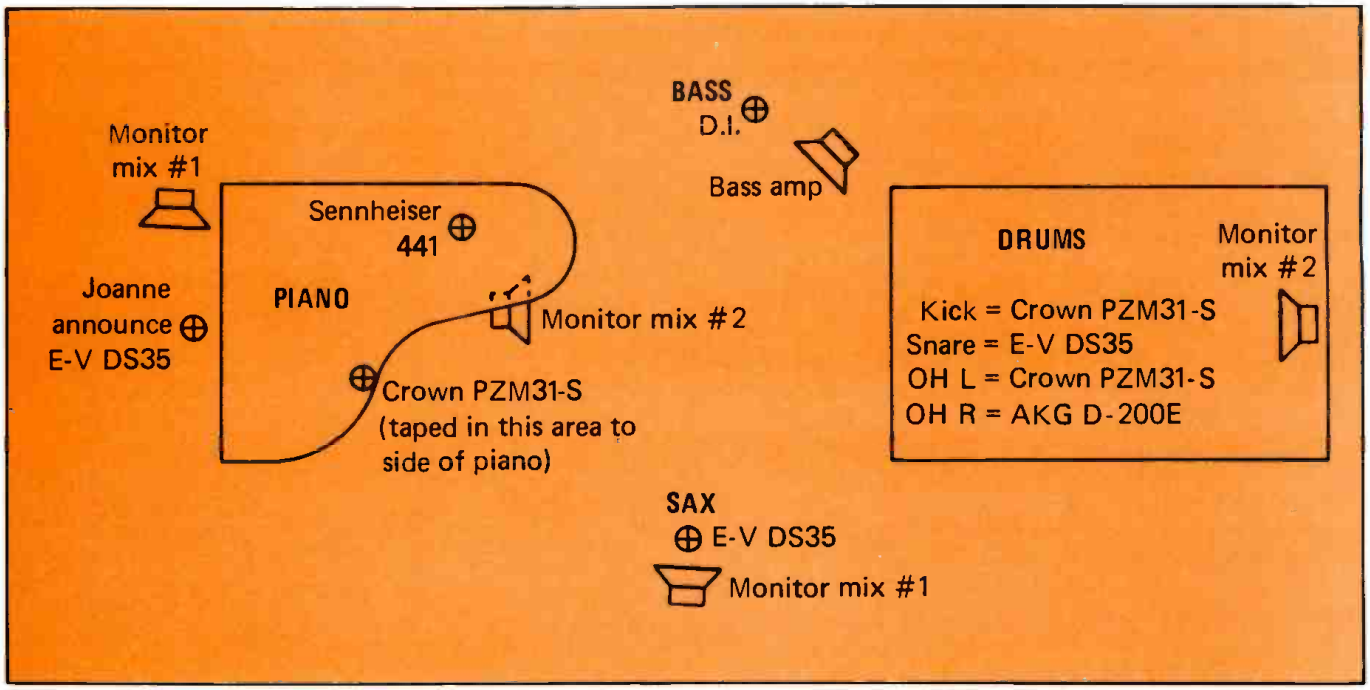


Figure 1. Stage plot for Vigado Hall.

as only through personal communication can all people of the world feel REALLY comfortable with each other as human beings; this kind of interaction is one of the many reasons USIA funds tours such as Joanne's.

October 9 was our concert day in Skoplje; I relaxed most of the day while the group gave a series of radio and press interviews. Set up at the Univerzalna Sala was scheduled to begin at 4 PM. The hall was shaped in a hemisphere, with the stage at one end; it projected into the room enough so that some of the side seating "wrapped" around it. Capacity was 1,500, and acoustics were on the live side but not unmanageably so. The house PA system was comprised of eight Bose 800 speakers, mounted in the proscenium facing above the stage. I ran a feed to the house sound technician, who tied me into their power amps. I also made sure that I kept the band back from the front of the stage, or the group would have set up in front of the PA, creating a feedback problem. Power for my gear was available stage right, on new European 2-pin receptacles, providing 220 volt, 15 amp power with functional equipment grounds. The bass amp was a Roland mini-cube with a 12-in. speaker, which Buster loved. Joanne commented that the piano, a Petrot 7-ft. grand, was voiced extremely bassy, with a huge drop in level past the G below middle C. I pointed my low-end piano mic more towards the mid-range strings to compensate. We played to about half a house, with a majority of young people. Joanne played a beautiful piano solo, and the rhythm section, Buster and Billy, contributed brilliant interplay all evening, continually bouncing ideas off each other. The PA proved to be a bit hot in the 200 Hz area, so a bit of EQ was required to smooth it out. My only criticism was the lack of even coverage: because the speakers were so high up and not angled down, sound was lost in the seats nearest the stage. I also noticed the A.C. voltage climbing during the show, with a total increase of about 8 volts.

Changes in programming dominated our next few days. Wednesday was scheduled as a travel day to Pristina, where we would give a concert that evening. However, due to a last-minute booking conflict, the concert hall (Omladinski Dom) was not available, so our concert was cancelled. Instead, we returned to Belgrade to enjoy two free days to shop and sightsee in Yugoslavia's capital city. Carl and I spent a good portion of Thursday at the USIA office here, where we received our new corrected GEBAT for the quartet's gear, and were informed that all posts had confirmed receipt of our cable requesting an appropriate bass amp, etc. We hoped that our problems were now over.

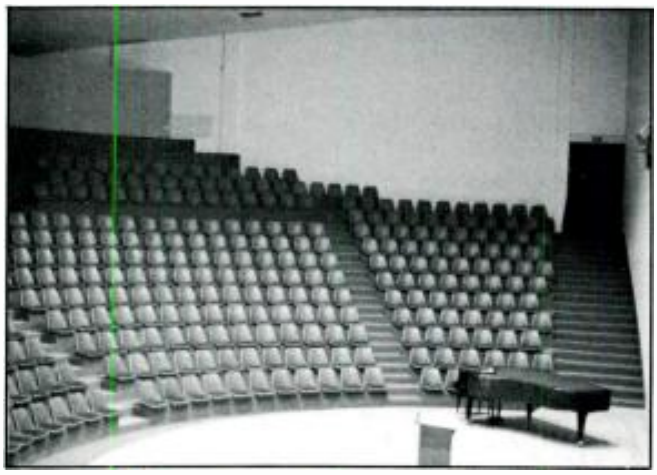
SOUND IN CYPRUS

Friday, October 10, was an endless travel day. With the help of the efficient USIA-Belgrade staff, we easily negotiated Yugoslav customs and began our long journey to Cyprus via Frankfurt, Germany, where we had a bit of a layover. We spent about 12 hours in airports or planes before arriving in Larnaca, Cyprus around 7:30 PM. After claiming our gear, which looked like it had been through World War III, we were loaded onto a bus for the 2½ hour drive to Pophus, at the western end of the island. The road was a four lane divided highway which became a twisty two lane coast road after about a half hour. It was quite dark, but we still enjoyed viewing the lovely Cypriot coastline by the light of the moon and stars. We arrived at our hotel around 11 PM, and gratefully turned in.

I got an early start Saturday so I could set up and still enjoy an afternoon by the beach. I was picked up by Loizos Christou, the local USIA audio guy, and we were over at the venue by 10 AM. This was an "auditorium" of the First Pophus Gymnasium, the equivalent of a high school in the US. The room was a gym seating around 300 in folding chairs, with a three and a half inch high stage and a proscenium-type opening, which was only thirty feet wide, at one end. As a result, things were more cramped than usual. Power was available stage left, with 15 amp new English and 5 amp old English receptacles. The voltage was 240 volts, and the neutral carried about 6 volts; I bypassed it by tying my neutral to a grounded water pipe. My PA here, as throughout Cyprus, consisted of a Roland R+P system, one cabinet per side, with a Roland PA-250 powered mixer. These cabinets each

contained a front-loaded 15-in. woofer, a small metal radial midrange horn, and two tweeters. For a room of this size, it was more than adequate. Some equalization was required to remove the harshness from the metal radial, and to prevent low end rumble in this very reverberant room. We played to a full house that evening, with many of the students present all decked out in the latest new-wave fashions. Most of these were gone by the end of the second number: I guess jazz wasn't their type of music. Those that remained proved to be a most appreciative audience. We were later informed that this was the first jazz concert ever in Pophus, which accounted for the mixed reaction of the crowd. I thought, however, that Joanne made a few converts with her fine playing.

After a day off to enjoy the sun, sightsee, and travel to Nicosia, we were ready for another concert Monday night at the Falcon Theatre. This theatre, located near the Greek refugee camps outside Nicosia, seated 750. These seats surrounded a semi-circular stage which jutted out



Falcon Theatre in Nicosia, Cyprus.

from the theatre's back wall, which led to a difficult problem in PA coverage and speaker placement. I elected to place the speakers well away from the stage on the back wall, angled back in towards the audience. This would create some dead spots in the center, but I counted on the room's excellent acoustics and the close proximity of the band to alleviate this problem. Power was available either offstage left or right, on new UK-type 15 amp receptacles located on the walls of the offstage wing area about 30-ft. from the stage. Voltage was 240 volts and very stable; unlike Pophus, the neutral here was excellent, with no voltage referenced to ground. Our audience consisted mostly of VIP-diplomatic types, and, although most enjoyed the music, they weren't particularly demonstrative. The room sounded terrific, especially enhancing the drums. Billy must have noticed, as the evening's drum solo was especially evocative.

