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serving: recording, broadcast and sound contracting fields

Touring West Africa with Ed Learned

Audio for the Georgia Dome

Master Sound Astoria—Revisited

Circle 10 on Reader Service Card

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About the Cover

● In *West Africa Touring II* soundman Ed Learned begins his survey of the sound-reinforcement adventures and problems he had while touring West African countries earlier this year. Our cover photo is of the Kokovobitey Drum Troup performing at Kokovobitey Beach in Accra, Ghana. Begin Big Ed's adventures on page 6.

Letters

The Editor:

The May/June issue had a reprint of the first chapter of my book, *Your MIDI Recording Studio*. Reader Jeff Rona was concerned about omissions in this chapter. The missing information is covered in detail in later chapters. The first chapter is a simplified overview of a typical MIDI studio, and is not meant to stand on its own as a complete article.

I'd like to briefly fill in the missing information based on Rona's comments. (Rona's book, *MIDI—The Ins, Outs and Thrus* was one of the references for *Your MIDI Recording Studio*.)

I said that a multi-track tape recorder was a component of a typical MIDI studio. However, it's an option, not a necessity. You need it only if you want to record a live performance of a non-MIDI instrument or a vocal for later mixdown. For example, you might use it to record a sax solo, an electric guitar solo—any-

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thing that you can't play well enough on a keyboard.

An alternative to a multi-track tape recorder is a multi-track digital audio workstation. With this system, you record the audio signal of the performance onto a computer hard disk or magneto-optical disk.

There's a way to omit the multi-track tape recorder. Pick up the live performance with a microphone, mix the mic's signal with your sequenced tracks, and record the mix on a mastering recorder.

The article mentioned that a drum machine was a part of a typical MIDI studio. But if you have a sampler, or don't want to use drum sounds, you probably don't need a drum machine.

I said that a piano-style keyboard is a MIDI controller for a sound module. But you can use any other controller — a sequencer, a breath controller, a guitar with a pitch-to-MIDI converter, and so on.

The article mentioned that a 2-track recorder is used for mastering during mixdown. Of course, you need an extra track for productions using SMPTE time code.

I said that, after recording a part into a sequencer, you should check it by playing it back through your synthesizer. This means, play back what you just performed and monitored to see whether you're happy with the performance.

You can change the tempo of a sequenced performance after recording, as long as you're not yet synced to tape.

An effects unit is normally patched into the effects loop of a mixer. But in some keyboard workstations, the effects are built in, and go between the synth and the monitor.

I noted that each track of a sequencer recording contains the performance of a different instrument. However, you can copy the same performance onto more than one track. Then each track can control different patches to simulate different instruments playing in unison. Or you might transpose the key of one duplicated track to create chords when both tracks are played together.

Also, you could have several performances on several tracks, all using the same patch. This can aid in composition.

The Yamaha C1 Music Computer mentioned in the chapter has been discontinued. (Publication delays have made some information out of date, but it will be corrected.)

Figure 1-2 should be "A simple MIDI studio." *Figure 1-8* should be "An effects unit."

Thanks for the opportunity to comment. These changes will be put into the book before publication. Readers who want more details than an introductory chapter can provide should read the book!

Sincerely,
Bruce Bartlett

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ED LEARNED

West Africa Touring 1992 II

BEFORE I BEGIN THE INDIVIDUAL country breakdown of my 1992 West African tours with the Pharoah Sanders Quartet and the Holmes Brothers, it is important to consider the chronology of each tour; political and meteorological conditions changed drastically in the region during the first half of 1992.

Pharoah's tour took place from mid-January to late February. This was during the Harmattan season: a time when strong southerly winds blow the sands of the Sahara desert over much of West Africa. The skies get very hazy, and there is a *lot* of dust in the air, something that becomes apparent pretty quickly if you are working outside. Equipment can get very dirty; people everywhere are afflicted with sore throats, clogged noses, and cold. These winds cover a wide area too—we experienced their effects as far south as Lagos. By the time I returned to Africa, with the Holmes Brothers in early May, the winds were gone and the skies were clear. Instead, it was the political situation that was unclear: we were originally scheduled to visit Sierra Leone in May, but due to the political and civil unrest that racked the country just before our departure, our scheduled visit to Freetown was cancelled. Pharouah's tour was not without tense spots either: political demonstrations almost resulted in the cancellation of our Congo visit. The prevailing political situation in Brazzaville at that time actually did affect our program in an interesting way—but more on that later.

IVORY COAST

Pharoah's entourage arrived here on Saturday, January 18, 1992 after a long day of travel that began in New York: we'd left JFK late Friday for Paris/Charles de Gaulle, transiting to a UTA flight

which deposited us in Abidjan around 4 PM. This was not the last time we would see the Houphouet-Boigny Airport: this facility is a major hub for Air Afrique, the national airline of several West African countries. It is difficult to travel long distances between West African coastal countries without transiting Abidjan. We were met by several US embassy staffers, who helped expedite a speedy trip through customs. The guys were pleased to discover that all their luggage, drums, and other instruments had accompanied us; I was pleased to receive confirmation that the USIA sound system, shipped from Paris two weeks before, had arrived and was safely stashed at the embassy. Mercifully, we had Sunday off to recuperate from our travel and prepare for our Abidjan performances. After a short meeting that morning to examine the local schedule, we retired *en masse* to the beautiful beaches of Grand Bassam, a short half-hour drive from Abidjan, for some serious fun in the sun.

Monday began early with me supervising a division of our USIA sound system; PA and monitor equipment were sent to the French Cultural Center, band amplifiers and the piano went to the ICSA (International Community School of Abidjan) for the group's midday workshop. I then left for a brief inspection of our concert sites for Tuesday and Wednesday, returning to the FCC, located in the Plateau area of Abidjan, to begin setup for our evening concert. The FCC was a mid-size theater, seating about 650 in a single loge seating area that was steeply raked. While the floor was hard, acoustic treatment of the walls and ceiling held room decay to a manageable 1.5 seconds. AC power came from floor pockets, featuring grounded European-style receptacles, located offstage left and right; these were 15 amp, 225 volt, with stable voltage. I set my mixing equipment just behind the seating area in a rear aisle, house center, in front of the projection booth. I elected to draw my mix point power directly from another grounded European plug in the booth, eschewing a long AC run from the stage. My setup went smoothly, but while I was waiting for the band equipment to arrive I received a troubling phone call from the ICSA. A well-meaning embassy staffer had managed to plug our 110-volt bass amplifier into a 220-volt outlet, with predictable results. Not a good start—we hadn't even done our first show, and already an important piece was broken. CAO (Cultural Affairs Officer) Victoria Rose and I huddled to try and find a solution: renting a bass amp at the last minute was problematical, but she felt she *could* get another amp in time to cover our next two shows. I figured I could take the bass direct and give Russel his own monitor mix, which could get us through the first show. Meanwhile, I suggested

Figure 1. The internal layout of the Tropicana Jazz Club in Abidjan, Ivory Coast.

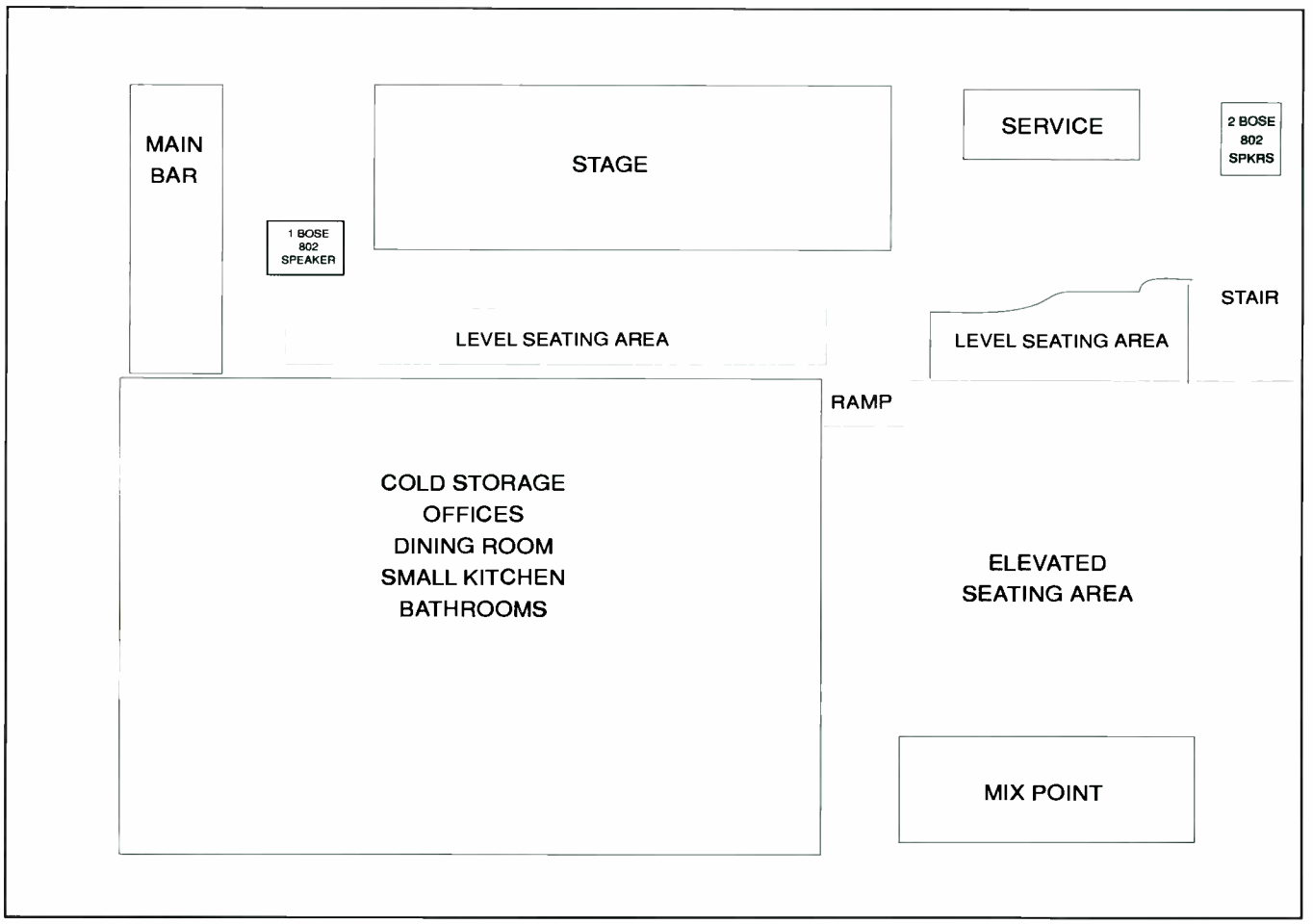


Figure 2. Keyboardist William Henderson (center in shirt and drum) along with members of the Tropicana All-Stars.

we take the broken amp to GSO (General Services Office) for possible repair. GSO handles most routine maintenance tasks for embassies and official American residences, from air conditioners to computers, and I'd learned through experience that their staff usually included at least one "genius of improvisation". That proved to be the case here, thank goodness—the amp was delivered to the FCC within two hours, fully repaired. I actually had time to rest before our 6:45 sound check. My concern at sound check was to get both Russel and Greg to lay back a bit on their stage levels, in deference to Pharoah's desire to maintain an acoustic sound whenever possible. I had things to consider other than live sound too: our concert was going to be recorded by Cot D'Ivoire National TV, later for re-broadcast. The TV control truck was parked in the loading dock off-stage left; they requested an audio feed from me, which called for some changes in my output configuration. With stage volume an issue, I really wasn't adding much bass or drums to my house mix.

Figure 3. The stage at the Ambassador's Residence in Abidjan, Ivory Coast.

Since I needed a full mix for TV, I elected to use a post-fader aux output for TV audio. I spent most of the evening monitoring this send via headphones—I knew that our potential TV audience would be much larger than the capacity crowd at the FCC, so my priority was obvious. I had tour escort Ron Mininger sit in the TV truck and give me frequent reports on sound quality; both he and the director reported that the mix was right on. Occasional checks on the house sound revealed that Pharoah and the group did a masterful job of controlling their own dynamics. Imagine my surprise (and delight) when the building manager told me that it was the best sound he'd ever heard at the FCC—and this with about a third of my attention devoted to the house mix! Shows you what can be done when the band is willing to co-operate. I needed this spirit of co-operation at the next show, held at one of Abidjan's best jazz clubs. The Tropicana Jazz Club, located off the Avenue Chardy on the west side of the Plateau area, was on the second floor, above the Tropicana Nightclub/Disco. It seated only 100, and it's unique floor plan necessitated some interesting decisions regarding placement of the sound system (see *Figure 1*). I used only one speaker for house left, two for house right, as the house right area was much larger, deeper and contained most of the seating area. The local GSO electrician tied me into a service located behind the service bar off-stage left, next to the stairs. The distance from the front of the stage to the house-left rear wall was only 25 feet, so the first thing I had to deal with was stage volume. It was quite easy for drummer Bandy and bassist Blake to overpower the others even at reduced volume, so I had to request drastic decreases in stage levels; Greg played most of the show with brushes, which should tell you we were desperate men! I also had the opening act to deal with: the Tropicana All-Stars, an amalgamation of several of Abidjan's top jazz groups, including an amazing balafon player. As if this weren't enough, the show was scheduled to be broadcast live by Radio Ivoire, but in typical African style they did not arrive until a half hour before

Figure 4. The stage setup in the garden of the Ambassador's Residence in Accra, Ghana.

the show. I again opted for a post-fader aux output to feed the radio, but for some reason they couldn't get any signal, just buzz and noise. I had several angry radio engineers in my face indicting my feed, until I plugged a pair of headphones into the designated output, proving there was nothing wrong with my gear. The problem was somewhere in the radio lines, and it was never located—instead, I was asked to record the show for later re-broadcast.

The station manager showed up later, during Pharoah's second set, and apologized for any misunderstandings. This situation was to repeat itself—my advice is to be prepared for any audio tie-ins to be done at the last minute, and people are big on assigning blame if things don't work. On the positive side, the place was packed to the rafters with appreciative jazz fans, who cheered Pharoah's every move.

Figure 5. The stage setup at the Maxima Hotel in Kumasi, Ghana

Highlight of the evening was an extended solo section, where Pharoah, William, Russel, Greg and as many members of the Tropicana All-Stars who could fit on the stage all grabbed drums and Pharoah's hand percussion for a furious drum/percussion duel that had the crowd on their feet and screaming.

Our final Abidjan performance was at the residence of the US Ambassador to Ivory Coast, located near Cocody, across from Plateau. Pharoah invited several of the Tropicana All-Stars to this show, asking them to jam with his quartet, so I had an expanded band to deal with (see *Figure 2*). The covered stage was positioned on the beautiful grounds behind the Ambassadors palatial estate (see *Figure 3*). A pleasant place to work, but it was *far* from a trouble-free afternoon: my 220/110 volt step-down transformer for the band gear broke, which necessitated an hour of on-site repairs, and I experienced a horrible noise in the system that came out of nowhere in the middle of the day. This latter problem defied solution—after a frustrating two hours of sorting through electronics, amps, and cables, I discovered the source of the problem: my AC power. Voltage here was 217, drawn from a GSO tie-in at the shed by the Ambassador's swimming pool, about 100 ft. from the stage. I realized that my "noise" appeared whenever the pool's filter pump switched on, something it had been doing intermittently all afternoon! Since there really wasn't any other graceful place to tie in, I got the Ambassador's permission to switch the pump off for the duration of the evening; my problem disappeared along with the filter action.

TRAVEL PROBLEMS

As we prepared to depart Abidjan for Ghana, we had to deal with an unforeseen travel problem—it would not be our last. We were originally scheduled to leave for Accra on a Ghana Airways flight around mid afternoon Thursday. We were informed early Wednesday that, for no apparent reason, the flight had been cancelled; we discovered there were no other flights that could get us to Ghana

Figure 6. Cultural Ensemble, Kumasi, Ghana.

in time to make our first performance. After a flurry of phone calls to USIA-Accra, it was decided that we could drive, a journey estimated at eight hours. The equipment was packed after Wednesday's concert, and sent ahead that night via a truck sent by USIA-Ghana. We began our journey Thursday morning: climbing into a USIA carry-all. The group, accompanied by CAS (Cultural Affairs Specialist) Fidel Blay-Mockey, began our one and a half-hour drive from Abidjan to the Ghanaian border. While nobody was enthusiastic about driving, we realized it *would* give us a chance to see some of Africa close-up. The terrain to the border was lush, the road traversed rolling hills; we passed through many small villages along the way. One thing I should point out to ground travellers, were many vehicle checkpoints on this highway—I counted eighteen between Abidjan and the border. Fidel remarked, with a knowing smile, that "only one of these checkpoints is official". Of course, with our diplomatic plates we could (and did) blow through all of them with a perfunctory wave, but a normal commercial venture would not have this luxury; special attention is paid to trucks. These "opportunities to contribute to the local economy" are a fact of life throughout Africa, worse in some countries than others; a wise man should make sure that "transit money" is included in any production budget.

Figure 7. Koonimo sings and dances accompanied by the Cultural Ensemble. Afain in Kumasi, Ghana.

GHANA

After clearing Ivorian customs, we passed through a short "no man's land" to the Elubo, Ghana customs station, where we were met by several USIA-Ghana staffers in their two vehicles. We bid farewell to Fidel and our driver, filing into the customs station for clearance. There was quite a cross-section of humanity at the Elubo station—truck drivers, bus passengers, animal herders, people on foot, and hustlers all vied for the clerks attention! Thank goodness we had diplomatic representation; after about 45 minutes we were on our way to Accra. It was interesting to note that we passed only two checkpoints during the nine and a half hour drive from Elubo to Accra—yes, it took us longer than we'd been told, but partly because we stopped in Elmina for a late lunch and a quick tour of Saint George's Castle, one of the most famous (or infamous) Portuguese gold and slave forts on the former Gold Coast. The road was in good shape for most of the drive, but deteriorated as we got close to Accra, becoming very bumpy with some broken pavement. The truck traffic increased too—and with the African style of driving to contend with, I would say that this highway is *definately* to be avoided at

Figure 8. Kakorobitey Drum Troup, Kakorobitey Beach, Accra, Ghana

night—downright dangerous. We were all relieved to finally arrive at the Labadi Beach Hotel, a beautiful new hotel right on a gorgeous Atlantic beach. After a brief meeting with Ghana PAO (Public Affairs Officer) Dan McGaffle, where we reviewed the schedule for the next few days, everybody retired for some much needed rest.

Friday, January 24, marked the beginning of our Ghanaian performance schedule. Complicating my job here was the fact there were opening acts scheduled to appear with us at every concert, and I was expected to provide sound for them as well. While it would give me a chance to check out the local music at close range, it *also* meant a lot more work. Fortunately for me, I had James Paa Aquah, the USIA A-V technician, to assist me. It turned out that James was a knowledgeable technician himself, working for both his church and local bands as a sound mixer/designer in his spare time. He was eager to learn from me, and I was grateful to have the help of such a skilled technician. He really did make things easier for me—the setup for our first concert, in the garden of the US Ambassador's residence, went faster than any setup to date (see *Figure 4*). This was good, as it gave me time to take a quick side trip to Sunday's venue for a little advance work. James even tied in my power, so we didn't have to wait for the GSO electrician. Power came from a garden lighting fixture—by opening the support box we had access to the garden's power grid, which supplied us 207 volts and a good ground. Yes, voltage in Accra can be a little strange—and occasional outages do occur. As it happened, the power failed during the evening concert, towards the end of the set by our local opener, an *avant* African/jazz group Mau Mau Musiki. Power was restored in time for Pharoah's part of the show: after an introspective hour set, he invited the saxophonist and drummers from Mau Mau Musiki to join in on "The Creator Has A Master Plan," one of his best-known tunes. The resulting jam brought this reserved diplomatic crowd to it's feet—there was even some frenetic dancing in the aisles!