ADVENTURES IN ATHENS

On Tuesday, October 16, it was time to change countries again. We left at 7 AM for Larnaca, and arrived at the International Airport in about 45 minutes. Our gear had been delivered about an hour before by Loizos, and with the help of other USIA staffers we were zipped through customs and sent on our way to Athens, Greece, where we would transfer to our flight for Istanbul, Turkey.

Of course, we had to deal with Greek customs officials, who are notoriously difficult. Fortunately, we were met by Coustos, from the USIA-Athens travel section, who successfully persuaded the customs agents not to inspect every piece, something they wanted to do. Having circumvented this problem, we boarded Turkair and continued our journey into Turkey, making a stop in Izmir before arriving at Istanbul's Yesilkoy Airport around 5 PM. We were met by both USIA officials and members of the Istanbul Foundation for Culture and the Arts, who were co-sponsoring our concerts here. After quickly making the transit through customs, we were delivered to our hotel, and after unwinding a bit we all attended a briefing chaired by Erol Pekan and Meral Selcuk. They were to be our host and hostess during the Istanbul visit. The schedule had undergone some revisions, so we went over it and made our individual comments. The PA system had been acquired, but I felt it was inadequate for the size of the hall here. I discussed this with Erol; he arranged for extra equipment to be procured and delivered in time for our first performance. Two concerts were scheduled here, both at the same venue on consecutive days. Unfortunately, due to a daily opera rehearsal, we would have to strike at least some of my sound equipment after the first night, resetting it the following afternoon. Our meeting completed, we settled down to enjoy a delicious Turkish meal and a good night's sleep.

Wednesday, our day off, was spent sightseeing with Meral and Erol, enjoying the history, color, and spirit of Istanbul; it also proved to be paradise for leather and carpet shoppers! Before returning to the hotel to freshen up for a night on the town, I requested a stop at the Ataturk Kultur Merkasi (AKM), the site of our two Istanbul concerts. Capacity was about 1,600, including two balconies. The acoustics were surprisingly manageable despite the fact that the room was enormous, with wide aisles and a huge stage. The plush seating, rugs, and thick hanging curtains all contributed to sound absorption. I located new European type 2-pin grounded outlets on both stage right and left, but made arrangements with the house electrician to tie my transformer tails directly into the service drop stage right. We were able to walk back to our hotel, as the hall was only a block away—convenience at its best. The evening was spent at the Gallatia Tower nightclub, enjoying great food and belly dancing; we later adjourned to the only jazz club in Turkey, where Joanne, Buster, and Billy surprised and delighted everyone by playing a few numbers. Joe later sat in (on piano) with the house band, a great group comprised of Turks who had spent some time in the US as students—some who'd attended the Berklee College of Music in Boston. A great time was had by all.

I wasn't able to get access to the AKM until 1 PM due to opera rehearsal, and things continued to run behind schedule all day. Joanne had scheduled a rehearsal that afternoon: normally the group didn't rehearse, but Joanne wanted to introduce some new material to the group. This was scheduled for 2 PM, but the group didn't show until 3:30, victims of a late press conference. I'd tied in my power: voltage was 220 volts and very stable. No house PA equipment had arrived, so I couldn't sound check during rehearsal. This gear was finally delivered at 4:30; the band took a break while the PA was set up. Per side, the stack contained three cabinets, each a passively-crossed, full-range box. The bottom was a Bojidar front-

loaded cabinet containing a 15-in. Oaktron cone, two 12-in. Celestion cones and three piezo tweeters. The middle was a Bojidar front-loaded cabinet with a 15-in. Oaktron cone, two 12-in. Oaktron cones and two piezo tweeters. The top was a Shure front-loaded cabinet with two 10-in. cones and a radial horn. Power was provided by four Bojidar stereo power amps, reputed to produce 150 watts a channel. Buster's bass amp was a Marshall 2195 100 watt top into a Bojidar front-loaded cabinet containing a single 15-in. Oaktron woofer.

This PA had two major problems: it was incredibly bassy, and it buzzed obnoxiously. I cured the first day by attenuating all frequencies below 500 Hz by 10 dB and pushing up the gain post-EQ. When I removed my feeds to the PA power amps, the buzz remained, indicating a grounding problem within these amps. We completed our soundcheck without the house system, and left the hall to freshen up for the concert; I agreed to return early to check the work of the PA guys, who were now frantically searching for the noisy equipment.

When I returned to the AKM at 7 PM, I was happy to hear that the problem—a faulty chassis ground—had been located and repaired. I checked the PA thoroughly with program music for coverage and response, finishing well before the doors opened at 7:45 PM. Our first Istanbul concert started promptly at 8:30, playing to a packed house of jazz fans. This concert highlighted a new piece of Joanne's, "Whirling Dervishes," which gave Joe a chance to use the Turkish wood flute he'd purchased while sightseeing. Buoyed by the knowledgeable audience, the group played two exceptional sets. After the concert, I broke down my house electronics, had my stage gear placed in the wings, and pulled the stacks slightly off stage to placate the opera officials. After a quick stop at the hotel, we adjourned to the jazz club, where the jamming went on until the wee hours. I cut out early to sleep before another day's foray into the bazaar for bargaining sessions.

Friday proved to be much less hectic. I enjoyed most of the day off before arriving at the AKM at 6 PM to prepare for the show. I quickly reset my house gear and the PA speakers; the stage crew replaced the instruments behind the closed front curtain. I also prepared to record off my console output, as it was important to record the "new" drum sound. Billy had spent most of the day at the Istanbul cymbal factory. This plant was where the famous K. Zildjan hand-hammered cymbals—for years amongst the "classic" cymbals in jazz—were made. The employees had recently purchased the factory and, using K. Zildjan techniques and quality, were manufacturing their own line of cymbals called "Istanbul." Billy bought quite a few, and wanted to try them out on the gig. I was just as eager to see how they sounded. When the curtain rose at 7 PM, the group was greeted by another capacity crowd, speckled with many musicians and music affecianados: our best audience to date. The group rose to the occasion, especially Joe, who brought the crowd to its feet several times with amazing saxophone forays. The cymbals sounded gorgeous, especially the ride cymbal: plenty of stick sound, balanced overtones and a clear, airy high end that shimmered over the group's sound without masking anything. Billy noticed this as well; he remarked that he could "hear" the band better with his new cymbals. After the concert, the gear was quickly packed and taken to the airport to be prepared for shipment the next morning, as our departure was scheduled for 7:30 AM. Buster was happy with the bass rig, so it was leased for our use for the remaining Turkish concerts. Again, everyone adjourned to the jazz club for after-concert partying and jamming.

A DOUBLEHEADER

Saturday featured a travel-concert doubleheader, starting with a 5 AM wake up call from Carl. Our plane for Adana left 2½ hours later; we arrived in Adana at 9:45 AM. We were taken to our hotel for a much needed rest; I elected to go over to the venue with the equipment for an early set up. We arrived at Cukurova University, about a fifteen minute drive from Adana, around 11:15 AM. The university was located on a series of bluffs overlooking a reservoir, with mountains visible in the distance: a beautiful location. The venue was a multi-purpose room normally seating 400; capacity was increased to 550 with extra folding chairs. It was much wider than deep, with the semi-circular stage jutting out into the seating area, similar to the Nicosia venue. As a result, no seat was more than 40-ft. from the stage. Alcoves adjacent to the stage sides gave me an excellent location for house PA speakers. All walls were wood paneled, yet thick carpeting and an acoustically treated ceiling made for nice acoustics, with reverb time around three quarters of a second. The PA proved to be a Shure Pro-Master 700E6 powered mixer with two Shure cabinets, each containing a 15-in. woofer and three tweeters. This system proved to be very hot between 100-250 Hz, which I attenuated on my graphic EQ. Power was located on moveable stage boxes, which either grounded or un-grounded European 2-pin receptacles. Voltage was 220 volts; 15 amp service was available. When setup was complete, I returned to the hotel for some much-needed sleep and a great lunch, courtesy of USIA-Adana. The concert began at 9 PM, our audience of three quarter capacity comprised of Turkish students and US servicemen from the large US air base in Adana. Jazz is not well known here, yet the many interested music fans were treated to a great concert, featuring an exceptional unaccompanied solo by Joe on Thelonious Monk's "Round Midnite." Billy, however, drew the biggest hand of the night with his most inspired drum solo yet; he obviously enjoyed experimenting with his "new" drum sound. I didn't mic the drums here due to the intimate nature of the hall; my house mix only required sax and piano.

OUR TRAVELS TO TURKEY

Sunday, October 21, was our travel day to Ankara, capital of Turkey. Our flight from Adana took about an hour, crossing a series of majestic, snow-capped mountain ranges. Upon arrival in Ankara, we were met by USIA staffers and representatives from Haceteppe University, where we were scheduled to play tomorrow. Our equipment was claimed and taken to the US Embassy for safekeeping while we were taken to the Haceteppe University guest house, our home during the stay in Ankara. After a lunch hosted by the University, I elected to visit the "M" salon at the school, where our concert would be held. This was a rectangular multi-purpose room seating about 650. The floor was carpeted, but all the other room surfaces were "hard," yielding a reverb time of around 1½ seconds. Power was available stage left, on old European 2-pin ungrounded receptacles. The voltage was 220 volts, but no one could tell me the available amperage. I made arrangements to return at 11 AM tomorrow to set up, and requested that a functional equipment ground be provided for our

transformer. I used the rest of my day to catch up on sleep.