SATURDAY

Saturday's concert was in Kumasi, a city located northwest of Accra in the heart of Ashanti country. James agreed to leave with the sound equipment at 8 AM—I followed at 10 AM, accompanied by CAO Angela Williams and her fiance Nana Danso Abiam, noted Ghanaian musician and leader of the Pan African Orchestra. Nana gave me a nice running narrative of village life and Ghanaian music during the ride, which took about four and a half hours over very bumpy roads—mostly paved, but there were stretches of dirt that could last up to several miles. Truck traffic was the major impediment—I understand that this journey can take even longer during the week. Most of the local traffic was on foot, or on cattle-drawn carts. We stopped several times to buy fresh fruit from women walking along the road, heavy loads of produce balanced on their heads. We arrived at the Maxima Hotel, the site of our show, just before 3 PM. I was pleased to find that James already had the PA system out of cases, positioned, and mostly wired—what a guy! Power came from a box directly behind the stage location; it was a UK/India style 15 amp plug, which supplied 247 volts and had a functional ground. Our stage was a temporary one, set up in a courtyard, behind the hotel, that was bordered by a short fence (see *Figure 5*). The dust of Harmattan was heavy in the air, accentuated by the dirt stirred up as workers positioned rows of chairs and tables for the evening's show—a crowd of over 750 was expected. All this grit in the air and the heat of Kumasi made for less-than-ideal working conditions, yet you could sense the excitement that permeated the air: not many foreign groups had ever played in Kumasi, so our appearance was a really big deal. After we completed wiring the system, James and I formulated our plan for the required set changes. There were to be four opening acts before us: the Cultural Ensemble and Koonimo & Ensemble, a combined performance of two local performance troupes; the Maxima Club Band; and a famous local singer backed by two guitarists and a drummer. We decided to set the dance groups up beside the stage, so we would not have to change Pharoahs's setup for the dancers; the bands could perform on stage and use our equipment, but nothing could be moved. James had his personal wireless mic along with him; I used it as a talkback mic for Pharoah's sound check, but designated it as a lead vocal for the dance troupes and bands. My other 3 open channels were filled with Shure SM-57s and designated as

Figure 9. Pianist Henderson (seated) gets a belafon lesson.

opening act vocals or instruments—I also used our drum mics for the larger ensembles. We agreed that James would mix all the openers—I handled moving all the mics and mixing Pharoah. The band arrived around 6 PM for sound check, fresh from dinner at the home of Asantehene, the direct descendant of the Ashanti kings. I returned to the site to start the show, which began at 7:30 PM with the two Ashanti dance troupes, accompanied by singers and musicians (see *Figures 6 & 7*). It was an unforgettable experience—the place was soon packed, with even more people standing outside the fence, straining to catch a glimpse of the show, or to hear it from outside. Our audience was so worked up by the infectious music and dancing that they were moved to join in. By the time Pharoah hit the stage, there was *definitely* a party goin' on—the friendly Ghanaians greeted the quartet with enthusiasm, and they responded with inspired playing. The crowd just did not want the evening to end, so, as a result, there were several encores. On the last one, our MC (the well-known Ghanaian Radio DJ "KKD") greeted the group with an improvised "rap" as they returned to the stage; Pharoah and the quartet, while surprised, quickly improvised a funky beat to accompany it! The evening ended with an enthralled audience serenaded by the first jazz/rap ever heard in Kumasi! The party continued at the Maxima Nightclub until the wee hours of the morning. I left for Accra early Sunday morning, again with Angela and Nana, so I could get back early enough to prepare for our evening show at the Accra International Conference Center. The return trip took only three and a half hours, because Sunday traffic was the lightest of the week. Ghanaians are very religious, and the villages along the way took on a whole new look, with scores of children, all dressed in white, walking beside the road on their way to church. I went directly to the Conference Center, where James was already waiting with the gear. This was a brand-new facility, designed primarily for meetings—it was a huge room that seated close to 1,000, situated as seats-behind-tables in most of the hall. Only in the rear sections was there standard theater seating, which made things a little weird—like playing in an upscale college lecture hall. Wood paneling and some acoustic treatment held the reverb time to just under 2 seconds, not bad for such a cavernous space, but the flat rear wall contributed to a nasty slap back on stage. Power came from pockets on the floor, located all around the stage area; these contained UK-type plugs with grounded 230-Volt AC. The grounds were all good, but I discovered that several receptacles stage right were out of phase with the rest—I avoided these. My entire crew, including James, were in a hurry to complete the setup by 3:30 PM, as the finals of the Africa Cup Football (soccer, to an American) Tournament were being televised. Ghana was playing Ivory Coast for the championship, and it seemed like everyone in town was in front of their TV, including the seven (yes, that is *not* a typo) opening acts scheduled to share the bill with us. Therefore, we couldn't preset any other band except Pharoah; trying to contact anyone else was futile—I think most of these people were at someone else's home, watching the match. I managed to get Pharoah and the group to the hall at 6 for sound check; it took a while to motivate the building staff to help us with our instruments. They were walking around in a daze, trying to contemplate Ghana's shocking defeat. This unexpected result actually impacted the concert in this soccer-crazed city: attendance was way down (only about 300 people showed up), and several bands showed up late, or not at all. The evening degenerated into chaos as we had to create a schedule as we went along; there was no stage manager, so I had to fill the vacuum. I had several bands play extended sets to cover for no-shows—late arrivals were put on out of order. James again helped with the mixing chores for the openers while I tried to maintain order. Our openers ran the gamut: two kids dancing and lip-syncing to tracks; a local five-piece high-life band, fronted by a singer named Frankie Avalon (yeah, I chuckled too); a jazz quintet; the Kokorobitey Drum Troupe; a traditional dance troupe. Pharoah started a half-hour late, and played a short set to the desultory crowd. I was completely burned out by the end of the evening.

I badly needed a day off after Sunday's fiasco, and that is exactly what I got Monday. We spent most of the day at Kokorobitey Beach, at the invitation of the Kokorobitey Drum Troupe. We enjoyed a performance by the Troupe, including the opportunity to informally jam with them and/or get drum lessons (see *Figures 8 & 9*). There was a

sumptuous lunch in our honor; some of us (I led the way) enjoyed hours swimming and enjoying the beautiful beach by the Arts Center. Tuesday found me enjoying a morning on Labadi Beach, after which I retired to Kotoka International Airport with Ron to prepare for our flight to Lagos, Nigeria. We were again scheduled to travel Ghana Air—unlike out last flight, this one really did leave on time. Checking in our 2,000 lbs. of equipment took over three hours—we were very glad we'd opted for an early start. Reserved seating is not used on Ghana Air, so when the flight is ready everybody charges ahead, pushing and shoving to get on first; it's a real mob scene. Courtesy to women? They could push with the best of them! People (mostly Westerners and jazz musicians) who tried to be polite ended up with lousy seats and carry-on luggage in their lap—a real educational experience, to be sure. Fortunately, the flight stopped in Lome (Togo) in route to Lagos; many people got off. So only the first half of the flight was unbearably cramped.

NIGERIA

Murtala Muhammed Airport had a reputation as a den of hustlers and thieves, but since entry has been limited to ticketed passengers, problems inside the airport have been significantly reduced. I would still recommend keeping a *very* close eye on your stuff, however. We were met by USIA Program Officer Bill Millman, the embassy expediter, and several other staffers, which made our passage through customs easier. Claiming our baggage, including the sound equipment, proved to be a story in itself! As we waited by our designated baggage conveyor (the baggage claim area here was very large & air-conditioned), I was approached by several baggage handlers and asked about the "heavy cases." I claimed them and suggested that they be off-loaded outside, where a USIA truck might pick them up. I was told this was impossible; they had to come in on the conveyor, so I instructed the handlers to place the cases casters-up, so they would not roll around or puncture the conveyor. My advice was not followed: our first large case got stuck as it rolled on its casters. After several bags passed by, the next case through was our heaviest, the amp rack. It was casters-down too, and after clearing the opening the casters, bearing the weight of the heavy contents, punctured the rubber conveyor mats and stuck through to the lower support ribs. This caused the conveyor to start chewing itself to bits—pieces of rubber and steel rods were flying everywhere as the case inched its way down the bucking conveyor belt. People were running everywhere, shouting for the system to be shut down-quite a scene. It finally was, after a third of it was destroyed, and then a brawl broke out between baggage handlers as they tried to blame each other for the fiasco! Security people scrambled to the scene to break up this donnybrook—welcome to Lagos! A customs official and the head of the baggage area quickly appeared to assess the damage and restore order—while our flight's baggage was moved to another conveyor, Bill and I suggested that maybe it would be wise for our equipment to be directly loaded onto a USIA truck, if it could be arranged. Surprise, surprise—I soon found myself on the tarmac outside baggage claim, supervising a crew of four in loading our stuff onto the USIA truck. We then drove out of this secure area to the arrival area of the terminal to re-join Ron & the quartet. The front of the airport was a complete madhouse, replete with all the hustlers and thieves no longer allowed in the airport. Keeping one hand on your wallet was imperative, while you batted away groping hands with the other—and, after our experience on Ghana Air, this did NOT improve everyone's attitude! We got out of there as quickly as we could, making the short drive to the Ikeja Sheraton. This hotel was a fair distance from downtown Lagos, but close to the highway we could take to Ibadan, the site of our first Nigerian performance.

Wednesday, January 29, began with an early AM departure for Ibadan, a city of over half a million about a two hours drive northeast of Lagos. We proceeded directly to the IITA (International Institute of Tropical Agriculture), where we were checked into the guest house. We enjoyed a brief lunch with Branch PAO Pat Byrd (I'd previously worked with Pat in Bangladesh), discussed the local schedule, and then I was off to the University of Ibadan for set up. Our evening concert was held at the University's Theater Arts Auditorium—a small place that seated only 300 people in a very severely raked center section. It was made of wood, with open louvered sides. AC power came from a power board with modern UK receptacles upstage center; this was in turn fed from a drop in the wings upstage left. Voltage was 237; the grounds were good. There was absolutely no space anywhere out in the house for my mixing equipment; I was forced to set this up in the front row, which meant my knees were against the stage and the PA was just over my head! I also had a scheduling problem to deal with: I discovered there was supposed to be a theater class in session all afternoon. The instructor and I came up with a novel solution—we turned my pre-show prep into an audio master class. The students were pressed into service as my crew, while I explained each step of the setup and answered questions. This proved to be very popular with everybody, and I was impressed by the technical sophistication of some of the questions. The instructor thanked me profusely after sound check, telling me that the afternoon's session had been more informative than a year of theater design class. Our performance went extremely well too—the auditorium was full, with additional students standing outside and watching/listening through the louvered side walls. Several dance students in attendance jumped up on stage during the last song and began doing some traditional Yoruba dances to the music, much to the delight of Pharoah, who set his horn down and started clapping along; this incited the audience to join him. I noticed that my "sound students" were out in force: several sat right behind me during the show, watching my every move, and even helped me pack up afterwards—now that's what I call audience participation!

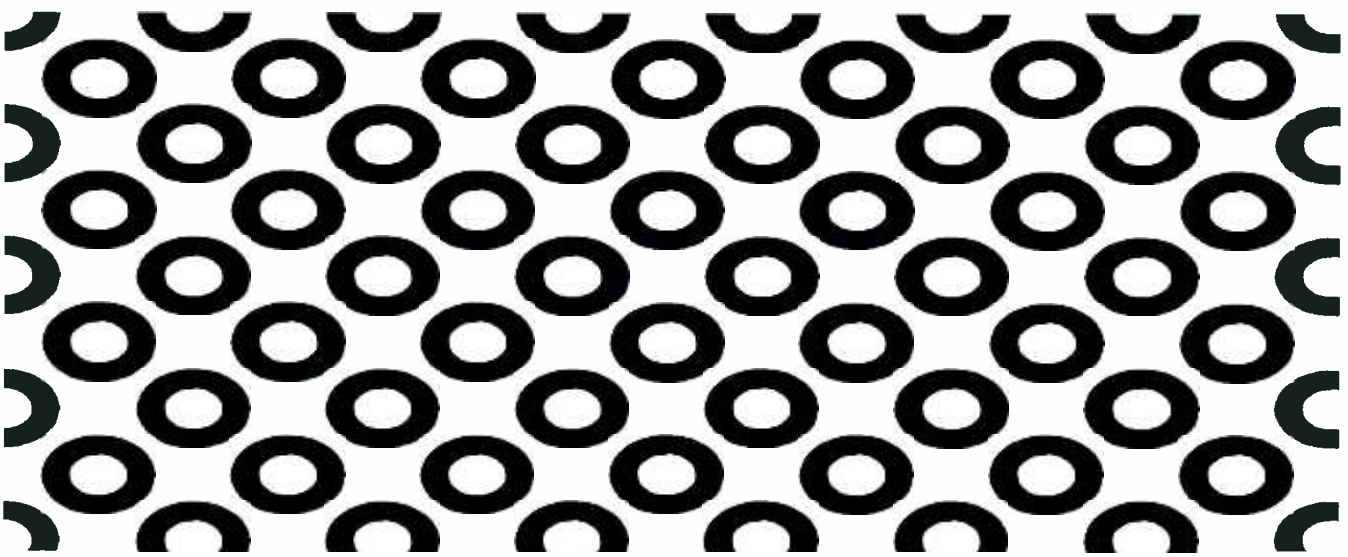
The drive back to Lagos Thursday took only ninety minutes as we took a different route, using the

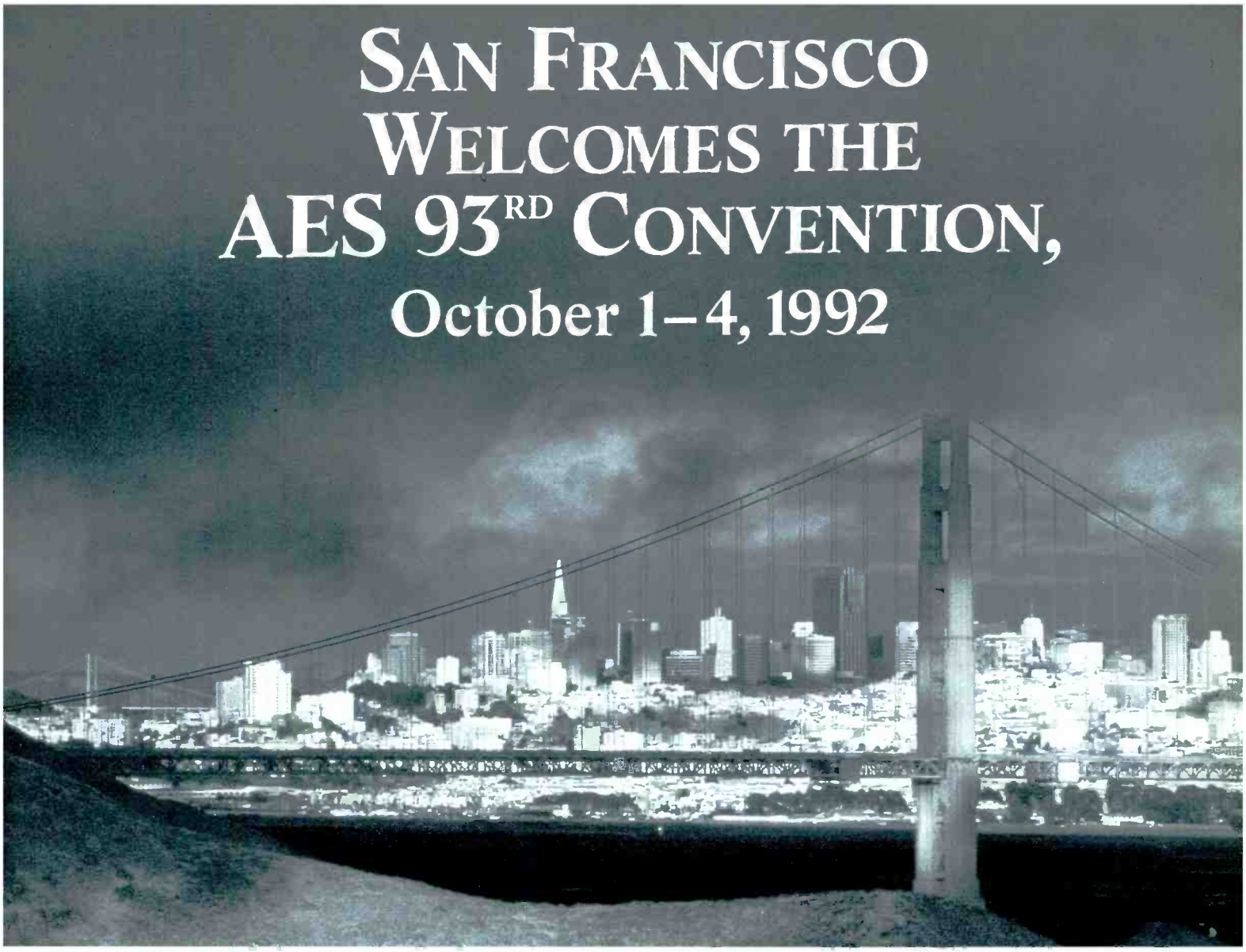
long causeway to cross Lagos Lagoon to Lagos Island. We then cut across to Victoria Island and the Eko Meridien Hotel, our home for the next three days and the site of our next concert. I'd arrived before the band, so after getting situated I went immediately to the hotel ballroom to commence set up. It was really two separate spaces—we would use the first one, opening the second only if crowd size demanded it. Room reverb time was only 1-⅓ seconds, but that was not my real problem here. The ballroom construction featured half-domes that left small projections where the roof met the walls—hard to describe, but it contributed to bad flutter echoes. Any sharp transient was greeted with several discrete repeats, guaranteed to drive any band crazy. There was power throughout the place, featuring UK-type receptacles, all with functional grounds. The hotel had it's own transformer, which kept the voltage at 235, a real feat considering the wacky Lagos power grid. As I suspected, the flutter echoes proved to be our major problem during the sound check—my only solution was to keep the house sound as low as I could. Monitor levels immediately threatened to get out of hand: the group kept requesting "more, more, more" in an attempt to drown out the repeats. After a half hour of frustration, I was finally able to convince everybody that less was more in this space—the resulting clarity reinforced my point, but it did call for a lot of diplomacy. I would not eagerly anticipate playing that ballroom again.

Friday's performance was another Ambassadorial special—the US Amabassador's residence in Lagos was located in a posh section of Ikoyi Island, next to the Lagoon. The band was set up on an uncovered portable stage behind the house, playing to a large lawn seating area and the lagoon. It was a *hot* sunny day as I set up—keeping the gear protected from the sun was a must. I got my power from a European-style grounded receptacle on the rear of the house; voltage was 225. Our concert started a 7 PM, and was scheduled to end at 8. Why so early, and such a short set? Because mosquitoes the size of B-52s usually show up at dusk—better party early outdoors by the Lagos Lagoon! Saturday was a day off, but not as carefree as we might have liked. The embassy expediter radioed Ron, Cultural Specialist Reuben Okudo, and me early that evening, while we were enjoying a meal at a local club. He'd discovered, while greeting some VIPs at the airport, that our Sunday Air Gabon flight to Libreville, scheduled to leave at 7 PM, had been moved to 1 PM for no apparent reason. We thanked our lucky stars that he'd noticed: apparently the airline makes no attempt to notify passengers about schedule changes; you are on your own. The next few hours were full of frantic radio and telephone calls as we attempted to re-arrange our transportation and contact drivers. Only when we finished this last-minute planning could we enjoy our last night in Lagos; the assessment of enjoyment varied from person to person. Greg Bandy was the victim of an attempted mugging while returning to the hotel in the wee hours (he sprained his ankle badly during an otherwise successful escape); others accepted an invitation to visit Nigeria's most famous musician, Fela Anikulapo Kuti, at his home and have a look at his club, the Shrine. Describing that jaunt would take more space than I have, but let's just say it was an interesting education in alternative lifestyles. It also made for interesting discussion the next day! Ron and I got a *very* early start the next day to check in the equipment, but fortunately we discovered the airport was *much* less chaotic on Sunday mornings. Still, we were glad for the extra time; Air Gabon did not set any speed records handling our equipment. And I suspect that without the presence of the embassy expediter and plenty of advance work, we would have been required to "contribute to the local economy" to get our gear out of the country.

NEXT ISSUE

With the Holmes Brothers, we visit the countries of the Sahel: Niger, Mali, and Burkina Faso. We'll look at local venues, experience local bands, and get our first look at African sound systems. db





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JOHN BARILLA

THE ELECTRONIC COTTAGE

The Art Of Editing: Part II

● In this installment, we are continuing to share some hot tips on the art of tape editing. If you know very little about the subject, make it a point to read the first installment published in the last edition of **db Magazine**; it will help you to get your basic editing skills together before you attempt doing major surgery on a one-of-a-kind master tape. In the previous article, we took the reader to a place where they should be able to perform an insertion—or deletion-edit on contemporary pop music. (The type of music is relevant, because not all musical forms include strong and constant "transient" information—such as drums—to make the cuts easy to find). In this installment, we will be considering a sampling of special editing cases (including different kinds of music), and also the unique problems of editing the spoken word.

THE IMPORTANCE OF BEING ORGANIZED

If your editing involves anything more complicated than deleting an unnecessary passage, you will undoubtedly be learning the value of being hyper-organized, for without such organization you may find yourself—very quickly—in a maze of confusion! Here's a moderately complex hypothetical example:

You have just finished mixing a pop tune. The mix is still on the board as the client listens to playback. Everyone agrees that the mix sounds very hot, but the client has some disappointments about the arrangement. Now that he has the final product, he can think of several ways the arrangement could have been more effective, but he doesn't want to start recording from scratch. Now you (*Mr. or Ms. Electronic Cottage Engineer/Producer*) can really do something to save the day—if you have enough confidence in your tape editing skills. Here is what would fulfill your client's wish list:

Item one, the instrumental break in the middle should be twice as long.

Item two, the vocal performance in the third chorus was more animated than the first chorus. Since the words and instrumentation are identical, it would be nice to exchange the first chorus with the third.

Item three, the fadeout ending just doesn't feel right. It would be nice to do several fades and cut-in the best one later.

Finally, item four, the optimum level for some drum fills during the bridge was not immediately obvious. Should they be "in your face" or more "laid back"? Well, let's cut the fills both ways and decide later.

If you should choose to take on this mission, how would you approach it? There is undoubtedly more than one efficient way to deal with it, but I'll just share with you the way I would approach and organize this task. First, I would put a large reel of clean tape on my mixdown machine. Then, while the mix is still hot on the board, I would remix the tune from the top, stopping at sections that need to be extended or altered, and leaving a few seconds of silence between the takes, I would re-record each section as many times as required to provide the raw material for editing. I would make sure I did this in sequential order through the last bar of the song, until the client's "wish list" of possible changes had all been collected.

So far, the task has been relatively easy to conceptualize, but once you start cutting these pieces together, you must be very organized or you will find yourself in an irrational nightmare! Each section of alternative pieces should be spun-off on a smaller reel in a "heads-out" position—and clearly labeled. Some short sections (such as the drum fills) might be more easily handled by just sticking the alternative sections to a nearby wall with splicing tape. (This is a technique reminiscent of film edit-

ing where scenes are frequently laid in bins, hung from clotheslines or draped over any available protrusion. Film editors, however, have some advantages over us: they can visually inspect what's on the film by holding it up to the light, and they can compare the edge numbers on the film. Unfortunately, to us, one piece of tape looks just like another; so, if you get into working with a bunch of short pieces, make a system of labeling them, by writing a note on the backside of the tape with a china marker).

Also, don't throw anything away hastily. What if your edit is not quite right? You'll need to put the original piece back first, and then re-assess your edit point, before splicing in the new part again. Therefore, unless you are absolutely sure of your edits, it's best to have an out-take reel on hand, so you can get back to the original—if necessary. If you want to be a little more cavalier about it, you might simply string the portion of tape you just replaced around your neck until you can get approval of the edit. If everybody is happy you can trash the necklace; if not, its right there where you can grab it.

By now some of you are probably reaching for the bottle of extra strength Excedrin—just from imagining this stuff; but I would like to assure you that editing will soon become extremely enjoyable to you as you get more comfortable with the procedures. It doesn't take a genius to do this stuff; you just need a clear head and a willingness to proceed step-by-step until you can realize the final product. At times, what you can do with a razor can verge on the miraculous in the eyes of a grateful client, and to be flattered as an "audio guru" is an honor that won't be hard to take.

DOING DANCE RE-MIXES

The rage for dance re-mixes has not abated in over fifteen years. It's the place where the amateur mind and the professional hand coalesce. What I mean is that the best dance re-mix producers have their finger on the pulse of the average person on the dance floor. It panders to the simplest-minded sense of aesthetics, but no one in the clubs ever seems to tire of the conventional ploys: the inevitable instrumental breakdowns, the *a capella* sequences, the percussion breaks, the start/stop/stutter beginnings, and other clever devices. Interestingly, such re-mixes are an excellent way to climb deeper into the art of editing—without losing your mind. Chopping a dance tape is actually relatively painless and gives you the opportunity to try some whacko techniques—and have everybody praise you for it.

One of the reasons why dance music is not that hard to cut is simply because the mixes are so well defined: the kick drum and high hat are usually right in your face and there are usually no cloudy pads or mushy strings to get in the way. The beat, of course, is indefatigable, so your main task is simply to keep the pulse going, shifting from one bizarre section to another to keep people on their toes. Usually, this stuff is not planned on paper or even all that well thought out in advance. It's a "yo, let's just do it!" kind of attitude that makes it happen; and it usually takes shape as it's being created in the control room. In a sense, there's a lot of creative liberty here, because unlike pop music, the dance re-mix does not have to fit into any specified time constraints; it just has to be able to hold the average person's attention for as long as it dares to.

Dance re-mixes can actually be a lot of fun. A typical scenario would involve re-opening a previously mixed piece of music—one that has at least a good beat and an incessant hook. Subtle parts are usually eliminated in favor of bare- bones rhythm tracks. Then everybody begins to have fun. Someone will say, "Let's drop out the bass here for 16 bars", then later, "let's drop everything else out but the drums and then add tracks back in one at a time"...etc.

GET THE PICTURE?

These kind of endless modification just keep on being mixed—section after section—and laid over to the mixdown machine until somebody says "stop". Then the editing begins. There are, of course, lots of

ways that you can make a smokin' re-mix—if you have a good selection of "mix elements" to choose from. Whatever you do, don't forget to be slightly crazy; it really helps.

ODDS AND ENDS

The world of orchestral music can be a lot tougher than dance music. Sometimes you can lost in a passage that features an indistinguishable cascade of strings or a wall of woodwinds with no strong transients (like a drum or bell) to make cutting easy. This is an area that can really test one's mettle as an editor. Your ability to discern patterns of sound will of necessity become highly developed after editing one orchestral tape. You will distinguish between the timbres of various instruments and attack transients that are less differentiated than in pop music. It's a bit like trying to walk while wearing someone else's prescription glasses; it's not easy at first, but after a while you start to make on-to-one correlations between the beautiful flurry of notes you hear at normal speed and the cacophony of growls when you manually scrub the tape. The problem here is that you can never manually move the tape at anything like a constant velocity; so these complex timbres are harder to identify. What might be helpful here is half-speed listening. As a matter of fact, by combining the half-speed button with a downward turn of the varispeed, you should be able to listen to the tape at a very slow, steady speed. After studying this for a while, you may find it easier to identify individual sound cues when scrubbing the tape.

Another useful technique for editing difficult passages is using a ruler to measure time in terms of distance. For example, let's say we recorded the mix of a song at a tape speed of 15 in./sec. (inches per second), and the tempo of the song was 120 bpm (beats per minute), how many beats would go by each second?

(Answer: $\frac{120}{60}=2$)

Therefore, each beat would require $\frac{15}{2}$ or 7.5 inches of tape.

Now for the sake of illustration, let's say there was a 4 beat string cadenza that needed to be shortened to 2 beats, how would you do it if there were no rhythm instruments to help us count beats. Well, simply mark the beginning of the passage and lop off exactly 15 inches of tape, and you should be all set!

THE SPOKEN WORD

Finally, consider the world of editing the spoken word. On one hand, this is a relatively easy form of editing, because it does not require a sense of musical timing or any real aesthetic decision making. On the other hand, it still requires a great deal of discretion to come up with natural sounding transitions. One thing which will give away your edit point is if you fail to respect patterns of breathing. For example, if a person characteristically breathes at the beginning of a sentence and that breath is cut off, it will be noticeable. If two disparate passages are being spliced together and both of them have breathing on them, the effect will be an unnatural double breath in the middle of a sentence: one of them must go.

Level matching can also be problemsome. For example, if you are attempting to merge to sections that were emphasized in different ways, (the speaker used different degrees of loudness, or spoke off-mic in one case, but not the other) you will not be able to mask your edit—unless you find a transitional phrase that can be inserted to gradually raise the level from one extreme to the other.

Sometimes due to fouled-up words on the part of the speaker, it may be necessary to actually fabricate a new word from some other unrelated consonant and vowel sounds. For example, if you needed to form the word "what", you might be able to do so by robbing the "wh" sound front the word "who" (spoken elsewhere on the tape) and the "at" from the word "shot" (also spoken elsewhere on the tape). Sometimes this works and sometimes it doesn't, but when it's your only avenue to prevent the speaker from looking foolish; it's certainly worth a shot.

Well, as you can see, editing can be a valuable skill to have under your belt—if your aim is to offer comprehensive audio services. Like many other things in life, editing takes some diligent practice to become an expert, but it's worth it. So don't be satisfied with a less-than-perfect product. Remember: it's not over until the final edit! db

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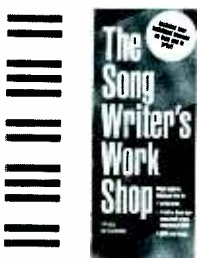

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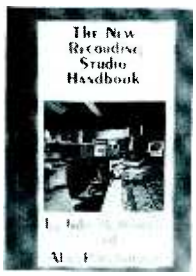

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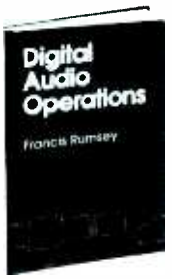

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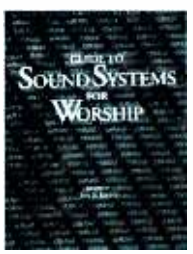

This book is written to assist in the design, purchase, and operation of a sound system. It provides the basic information on sound systems that is most needed by ministers, members of Boards of Trustees and worship and music committees, interested members of congregations, and even employees of musical instrument dealers that sell sound systems. To be of greatest value to all, it is written to be both nondenominational and "non-brand-name."

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LARRY ZIDE

Master Sound Astoria—Revisited

It begins with a trip into Master Sound, located in the Kaufman Film Center in Astoria, NY. This complex boasts, among many other things, the largest film sound stage on the East Coast.

THIS SOUND STAGE ONCE WAS used to film many Charlie Chaplin silents, as well as many other film greats. During the 2nd World War, it became a military film center for military and propaganda films, then went fallow for some years, before being completely restored both physically and electric-electronic. Today it's the pre-eminent film/TV production center located this side of Hollywood. Ben Rizzi and Maxine Chrein run Master Sound Astoria which is located in the lower-level expanses of the main building.

The first question asked of Ben Rizzi was that not only is the studio deeply involved in film scoring and post production for film and TV, but doesn't it still do quite a bit of music recording?

"Approximately more than two-thirds of our work is album work. The other one-third is post production and scoring. And we're very proud of the fact that it is the only facility that has an Artel in its control rooms where we can convert directly to fiber transmissions and send anything back to Hollywood or any place else in the world—we're directly interfaced with Telepost.

"Regardless of the type of session, my greatest concern is to maintain the highest quality possible for the music recording. As a former musician, music has always been my first love. Acoustically, and electronically, I'm concerned about giving my clients the very best that they can get. Master Sound Astoria has a very diversified client base. We are heavily involved equally in classical, jazz and rock. You can be here one week with *Placido Domingo* and another week an artist such as *Keith Richards*. Also at the same time, we do film scoring and audio post production for network and cable TV, as well as feature film. We're also pioneers on the East Coast for sitcom sweetening, so, as you can see we cover a broad area. Right now Master Sound has two rooms in operation, A-1 which is basically music, A-2 which is basically post production. Our new room A-3 is currently in design and will shortly start construction. That room will be an all digital room—right from console through whatever storage media we decide on."

Figure 1. Ben Rizzi, in a pensive mood, sits at the console in Master Sound Astoria's Studio A Control Room.

A question came up then about a date for completion.

"Unfortunately we keep moving it up, but in all seriousness, we're hoping by the end of February 1993, we'll be open for business with the new room. We enjoy the occasional film scoring sessions. We've become specialists in all types of inter-format lockups and we are able to do film-to-tape transfers. With the gradual disappearance of large recording spaces in the NY metro area, we have turned our attention to the utilization of the huge shooting stages here, like the 27,000 sq.ft. Stage E for recording sessions. Our control room A-1 which is our current music room and our new control room A-3, are both going to be able to access the various stages. Having 27,000 sq. feet of space to record, we can easily put two symphony orchestras in there with multiple choirs and

still have enough room to put in tall buildings. That's how huge the place is. What's nice about the space is that we have parking; it's quiet and it's an easy place to get to."

The question came up on just where Astoria, Queens is relative to the obvious action of Manhattan.

Ben responded, "By subway, we're ten minutes. And if you travel during non-rush-hour times it's about 15 minutes by car from midtown Manhattan. Some people think they don't know where Astoria is. They didn't realize; that they only have to go over the 59th Street (Queensboro)bridge and there it is. We're here right in the middle of the largest Greek community in this side of Europe. One of the nice things about working here is that the neighborhood is safe. It's like the lower east side was 50 years ago. And you can go walking around at night and the restaurants are just unbelievable. We take full advantage of that."

RIGA, LATVIA

"As you may know, three years ago we started the Master Sound Riga project. It was our intention to open a new recording facility in Riga, Latvia, then part of the Soviet Union. It was to be based in an existing 13th century cathedral. It was in beautiful condition, with 200 stained-glass windows."

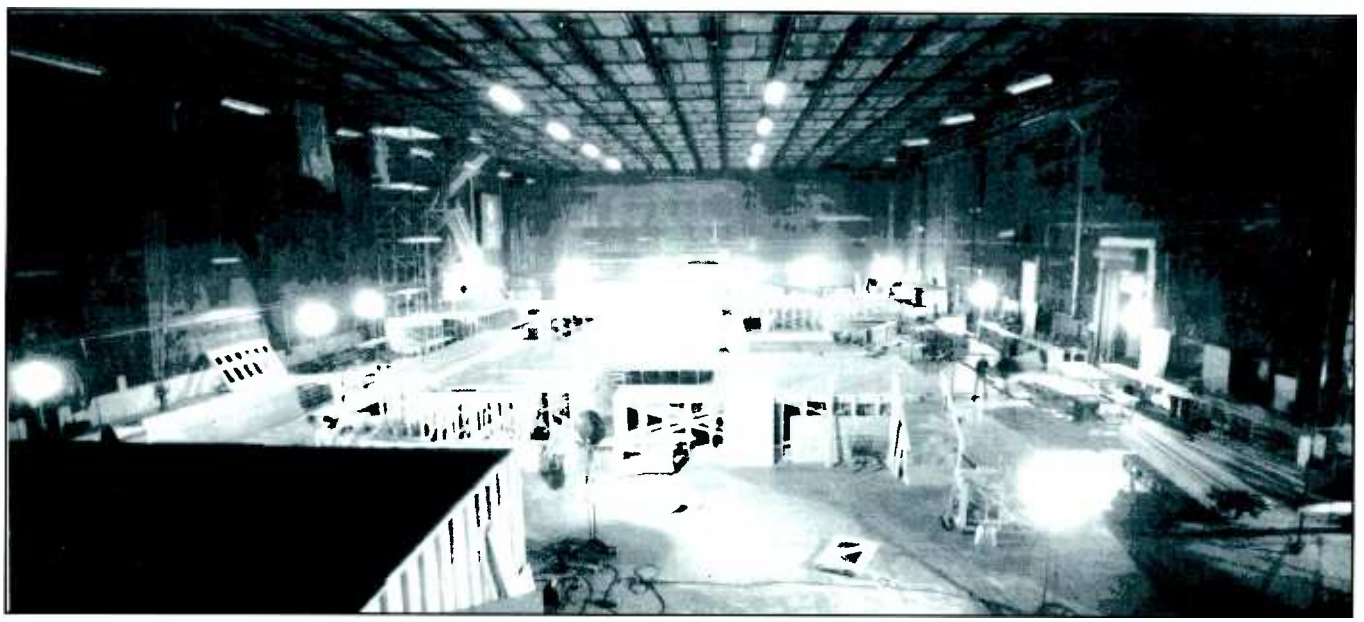
Ben continued, "What I did basically was rebuild it to its original specifications—it was awesome, and everything looked good. But as the Soviet Government collapsed, and independence came in—all our agreements were in jeopardy. And while Maxine and I would go back and forth and be reassured—what finally happened was they nationalized our Latvian partners. and once they did that, I had to throw in the towel, which was about 1.5 million dollars later.

"Maxine and I miss the people. We certainly miss the opportunity—but more than that, the people and the excitement that we had at being pioneers in doing something like this. A lot of people asked me, 'Why would you want to buy or build a facility in of all places Latvia?' Well, the town is beautiful. Riga is a beautiful city. The people were wonderful. They had two of the best symphony orchestras in Riga itself that I've ever heard. Many of the finest classical musicians in the Moscow symphony were Latvians. We had tentative agreements to pay musicians $20.00 a day for a full-day recording session. With $40.00 a *month* being the average income at that time, it was a great deal for everyone.And what we were going to basically do was put in our own facilities, to uplink to Master Sound Astoria.

Before leaving that entirely what if anything is left in Latvia, and will a studio someday be in the building or is it totally gone?