Alas, all did NOT go according to plan Monday. I set up as scheduled around 11, using the same house system as in Adana. This Shure system would stay with me for the duration of our Turkish concerts. No electrician showed up as I'd requested, so after an hour's wait I returned to the guest house. Joanne wasn't feeling well so we blew off sound check, arriving at the hall around 7 PM, an hour before showtime. The electrician finally arrived about

PA stack used at the AKM in Istanbul, Turkey.

ten minutes before we did and, with properly grounded power finally available, I quickly aligned the system. Again, I found it necessary to attenuate 125 Hz to smooth out PA response, as well as remove a bit of the 1-2 kHz area to compensate for room harshness. We had an overflow crowd—even the aisles were full of seated students, making it impossible to move around. Fortunately, the crowd was very well behaved and loved the music, expressing their appreciation loudly and often. I had plenty of student labor to help me pack up afterwards, so for a change I even beat Billy packing!

Tuesday's Ankara performance was scheduled for 3 PM, so we could catch a flight out of Ankara later that evening. I got an early start, arriving at the Middle East Technical University by 11 PM. Our concert was held in the amphitheater of the Architectural faculty, which seated 350, increased to 500 with extra folding chairs. The concrete structure and lack of any absorptive materials created a reverb time of two plus seconds. Power was available backstage center on new European 2-pin grounded receptacles, 220 volts. The drums were incredibly loud in this room, so I didn't mic them. Joanne needed a lot of monitor level in order to hear herself, and it was a struggle to get the piano audible in the house. Fortunately, we had another overflow crowd, with all seats full and the back wall lined with standees; all those bodies helped damp the reverb enough so I could mix effectively. There were many local musicians in attendance, and they besieged the group after the concert while I packed up. We zipped over to the airport to catch our 7:30 flight to the port city of Izmir, arriving after an hour's flying time. We enjoyed the evening and the next day off, eating great fresh seafood meals and taking a side trip to Ephesus to view the excavations there.

Our concert in Izmir on the 25th was to be held in the auditorium at the American Girls' College of Izmir. This hall seated around 600 total, with 200 in a small balcony. There was lots of wood paneling and a tile floor, but an acoustically-treated ceiling and heavy drapes over the side windows helped damp the room reverb somewhat. Power was available stage left on old European 2-pin ungrounded receptacles. I got my chassis ground from a water pipe in the "dressing room" just off stage left in the back of the hall. I also tied my transformer neutral here when I discovered the house neutral was carrying about 7 volts. AC voltage was 220 volts, and I noticed fluctuations of around 5 volts, always in a downward direction. Apparently, these drops were common in Izmir, and it was the most significant fluctuation I noticed at any Turkish concert. The grand piano, a Knabe, proved to be terrible: going from low to high on the keys we noticed huge volume dropouts on the instrument itself. Joanne again asked me for all the piano I could give her in the monitor. Despite this handicap, the band played well, and the audience responded, calling for an encore. After packing up, we all returned to the hotel to prepare for our next destination: Greece.

Friday began all too early, with a wake-up call at 5 AM. We first flew to Istanbul, where we were met by Ates and other USIA officials. Our gear was claimed, rushed through customs processing, and loaded onto our flight to Athens. We arrived in Athens after a one and a quarter hour flight, and began working on transferring the gear to a domestic flight bound for Thessaloniki, our final destination. THIS time though, we were not as fortunate with customs. As some of the proper paperwork had not been prepared, we were held up in customs, and ended up missing our flight. Due to the Demetria Festival and the national holiday celebrations in Thessaloniki, most flights were booked solid, so we had a five hour wait at the airport before another flight was found, arriving at 7 PM. We were all in a sour mood by then, so we wisely adjourned to our hotel for a much-needed rest.

Saturday, after attending a luncheon given in our honor by Al Crocker, head of USIA-Thessaloniki, and the Demetria festival, I drove over to the State Theater to prepare for our concerts. We were to give two performances here, one today and one Monday, as Sunday was a Greek national holiday. The State was a classic European opera house, seating 800, with three balconies, the first comprised mostly of private boxes. Thick drapes and plush appointments made for nice acoustics. Power was available either stage left or right, on new European 2-pin grounded receptacles, supplying 220 volts. The sound system proved to be a Dynacord, each side consisting of two full-range boxes and a radial horn. Each box contained a 15-in. front-loaded woofer and an

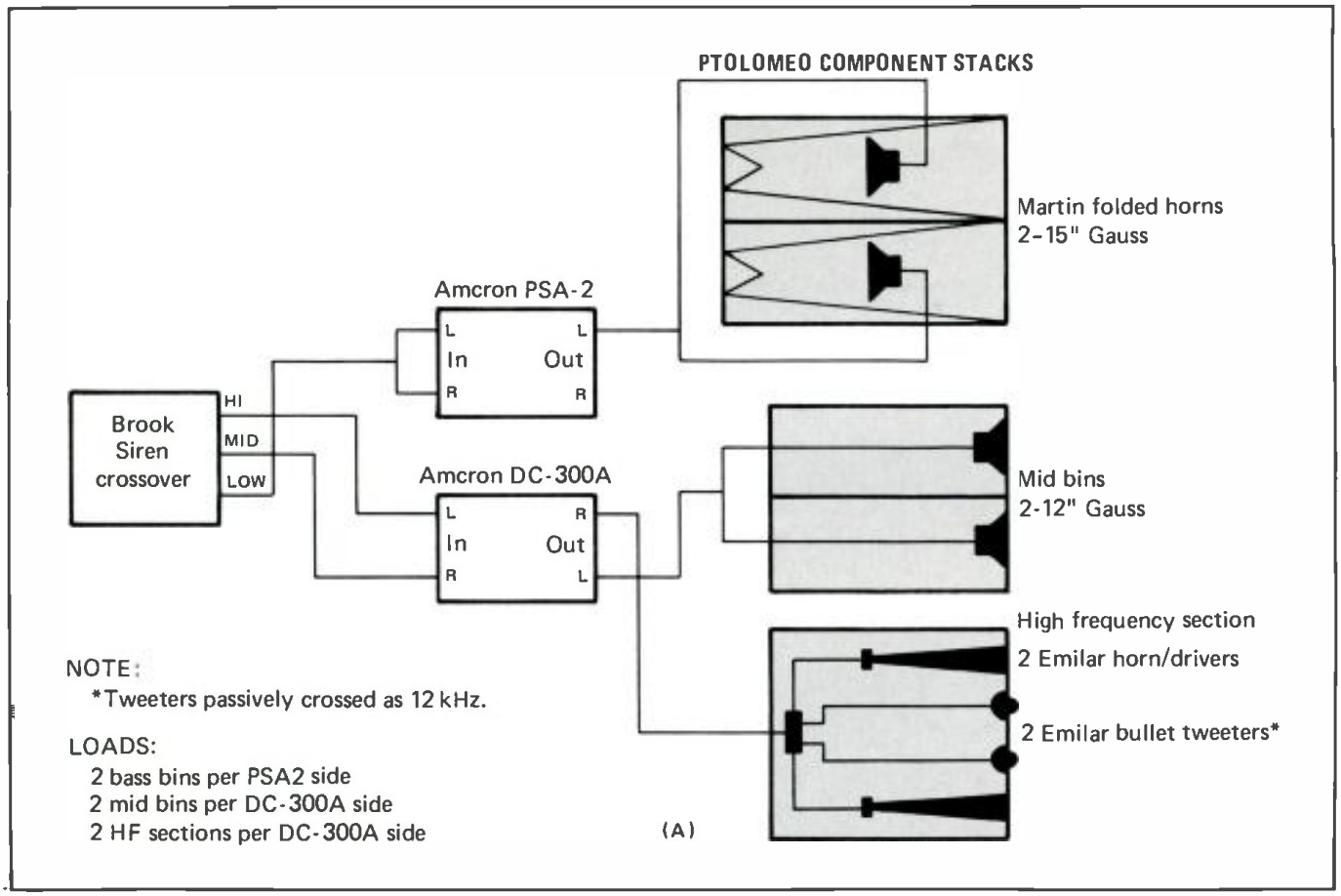


Figure A

Emilar-type midrange horn, with the extra radial panned up to cover the balconies. Buster's bass rig was a Fender Bassman amp into a Marshall four 12-in. bottom. This buzzed unmercifully, even with nothing plugged into it. As no other arrangements could be made on such short notice, he had to live with it, although he made his displeasure obvious to all concerned. I had my own problems: no seats had been pulled for a house mix point, and both concerts were totally sold out. I ended up mixing from a small corner in the back well under the balcony overhang, hardly an ideal spot. The PA buzzed horrendously when the house lights were up, but fortunately quieted down when they were dimmed. Despite these problems, our first concert was a success. The festival organizers pledged to procure a new bass amp for Buster by Monday's performance.

After a relaxing Sunday off, on Monday everyone was in better spirits. We went over to the State around 4 PM to reset our gear, and found that a new bass amp had indeed been delivered: a Fender Bandmaster Reverb that actually worked without making noise! Buster was delighted, and the evening's capacity crowd reaped the benefits. He was featured on the Miles Davis classic "All Blues," beginning with only the bass playing the melody. Buster's brilliant playing and a typically amazing Joe Henderson solo were the hits of the evening. The Demetria festival organizers were overjoyed, lauding the quartet as stars of the festival at a post-concert dinner.