Ben answered, "When they nationalized our Latvian partner, it was the straw that broke the camel's back. It reinforced that the real problem was that no one was really in charge. The independent government of Latvia was disappointing to us. We emassed a huge quantity of equipment ready to be shipped there, and the building was all ready to go. The studios were virtually all finished. We were ready to ship equipment. We had all the guarantees, we had contracts that were governed by the laws of Sweden. Literally, the contracts were a couple of feet high. They cost a bloody fortune in attorneys, both experts in international law as well as American law. And it turned out to be meaningless because the situation is not stable—it is still not stable. So after trying and trying, On March 9th, I sent a letter of termination and shut it down. I actually hung on perhaps too long, but we had developed wonderful relationships with the people. We really thought that the people would appreciate what was happening., we'd be bringing business and people would come and see a beautiful city, but once the government fell apart there was just no longer any assurances that whatever we did there would re-

Figure 2. Stage E, Kaufman Astoria Studios. At 27,000 square feet, this is the largest sound stage on the east coast.



main in our possession. If they could nationalize our partners, they could nationalize anything."

But if Latvia is moving toward free-market democracy isn't this going to be of benefit?

Ben said, "That's true except you have to remember that this generation of Latvians know very little of democracy. When I made the original agreements I made them in Moscow as well as in Riga—because I wanted to be sure it was government approved. But what happened in the situation is, these people really don't know about having a contract. So anyone who wants to go into a situation like we went to, you've got to realize that honoring a contract is not exactly a situation they're familiar with. Even though we had all these contracts and everything had to be completed by such and such date and so on and so forth, they were virtually meaningless because the government officials kept changing and did not honor the agreements made by previous officials. Literally we came back to New York and two weeks later on the Telex we find out that the people we made new agreements with were no longer there. This would happen repeatedly. So you just have to understand that you took a bath with 1.5 million dollars and just pull out—that's it"

MASTER SOUND ASTORIA TODAY

Ben went on, "The best way for Master Sound Astoria to grow and thrive is by providing something that smaller studios can't—that is, big rooms, wonderful acoustics, the best of equipment, knowledgeable staff and facilities that are unique in various ways. Such as being able to uplink or downlink information. If you want to do something special, having all these technical facilities, and great acoustics at your disposal is a major advantage. I can go on and on where a small facility can't compete.

"Even if you're doing an album that is virtually all samples, the ability to process those samples in a great natural acoustic environment is something not exactly duplicated elsewhere. All of a sudden it becomes a believable situation—it is not as card-board-boxy as before. Occasionally, we get an artist that has done an album in small facilities. Just before they're ready to master it to a CD and get it out on to the market, they realize it doesn't quite compete with some of the better things out here. They'll come to us and say, 'Gee, it probable needs a remix.'. The engineer and the client put it up in the control room and really listen to it, and find those vocals do sound a little boxy, with perhaps a little distortion on them. 'Let's, at least redo the vocals.' Invariably , that's what the client says. While our hourly rate may be a bit higher, it's not likely that a client will ever have to redo tracks because they weren't recorded properly and don't sound the way they wanted them to."

The advantage in locking everything into one central reference is because then all things are possible.

So, I'm not just saying Master Sound, there are other wonderful studios that can legitimately provide a professional level of performance that home-studio environments simply can't."

THE NEAR FUTURE

Ben continued, "One of the things we're looking at are the various storage media that are practical for our digital workstations Even though CDs are 16 bit and are going to be around for a long time, we want to be able to store information conveniently in 24-bit format.I think that 24-bit is an ideal situation. And I'd rather try to shoot for the ideal situation. Our digital work stations are capable of recording 24 bit, so why not take advantage of it? In any event, we're constantly exploring new storage media for our digital work stations"

CAN MAGNETIC MEDIA DO IT?

Ben's response, "Right now, no. I'll tell you the truth, 15 years ago I was espousing bubble memory, so I was wrong there. As a matter of fact, one or two people that have been with us for quite a few years periodically say to me, 'bubble, that's the way to go,' I was wrong. But overall, my track record has been pretty darned good in looking at these situations. I just want to be able to store information for my clients in a manner that really is as state-of-the-art as possible, and 24-bit is clearly that right now."

Our post production continues to expand and become more comprehensive as the marriage of picture and sound gain further importance. Currently when we do something at Master Sound we're locked to the house reference on everything. Even though producers in some cases think it will never go to picture or they'll never have to lock it into anything else, often they come back and say, 'Gee we want to lock it to picture, we want to do this, we want to do that'. The advantage in locking everything into one central reference is because then all things are possible. You don't have things running into various references and walking away from one another. We just finished doing a high-definition (video) scoring and post- production job for NHK. NHK broadcasts high-definition television in Japan.

"As I told you before, we have our own proprietary sweetening set-up where we can do sitcom sweetening so easily that it's remarkable.I give a lot of credit for that to our head of post-production, David Browning, who's done a wonderful job. David and I are always looking into areas where we can expand hi-tech audio into television and film areas. Master Sound has D-2 and 1-inch capability. What's really nice about D-2, is when we do a D to D transfer locked to picture—no generation of loss; you look at the picture and hear the original digital recording which is so great. We finally have the capability of good sound on television media." db

KEITH CLARK

Georgia Dome Gets A Top Notch Audio System

Situated in downtown Atlanta next to the Georgia World Congress Center, the new Georgia Dome is the first large-scale enclosed oval stadium ever constructed. Built at a cost of more than $200 million, the facility officially opens its doors in September when the National Football League's Atlanta Falcons kick off the 1992 season.

THE STADIUM BOASTS THE world's largest cable-supported dome, with a teflon-coated fiberglass roof suspended by hundreds of steel cables through a principle known as "tensegrity" (tension integrity). The design is vastly different from domes completed in the past decade or so in Minneapolis, Detroit and Indianapolis. Those facilities have fiber roof coverings inflated by extremely high levels of air pressure.

With a capacity of 71,500, the dome will serve as the home field for the Falcons and also will be the site for a number of notable events, including the 1994 Super Bowl, the annual Peach Bowl, and many events of the 1996 Summer Olympics. More than 100,000 feet of exhibit space also make it ideal for augmenting major conventions at the World Congress Center, one of the world's busiest convention facilities.

Heery International, an Atlanta-based architectural firm, assembled a five-member team to design the Georgia Dome. Unlike other domed arenas, the Georgia Dome is primarily geared for football with its unique oval configuration. Front seating is as close to the field as possible, while other seating levels are steeply raked to put all fans reasonably close to the action.

Two Sony JumboTron Video Screens allow viewing replays of exciting or controversial plays, as well as viewing of promotional video programming. In addition, video monitors receiving a closed-circuit "feed" of the action are distributed throughout many of the seating areas. The monitors, easily viewed from the concourses, allow fans to keep up with the action as they move about or stand in line for refreshments.

Figure 1. Closeup view of a cluster.

This same consideration went into the design and installation of the facility's state-of-the-art audio system. Primary consultant Richard Zwiebel of the Joiner Consulting Group, Arlington, Texas decided that a satellite cluster system with a Crown IQ computer control system would be the best choice in providing coverage to the seating areas, as well as the venue's 203 luxury suites and other areas. Also playing a major role in the success of the system was the care and professionalism exercised by installing contractor Ancha Electronics of Norcross, Georgia and electrical contractor Inglet & Stubbs of Atlanta.

Both Joiner and Ancha have been involved with the project for nearly three years. Jay Foster, Ancha's project engineer for the job, notes that actual installation commenced in October, 1991, with up to 12 Ancha technicians employed at certain times to insure that the system would be up and running in time.

THE SATELLITE CLUSTER SYSTEM

The Georgia Dome is a highly reverberant room. Reflective materials and surfaces abound, from the fiberglass ceiling down to the con-

Figure 2. The Crown IQ host computer with AMX touch screen. This is located in the main sound booth at the dome.

crete floor that will be covered with artificial turf for football games. Acoustically-treated panels along the top of the dome help cut this reverberation a bit, but sound still bounces throughout the room. Zwiebel and Ron Baker (formerly with Joiner and now with WJHW of Dallas) specified a satellite cluster system to combat these acoustic challenges.

A total of 22 satellite speaker clusters are employed, supplemented by underbalcony speakers and auxiliary systems. The clusters, made up of a variety of components including Electro-Voice DH1A drivers and HP6040 horns, as well as JBL and Community equipment, are attached to the second of three catwalks that hang above the playing field. The system is powered by a combination of Crown Com-Tech 200, 400, 800, 1600 amplifiers.

These clusters, all containing the same number of components and identical configurations, offer low, mid and high frequency coverage for the entire main arena. They are located about 50 feet apart on the "straight" parts of the catwalk, with clusters at each end of the oval catwalk located about 30 feet apart.

Zwiebel notes that a satellite cluster system was chosen to "get the sound as close to the people as possible. You want to increase the direct-to-reverberant ratio as much as possible, especially in a huge, reverberant room like this." This reverberation concern was a deciding factor in the decision to rule out a central cluster and instead go with the satellites.

Zwiebel, designer of systems for numerous major venues, relied upon his experience as well as extensive modeling and the use of AutoCADD and Bose Modeler programs in making specifications. "No two venues like this are similar," he notes. "You just have to do what's best for each individual job, relying upon the best tools available and your own experience and intuition."

Highlighting this point is Zwiebel's work at the new Oriole Park at Camden Yards in Baltimore. It too is a major venue, but the similarities end there. Camden Yards is outdoors, features a variety of sharp angles and a grass playing field. A distributed sound system, also Crown IQ-controlled, turned out to be the best choice for that venue.

Each satellite cluster at Georgia Dome weighs about 2,000 pounds, with components placed in custom frames. The frames are designed to allow the components to be preaimed before being raised into position via winches placed on the catwalk. However, they also allow for convenient adjustment of the components, if necessary. Foster notes that raising the first few clusters was difficult, but the process became much easier as his crew gained experience.

Cable runs to the clusters are designed to be as short and uncomplicated as possible. The custom white Coleman, 12-gauge cable runs from the amplifiers in the "East PA Room," near the top level, out to the "A" (or top) catwalk. It is then routed down the catwalk to each individual cluster.

Cabling for the 184 underbalcony speakers, the luxury boxes, lounges, locker rooms and other auxiliary systems was run by Ancha with assistance from Inglet & Stubbs. The Crown Com-Tech amplifiers and other electronic devices for these systems are rack-mounted in the "West PA Room," located exactly opposite the East PA Room.

Each luxury box is equipped with at least one underbalcony speaker as well. A special switch panel in each of the 203 boxes, installed by Ancha, allows the user to select between the television audio feed, radio audio feed, or stadium PA feed.

Direct PA coverage to the field is provided by a single horn/driver suspended from several of the clusters on the south side of the catwalk.

These single horn/drivers are aimed down at the field and are intended for paging and announcement capabilities for conventions.

Seats at the very top of the dome receive additional coverage by 26 single horn/driver systems at-

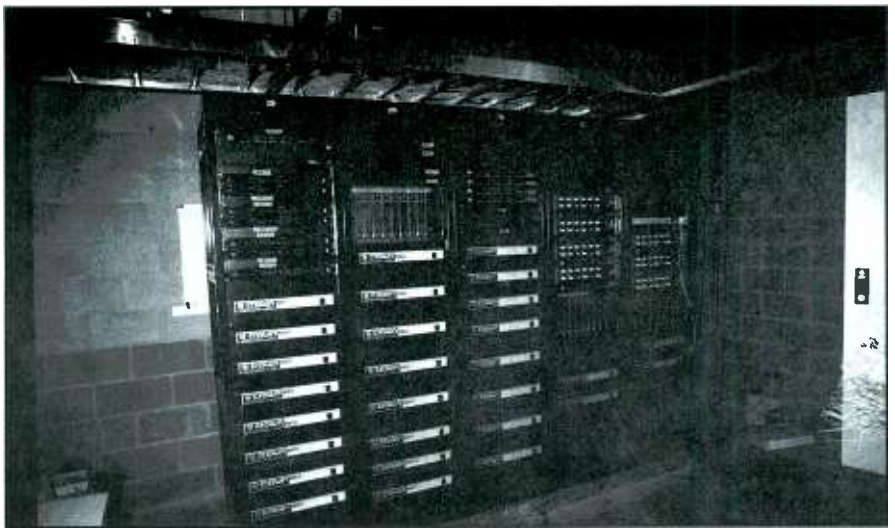


Figure 3. Amplifier and other electronics components in the West PA room on one of the dome's upper level.

tached to the lowest of the three catwalks.

Future plans call for the addition of a central PA cluster to provide additional coverage in the basketball configuration.

MAXIMUM PERFORMANCE

With all projects of this scope and complexity, final testing and fine-tuning becomes a key in ensuring that the system is reaching its maximum performance potential. Zwiebel spends several days in this process, which used to take even longer before the development of the Crown IQ System (more about this later).

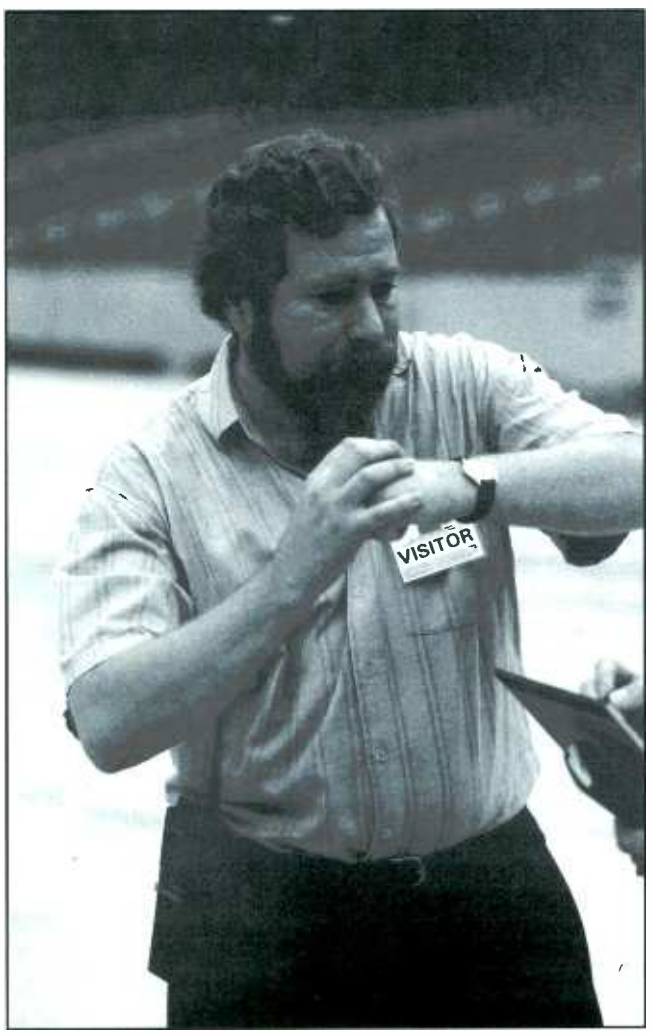


Figure 4. Rich Zweibel of Joiner Consulting.

For test and measurement, Zwiebel employs an Ivie IE-30 spectrum analyzer; a Gen Rad-1982, an SPL-type of meter that also allows for selection of different octave bands; and a Gen Rad-1995, a highly advanced spectrum analyzer.

He walks every inch of the venue, testing each individual component, and then individual clusters, and then the main system as a whole. Ideally, he is trying to "tweak" the system to provide the exact same coverage for each seat, minimizing shadowing and comb filtering. At Georgia Dome, there is no more than a 3 dB difference in the sound levels between seating sections, a variation Zwiebel terms "highly acceptable."

Zwiebel adds that "we also want the system to deliver an overall level a few dB lower to the luxury suites and on the concourse areas. You have to balance system levels with the fact that people need to be able to talk to one another."

Control of this monstrous system is centralized at the main sound booth through Crown IQ System 2000 computer control software loaded onto a host PC and linked to an AMX touch panel.

Making this fine-tuning process even more difficult is the need to factor in the added absorption and sound levels created by the presence of more than 70,000 people. "The absorption occurring when the room is filled definitely enhances the sound quality, drastically cutting down on reverberant sound. At the same time, the noise

floor is raised and helps cover this non-direct sound," he says.

After the satellite clusters are completely fine-tuned, Zwiebel then employs the same test and measurement process for each auxiliary system, checking their individual performance as well as the impact of the satellite clusters.

COMPUTER CONTROL

Control of this monstrous system is centralized at the main sound booth through Crown IQ System 2000 computer control software loaded onto a host PC and linked to an AMX touch panel. Joiner Consulting also specified the Crown/AMX combination at both Anaheim Stadium and Oriole

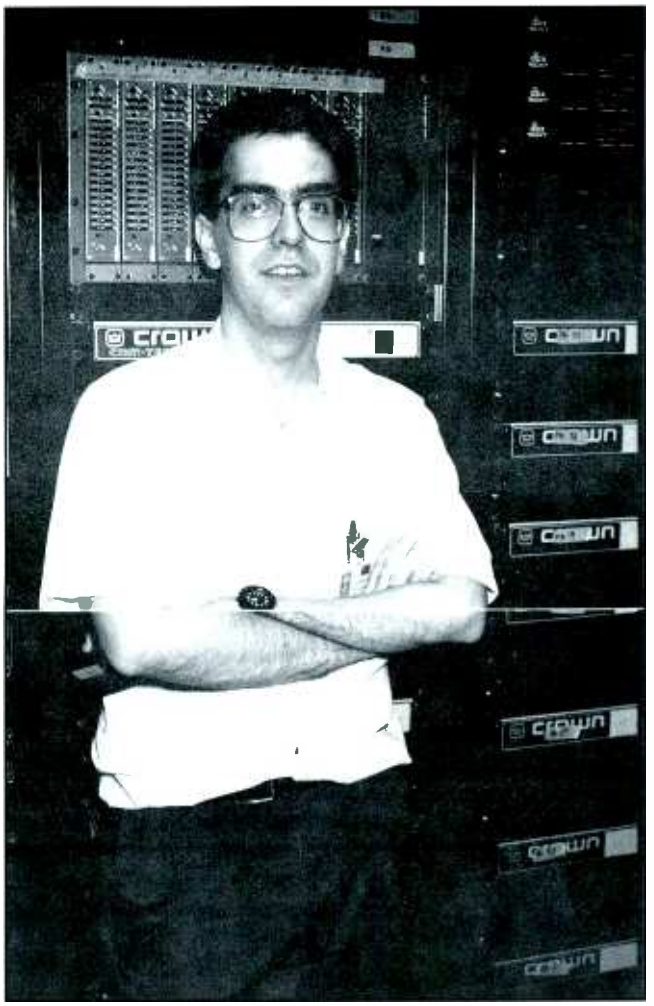
IQ allows for control of on/off of the entire system, level and mute control, pre-setting of configurations, and also serves as a quick, convenient source for system diagnostics. Linked by regular telephone cable to the Com-Tech amplifiers equipped with Crown P.I.P.-IQ cards, IQ provides these control functions through the single host PC.

System control functions and levels are programmed onto the IQ System and then downloaded into the AMX touch panel system. A special access code denies unauthorized system access.

We'll add more pre-sets as we need them. This will really be of benefit to the system operator...

Taking data from IQ, the AMX displays each cluster on screen. If an individual cluster display is lit, it tells the operator that at least part of that cluster is activated. The cluster can then be highlighted, allowing the operator to determine which components or frequency sections are indeed functioning. As one can imagine, this feature allows for convenient tuning of clusters by both frequency range and component. Low, mid or high frequencies for the entire system can be activated individually

Figure 5. Ancha project engineer Jay Foster in the West PA room.



or in any desirable combination, for the entire system or for portions of the system. There's no concern of someone getting into trouble because all parameters have limits set, with return to default settings just a touch away.

Dan Schipper of Ancha served as chief of operations at Georgia Dome and performed the installation of the IQ System, finding his first IQ experience to be extremely positive. He notes that he has been particularly impressed with the efficiency IQ affords in the initial tuning of a system.

Zwiebel adds that instead of having to run back and forth between the field and amplifier rooms to make adjustments, they are simply accomplished through IQ. "We position a technician in the sound room to operate the IQ host PC while I walk the stadium," he explains. "I am then able to radio changes and obtain instantaneous A/B comparisons, allowing much more accurate tuning of the system. Not only do I save a lot of time and energy, but I also end up with a better sounding system."

Schipper points out that he also likes the ability to pre-set up to 10 configurations (or modes), which can be activated by a simple touch of the AMX panel. "We currently have the system pre-programmed for three modes — football, conventions and basketball," he says. "We'll add more pre-sets as we need them. This will really be of benefit to the system operator, who can simply activate the system configuration needed with the touch of the panel."

Zwiebel plans to specify the IQ/AMX combination in three upcoming projects, all large-scale arenas. "We have ambitious future plans for the system. One thing we're looking at right now is tying the system in with MIDI controllers and delay lines, so that when you change a mode you can also change your delay settings." db

DAN MOCKENSTURM

Broadcast Audio

Welcome to a new series of articles on engineering for broadcast. This will be written in 6 articles covering the basics of recording and through the completion process of preparing audio for Television and Radio. The articles will be on 1) Field recording 2) Studio recording 3) Transferring 4) Sweetening and Sound design 5) Music Production and 6) Mixing. I will discuss equipment that is needed, problems that occur and solutions to them, new techniques and technologies, as well as general information.

Field Recording

● Let's start with where the audio originates for production and that's *Field Recording*. This is one of the most critical stages of the process and is one that sometimes gets overlooked.

The saying "we'll fix it in the mix" really does not apply here. Distortion, clicks and pops, rattles and hums as with most bad audio, cannot be fixed. Your best results will come from great audio to begin with. Otherwise the mixing engineer will be left with "polishing a turd". So, to get that great audio from the start, here are a few things to consider.

Dan Mockensturm is the Directer of Audio at CPN Television in Clearwater, Florida. He originally was with the Full Sail Center for the Recording Arts in Orlando, as Director of their Digital Studio Course. He is a graduate of Berklee College of Music in Boston, and has fifteen years of experience in audio and post production.

INFORMATION

This is the first step for any part of the process. As a sound recordist it is important to ask questions to the right people and find out as much as possible about the job. Ask questions such as "Where is the location and what are the directions to it?" "Is it indoors or outdoors"? " Is AC available"? "

Although there are some units which can supply the needed microphone power, you should have a mixer that can supply the right voltage.

How long is the project"? "Am I recording dialog and/or sound effects"? "How many different audio sources will there be?" and so on. Find out as much as you can so you will know what equipment you need and if you need other special pieces of gear. Of course, you should try to think ahead for your client and bring extra equipment in-case things change or you have equipment failure.

It is essential to get as many names and numbers to contact in-case an emergency happens and you can't make the gig. Remember that a lot of people are depending on you and you need to be responsible. When you can, always try to show up early so you can meet people, check out the situation and get set-up.

EQUIPMENT

The equipment you use will depend on the job and what is needed which is why the information is so important. It can also depend on the budget. Some recordists have different package deals for different size projects. Equipment varies so much that it's hard to be specific so I'll use the standards and concentrate on the application. Field recording is not as easy as just plugging a microphone into a tape player and pressing *record*. First, you do need some microphones, and good ones such as Nuemann, Schoeps, Sennheiser, Electro-Voice, Beyer or Shure. Usually, a condenser microphone

works and sounds best for recording voice and some effects. The microphones needs to be placed properly, either set-up somewhere or using a boom. I like to use a hypercardioid pattern, as opposed to an omni pattern, to get the most separation and the most direct sound from the voice. Using more than one microphone can have the advantage of not having to move around a lot and still being close to different sources. Just be careful of phase problems and changes in tone and volume. But it's not unusual to have a single microphone on a hand-held boom, pointing toward each source, held overhead out of the cameras' eye. That way actors don't have to be wired with a microphone and transmitter. Although if a shoot allows, a lavalier microphone works very well for picking up dialog, you just need to be very careful in the placing of that microphone so it is hidden away but still able to pick up good, clean audio. Be careful with lavalieres because they are sensitive to clothes rustling and movement, even the cable can sometimes act as a transducer. Remember condenser microphones take phantom power and that's not so easy in the field. Although there are some units which can supply the needed microphone power, you should have a mixer that can supply the right voltage. The mixer should be simple, have a clean audio path and be as light weight as possible. It usually will only need to be six to eight channels with simple EQ capabilities. You should be able to get a good sound by using the right microphones with the right placement and, therefore, minimize EQ. The mixer also needs at least two outputs to feed the audio tape deck or the camera and a fold-back send to the boom operator so he can hear what his microphone is picking up.

Good headphones are essential. They need to cover the ears and isolate you from any outside source. I like to listen at a loud volume so I can hear the quality of audio as it's being recorded. If you have the luxury of a recordist and a boom operator, the recordist should be monitoring the output of the tape recorder so he/she can verify the audio. It's very important to *make sure* you have a clean audio take to match the picture. The type of tape deck to use may vary. The standard in the field is a Nagra ¼-in. open-reel running at 7.5 in./sec. because of it's durability, quality and standardization. But lately the trend is going digital. Recording to a DAT has the advantages of digital audio—which means less transfer problems, little or no tape speed problems, and it's a little more portable. But not without it's disadvantages, such as durability in the field, they are not as forgiving to input overload/tape saturation, and they eat up batteries. Not to mention you can't monitor from the tape and machines that have timecode capabilities are very expensive, especially to have two, one for a back-up.

Slate the tape with an audible description when you can, label boxes and tapes immediately, and at the end of the day take time to write more information down and put it with the tape.

Timecode is a way to keep your sound in sync to the picture and is available on Nagras and DATs. To get timecode to your recorder you need to tap into the feed. That usually comes from a camera but could be from a separate generator. Not all producers/directors need that capability. Most times a simple clap track will work. That is the clap from the slate machine and will be the source for syncing the sound to picture.

FIXING PROBLEMS—COVERING ALL BASES

One source of problem is hum from AC and a solution to that is to use batteries. Batteries will also give you the ability to move around quickly and easily.

Slate the tape with an audible description when you can, label boxes and tapes immediately, and at the end of the day take time to write more information down and put it with the tape.

But with no AC you are going to need a lot of batteries. Buy the best you can because they will be the most reliable and last longer and that will save you time and money in the long run. Bring plenty of stock for things like batteries, tape, audio tape, etc. It's better to have too much, than not enough. And what about adapters? You may need all kinds of connectors like banana plugs, ¼-in. phone, mini, RCA, XLR and BNC to be able to interface with all kinds of different equipment. Y-connectors and adapters are very important. You may need to record directly to BETA tape and you need to be able to split the signal to both the BETA and your tape deck. (That's not a bad idea, it allows you to have a back-up in case any thing goes wrong to the BETA.) If you can afford to have custom cables made, do it. You don't want to have to worry about bad audio because of connectors or cables. Good shielded cables and smart placement away from power cables will also help you reduce hums and buzzes. When using wireless systems, take notice of potential interference threats like radio towers, rheostats, transformers, neon and florescent lights and other transmitters on or near the set. Also notice if there is a lot of metal in the room, it can cause the receivers to go crazy. Wind screens for the microphones are almost always necessary when working outside to help reduce low rumble from the wind and pops on dialog tracks.Always bring your back-up gear in case anything doesn't work or breaks down on the set.

My last suggestion is documentation. Slate the tape with an audible description when you can, label boxes and tapes immediately, and at the end of the day take time to write more information down and put it with the tape. It will make the job much easier in the transfer stage.

In the next issue I will go further in depth with the recordist's responsibilities and how to do it when we move into the studio and discuss recording in the television and audio studio. db

JOE CICCARELLO

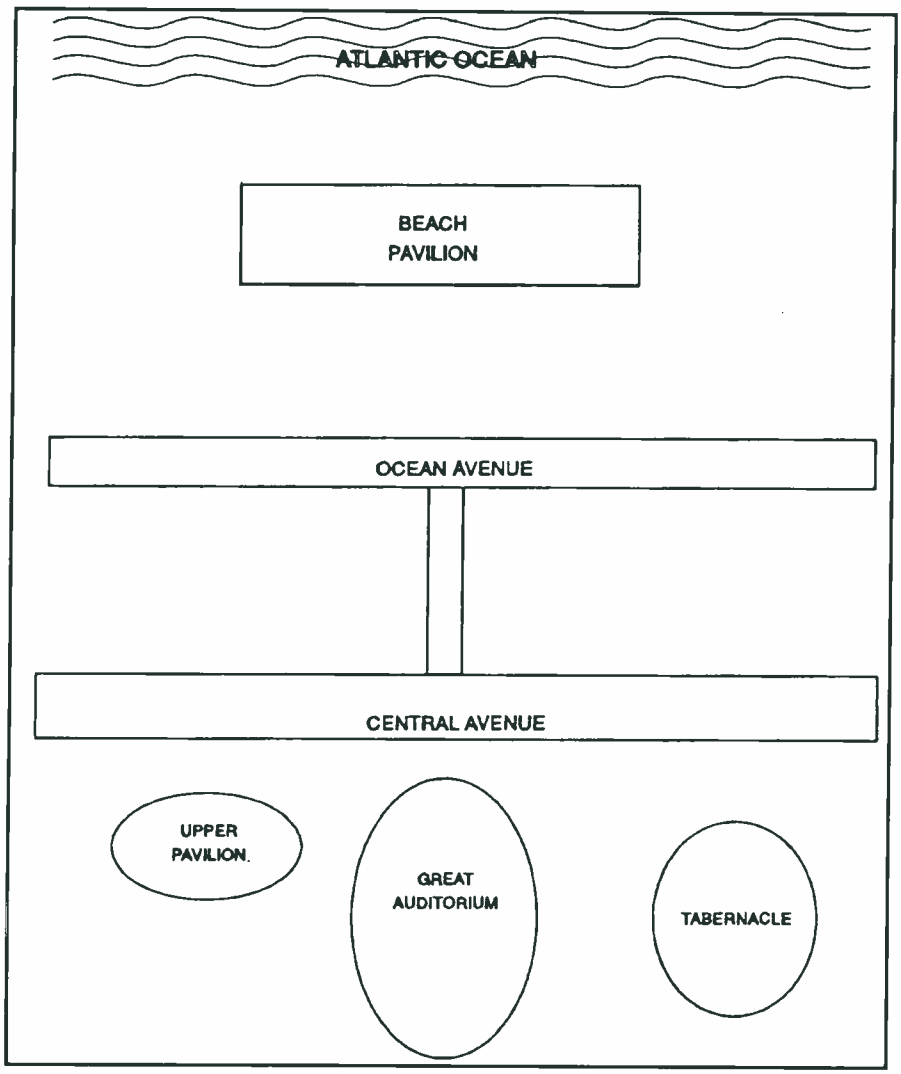
AUDIO FOR THE CHURCH

Big Splash '92

● Once a year in August, tens of thousands of Christians descend upon the picturesque seaside community of Ocean Grove, New Jersey to enjoy a family beach festival known as Big Splash.

This 16 hour event was organized by WWDJ, the largest Christian radio station in the New York Metropolitan area. On this particular day the station broadcasts live from Ocean Grove beginning at 8 a.m. The schedule of events for the day include a 5k Run, six hours of live music from the beach, puppet shows, kite flying, sand-castle building, inspirational Bible teachings and a contemporary Christian music concert in the evening at the 6,600 seat Great Auditorium. All this activity is spread out over four separate locations, each with specific audio needs (see *Figure 1*).

Figure 1. The Beach Pavilion had six hours of live local bands.. The Upper Pavilion had puppet shows and childrens' entertainment. The Tabernacle provided live radio prgramming with inspirational Bible teaching, and the Great Auditorium offered evening concerts with contemporary artists.



The company contracted for the job was Panavid Inc. of Somerset N.J. Due to the size of the event Walter Loehr, President of Panavid subcontracted Impact Audio to assist in the evening concert. Much of Panavid's equipment is custom designed and built by Sam Andriano owner of Impact Audio. Sam explains that he carries no stock product line. Each customer gets his own design based on intended use. These two companies often join forces to offer a diverse array of knowledge and experience to produce a quality show.

SET UP

The day begins early as the two audio trucks pull in to Ocean Grove at 6 a.m. and begin unloading. One team of men begin set up at the Beach Pavilion and Tabernacle preparing for an 8 a.m. start while another sets up at the Great Auditorium for a 12 noon sound check. WWDJ is to begin live programming from the Tabernacle at 8 a.m. which is to continue throughout the day. The audio requirements here are very simple. Two to three mics are sent through the house PA. This signal is then sent to the radio station in Hackensack N.J. via the phone lines, then to the stations transmitter and over the air waves. At the Beach Pavilion the

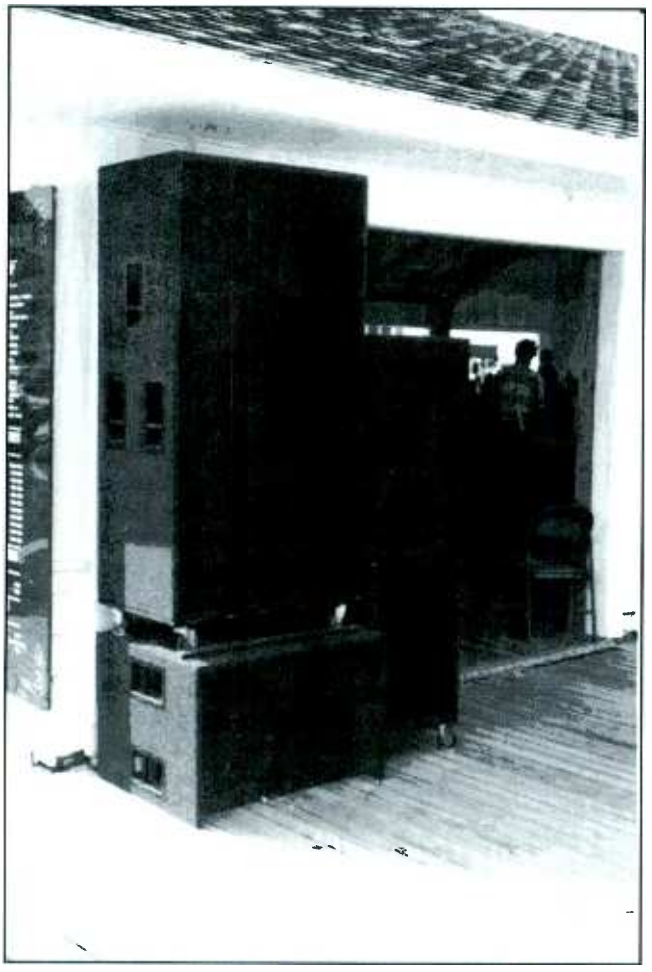


Figure 2. These speakers are outside the Beach Pavilion and face the ocean.

Figure 3. Details of the systems of Figure 2.

Panavid crew is setting up for a challenging day. Seven bands will be performing in the space of six hours with 15 minute set up times and sound checks between them! Lets take a look at this sound system.

BEACH PAVILION

The Beach Pavilion is located right at the edge of the beach, shelters about 200 people and looks like a big tent with the sides rolled. The speakers chosen for this particular location were designed and built by Impact Audio. Walter Loehr of Panavid explains that he also uses these same speakers for corporate work because of their neat appearance. The cabinets are a 4-way system loaded with 2—15-in. speakers for sub bass, 2—15-in. EV 15 Bs for low mids, a 2-in. horn with a phenolic driver for the upper mids and a 2-in. horn with a barilium driver for high frequencies. *Figure 2* shows the speakers outside the Beach Pavilion facing the ocean. The smaller speaker to the right is the same components only with one less 15-in. sub and 15-in. low mid. Inside the pavilion Panavid used another 4 way system designed by Impact Audio. This particular design employs 2—18-in. and 2—15-in. to cover the sub range, 2—15-in. for the low mids, a phenolic driver and horn for high mids and a 2-in. barilium driver for the highs (see *Figure 3*). Loehr of Panavid prefers a 4 way crossover system as opposed to a three because you can get more gain before feedback. Speaking of gain the house and beach front speakers are all powered by Carver PM.5 and P.T. 1250 amps. Loehr likes the Carvers because they're light but powerful—600 watts per side at 4 ohms.

MONITORING

The unique feature of this entire beach front system is the Tiltazoid. The what? The Tiltazoid—so named by designer and builder Sam Andriano of Impact Audio. This multi-purpose speaker can be hung (utilizing four flying points), mounted on a stand or used as a monitor. Its shape is trapezoidal with the back edge trimmed so it will tilt back when used as a floor monitor—thus its name, Tiltazoid!

It employs a 12-in. coaxial speaker with a 1-in. compressor driver and is operated at 400 watts program. Loehr of Panavid likes them so much that he ordered 40 of them! On this job he used nine for monitors and two Community PBL speakers loaded with 15-in. E.V.s and 1-in. horns with TAD drivers for side fills.

The nine Tiltazoids are driven by Carver amps and the two side fills are driven by Crest Amps. The monitor board is a 24 channel Soundcraft with three monitor mixes.

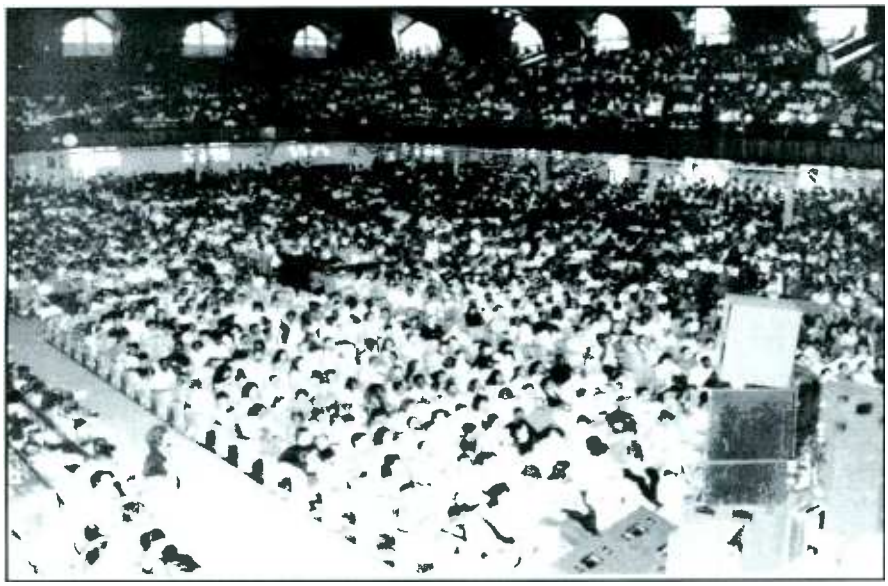


Figure 4. The 6,600 seat Great Auditorium.