MUSIC IN MADRID

Tuesday, October 30, was our day of departure for the Iberian peninsula. We arrived in Madrid, Spain, after yet

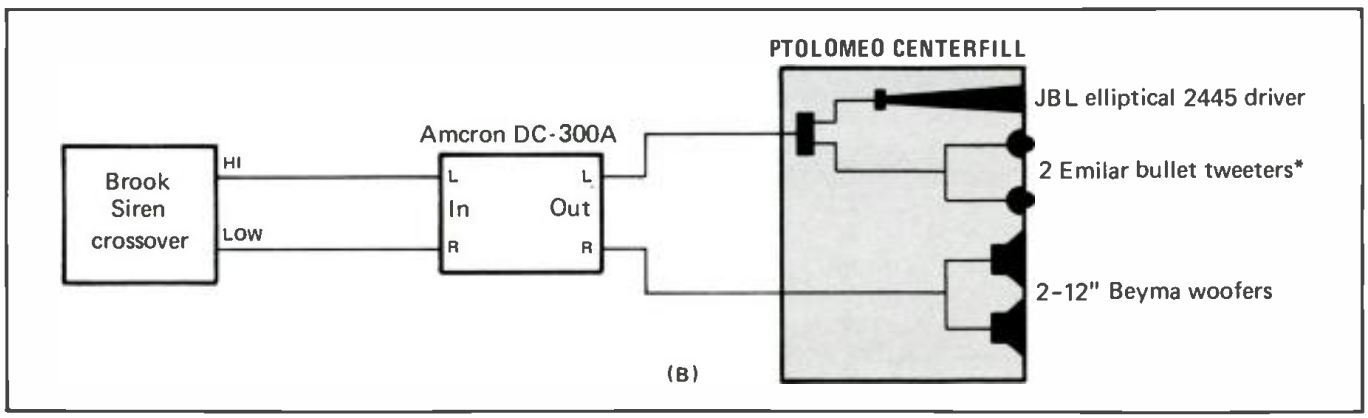


Figure 2. Ptolomeo PA system used in La Coruna.

another brief layover in Frankfurt, Germany. Our equipment was loaded onto a bus, which was to be our mode of transportation throughout Spain, and we adjourned to our hotel for check-in and a discussion of the Spanish schedule. Our concerts here were sponsored and promoted by Jose "Pepe" Rial, an independent promoter, who chaired our meeting. USIA-Spain was responsible for bringing the group to Spain and dealing with customs, nothing more; a much different arrangement than in any other country we'd visited. Among our concerts was a performance at the fifth Madrid International Jazz Festival on November 4th. After our

PA stack used in La Coruna, Spain, provided by Ptolomeo S.A.

meeting concluded, some of us took Pepe up on his invitation to dinner and a visit to the Jazz Festival, currently under way. I went along, planning to carefully study the production we'd be using in only five days when we'd make our appearance.

The Madrid Jazz Festival was held at the Palaccio de Los Deportes, a massive velodrome/sports arena seating up to 12,000. Our seats on the side were quite a distance from the stage, although a giant suspended TV screen helped viewing considerably. During performances by Ahmad Jamal and McCoy Tyner I got permission, via Pepe, to go down to the arena floor to check sound and talk to the technicians. The sound system was composed of component "stacks" placed on stage, with delay "stacks" located in key areas throughout the arena for side and rear-fill coverage. I noticed quite a few dead spots on my walk around the floor, indicating improper component focusing. I spoke briefly to the house engineer about our sound and monitor needs, and was assured they could be met. I found the house electronics package to be more than acceptable: a Midas 24 by 8 console, Klark-Teknik graphic equalizers, dbx limiting, Lexicon Prime-Time digital delay and a Crown RTA-2 analyzer. We followed this great music with a great meal and called it a night.

Wednesday, we left Madrid around 10:30 AM for the four hour drive to Leon. The venue here, the Auditorium of Caja de Ahorros, was across the street from our hotel, so after the obligatory "siesta" we went over to set up. The hall was very small, seating only 250, with a wooden ceiling and a carpeted floor. The stage was also carpeted, with a thick curtain backing the entire stage area. As a result, reverb time was very short, on the order of one half a second. The house PA proved to be four Bose 800 speakers and a Bose power amp. Power was available upstage left, on old European 2-pin ungrounded outlets. The wiring of these receptacles, however, proved most unusual. BOTH pins of the receptacle were hot, each carrying 115 volts, with no neutral or ground available on the receptacle or the conduit. After switching my transformer input to the 120 volt tap, I tied the hot input to one of the receptacle's pins, running my neutral and chassis ground to a water pipe in the men's john about 100-ft. from the stage, as this was the nearest ground I could find. After adjusting my output level, we had stable 120 volt power. A Roland Cube amplifier was provided for the bass. We had another overflow crowd that evening, with people standing anywhere they could find room. As soon as anyone left, many people would start jockeying for position—it was quite a scene. Joe played a stunning cadenza on "Stella By Starlight" that had Joanne, Buster, and Billy applauding along with the audience! After the show, we enjoyed a late dinner before adjourning to pack for tomorrow's trip to La Coruna via Santiago de Compostela.

LA CORUNA

After eight hour's travel in the bus Thursday, we were all quite glad to finally reach La Coruna. Friday's concert here was at the Teatro Rosalia de Castro. This theater, an old opera house, seated 1,100 in a main-floor area encircled by four balconies, the uppermost being very deep in the back. The main floor was carpeted, and drapes hung thickly from walls and box seats. The painted plaster ceiling and enormous height of the hall conspired to create a wonderful live reverb, tempered perfectly by the absorptive surfaces. Without question, it had the finest acoustics of the tour. A Peavey Centurion bass head with a dual 15-in. bottom was leased for Buster to use at the next two concerts. The PA was provided by Ptolomeo S.A., out of Madrid. Ptolomeo was one of Spain's major national sound companies, handling domestic tours for Julio Iglesias, among others. They provided sound for the Madrid Jazz Festival, and would provide a complete sound system for our next two concerts, La Coruna and Lugo; I wouldn't have to set up any of my gear. I immediately contacted Francisco, the Ptolomeo house engineer, to discuss the stage plot. He spoke English fluently, and we established an immediate rapport. Due to the live nature of the hall, he'd brought in much less PA than he planned on using in Lugo. Due to the live response of the hall, I elected to minimally mic the drums, allowing the excellent acoustics and the intimate seating arrangements to enhance projection. Francisco concurred: we used a PZM on the kick and two AKG D-224Es

for overheads. We also used his Sennheiser 421s for sax and low piano. The only problem I encountered was in getting two monitor mixes: the console had two monitor outputs, but there was only one channel of EQ available for monitors. With the level and balance I used for Billy and Buster's mix, I felt confident I could run their monitors flat without feedback. After a quick level check, we were ready for the show. Spain continued to treat us well: another full house that greeted the music with rapt attention and appreciative applause. Acoustics were additionally enhanced by the capacity crowd: mixing under these conditions was a total pleasure, and I was able to do exactly what I wanted with the sound. Joanne played an evocative solo piano piece with frequent flamenco allusions; it was a show-stopper. After the show, Francisco and I conferred about tomorrow's gig in Lugo, discussing mic selection and placement; he'd have all mics and monitors set when I got there.

Saturday's drive to Lugo took about two and one half hours due to hilly terrain, twisty roads, and slow-moving trucks. Lugo's Palacio de Deportes was a 3,000 seat basketball arena, shaped like a college fieldhouse. With all the hardwood and concrete surfaces, acoustics were predictably dreadful. Reverb time was around two and one half seconds, so keeping volume low in the house was the order of the day. Mic'ing was identical to La Coruna with the addition of a Sennheiser 421 as a snare/hat mic. After sound check, Francisco and I wandered off to a private dressing room to relax. As engineers inevitably do, we immediately started talking shop. Francisco had been to the US, studying sound engineering at the College of Recording Arts and Sciences in San Francisco. After comparing salaries and work loads, he discussed Ptolomeo's PA.

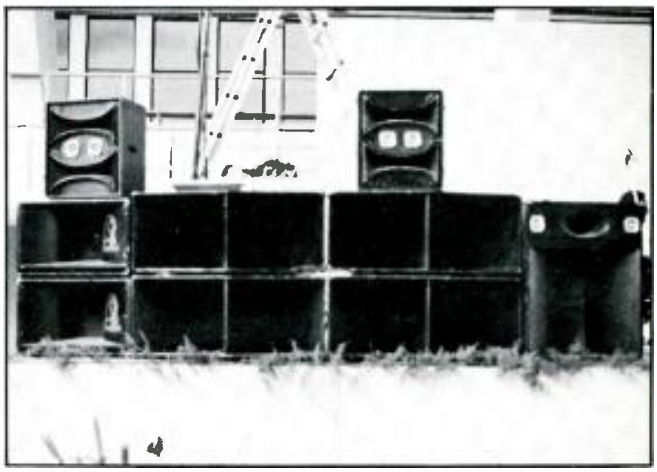
The system contained two component parts: the main PA and center fill. Only the main stacks had been used in La Coruna; both were used here due to the width of the seating area. FIGURE 2 illustrates both systems.

Crossover frequencies used were 250 Hz and 2,500 Hz on the main, and 2,500 Hz on the centerfill. Unlike some US companies, Ptolomeo had their crossovers on stage, in racks with the power amps. The house console was a Soundcraft 1S 20-input console, with two MXR 1/3-octave graphic equalizers for house EQ and Joe/Joanne's monitor EQ. The monitor mix for Billy/Buster was run flat, as before. We only had about one third of a house, a younger audience that responded well to the up-tempo numbers but talked throughout the ballads. I tried to keep the volume down, yet it was a constant struggle with echo all night. After packing up and enjoying a late dinner, we began a two and one half hour drive to Santiago de Compostela. After dropping us at our hotel, the bus departed for Madrid; we'd follow by plane tomorrow.