MIXING CONSOLE (HOUSE)

The mixing console used for the house is a SOUND TRAC M Series 24 channel board with a eight sub groups and six auxiliary buses. In addition a C.A.D. 16 channel board was used and sub mixed in for additional channels, such as C.D. and cassette background tracks.

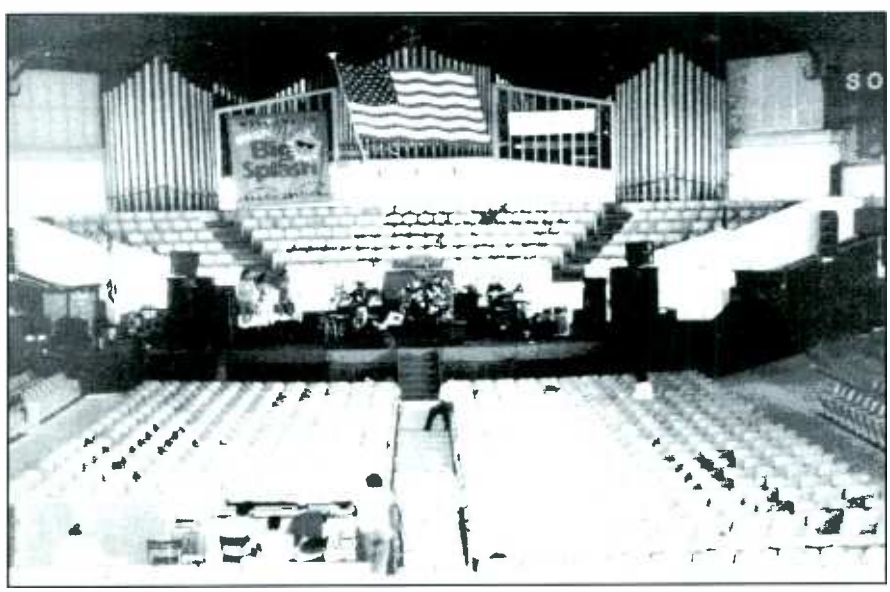
EFFECTS

Panavid carried a full compliment of effects; a Lexicon PCM 70, a Yamaha SPX 900, 3—dbx 160 compressor/limiters, a dbx 1531. The house e.q. was an Ashly 31 Band ⅓ octave GQ231 and the monitors were run through 2—Rane RE-27. A Peavey 4 Way System was used for the house system and 2—TDM model 24 CX-4 for the monitors (one used for a spare).

MIC'ING

Approximately 24 mics were used during the day. The vocal mic of preference was the Electro-Voice ND 857 specifically used for its increased gain before feedback. Shure SM-57s were used almost everywhere else, except to mic the kick drum where a AKG D-12E was used. Hats off to the guys of Panavid who successfully maneuvered and mixed the seven bands with relative smoothness while maintaining a consistently musical mix.

Figure 5. The 200-seat choir loft in the Great Auditorium.



THE GREAT AUDITORIUM

The 6,600 seat Great Auditorium is nearly a century old (built in 1894). It once boasted the world's largest organ and when first constructed held 10,000 people. After renovations were done to enlarge the stage, widen the aisles and install more comfortable seating, the capacity decreased by over 3,000. The building is constructed mostly of cedar wood and has fairly pleasing acoustics (see *Figure 4*).

SET UP

Set up began for the 6:30 evening concert at 8 a.m. The five artists started their sound checks at 12:00 noon. Three of the five artists had bands consisting of guitar, keyboards, bass guitar, drums, sax and background vocals. The other two artists sang to background tracks either on C.D. or cassette. Each band shared some equipment like drums, keyboards and amps. The greatest challenge of the afternoon however, was providing proper monitor mixes for each group. Fortunately the monitoring system provided by Panavid saved the day.

MONITORING

The monitoring console is a 32 X 10 board designed by (yes you guessed it) Impact Audio. It began as a Hill board but was modified to Sam Andriano's specifications. Sixteen different mixes were produced for the five different acts. Getting the proper monitor mix for each group took up the majority of the time during the sound check. Most bands like a loud monitor mix, sometimes louder than the house, but in this room it presents a major problem. Directly behind the stage is a 200 seat choir loft (*Figure 5*). The ceiling above this area is parabolic, which means it is designed to project the voices (or any other sound wave in that vicinity) forward. The problem is that monitor mixes which are usually negligent in other venues become

part of the house mix in this auditorium. Sam, knowing the room very well explained the solution. Keep the monitor mix as quiet as possible and add reverb for ambience which will give the effect of being louder without adding decibels.

The monitor speakers used were Impact Audio wedges with a 15-in. JBL and a 2-in. 120 degree wide dispersion horn. Nine of these were used in addition to two side fills. These side fills are another multipurpose Impact Audio design. Standing 60-in. tall, these speakers are made to take up the least amount of floor space—20-in. X 20-in.. They are a three-way design and are loaded with 2—15-in. subs, an Electro-Voice EVM 15-B and a 75 X 30 degree, two-inch constant directivity horn with a Radian driver (see *Figure 6*). Walter of Panavid likes to use multiple pairs of these as house speakers due to their portability and power.

MIXING CONSOLE

The house mixing console is a Soundtracs MX Series, 40 channel stereo board with eight sub groups, six auxiliary buses and a four band E.Q. with two parametrics (see foreground of *Figure 5*). When asked about the use of sub grouping, Sam explained that even though they are available, he doesn't like to use them because you lose something sonically. On occasion, he'll use them to turn off groups of instruments or vocals.

EFFECTS

The effects used in the house system are two Lexicon LXP-1s, used mainly for reverb and an LXP5 (multi effects). Both of these units are connected to a Lexicon MRC MIDI controller. An older but useful effect that Sam likes is a Roland SPE 1000 delay unit. This unit comes with a pedal used to tap in the tempo of the song being played. The effect is a slap-back echo effect which is in perfect time with the music.

The monitor system also used some effects, a Roland SDE 2000 for reverb and a Yamaha SPX 900 for multi effects. The latter unit was a special request by one of the bands.

Figure 6. Side fill units have three-way driver systems and are five-feet tall.

MICING

Both Panavid and Impact Audio carry a full compliment of microphones. The mics used were as follows; Shure SM-81s for overhead cymbals and hi hats, Sennheiser 421 for tom toms, an AKG D 12-E and Beyer M88 for the kick and a batch of Shure SM 57s for vocals. Sam prefers the 57s over the 58s because the tops screw off and the windscreens can be laundered.

HOUSE SPEAKERS AND POWER

The house speakers are a three-way system designed by Impact Audio (see right side of *Figure 6*). Each side of the stage has a stack of enclosures: two enclosures side by side in front of the stage handled the bass frequencies each employing four 15-in. specially designed bass speakers. On the stage was one more of the same cabinet. The mid cabinets are loaded with two JBL twelve-inch speakers with two enclosures per side. The high end is a two inch Eden horn with a TAD driver (two per side). To cover the side balconies is the same double horn combination used at the Beach Pavilion—a 2-in. horn with a phenolic driver for the low—mids and a 2-in. horn with a barilium driver for the highs.

The house system is powered by a combination of Crest Audio and SCS stereo amps. Because each of the 16 monitor mixes requires an amplifier, the accumulated power for the monitor system turned out to be over 10,000 watts.

If big crowds are any indication of a good show, Big Splash was a big success! The evening concert went well past midnight with a full house. By the time the last note sounded and the day ended the guys of Panavid and Impact Audio had set up and sound checked ten bands, mixed 12 hours of live music, and clocked a 22 hour day. It's getting close to sunrise, Sunday morning. The trucks are loaded. It's time to hit the road. Next stop for these "audio-philes"—set up for church! db

Tools Of The Trade

SHELLEY HERMAN

Stanton-Vestax CD-22 Dual Disc Player

● Every once in a while, while attending a trade show, I see a piece of equipment that jumps off the shelf and says: "I have an alternative use, I don't have to be used the way you see me here!"

The Stanton-Vestax CD 22 dual CD player is one of these items. It was shown as a CD player for disco DJs, but it can be used for live theater productions that will have only one or two performances especially where there is not a budget to transfer all of those sound library CDs onto a sound-effects tape. It also is a high-quality music CD player for touring sound systems.The CD-22 is comprised of two 19-in. rack mount units. The larger unit (5-in.high) contains the two transports, with only the open/close buttons and the power switch. The smaller chassis (3.5-in.high) has all of the controls and displays. The chassis' may be located up to 8.5-ft. apart but there is an optional 17-ft. extension available. Each deck has its own unbalanced RCA stereo output. The CD-22 is designed to be used with a console that has a cue feature to properly cue the next selection.

The specifications are listed with this article, but one of the neat features is that selections play from one to the next with almost no time lag, skipping the silent portions between cuts. It will handle either 12 cm or 8 cm discs. The controls for each deck are: *track select; jog; scan; pitch; monitor; play;* and *stop*. *track select, play,* and *stop* are self explanatory, but the others need some explanation. The *pitch* control gives a 8 percent variation of speed with a fine button that adds another 4 percent. The *scan* dial allows the operator to scan forward or reverse across the tracks to find just the track wanted. Of course the track select buttons allows the operator to go directly to a track, but the *scan* dial allows searching for just the right sounding track. The *jog* dial, in conjunction with the *monitor* button allows the operator to skip beats or sounds in forward or reverse, or even add a sample effect by quickly operating the *stop* and *play* buttons. With a little practice *scratch* effects that many of us used to get with LPs can be achieved.

The CD-22 has a built in computer that will allow the operator to program up to ten selections and nine files, review the selections then play them back. The computer displays which track is cued or playing on each deck, the timing, either track time; elapsed time, remaining time, or CD total time, a bar graph indicator for a quick display of position on the track, and status of the memories. It also has a diagnostic program indicating mechanical problems with the disc, such as being jammed, upside down, dirty, scratched, etc.

Another feature of this unit is a very intricate dual suspension system. There are no shipping screws or lockdown handles, just turn it on and insert the disc. This feature allows the unit to be moved without danger of damaging the transport.

The only difficulty I have found with the machine is that the INDEX numbers are not available, as used by some sound effects library CDs, however the JOG and SCAN dials allow the operator to find those tracks. Perhaps the MKII version will have the INDEX feature.

For only a few hundred more dollars than a high-quality home CD player, this professional unit is a worthwhile addition to any facility or portable system that uses sound library CDs as well as being a fine music CD player.

Specifications

Audio Output Channels	2 Stereo
Frequency Response	10 Hz to 20 kHz ±1 dB
S/N Ratio	>96 dB
THD	<0.03%
Dynamic Range	97 dB ea. out.
Channel Separation	106 dB ea. out.
Output (each chan.)	–10 dB V
Output Impedance	100 ohm unbalanced
Wow-flutter	Below measurable limits
Loading Time (no scan)	0.7 sec
Program Memory	Up to 9 program files of 10 selections each (total 90 tracks)
Display Capability	Track number, track elapsed time, track remaining time, total disc time remaining, program number
Suggested list price	$$1699.00 db

1992 Editorial Calendar

JAN/FEB The Sophisticated Electronic Cottage.

Winter NAMM Show issue.

• **GUIDE: Speakers: Performance & Monitor.**

MAR/APR Broadcasting—Audio Production for Radio and TV

NAB show issue.

• **GUIDE: Consoles and Mixers.**

MAY/JUNE Audio in Houses of Worship/Fixed Venue Sound Reinforcement

NSCA show issue.

• **GUIDE: Power Amplifiers.**

JULY/AUG Live Sound—Touring and Stadiums.

• **GUIDE: Tape, Tape Recorders and Accessories, Microphones.**

SEPT/OCT The Recording Studio—Digital and Analog, Big and Small.

AES in San Francisco Show issue.

• **GUIDE: Signal Processing Equipment, Part I, (delays, reverbs, crossovers, equalizers.)**

NOV/DEC **db Magazine's 25th Year Anniversary Issue!**

The World of Post-Production for Radio, TV and Film.

SMPTE in Canada Show issue.

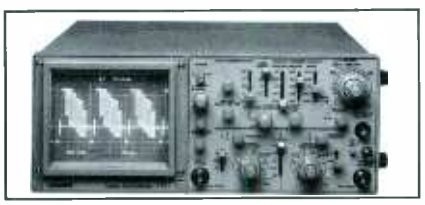
• **GUIDE: Signal Processing Equipment, Part II, (noise gates, noise reduction, limiters, compressors), Work Stations.**

NEW PRODUCTS

MONITOR LOUDSPEAKER

● The PowerMax 4 full range monitor loudspeaker features the new HPB15 high excursion low frequency driver, and the EXF16 high frequency compression driver. The loudspeaker utilizes an all new Linkwitz-Riley 24 dB passive crossover to ensure phase coherence through the crossover region. This is a concert profile monitor with an operating angle of 45°, and is finished in non-skid Duratex finish. The unit is designed to be used with the PowerPro Loudspeaker System Processor which offers the ISC system protection, phase and frequency correction, plus balance XLR inputs and XLR outputs.
Manufacturer: ARX Systems
Price: Available on request
Circle 50 on Reader Service Card

100-MHz OSCILLOSCOPE



● The Model 8101 100-MHz Oscilloscope features four trace operation with on-screen readout of basic settings and cursor measurements of voltage, time, frequency, voltage ration and phase. The sensitivity ranges are from 1 mV/div to 5 V/div in twelve steps with band limiting to 20 MHz in the 1 and 2 mV/div settings. Sweep speeds as high as 5 ns/div are offered, and built-in CH-1, CH-2 delay lines allow observation of fast trigger edges. Delayed sweep expands the main time base for close observation of timing events, and the use of ALTernate sweep displays both the main (A) and delayed (B) sweep simultaneously (four traces in the dual channel mode). Trigger source selection includes a VERT mode where the trigger is selected automatically from the channel under observation plus ALT or CHOP in the dual mode. A FIXed trigger mode keeps the trigger point with the p-p value of the signal, and a SINGLE sweep mode sets up one shop operations for low speed observations of photo capture purposes. X-Y operation is provided and dedicated sync separators ensure stable waveforms at video H and V rates. Variable hold off corrects triggering on long, complex wave trains.
Manufacturer: Leader Instruments Corp.
Price: $1,895.00
Circle 51 on Reader Service Card

WALL MOUNTING CABINETS

● The re-designed 300/320 Series of cabinets now feature right or left-hand hinging. Simply invert the right-hinging models with a 180 degree rotation for left-hinging applications. This change offers full functional and mechanical flexibility for wall-mounting 19-in. wide rack equipment. The cabinets are available in two overall depths, either 11-in. or 15-in., and six internal space heights. They are: 17-9/16; 21-1/16; 26-5/16; 28-1/16; 42-1/16 and 61-5/16 inches. For overall height add

2-15/16 inches. The standard width is 20-5/8-in. All models are constructed of welded 16-gauge CRS and included side louvers for ventilation, knockouts for easy wiring access and a front door cylinder lock. Mounting holes and removable pins allow independent installation of the rear section before mounting the center section. Structural features include M.I.G. welded seams and miters, alignment pins, and screw-type locking rods. Models over 28-in. in panel space height include 11-gauge mounting supports on the rear section for additional rigidity.

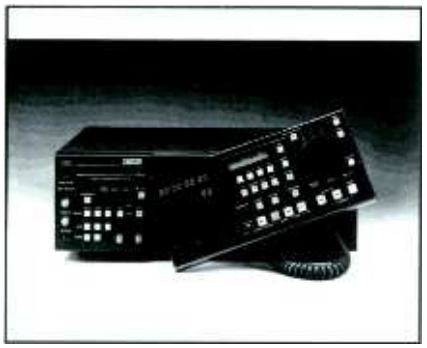
In addition, models over 42-in. in panels space height contain 16-gauge gusset support in center section to reduce sag. To ensure the security of the equipment, the 2-in. deep front door cannot be removed from its hinges while locked. Models without a front door are also available. Cabinets are shipped completely assembled.

Manufacturer: Atlas / Soundolier

Price: Depending on configuration

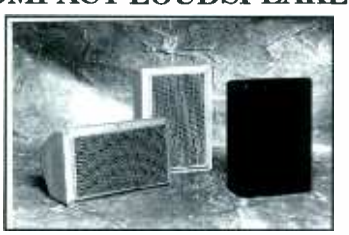
Circle 52 on Reader Service Card

PROFESSIONAL R-DAT RECORDER



● The DTR-90N R-DAT offers full-featured high performance and a removable front panel which can be laid flat or mounted on any work surface for remote operation. The recorder is designed with four heads to work in tandem with its companion CB149 Editor, providing simultaneous edit control of two recorders. The recorder can be packaged with several different client options which are: the Editor Interface/Memory Card for non-destructive preview editing; the Quickstart Memory Card which provides instantaneous playback when the play button is engaged; and the Time Code Generator/Reader/Synchronizer/Extern al Video Sync Card. The recorders comes with an integrated, switchable AES/EBU-SPDIF Serial Digital Interface as standard equipment. An optional interchangeable PC board is also available, conforming the digital interface to an SDIF-II format. A four-color brochure is available by circling the Reader Service number.
Manufacturer: Otari Corporation
Price: $8,495.00-R-DAT, $3,695.00-Editor; Card prices available by contacting manufacturer.
Circle 53 on Reader Service Card

COMPACT LOUDSPEAKER



● The Hot Spot PM is available in a 16-ohm version that is capable of handling 120 watts of power. A 70 V transformer and a 100 V transformer versions are also available. The cabinets are constructed of rugged black ABS with a metal grille screen. They contain two five-in. speakers. Besides the transformer versions, other options are available, including: A weather-resistant cone treatment for outdoor use; black, white or easily painted primer gray finish, or custom colors on special order; a swivel bracket that allows the speaker to be conveniently mounted on the wall or ceiling.
Manufacturer: Galaxy Audio
Price: (standard) $159.00, (70 or 100 V transformer) $198.00
Circle 54 on Reader Service Card

IMPROVED AURAL EXCITER TYPE C

● The Type C(2) replaces the Type C which was introduced in 1985. The Exciter is a patented audio process that recreates and restores missing harmonics. The new unit has a number of improvements and simpler harmonic level adjustments and is virtually noise free. A new process which is called "Big Bottom" is a major feature of this new unit. The C(2) Exciter is a two channel unit with the Aural Exciter and Big Bottom processes on both channels. Big Bottom enhances bass the same way the Exciter process enhances the high end. It is a psychoacoustic process which increases the perception of bass, without vastly increasing amplitude or generating subharmonics which can burn out speakers or over-saturate tape. Big Bottom is designed to make an 8-in. woofer sound like a 15-in. one, and add extra kick and thunderous bass to tape, without mud.
Manufacturer: Aphex Systems
Price: $349.00
Circle 55 on Reader Service Card

DUAL-GATE COMPRESSOR/LIMITER

● The model 266 effectively combines natural sounding gating with smooth, "soft knee: compression and automatic variable-knee soft limiting. Each channel's gate and compression controls are capable of dynamic range exceeding 112 dB, while the limiter blankets and unobtrusive roof on the output signal level. Stereo signals can be utilized with the simple flick of the stereo link switch, converting channel one into the master channel. Direct, hardwired input-to-output bypass switches are also provided for each channel. The unit is housed in a 1U chassis that is easily rack-mountable in either a flush or recessed position. It includes both XLR and 1/4-in. TRS input and output jacks for connection versatility, with two unbalanced 1/4-in. side chain inputs and outputs also available. A two-terminal barrier strip allows the unit to be connected to a variety of grounding configuration. DC control voltages shorten the audio path and utilize balanced inputs and outputs to reduce common mode noise, while low noise VCA's are factory trimmed to remove distortion and provide the unit with transparent audio signal. Other features include a 10-segment gain reduction LED bargraph, as well as LED indication of all dynamic functions, and a feed-forward gain control is included.
Manufacturer: Audio Logic
Price: $450.00
Circle 56 on Reader Service Card

ENGINEERED SOUND

MICROPHONES

● This is a new series of mics specifically designed for sound contractors, and they include the MicroLine series of ultra-miniature mics. Among the first of the MicroLine mics are the AT933PM/ML and the AT933R/ML miniature shotgun mics. Highly directional, these mics also offer low-noise and high-output characteristics. The output is 15 dB higher than that of conventional miniature condenser mics. They offer excellent signal-to-noise ratio for distance micing and despite their tiny size, the significantly narrower acceptance angle

solves difficult sound pickup problems. The line + gradient design is precisely scaled to provide a polar pattern normally found only on much large mics. The PM/ML unit includes a power module which contains all the necessary circuitry for simple installation into a standard electrical box in ceilings, including solderless connections for both inputs and outputs and a selectable low-cut filter. A hanging bracket, which is included, allows the mic to be hung unobtrusively over choirs, orchestras or in conference rooms. The R/ML model is similar but with a standard XLR connector. Both models are phantom power only, 9 to 52 V DC, and they are available in either black or white.

Manufacturer: Audio-Technica U.S. Inc.
Price: depending on model
Circle 57 on Reader Service Card

PASSIVE SUB SYSTEM

● The SubSat 1 is a 12 dB per octave, passive crossover system designed to work with the user's existing speaker systems. It has stereo inputs for the full range of signal coming from the existing power amplifier and it then splits the inputs into two stereo outputs. The low frequency output is to be sent to the subwoofer systems. The crossover frequency is 120 Hz. Frequencies above 120 Hz are sent to the high frequency outputs. these are to connected to the users regular full range speaker systems. The user has a choice of two output levels for the high frequencies: 0 dB and -3 dB. The -3 dB output is to be used with systems where more low end response is desired. This output attenuates the high frequencies by 3 dB so that the lows can appear louder in relation to the highs. The unit will handle up to 400 watts of RMS power per channel, making it compatible with a large variety of equipment.

Manufacturer: SoundTech
Price: $199.90
Circle 58 on Reader Service Card

DIGITAL WORKSTATION

● The Model 408 OMX Optical Multitrack Recorder/Editor has a separate, light-weight control/edit panel with dedicated keys; a shuttle/jog knob, and a track-sheet display. It is configured to emulate a 64-track tape recorder with four record heads and eight playback heads. It features two removable, rewritable magneto-optical disc for storing both audio and session information, each holding 100 track-minutes of audio per side. When a session must be interrupted, the discs can be removed and later re-inserted to complete the session. Very long recordings can be made by simply switching between discs. At the end of a session, the discs can be transported to another workstation for further post, or archived for re-editing later. The system's eight 1000-bin libraries can store audio segments of any length, can be copied from session to session, and be triggered from the control panel or from a MIDI keyboard. In post-production, the unit can be used for telecine and video track laying, audio-for-video and film post, dubbing and dialog replacement, music production, and editing, storing and triggering music, effects and dialog. For radio broadcasting the unit is very efficient as a tool for producing and triggering news, jingles and commercials.

Manufacturer: Augan Instruments BV

US Distributor: A/Z Associates

Price: $28,900 to 43,900

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Send to New Products Department, db Magazine, 203 Commack Road, Suite 1010, Commack NY 11725

db Buyer's Guide

Crossovers, Delays, Equalizers, Multi-Effects Processors

On the pages that follow, we present this issue's Buyer's Guide on Compressors/Limiters, Noise Gates, Noise-Reduction equipment, Miscellaneous, Digital Workstations. The information contained is supplied by the respective manufacturers. Further, if a manufacturer that you seek is not listed, the chances are strong that, as many times as we tried, we could not get information from them.

CROSSOVERS

ALTEC LANSING CORPORATION

Model 1631A is a two-way electronic crossover using plug-in modules to select crossover frequency and configure specific equalization to provide flat power response for various horn/driver combinations. The high-pass output has a level control and the low-pass output has a delay adjustment of 0 to 25 ms.

Dimensions: 1.75 in. X 19 in. X 4.875 in.

Weight: 4.74 lbs.

Price: $660.00

The 1632A Electronic Dividing Network is a dual channel two-way or single channel three-way active crossover, 24 dB/octave, selectable from 50 Hz to 10 kHz; elect. balanced in/out with xfmr in/out optional; 30/60 Hz HP inputs, hard limiters on all 4 outputs; sub-modules to customize response.

Dimensions: 1.75 in. X 19 in. X 9.75 in.

Weight: 8 lbs.

Price: $1,150.00

The 15594A Low Pass Crossover/Equalizer Module is a plug-in module for the 9400 series power amplifier; has 18 dB/octave roll-off pre-programmed at 125 Hz, 500 Hz, 800 Hz, 1250 Hz; customer programmable for other frequencies; programmable 12 dB HP roll-off with pre-sets at 16 Hz or 32 Hz.

Dimensions: 1.6 in. X 2 in.

Weight: 1.6 oz.

Price: $96.00

The 15595A High Pass Crossover/Equalizer Module is a plug-in module for the 9400 series power amplifier; 18 dB/octave roll-off pre-programmed at 125, 315, 500, 800, 1250 Hz; customer programmable for other frequencies; sub-modules available to customize frequency response to horn/driver.

Dimensions: 1.6 in. X 2 in.

Weight: 1.6 oz.

Price: $96.00

ARX SYSTEMS See our ad on page 2

The EC-1 is a low noise Linkwitz-Riley 24 dB Phase correct electronic crossover. It is ideally suited for all studio installation and live sound applications.

Dimensions: 1.75 in. X 19 in. X 6 in.

Weight: 3 kg

Price: to be announced

EC-2 is dual-channel 2-way/mono user configurable 24 dB Linkwiwitz/-Riley electronic crossover, balanced XLR in and out, also features mono low-frequency sum output, ultra low noise and distortion.

Dimensions: one rack space

Price: to be announced

BRYSTON/Brystonvermont Ltd.

The 10PBX is a 2-way stereo 3-way mono crossover with 12 switchable turnover points, 3 switchable slopes of 6, 12 +18 dB

per octave; balanced input/output; high frequency gain or cut control and mute switches; S/N ratio of -90 dB; distortion of 0.005 percent; 20 k ohm input impedance and output impedance of 100 ohms.

Dimensions: 1.75 in. X 19 in. X 10 in.

Weight: 12 lbs.

Price: $1,295.00

The 10PBX LR is a 2-way stereo, 3-way mono Linkwitz-Riley slopes with fixed cross-over points; high frequency gain or cut control; S/N ratio of -90 dB; distortion of 0.05 percent; 20 k ohm input impedance and output impedance of 100 ohms.

Dimensions: 1.75 in. X 19 in. X 10 in.

Weight: 12 lbs.

Price: $1,350.00

DOD ELECTRONICS CORPORATION

The Audio Logic X 34 Stereo 3-way, Mono 4-way Crossover features 24 dB per octave Linkwitz-Riley filter topology; continuously variable, extended range, crossover points; independent level; mute and polarity controls on each output; and 15 Hz, 4th order Butterworth high-pass filters on each input.

Dimensions: 1.75 in. X 19 in. X 6.5 in.

Weight: 3 lbs.

Price: $475.00

ELECTRO-VOICE, INC.

Model XEQ-3/Electronic Crossover features 3-way configurations; allows low-frequency signal delay for source alignment; low-frequency boost for extended bass; step-down operation of TL bass system. Has simple, easy to install modules for compression-driver high-frequency equalization.

Dimensions: 1.73 in. X 19 in. X 7.28 in.

Price: $820.00

FURMAN SOUND, INC.

The Model TX-324 stereo 2-way/mono 3-way crossover features 24 dB/octave rolloff slopes. Field Select allows optimizing filters for long-throw (Butterworth) or near field (Cauer); hard limiters on each output with adjustable threshold provide speaker protection; includes on/off transient muting; ground lift switch; in/out level controls; limit threshold indicators. Optional balanced configuration.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 7 lbs.

Price: $419.00

Model TX-424 stereo 3-way/mono 4 or 5-way crossover has features similar to the Model TX-324.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 9 lbs.

Price: $549.00

Model TX-524 stereo 4-way crossover has features similar to the TX-324.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 9 lbs.

Price: $679.00

The Model TX-3A is a 12 dB/octave tunable crossover that may be used for either stereo 2-way or mono 3-way applications. Includes calibrated input/output level controls, power indicator and ground lift switch. Optional balanced configuration.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 7 lbs.

Price: $319.00

LT SOUND

The ECU-2 is a stereo electronic crossover unit capable of stereo bi-amping as well as stereo tri-amping. Crossover points are continuously variable from 70 Hz to 11 kHz. It has 12 dB/octave Butterworth filters; summed mono output for subwoofer operation; individual phase switches on mid and high bands.

Price: $295.00

PANASONIC PRO AUDIO SYSTEMS

The WS-SP2A Subwoofer Processor (crossover) is networked for use with Ramsa loudspeakers. Includes 6th order alignment network for Ramsa subwoofers; has frequencies of 50 Hz, 80 Hz and 120 Hz; A and B (left and right) inputs; XLR; +4 dB balanced; A and B outputs; phone jack; +4 dB unbalanced; VLF is sum of left and right passed through crossover filter network; mono has phone jack, +4 dB unbalanced.

Dimensions: 1.75 in. X 19 in. X 7.875 in.

Weight: 6 lbs.

Price: $275.00

PEAVEY ELECTRONICS CORPORATION

The V4X is a variable 4-way electronic crossover; low, mid, high and very high level controls; switchable high EQ; balanced outputs; high and low pass filters; at 40 Hz and 20 kHz, calibrated System Gain Control; balanced XLR and ¼ in. input jacks; transformer-balanced XLR and ¼ in. output jacks for all four bandpass outputs.

Dimensions: 1.75 in. X 19 in. X 9 in.

Weight: 8 lbs.

Price: $399.99

The PC4-XL is a totally programmable, all digital four-way (mono) crossover; three-way mono with 4th output as additional LF out; MF out or HF out; two-way mono or stereo; 48 kHz sample rate; 24-bit internal processing; 64 times oversampled A-D; 70 to 650 ms of pre-delay time; up to 10 ms of delay on each output for driver alignment; two balanced inputs, four balanced outputs; selectable filter type.

Price: $799.99

RANE CORPORATION **See our ad on page 5**

The AC 22 and AC 23 State Variable Time Correcting crossovers feature 24 dB/octave Linkwitz-Riley filter performance via 41-detent frequency selector controls; built-in variable time delay for phase correction; automatic internal configuration switching; mute switches and input/output level controls with 6 dB gain each.

Dimensions: 1.75 in. X 19 in. X 5.25 in.

Prices: $389.00 and $499.00

The FAC 24 Flex Series Crossover features 24 dB/octave Linkwitz-Riley performance; 24-position digital frequency selector switch for plug-in card accuracy; electronic phase alignment; built-in adjustable CD-horn EQ; mono sub-bass input; and fully balanced ins/outs in half rack package.

Dimensions: 8.5 in. X 1.75 in. X 8 in.

Weight: 4 lbs.

Price: $339.00

The FAC 28 Flex Series Crossover is identical to the FAC 24 except that it features 48 dB/octave slopes to minimize the crossover region and associated problems.

Price: $449.00

SYMETRIX

The 524E multi-mode crossover has four configurable bands; precision cards that set frequencies and slopes; limiter attack/release times; HF horn EQ in/out; flat response from 20 Hz to 50 kHz; 0.01 percent distortion; threshold, gain, mute, phase reverse and phase adjust controls.

Dimensions: 1.75 in. X 19 in. X 9 in.

Weight: 10 lbs.

Price: $1,095.00

WHITE INSTRUMENTS

The DSP 5000 has a digital crossover, delay and parametric equalization all in one rack space; 19 bit, user configurable single channel in, 4 out; remote control capability via PA-422; MIDI or contact closures.

Dimensions: 1.75 in. X 19 in. X 12 in.

Weight: 9 lbs.

Price: $3,400.00

DELAYS

EVENTIDE, INC.

The PD860 precision delay features stereo; 20 kHz frequency response; delay adjustable from 15 milliseconds to 5.24438 seconds; adjustable in microsecond increments.

Dimensions: 1.75 in. X 19 in. X 12.5 in.

Weight: 8 lbs.

Price: $2,695.00

The BD980 broadcast delay has stereo; 20 kHz frequency response; 10 seconds maximum delay; dump; wait & exit; ramp to zero functions.

Dimensions: 1.75 in. X 19 in. X 12.5 in.

Weight: 15 lbs.

Price: $5,495.00

The BD955 broadcast delay features mono; 15 kHz frequency response; variable delay; dump and catch-up functions.

Dimensions: 1.75 in. X 19 in. X 12.5 in.

Weight: 10 lbs.

Prices: $3,360.00 (3.2 seconds maximum) or $4,300.00 (6.4 seconds maximum)

The BD941 broadcast delay features mono; 20 kHz frequency response; fixed delay; delete and bypass functions.

Dimensions: 1.75 in. X 19 in. X 9.4 in.

Weight: 5.5 lbs.

Prices: $1,795.00 (6 seconds) or $2,195.00 (12 seconds)

The BD942 broadcast delay features stereo; 20 kHz frequency response; fixed delay; delete and bypass functions.

Dimensions: 1.75 in. X 19 in. X 9.4 in.

Weight: 5.6 lbs.

Prices: $1,995.00 (3 seconds) or $2,395.00 (6 seconds)

KLARK-TEKNIK ELECTRONICS, INC.

The DN716 is a one in, 3 out 16 bit digital delay line with less than 90 dB dynamic range, 20 Hz-20 kHz, unweighted. Delay times from 0-1.3 seconds in minimum increments of 20us; input level indicator and level control; non-volatile memory; electronically balanced input; unbalanced outputs; transformer balancing optional.

Dimensions: 1.75 in. X 19 in. X 11.75 in.

Weight: 5.5 lbs.

Price: $1,625.00

The DN726 has two in, two out stereo 16 bit digital delay; 100 percent stereo tracking; control functions lock out and non-volatile memory; dynamic range of less than 90 dB; 20 Hz-20 kHz unweighted; electronically balanced inputs; unbalanced outputs; transformer balancing optional.

Dimensions: 1.75 in. X 19 in. X 11.75 in.

Weight: 5.5 lbs.

Price: $3,500.00

The DN726V is very similar to the DN726, but will display in either milliseconds or fields, and is switchable between PAL and NTSC standards (internally). Also has a (4) GPI control function to automatically follow delay introduced by other devices. For use in video applications.

Dimensions: 1.75 in. X 19 in. X 11.75 in.

Weight: 5.5 lbs.

Price: $3,900.00

The DN775 is a stereo disc-cutting delay, switchable to select 33 or 45 RPM; 100 percent stereo tracking; less than 90 dB dynamic range; 20 Hz-25 kHz; unweighted, electronically balanced inputs; transformer balanced outputs (standard); frequency response of 20 Hz-25 kHz + 1 dB, any level, any delay.

Dimensions: 12.75 in. X 19 in. X 11.75 in.

Weight: 5.5 lbs.

Price: $3,900.00

LEXICON, INC.

The LXP-15 combines range of reverb, pitch shifting and delay effect with fast editing of presets, MIDI control in a single rack-space package and user interface. Offers 128 preset effects with up to five pages of parameters per effect, and the ability to store 128 of your own effects and five external analog inputs for foot switches or pedals.

Dimensions: 1.75 in. X 19 in. X 13.9 in.

Weight: 12 lbs.

Price: $1,050.00

PANASONIC PRO AUDIO SYSTEMS

The WZ-9375 has 2 inputs with 2 outputs, alternately, 1 input with 4 outputs; up to 654 msec @ 100 kHz sampling rate; 10 microseconds to 1 millisecond of delay time steps; 50 kHz or 100 kHz sampling rate; frequency response of 20 Hz to 20 kHz, +0.5, -2 dB at 100 kHz sampling rate; dynamic range of more than 90 dB; less than 20 micro-seconds of group delay; less than 0.03 percent at 100 kHz sampling rate T.H.D.

Dimensions: 3.5 in. X 19 in. X 13.75 in.

Weight: 19.5 lbs.

Price: $4,500.00

ROLAND PRO AUDIO/VIDEO GROUP

Features digital companding PCM system equivalent to a 16-bit A/D/A converting system; dynamic range more than 100 dB; frequency response ranges from 10 Hz to 17 kHz with delay time from 0 to 1,500 ms; can store up to 8 different programmable memories.

Dimensions: 1.75 in. X 19 in. X 11.75 in.

Weight: 11 lbs.

Price: $1,095.00

SOUND CONCEPTS, INC.

The SSD550 surround and ambience delay unit features two channels of delay; 5 to 50 ms; may be switched to sequential for 10 to 100 ms.. variable mix of original and delayed signals available; passive surround decoder for film; S/N 90 dB; response 10 to 8000 Hz.

Dimensions: 3.5 in. X 19 in. X 9 in.

Price: $975.00

WHITE INSTRUMENTS

The DSP 5000 has a delay, parametric equalization and digital crossover all in one rack space; 19 bit, user configurable single channel in, 4 out; remote control capability via PA-422, MIDI or contact closures.

Dimensions: 1.75 in. X 19 in. X 12 in.

Weight: 9 lbs.

Price: $3,450.00

EQUALIZERS

ALESIS STUDIO ELECTRONICS

The MEQ-230 Precision Equalizer has dual 30 band, 1/3 octave EQ in single 19 in. rack space; interface provided by means of 1/4 -in. and RCA jacks; center frequencies range from 25 Hz to 20 kHz and are set to ANSI/ISO standards; each band provides 12 dB cut/boost; in/out switch.

Dimensions: 1.75 in. X 19 in. X 4 in.

Weight: 2.5 lbs.

Price: $249.00

ALTEC LANSING CORPORATION

The 8558B Programmable Microaudio Equalizer offers eight memories; only one rack space; no front panel controls; 28 1/3 octave filters with 12 dB of cut/boost; fixed HP/LP filters; elect. balanced in/out; xfmr in/out optional barrier strip only.

Dimensions: 1.75 in. X 19 in. X 7 in.

Weight: 5.9 lbs.

Price: $1,320.00

The 1750A Cut-Only ⅓ Octave Mono Equalizer has 28 constant-Q filters from 31.5 Hz to 16 kHz; 15 dB of attenuation per filter; 20 dB of broadband gain; variable HP/LP filters; elect. balanced in/out with optional xfmr, XLR and barrier strip.

Dimensions: 3.5 in. X 19 in. X 9.75 in.

Weight: 10.7 lbs.

Price: $1,200.00

The 1753A Boost-Cut ⅓ Octave Mono Equalizer has 28 constant-Q filters from 31.5 Hz to 16 kHz; 12 dB cut/boost per filter; 20 dB broadband gain; variable HP/LP filters; elect. balanced in/out with optional xfmr, XLR and barrier strip.