BACK FOR MORE IN MADRID

Sunday proved to be a very cold and rainy day, but that didn't prevent us from making our fifty minute flight from Santiago to Madrid. Upon arrival at our Madrid hotel, I phoned Pepe to confirm sound check times, and received interesting news: the evening's billing had been changed. We would now play second and Stan Getz would close the show. I would have to wait for Stan's setup and soundcheck before doing mine. Billy and I elected to go over to the hall at 4:30 PM to observe the proceedings, giving me another chance to more carefully investigate Ptolomeo's large system during Stan's sound check. This took more than an hour, as Stan wasn't happy about the sound, and made sure everyone knew about it. On my walks around the main floor, I noticed a distinct lack of midrange, especially lower mids, and a tinny quality to the highs, as well as numerous high-end dead spots. The PA configuration had much to do with this. There were only four Ptolomeo 12-in. mid cabinets to match the eight Martin 15-in. bass bins and six radial horns per side, a stack numerically deficient in midrange components. Several of the radial horns were placed adjacent to each other in the same horizontal plane, creating the dropouts I'd heard due to cancellation. By the time Stan finished, there were only thirty minutes left before doors opened; I'd anticipated this, and had already phoned Joanne to blow off a formal sound check. Billy was set up offstage, so we positioned his drums and did a piano/drum check in only ten minutes, which immediately endeared us to the production manager and stage crew. I spoke with Hernando, the house engineer, about our layout and monitor needs. As the opening act would also use the same instruments and basic placement as Joanne, I could use existing mics and board settings for sax, piano, and bass, needing only to restore my drum settings to be prepared for the show. I'd changed two mics, using my PZMs for kick drum and high piano, as I always did. The piano was mic'ed with two Sennheiser 421s and one AKG-224E; I taped my PZM to the side, needing only to plug the cord from the AKG into the PZM power pack to switch. Assured of a rapid changeover, I stayed behind to catch the show while Billy returned to the hotel to change and get the rest of the group.

Attendance for the Madrid Jazz Festival had been



Ptolomeo PA used in Lugo, Spain.

spotty, but a crowd of over 8,000 was present for Sunday's concert, drawn by the appearance of Joanne and Stan Getz. Our setup was handled quickly and easily; I even had time to leisurely walk through the monitors, helping achieve the proper balance on the four mixes I'd asked for. Once the show began, I quickly went to work on touching up instrument tone. To compensate for the reduced midrange response, I boosted low mids slightly on the piano and sax channels to get some warmth. This, and the use of my PZM, gave me a superior piano sound that sounded lovely and blended well with the rhythm section. I rolled a bit of high end off the sax to try and minimize the bite caused by the overlapping radial horns. The group was really turned on by the large audience, and played fantastic, but Joe was interstellar! Some had billed the evening as a "tenor duel" between Stan and Joe,

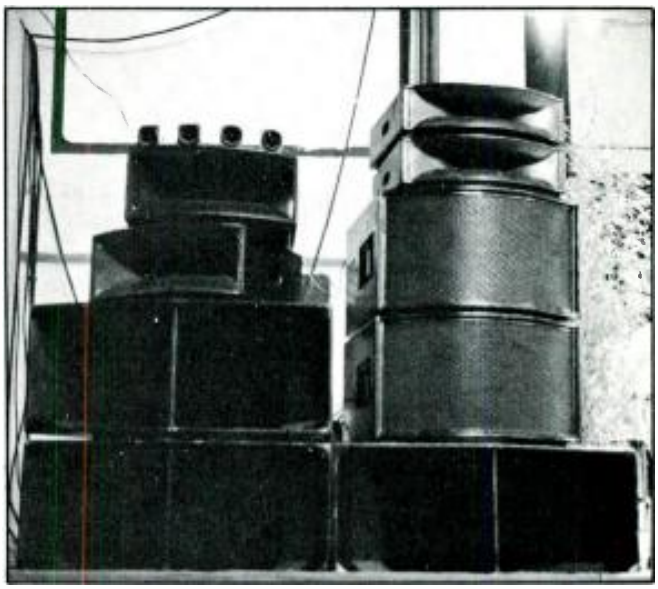
giants of the instrument. If so, Joe was taking no prisoners. His soloing was so immense that on several occasions the rest of the group stopped playing, letting him take off on his own. Billy also got into the spirit of things, playing an inspired drum solo. We played well over our 90-minute limit, and, after leaving the stage to a thunderous ovation, the production manager gleefully allowed us a fifteen minute encore, which meant Stan's set would start late. Our positive vibe during sound check had the production staff in our corner, resulting in extra performance time for the band. A helpful, cooperative attitude during setup can reap benefits later.

Charged by the encore, the energy continued to flow back in the dressing room, where the group entertained a crowd of fans and fellow musicians who were eager to chat and pay respects. For background music, we played the tape I'd made off the house PA output. Due to the size of the hall, I'd finally been able to fully "mix" the band in a situation where stage sound was not a factor. I got a lot of compliments on my balance, but it was the house piano and tenor sax sounds that I was most asked about: both the musicians and technicians present found them exceptional. Use of my PZM on the piano proved to be a definite advantage over an AKG-224E, but it was my input EQ that made the final difference. Due to the increase in low mids, my sounds contained the warmth that was missing from EVERYTHING due to the PA component disparity and phasing problems. Under normal circumstances, I'd never need to use EQ boost so drastically. However, at many large multiple-event festivals such as Madrid Jazz, access to the house graphic EQ, let alone input to decisions on PA configuration, are not available to the touring engineers present. Channel EQ can become an available tool to compensate for PA deficiencies.

The warm hospitality and adulation carried over to the after-concert festivities, involving jam sessions at various clubs in and around Madrid: these featured musicians from the Festival and top local players. The music continued throughout the night, with attendant partying. Fortunately, our flight to Portugal was scheduled for 4:10 PM Monday, by which time we'd recuperated from revelry. USIA saw to a quick transmit through Spanish customs, and we landed in Lisbon at 4:15 PM: not a miracle, a time change. Wally Keiderling, USIA cultural affairs officer, and his staff met us and soon had us relaxing at our hotel. At an informal briefing that evening, I had a chance to confirm PA arrangements with Wally, as well as get a full description of each venue; he was intimately familiar with each. All inter-country travel was to be done by bus, and our longest drive was the next day's four and one half hours to Coimbra.

THE COIMBRA CONNECTION

Tuesday, November 6, began early with a press interview/breakfast scheduled for all of us; I spoke on the group's technical requirements and the gear we were carrying. We left Lisbon around noon, arriving in Coimbra around 5 PM. After dropping the band at the hotel, Wally and I went over to Coimbra University to set up. The evening's venue, the Teatro Gil Vicente, was a rectangular theatre seating 900, 300 in a balcony. The seating area was carpeted, but the wood-paneled walls and ceiling contributed to a reverb time of about one and one half seconds. My PA (per side) was a Perkins cabinet with a 15-in. woofer for bass, a 15-in. woofer in a slit radiator for mids, and a high-frequency section consisting of a small JBL diffraction horn and a small radial multicell. Neither the power amps nor the crossover had any brand names; they looked hand-built. Power was available stage left, on new European 2-pin grounded receptacles, providing 220 volts. The grounds on these receptacles proved to be non-functional, so I hooked my ground wire to a water pipe adjacent to the house power panel. Powering up, I found the PA to be incredibly thin. On closer investigation, I found the cause to be the crossover gain settings: all were at equal volume, with no compensation for the greater efficiency of the high end. By setting the bass seventy five percent hotter than the highs and the mids twenty five percent hotter, then attenuating some 1-2 kHz on my house graphic, I was able to achieve much smoother response. Buster's amp was another mystery, a generic Marshall copy



PA stack used for the Caiscais International Jazz Festival in Estoril, Portugal.

powering a single front-loaded 15-in. woofer. Our concert here was well received by the largely student audience, who seemed familiar with jazz and appreciative of fine musicianship. There was plenty of student labor available, so the strike went quickly and we had time to fully enjoy a dinner in our honor, sponsored by the students cultural organization.

Things now began to run at a more leisurely pace as we approached the end of our long trip. We enjoyed Wednesday and Thursday off, and played a special concert at the home of the US Ambassador to Portugal, H. Allen Holmes, on Friday. As this concert was held in the Ambassador's living room to an invitation only audience of seventy five, there was no need for any PA or monitoring equipment, just a small amp for Buster's bass. I enjoyed a rare concert as a spectator, and appreciated the excellent cuisine and an opportunity to rub elbows with some of Portugal's most influential citizens.

A HEADLINING PREMIERE

Saturday was our scheduled performance at the fourteenth Caiscais International Jazz Festival, one of the premiere jazz festivals of Europe. We were the headline act for the evening, so we elected to sound check at 4 PM and leave our stage gear set. The Festival site was the Salesianos Pavillion, located in Estoril. This was a long

rectangular hall seating 3,000, including floor seating. Built as a basketball arena, the wood floor, concrete walls and metal ceiling made for an acoustical nightmare, with a reverb time of close to three seconds. The PA was provided by Musismo out of Lisbon. The stacks were comprised of Martin and JBL components, with power from Hafler and Crest amps. There was an Allen+Heath 24 by 4 in the house, a Studiomaster 20 by 8 on the monitors. Mics were Sennheiser 421s and Shure 548s and SM-58s. Buster used a Walter Woods bass amp into a 12-in. front-loaded cabinet. The Festival was being videotaped—there were plenty of extra TV lights and two large video production trucks outside. This could have been responsible for the nasty buzz eminating from the PA. I spoke to the sound technicians and the stage manager, and was told the buzz had been there all during the festival, and no one knew how to get rid of it. I decided to concentrate on sound check and try to deal with the buzz later. I again elected to use my PZM on the piano instead of a Shure 548, keeping a 421 on the lows. I also used another PZM on the kick drum. The empty hall sounded horrendous: I found that by keeping drums and bass turned off in the house I was able to get some reasonable definition on piano and sax. Hopefully, a full house would allow me to sneak these back into the mix, but it was obvious that keeping house volume low would

Joanne, Buster and Billy on stage at the Jazz Festival.

be the key to good sound here. Several members of the Portugese All-Stars, the opening act, hung out by the console while I sound checked, stopping me to talk about the sound before I left. Apparently, the sound company had been using a real rock 'n roll approach to mixing, cranking drums and bass to the detriment of everything else. I had gone in a different direction, and they preferred it. I also consented to let them use my PZM, as the piano sound had suddenly improved one hundred percent with its addition. I then got together with the stage manager about the buzz: I suggested that the ground for the sound system be changed to a different point, and the hots of the PA power distribution be changed to a phase that wasn't shared with video or lights, if possible. Our check complete, we all adjourned to the hotel to relax and enjoy dinner.

I returned to the hall early to catch the All-Stars and walk the hall. There were numerous sound problems, most noticeably frequent feedback and that obnoxious buzz. During our set change, I tried to minimize both. The production manager came over to confirm my instructions re: power, and informed me they would cut power to the PA and stage to make the change. This was done, with encouraging results: the buzz, while not completely gone, had been reduced seventy five percent, so we would be the first act to enjoy reasonable freedom from extraneous noise. I carefully walked through the four monitor mixes, informing the monitor engineer that I wanted the volume kept low so as to avoid feedback. The place was totally packed for the evening's show, and all the bodies did improve the acoustics enough so I could restore a bit of drums and bass to the mix. The crowd was primed for Joanne's quartet, and each number was completed to wild applause. Again, Joe contributed some massive sax solos, and Joanne played an impassioned solo piano piece that brought the crowd to its feet.

Sunday's bus ride to Evora took about three and one half hours. The Teatro Garcia De Rezende was an old opera house with four balconies, seating 750. The balconies contained only private boxes, so there would not be a lot of people up there for the performance. Acoustics were quite nice: a one second reverb time due to the plush seating and carpeting. Power was available stage left, on old European 2-pin ungrounded receptacles. I acquired a ground from a water pipe offstage left. Power was 220 volts; I noticed about 2 volts on the neutral, but this didn't seem to cause any real problems. The PA (per side) consisted of two cabinets: a 15-in. woofer in a folded horn and a high frequency section. The high cabinet was a Furnacio Compact 350 with an on-board power amp and crossover network, containing one 12-in. speaker, a multicell horn, and two tweeters. There was another large Furnacio power amp for the folded horns; total system power was purported to be 600 watts. The bass amp was a Farfisa top and a bottom with four 10-in. speakers which, predictably, didn't have much bass response. I was again obliged to run Buster's level in the monitors higher to compensate. We had another full house, and the audience was treated to a great performance, as the band wanted to make the last performance a good one. There was one surprise at the concert's close: Joanne called me up to the stage to take a bow, and the musicians applauded for me along with the audience. It was their way of thanking me for a job well done.

OUR RETURN TO LISBON

We returned to Lisbon on Monday, where the band gave a workshop at the Hot Club, the premiere jazz club of Lisbon, which was packed with many local musicians eager for tips on the art of jazz. Wally hosted a great farewell dinner, with the joking and telling of tour stories that was common at group outings. Tuesday, November 13, found us on our way back home via London. The tour proved as rewarding as I'd expected, and the music was frequently beyond description. And I'd made four new friends: Buster, always cracking jokes; Joe, band philosopher and funk fan; Billy, always smiling and perpetually positive about life; Joanne, who loved to dance and make music. We parted with a promise to stay in touch and work together again in the future. As this all-star group was comprised of four legitimate bandleaders, I felt confident more work would be forthcoming. My feelings were confirmed in an oblique manner: due to a personal recommendation from Billy, I was asked to accompany the Jay Hoggard Quintet on a USIA tour of North Africa, the Middle East, and India in early 1985. ■

JAMES CORONA

Profile: Howard Schwartz Studio

Bagels in a state-of-the-art recording studio? On the East side?? Come along for a whirlwind tour of a studio that spent the last ten years not following all the rules!

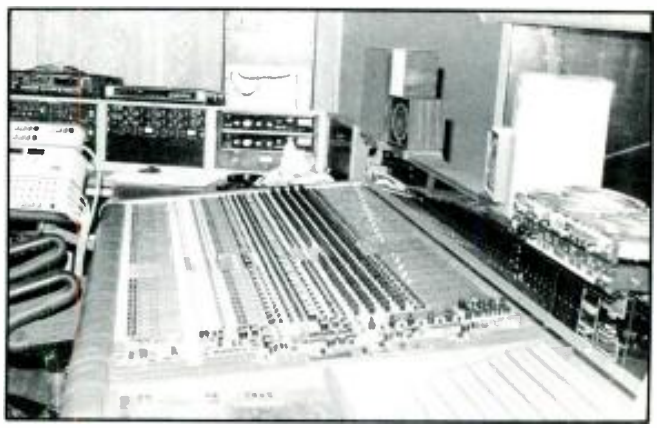
FORTY-THIRD AND LEX? Certainly not the norm for locating a recording studio when all the artists are on the West side. But, to contemplate for a second where the ideal location for a studio performing unparalleled advertising, television, film and video work with a staff as competent as the finished product, one could conclude that an insightful gentlemen named Howard Schwartz has gone a step further than contemplation.

db recently visited Howard Schwartz Studios in NY to see why the major networks, record companies, ad agencies and film studios continually return to this studio on 'the other side of town.'

As we entered the building, I had a weird feeling that I was not on my way to a recording studio, probably because I was standing in a lobby filled with people in suits. My subconscious reminded me that if I was indeed on my way to a studio, I would be in a freight elevator with a Swahili janitor telling me in his native tongue that I would have to walk down because this was the last trip of the day. With this in mind I cringed when I saw the studio was on the 19th floor.

James Corona is a freelance writer and former Technical Editor of db *magazine.*

As I walked into Suite 1934, I thought that maybe this wasn't the actual location, that this was just a support office. Well this was indeed the office for HSS, but as I waited for my contact, studio manager Michael Laskow, to arrive I had determined that I was in the busiest studio lobby around.



Accessory equipment lines racks to the left of the console.

A closeup of the equipment rack.

The back wall is lined with tape decks. The 24-track unit is out of sight further left.

Before my appointment, I was reading some literature written about the studio some years ago. It seems that prior to the fall of 1979, Howard Schwartz Studios were already commanding a very large percentage of the major network's jingles. However, the studio was so busy that they were turning down almost half as many gigs as they were handling each day. So rather than turning down clients that had already been sold on the studios capabilities, Howard contacted a design firm, Sugarloaf, in order to accommodate his dedicated clients. And, after working out the details, the new studio was complete.

FAMILIAR AROMA?

While sitting in the reception area, I was overcome with one of NY's cherished aromas,—BAGELS! Then I saw an ad for the studio, "Howard Schwartz offers his clients Bagels & ..." The ...was a printed list of pertinent services, equipment and formats that are always available. The bagel thing may seem quite superfluous to some but this particular studio probably does more sessions before 10 am than most and a fresh bagel can mean the difference between a grouchy producer and a content one.

When Mike Laskow first walked out of his office, I knew he was the studio manager because twice he turned right around and went back into his office for an important call. When he returned he smiled and threw up his hands this time determined to begin the interview.

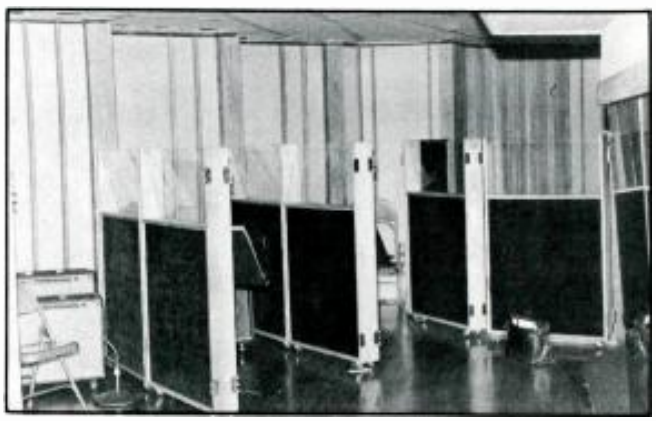
Because there were sessions in progress, we did not go into every studio in the facility, however, we did view both Studio East and Studio West.

When we entered Studio East, they were preparing for a mix session for the TV program, "Lifestyles of the Rich and Famous." I was informed that East is one of the hottest audio for video production rooms in the states and all the proof necessary is a growing client list with all clients happy to pay whatever the hourly rate may be. As we entered Studio East's reception area, Mr. Laskow and myself were discussing some of the customized equipment that has made this room so special. One such component was the EECO synchronizer. It was customized for the purpose of sync-ing up three machines simultaneously, such as video scratch-audio master-video master. This in itself is a major attraction because of the time reduction.

HIGH EFFICIENCY

Efficiency is the foundation of this studio and you readers know that even more important than speed and accuracy is maintenance. Howard Schwartz Studios pride themselves on the high degree of maintenance that they possess. The maintenance engineers, Daniel Zellman and Martin Newman are as professional as they come and have this studio continually running with minimum down time. This is not as monumental a task at any given moment because they are all over this studio after each session to see that the smooth operation is sustained. I noticed upon entering the control room that there were

The console overlooks the studio and has monitors above.



Small, adjustable booths line the entrance.

The Howard Schwartz Recording Studios is equipped with a wide range of state-of-the-art equipment. This list is up to date as of the time of this writing (7/85). The studio is in the process of replacing and upgrading some of their old equipment. [This is only a partial listing.]

CONSOLES

MCI JH-538 and JH-556 consoles, fully automated with Spectra-View and 12 echo returns.
MCI-400 consoles, in radio production rooms.
Sound Workshop Series 30.
[Some of the studio's consoles are being replaced by Neve or Solid State Logic consoles in the future.]

TAPE MACHINES

MCI JH-24 tape machines in all control rooms.
[Some of the studio's tape machines are to be replaced by Studer tape machines and the studio plans to offer digital recording in the near future.]
Scully and Revox ¼-track machines as well as a full array of 2-, 4-, 8-, and 16-track machines are also available.
Magnafax high speed dubbers.

VIDEO and FILM EQUIPMENT

NEC TT 7000 1-in. videorecorder with TBC.
Tektronic Vector Scope waveform monitors.
JVC 8250 ¾-in. video cassette recorder.
Modified EECO MQS/100A synchronizer with ports and events delegation.
Grass Valley Video Distribution system.
Videotek and Sony video monitors.
Magnatech film dubber.

MONITOR SPEAKERS

UREI 813s
Visoniks
Auratones
MDM4s
JBL 4311s

AMPLIFIERS

A full selection of Crown, MacIntosh, and Sound 80 amps.

OUTBOARD EQUIPMENT

Lexicon 224
Lexicon Prime Time digital delay
Lexicon Delta T
EMT 140 and 250 plates
Eventide Harmonizer
Eventide Phaser
EXR Exciter
dbx and Dolby noise reduction
Studer phone patch
Pultec, Orban, Trident, A.D.R., and Valley People equalizers.

MICROPHONES

Large selection of mics including Neumann, AKG, Electro-Voice, Sennheiser, Sony, Shure, and Telefunken.

INSTRUMENTS

Steinway 9-ft. Grand Piano
Fender Rhodes 88
Yamaha Recording Series drum kit
Various guitar and bass amps.

The drum booth is at the back of the studio.

small pre-printed decals attached to each piece of equipment and on these stickers was information relative to alignment report, date, technical engineer and tape speed to name a few. The interesting thing was that everywhere I looked throughout the visit, I found that the last date indicated was never more than three days. Pretty good considering this was a Monday morning. This studio is also known for customizing a large majority of its equipment which requires serious electronic know-how especially when you're opening up a 24-track tape machine.

During the tour I met maintenance engineer, Dan Zellman and briefly discussed some of the things he's personally involved in at the studio. He first mentioned the endless preventative maintenance schedule. Then he discussed new equipment and the procedure involved before it even gets considered for purchase. This means that sometimes a trip to the manufacturer and discussion with their design engineers is in order.

I noticed during this discussion a reel of Agfa PEM 469 2-in. tape and asked why the studio chose Agfa. Well, both he and Michael grinned and said because they couldn't find anything wrong with it. This struck me very strange and I probed further. It seems they got a call from Agfa asking if they would 'just give it a try.' which they did. I was then informed that they made their best attempt to find the smallest error in the recordings and analysis. It seems that not only did they not succeed but they found that this tape out-performed the brand they were presently using. Needless to say the new tape coming into Howard Schwartz Studios is Agfa PEM 469.

As my visit at this fined tuned studio concluded, I had the opportunity to meet the man responsible for this fine-tuned studio. I asked Howard Schwartz if he would like to make a comment or suggestion and he said his primary concern was for the client's satisfaction. I then asked him if any new equipment was on the drawing board and he said, "Technology does not replace effective, maintained, working equipment."

I imagine that a number of studio owners feel the same way about their studios. And rightfully so. ■

CHANNA IDOR

Piano From A Trash Can

Follow a Steinway Grand on its long journey, starting in Long Island City, NY, nearly 100 years ago, and finishing up as a beautiful salute to artistry.

THE TENANTS of the apartment house in Tel Aviv's prestigious residential area rubbed their eyes in disbelief as they watched a white and gold "unidentified object" being raised to the top floor, while almost touching their balcony railings. Could it be a royal bed, asked one of the neighbors? But only the Kreiner family was not surprised; they were very excited at that moment, after waiting 8½ years to bring this white object to their home.

For many years it was a broken, dilapidated, shade of its former self, a Steinway grand piano. It had stood in a corner of an elementary school in southern Tel Aviv, where nobody knew from where it had come, or how it had arrived at that school. They only knew, or perhaps guessed, that somewhere, in its better days, this had been a beautiful grand piano in the United States.

The school principal wanted to get rid of this rusty, ecological nuisance. The instrument was offered for free to various piano tuners, but none of them was even ready to pay the expenses involved in transporting this broken piano. Just before they decided to get rid of it by sending it to a junk yard, Nathan Kreiner, a wellknown Tel Aviv musical instrument dealer, happened to be around, and set his eyes on the piano for the first time.

"I saw the instrument, and I knew that I had to take it. I had a strange feeling that this instrument was something extraordinary, a unique piano. It is difficult for me to explain the feeling which I had when I saw that piano for

Originally published on July 8, 1983 by the Ma'Ariv newspaper in Tel Aviv, Israel.

the first time. Perhaps I was enchanted by the remnants of the woodwork in various parts of the piano, although in each leg three out of four corners were broken. Everything was falling to pieces, the action was completely shattered, the keyboard was broken, and the soundboard had ten cracks in it. The wrestpins were all loose, and rusty. Everybody laughed at me, even the piano tuners called me an idiot."

His wife, Dalia, knew that when Nathan wants something, nothing will stand in his way. "When I opened the music store, Ron-Bah, my friends thought that I would not be able to support my wife. They advised me to open a shoe store, or a clothing store, but I knew that I couldn't live doing something which I didn't like," Nathan said.

In his youth he studied piano with the well known

pianist Prof. Rudiakov, and theory with Prof. Boscovich, the composer. Nathan was a fine pianist. But when he was 16 years old, in 1948, his brother was killed in the war of independence, and that was the end of Nathan's promising musical career.

"For about two years I didn't have the courage to touch the piano. It was put away in my store's workshop. One day Semyon Levker, an immigrant from Russia, and a second generation piano builder, came to me after seeing the piano and being as fascinated by it as I was. "I wanted to rebuild the piano, and I do not care about money, it doesn't matter," Levker said. Every day, at 6 am, Nathan and Semyon met at the workshop to start the impossible task of reconstruction. An old Bechstein soundboard, which Semyon had brought with him from Russia (as if it were a precious jewel) was used to repair the cracks in the original soundboard made by its competitor. The action was hopeless. They had no choice, but order a new action, based on the exact measurements of the old one. The Steinway Company in Hamburg, and the Renner Company—which specializes in the construction of piano actions—agreed to do the job. They had to put an expert on the job to measure the various parts, and to build everything anew. This lasted more than three years.

However, when the new action arrived, Nathan Kreiner wasn't sure whether a new piano would emerge out of all that work. "Only after the strings were set in place, I felt that I had a magnificent instrument," says Nathan while stroking the piano with a look of a man enraptured. He was so concerned about the instrument which took 8½ years of his life that, when the big day arrived to move the piano from the workshop to his apartment, Nathan preferred to close himself in his shop rather than witness how they moved his "baby" and how it would land on the balcony, transported by a crane. "The piano landed in our apartment a Zeppelin," Dalia comments with humor. Only when it stood on its legs, in all its beauty, did she dare call her husband and notify him: "It is here!"

"I am entranced when I hear the sound which comes from the piano," says the 1983 Israeli-style Pygmalion. And just to prove that well known and more objective pianists than Nathan Kreiner were electrified by the sound of the grand Steinway, he takes out a pack of "testimonials": "I played this extraordinary and magnificent piano. It has a unique tone—the first American piano to possess a German soul," wrote the Israeli pianist Ruth Menze. "I must tell you that very seldom do you come across such a beautiful instrument. There couldn't be anything better," commented leading Israeli pianist Jonathan Kak. "Your white Steinway is worth its weight in gold," enthused Dr. Chanan Winternitz.

However, this is not the end of the story. In the process of reconstructing the piano, Nathan Kreiner was curious about its origins and history. "I have never seen a soundboard made out of such superior wood," commented Semyon. "My guess is that the piano was built for someone very important." But Nathan was restless, trying to find the origin of the piano. As an avid collector of paintings, old Judaica books, sacred objects which were passed from generation to generation, and practically every item which has a history, Nathan continued to search into the piano's background. When he met representatives of the Steinway company at a conference in Frankfort a few years ago, he showed them a picture of the still broken piano, and asked them to verify its origin by the serial number. Their answer was that: "We found in our records that the instrument was built in 1887, and that on Dec. 5, 1887, it was delivered to a very respectable resident of New York City, who had served in the past as the mayor of the city."

Nathan Kreiner's curiosity was just intensified, because he was now running after additional details. Only after two years did he receive additional information from the company indicating that originally it had been a black piano, but that a New York company called Hurts had refinished it in white enamel, and decorated it with elaborate gold ornamentation, as requested by the ex-mayor of New York, the honorable Edward Cooper.

Recently, Nathan Kreiner wanted to lend the reconstructed piano to the Tel Aviv Museum, so that it would be the center of a concert season, but he has not received a reply to his proposal. It was suggested that the well known pianist and entertainer Victor Borge use the piano on his visit to Israel for a fund-raising campaign for the Diaspora Museum. But, probably due to a misunderstanding, Victor Borge was under the impression that the offer pertained to an "antique" 100 years old, and, preferring to be on the safe side, he chose to play on a new piano. After his performance, Victor Borge dropped in to have a look at the three-legged "white elephant." He played on it and could not take himself away from it, he was so enchanted by the piano.

Now that this unique and magnificent piano, the only one of its kind in the world, has arrived at its destination—the Kreiner's living room—the Kreiners have only one wish: that many pianists will come and play on it! ■

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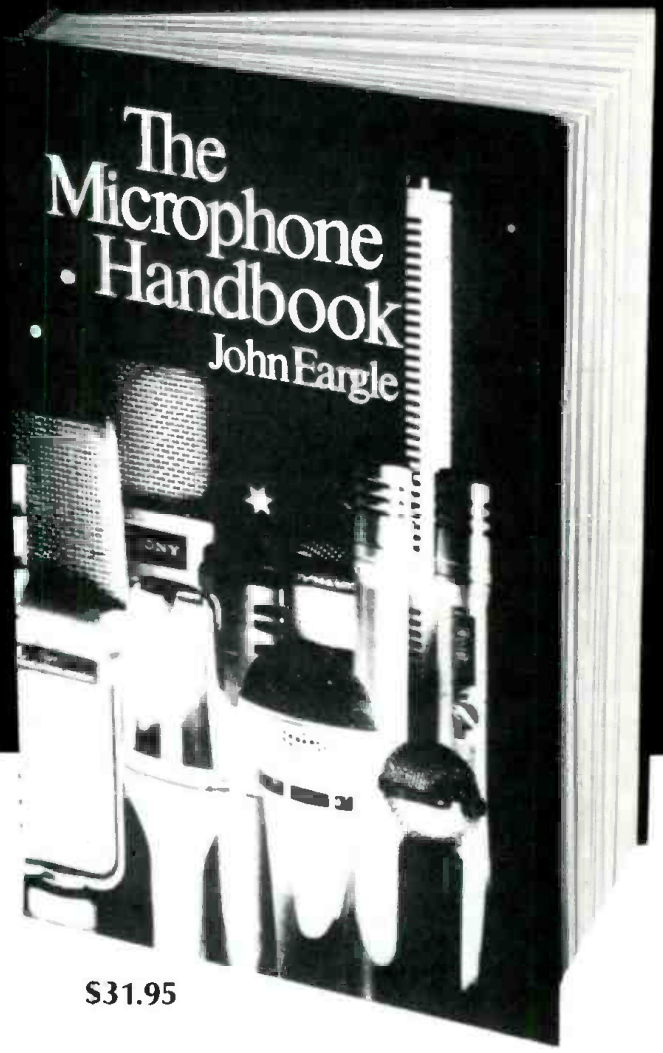

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New Northeast Studio is a Dream

Acoustic Spaces and KDP Engineering have just completed installation of **Dreamland Recording Studios** near Woodstock, NY. In collaboration with BIJA Productions, Dreamland will offer a full range of services. David Vercelletto's comprehensive design utilizes innovative construction techniques, creates a perfect controlled environment for Dreamland's Automated 40-input API console with Allison 65-K Mixdown Computer. Other features of the 800 square foot lead shielded studio/control room are extensive wiring and patchbay versatility, video and telecommunication links to each room and entire facility, complete acoustical and structural isolation and pressure controlled ISO and Air Lock. Equipment features will include: Studer A-80 and MCI JH-24, both synchronized to a BTX Shadow System, McIntosh MC 2500, Crown, BGW, and AB amplifiers. Monitors include UREI 813, Ed Long TA3, Yamaha NS-10, JBL 4333B, and Auratone. An extensive list of outboard equipment is available on request. Adjacent to the rooms is a 40 by 45-foot ambient room. Dreamland affords a comfortable, productive atmosphere set in an 1890's renovated church. Rehearsal space will also be available and the studio will soon be video ready. Dreamland can be reached at PO Box 884, Woodstock, NY, 12498.

Sony Directs Public

Sony Professional Audio Products Division has published a US studio directory designed to aid members of the production community interested in digital audio. The guide includes info on all US facilities equipped with Sony's PCM-3324 digital multitrack recorder.

Underwater Acoustics Course

A short course on **Underwater Acoustics and Signal Processing** will be held on October 21-25 at the Pennsylvania State University. The course is designed to provide a broad, comprehensive introduction to important topics in underwater acoustics and signal processing. The primary goal is to give participants a practical understanding of fundamental concepts, along with an appreciation of current research and development activities. Included among the topics covered are: an introduction to Acoustic and Sonar Concepts; Transducers and Arrays, and Turbulent and Cavitation Noise; an extensive overview of Sound Propagation Modeling and Measurement Techniques; a physical description of the Environment Factors affecting deep and shallow water acoustics; a practical guide to Sonar Electronics; and a tutorial review of Analog and Digital Signal Processing Techniques and Active Echo Location Developments. Each of the ten instructors contributing to this course is actively involved in both the theoretical and practical aspects of the materials he or she will present and will be happy to confer on individual questions or problems. Each participant will receive, for his retention, a bound set of lecture notes and three texts. Further info may be obtained by contacting Alan D. Stuart, Course Chairman at the Applied Research Lab at Penn State University at (814) 865-7505.

RCA Launches in Late '85

The first high power Ku-band satellites in RCA's new generation of communications spacecraft will be launched late this year aboard the Space Shuttle from NASA's Kennedy Space Center in Florida. The satellites are designed and built for RCA American Communications Inc. by RCA Astro-Electronics Division. Known as the Series 400 spacecraft, the satellites operate at a higher frequency than their C-band predecessors. The Ku-band communications network will include four satellites—three in orbit and a ground spare. Each spacecraft will have 16 channels operating at 45 watts in the 14/12 GHz band. Each satellite will provide coverage of Hawaii via spot beam.

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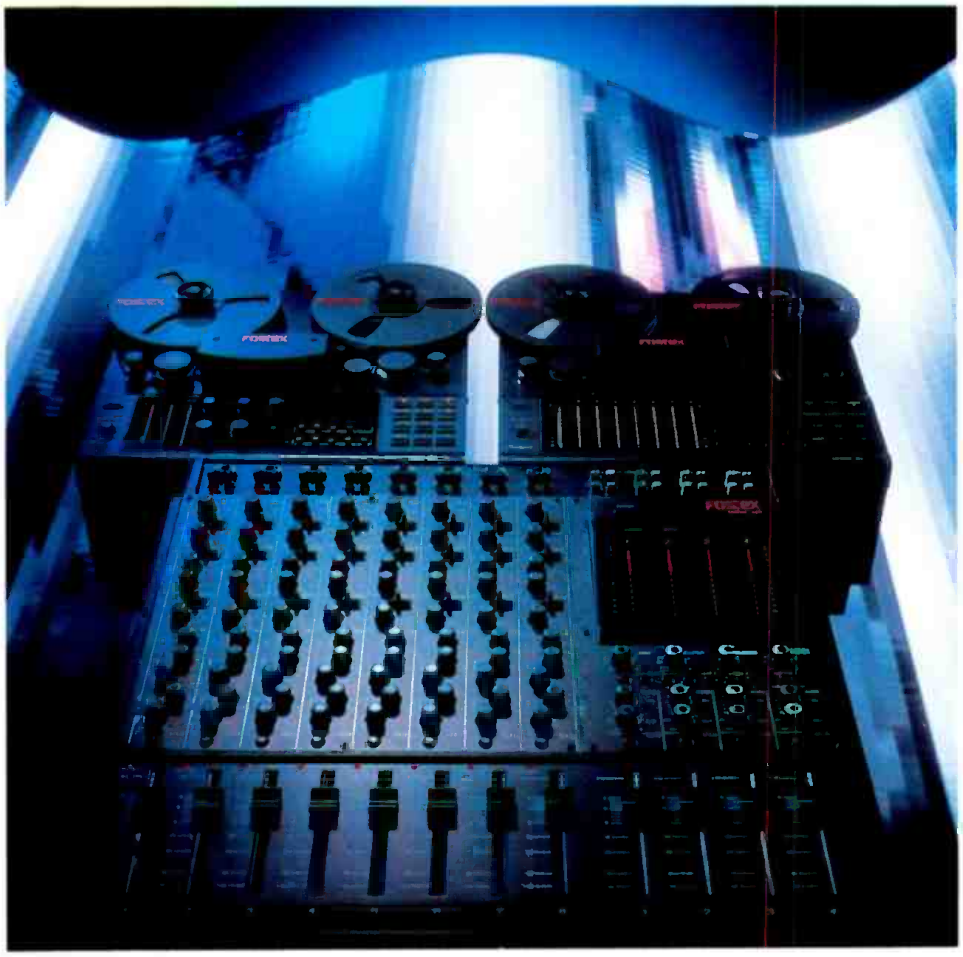

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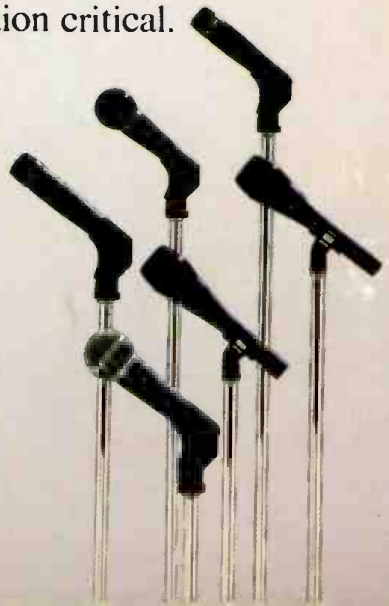

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