Dimensions: 3.5 in. X 19 in. X 9.75 in.

Weight: 10.7 lbs.

Price: $1,200.00

APPLIED RESEARCH AND TECHNOLOGY

The HD 31, Model 350 is an active balanced ⅓ octave 31 band equalizer featuring constant Q filters; 60mm sliders; switchable 15 and 7.5 dB level scale; switchable subsonic and ultrasonic filters; hard bypass at no power and S/N of 115 dB.

Dimensions: 3 in. X 19 in. X 6.25 in.

Weight: 8 lbs.

Price: $425.00

The HD 15, Model 340 is an active balanced ⅔ octave 15 band equalizer with constant Q filters; 60mm sliders; optional XLR connections; switchable subsonic and ultrasonic filters; hard bypass at no power and S/N of 115 dB.

Dimensions: 3 in. X 19 in. X 6.25 in.

Weight: 8 lbs.

Price: $425.00

ARX SYSTEMS **See our ad on page 2**

The EQ 30 and 60 are ultra low noise constant Q ⅓ octave graphic equalizers featuring balanced XLR and jack inputs/outputs and switchable 6 dB or 15 dB of cut/boost.

Dimensions: The EQ 30 is 3.5 in. X 19 in. X 10 in.

The EQ 60 is 5.25 in. X 19 in. X 10 in.

Weight: The EQ 30 weighs 3 kg

The EQ 60 weighs 4.5 kg

Prices: to be announced

The Multi Q is a six channel/band fully variable parametric EQ. Featuring ARX Auto Patch, the Multi Q allows the user to select any number of channels without the need for patch cables.

Dimensions: 1.75 in. X 19 in. X 6 in.

Weight: 3 kg

Price: to be announced

dbx PROFESSIONAL PRODUCTS, A DIVISION OF AKG ACOUSTICS, INC.

The 905 three-band parametric equalizer features instant before/after comparisons available by switch bypass; symmetrical peak/dip; and switchable notch mode on each band.

Dimensions: 5.25 in. X 1.5 in. X 9.5 in.

Weight: 0.75 lbs.

Price: $499.00

The 1531X graphic equalizer has selectable 15 band stereo (2/3 octave) or 31 band mono (⅓ octave) equalizer on ISO centers; constant-Q and symmetrical peak/dip curves with selectable 7.5 or 15 boost or cut; and switchable HP filtering at 20 Hz, 60 Hz or 120 Hz.

Price: $419.00

DOD ELECTRONICS CORPORATION

The DigiTech MEQ 28 Mono 28-band MIDI Programmable Graphic EQ is a two space, rack-mount mono graphic EQ that is

fully MIDI controllable and programmable with 99 user-definable programs. It features 28 bands of 12 dB cut/boost equalization.

Dimensions: 3.5 in. X 19 in. X 8.5 in.

Weight: 7 lbs.

Price: $569.95

The DOD 830 Stereo 15 band per channel, 2/3 Octave Graphic EQ is a two rack space EQ featuring 20 Hz to 20 kHz equalization; 12 dB cut/boost; low cut filter; 90 dB S/N; THD 0.006 percent and 5 percent frequency tolerance.

Dimensions: 3.5 in. X 19 in. X 8.5 in.

Weight: 7 lbs.

Price: $319.95

ELECTRO-VOICE, INC.

Model 2710 1/3 octave graphic EQ features 27-band, 1/3-octave equalizer; constant range variable-Q filters; minimal interference between adjacent filters; user-selectable high- and low-pass filters; built-in pink-noise generator for noise masking; system equalization and other applications.

Dimensions: 3.5 in. X 19 in. X 10.25 in.

Weight: 11.5 lbs.

Price: $1,130.00

FURMAN SOUND, INC.

Model GQ-31 is a 31-band single rack space graphic equalizer. Design results in extremely low noise, even with large amounts of boost or cut. Features include 12 dB of equalization; gain control; LED indicators for overload; EQ in, and power, as well as Loc Cut button and ground lift switch. Optional balanced configuration.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 6 lbs.

Price: $369.00

The Model GQ-15 stereo graphic equalizer is the same as model GQ-31, except it has two channels, each with 15 bands spaced at 2/3 octave intervals. Single rack unit height.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 6 lbs.

Price: $379.00

The Model GQ-62 stereo 31-band graphic equalizer is the same as model GQ-31, except it has two complete 31-band channels in one double-height rack chassis.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 10 lbs.

Price: $699.00

The Model PQ-4 parametric equalizer has constant-Q equalization curves; peak/shelf switches on top and bottom bands; extra wide range of bandwidth and EQ adjustment. Includes input level control; EQ in button, as well as overload; EQ status and power indicators; high and low level inputs/outputs; and footswitch jack, allowing use as a preamp. Balanced configuration is optional.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 6 lbs.

Price: $379.00

KLARK-TEKNIK ELECTRONICS, INC.

The DN410 is a dual (5) band/Single (10) band parametric equalizer with 100 percent frequency overlap on all bands; +15/-25 dB boost/cut; 1/12 to 2 octave bandwidth; separate variable high/low pass filters (each channel); separate EQ in/out switch on all bands plus overall noise less than -94 dBm; 20 Hz-20 kHz, unweighted.

Dimensions: 3.5 in. X 19 in. X 9.25 in.

Weight: 10 lbs.

Price: $1,195.00

The DN405 is the same as above, but with single (5) band only.

Dimensions: 1.75 in. X 19 in. X 9.25 in.

Weight: 7.7 lbs.

Price: $775.00

The DN360 is a dual channel 30 band 1/3 octave graphic equalizer with switchable 12 dB/6 dB scale on faders; switchable high pass filters; electronically balanced inputs, unbalanced outputs; transformer balancing optional; noise less than 90 dBm; 20 Hz-20 kHz unweighted.

Dimensions: 5.25 in. X 19 in. X 8 in.

Weight: 10 lbs.

Price: $1,795.00

The DN300 is a single channel 30 band 1/3 octave equalizer with continuously variable high and low pass filters; switchable 12 dB/6 dB fader scale; noise less than 90 dBm; 20 Hz-20 kHz unweighted; electronically balanced input; unbalanced output; transformer balancing optional.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 7.7 lbs.

Price: $1,150.00

The DN301 is a single channel 30 band 1/3 octave Cut only graphic equalizer with continuously variable high and low pass filters; switchable 12 dB/6 dB fader scale; electronically balanced input; unbalanced output; transformer balancing optional; noise less than 94 dBm; 20 Hz-20 kHz unweighted.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 7.7 lbs.

Price: $1,150.00

The DN332 is a dual 16 band 2/3 octave graphic equalizer with +12 dB boost/cut; switchable high pass filters; electronically balanced inputs; unbalanced outputs; transformer balancing optional; noise less than -90 dB;, 20 Hz-20 kHz unweighted.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 7.7 lbs.

Price: $1,095.00

LT SOUND

The PEQ is a dual-channel, 4-band parametric equalizer with selectable peak/dip or shelving response on upper or lower bands, overall hard-wire bypass and individual bypass on middle 2 bands. Bandwidth variable from 0.15 to 2 octaves.

Price: $595.00

The PEQ-1 is a single-channel version of the PEQ-2. Utilizes a single-rack space.

Price: $349.00

ORBAN, A DIVISION OF AKG ACOUSTICS, INC.

The Model 642B dual channel/stereo is a fully parametric equalizer with 4 bands per channel, switchable to 8 channels mono; each band with separate bypass, Q, frequency and fine tuning control; high pass and low pass filters per channel; minimum 40 dB notch per channel.

Dimensions: 3.5 in. X 19 in. X 11.25 in.

Price: $1,200.00

The models 672A/674A mono/stereo 8-band graphic parametric equalizers have long throw faders controlling boost and cut for each band; high pass and low pass filters with separate outputs for use as 2-way crossover.

Dimensions: 3.5 in. X 19 in. X 5.25 in.

Prices: $725.00 for the 672A

$1,525.00 for the 674A

Model 764A features programmable, digitally-controlled parametric equalizer version of the 642B; controls up to 99 channels of masters and slaves; stores up to 99 presets; has four bands, dual channel, with high and low pass filters; and programmable input attenuator.

Dimensions: 3.5 in. X 19 in. X 9.625 in.

Price: starting at $1,900.00, depending on configuration

OXMOOR CORPORATION

The DEQ-1 High Resolution programmable 1/3 octave equalizer has 29 1/3 octave filters adjustable in 1/2 octave spacing; 8 presets with security; balanced inputs/outputs; PA-422.

Dimensions: 1.72 in. X 19 in. X 13.5 in.

Weight: 13 lbs.

Price: $1,060.00

The DEQ-II High Resolution Programmable 1/3 octave Equalizer has 29 1/3 octave filters adjustable in 1/2 dB steps; high/low pass filters selectable on 1/6 octave spacing; large LCD display and front panel controls make programming simple; 8 presets with security; balanced inputs/outputs; PA-422.

Dimensions: 3 in. X 19 in. X 13.5 in.

Weight: 15 lbs.

Price: $1,400.00

PEAVEY ELECTRONICS CORPORATION

The AEQ 2800 is an automatic equalizer with up to 12 complete EQ memories; automatic EQ curve fit; 28-band EQ on 3rd octave centers; user friendly; 12 dB in 1 dB steps; 40 X 2 character liquid crystal display; 128 complete EQ program memories.

Price: $499.99

The PME 4 is a 4-band parametric equalizer with control over 11 octaves via state-variable filters; four bands with calibrated adjustment; 18 dB boost/cut; 1/2 to 2 full octave range.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 6 lbs.

Price: $229.99

The Autograph is programmable with automatic EQs with up to 128 user-selectable program memories; complete with real-time analysis EQ capability; 12 dB in 1 dB steps; 6 dB in 0.5 dB steps; 8 settings; MIDI-controllable sliders; rack mountable.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 7 lbs.

Price: $549.99

The PME 8 is a stereo version of the PME 4.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 10 lbs.

Price: $349.99

The PME 4000 is a parametric control over 11 octaves; top and bottom bands switchable (peak to shelving); +4 balanced in and out; 4 parametric bands.

Price: $349.99

The EQ 215 has two 2/3 octave graphic equalizers; 6 or 12 dB ranges; level control; EQ bypass; +24 dBv input and output capability.

Price: $399.99

The EQ 31 has 31 bands of graphic EQ; 150 centers; 6 or 12 dB ranges; level control; low and high cut filters; +24 dBv input and output.

Price: $379.99

RANE CORPORATION **See our ad on page 5**

The ME 30 and ME 15 MicroGraphic Equalizers feature constant-Q 1/3 and stereo 2/3 octave performance in single rack space packaging; with switchable 6/12 dB boost/cut; input level; hard-wire bypass and 20 mm center-detent sliders.

Dimensions: 1.75 in. X 19 in. X 5.25 in.

Weight: 5 lbs.

Prices: $359.00 and $369.00

The GE 27 and GE 14 Graphic Equalizers feature constant-Q 1/3 and 2/3 octave performance in two rack space packaging; with 45 mm center-detent sliders; level control; hard wire bypass; low noise and low distortion circuitry.

Dimensions: 3.5 in. X 19 in. X 8.5 in.

Weight: 9 lbs.

Prices: $499.00 for GE 27 and $529.00 for GE 14

The SP 15 Studio Parametric Equalizer/Notch Filter provides 5 bands, each with 4-octave sweep; bandwidth from 1.5 to 0.03 octave; +12/-15 dB boost/cut; individual bypass; overall bypass and gain control; and fully balanced input/output. Noise and distortion specifications exceed 16-bit digital performance.

Dimensions: 1.75 in. X 19 in. X 5.25 in.

Weight: 5 lbs.

Price: $599.00

The FPE 13 Flex Series Parametric Equalizer features three fully parametric full-range bands in a single channel half-rack format. Vertically or horizontally mountable, the unit provides fully balanced three-pin and ¼ in. input/output; exclusive I/O patch point; overall gain and bypass; and bandwidth range from 0.03 to 2 octaves and 10 Hz-20 kHz frequency range for each band.

Dimensions: 8.5 in. X 1.75 in. X 8 in.

Weight: 4 lbs.

Price: $289.00

The FME 15 Flex Series MicroGraphic Equalizer is a single channel ⅔-octave Interpolating Constant-Q graphic equalizer with dual boost/cut range switch; input/output level controls; exclusive Patch I/O jack; and fully balanced three-pin, terminal strip and ¼ in. input and output connectors.

Dimensions: 8.5 in. X 1.75 in. X 8 in.

Weight: 4 lbs.

Price: $289.00

The MPE SERIES Programmable Equalizers feature the MPE 28 ⅓ octave and MPE 14 Dual ⅔ octave equalizers with 128 memory locations plus a software package that enables curve weighting (adding 2 curves together); real time program changes; remote control; copying; data-dumping, full MIDI mapping and other functions.

Dimensions: 1.75 in. X 19 in. X 8.5 in.

Weight: 6 lbs.

Prices: $749.00 for the MPE 28 and $799.00 for the MPE 14.

SABINE MUSICAL MANUFACTURING COMPANY, INC. **See our ad on page 5**

The FBX Feedback Exterminator is a microprocessor-controlled, parametric, filtering device which automatically seeks out and eliminates feedback in sound systems and continuously updates the filters as necessary.

Dimensions: Single space rack mount

Price: $550.00

SOUNDCRAFTSMEN

The PRO-EQ 22 C-MOS 0.1 dB Differential/Comparator Octave Equalizer is a two-channel device with 10 octave-wide bands of adjustment for each channel featuring C-MOS Digital Switching; Differential/Comparator 0.1 dB True Unity Gain controls; LED True Unity Gain indicators; EQ defeat totally bypasses equalizer; Pre/post EQ processor loops.

Dimensions: 3.5 in. X 19 in. X 11 in.

Weight: 15 lbs.

Price: $349.00

The PRO-EQ 44 is a C-MOS 0.1 dB Differential/Comparator Third Octave featuring C-MOS digital switching; two independent channels of EQ; ⅓ octave 40 Hz/1 kHz; alternate ⅓ octave 1 kHz/16 kHz; exclusive differential/comparator unity-gain circuits; balancing LEDs for instant adjustment to unity gain; pre-post EQ loops and EQ defeat switch.

Dimensions: 3.5 in. X 19 in. X 11 in.

Weight: 15 lbs.

Price: $549.00

SUMMIT AUDIO, INC.

The EQP-200A is a dual program equalizer utilizing tube gain make-up stages with 990, balanced output. All units are hand-crafted and burned in for ten days or more.

Dimensions: 3.5 in. X 19 in. X 10.5 in.

Weight: 19 lbs.

Price: $2,100.00

The EQF-100 Full Range Vacuum Tube Equalizer is a full-range, single channel, four band equalizer with Hi/Lo pass filter section; musically selected center frequencies; with bands one and four peaking of shelving selectable; 990, balanced output.

Dimensions: 3.5 in. X 19 in. X 10.5 in.

Weight: 21 lbs.

Price: $2,200.00

SYMETRIX

The SX201 parametric EQ has three overlapping bands; +15 dB boost; -30 dB cut; 0.05 octave to 3.3 octaves bandwidth; 119 dB S/N ratio; 20 Hz to 20 kHz response (+0, -1 dB).

Dimensions: 1.75 in. X 8 in. X 5.5 in.

Weight: 5 lbs.

Price: $259.00

WHITE INSTRUMENTS

The Model 4700/4700-2 is a digitally-controlled 1/3 octave equalizer; has one or two channel; controllable from the front panel with password protection or software control via RS-232 or PA-422 interface with Pilot 447 software provided.

Dimensions: 1.75 in. X 19 in. X 12 in.

Weight: 9 lbs.

Prices: $950.00 mono/$1,425.00 dual

Model 4710 is a digitally-controlled 1/6 octave 55 band equalizer in one rack space. Controllable from the front panel with password protection; has 10 memory locations and 10 separate preset locations in non-volatile storage.

Dimensions: 1.75 in. X 19 in. X 12 in.

Weight: 9 lbs.

Price: $1,550.00

The Model 4650/4660 is a 60 mm slider controlled 1/3 octave filters 31.5 Hz-16 kHz; 12 dB, 10 dB gain; variable high/low pass on 4660; XLR and 1/4 jack connectors; input/output transformer available (4622).

Dimensions: 3.5 in. X 19 in. X 5 in.

Weight: 7 lbs.

Prices: 4650 is $699.00/4660 is $750.00

Model 4675 is a 60mm slider controlled stereo 2/3 octave; filters 40 Hz-16 kHz 12 dB range, 10 dB gain; variable high pass, fixed low pass; XLR connections; servo-balanced differential input/output circuit.

Dimensions: 3.5 in. X 19 in. X 5 in.

Weight: 7 lbs.

Price: $795.00

Model 4400 has L-C active 1/3 octave filters 31.5 Hz-16 kHz; 10 dB range; variable high/low pass; 3 outputs and crossover socket for optional bi-amp/tri-amp operation; input/output transformers available; noise -90 dBu worst case.

Dimensions: 3.5 in. X 19 in. X 8 in.

Weight: 15 lbs.

Price: $1,050.00

The Model 4500 is R-C active 1/3 octave filters 31.5 Hz-16 kHz 10 dB range; variable high/low pass; 3 outputs and crossover socket for optional bi-amp/tri-amp operation; input/output transformers available; noise -80 dBu worst case.

Dimensions: 3.5 in. X 19 in. X 5 in.

Weight: 7 lbs.

Price: $790.00

Model 4100A has L-C active stereo octave band 31.5 Hz-16 kHz 10 dB range; variable high pass; fixed low pass; bi-amp available; input/output isolation transformer available; noise -92 dBu worst case; L.A. approved.

Dimensions: 3.5 in .X 19 in. X 5 in.

Weight: 11 lbs.

Price: $975.00

The DSP 5000 has 12 bands of parametric equalization, digital crossover and delay all in one rack space; 19 bit, user configurable single channel in, 4 out; remote control capability via PA-422, MIDI or contact closures.

Dimensions: 1.75 in. X 19 in. X 12 in.

Weight: 9 lbs.

Price: $3,400.00

MULTI-EFFECTS PROCESSORS

APPLIED RESEARCH AND TECHNOLOGY

The SGX-2000, Model 500, is for guitar. Tri-channel programmable tube and solid state preamp with stereo digital effects; full 20 kHz bandwidth; 24 bit processing; seven band equalizer.

Dimensions: 3 in. X 19 in. X 9 in.

Weight: 15 lbs.

Price: $829.00

The SGX NightBass, Model 490, is for bass guitar. Tri-channel programmable tube and solid state preamp with stereo digital effects; full 20 kHz bandwidth; 24 bit processing; seven band equalizer and selectable crossover.

Dimensions: 3 in. X 19 in. X 9 in.

Weight: 15 lbs.

Price: $839.00

The Power Plant, Model 410, is a dual channel guitar preamp. Channels are switchable between clean and dirty with their own separate EQ effects loop; separate guitar, line and power amp and headphone outputs.

Dimensions: 1.5 in. X 19 in. X 10 in.

Weight: 11 lbs.

Price: $329.00

DOD ELECTRONICS CORPORATION

The DigiTech DSP 256XL Digital Effects Processor features 21 different studio-quality effects, up to 4 simultaneously, and is built tough enough for road use.

Dimensions: 1.75 in. X 19 in. X 8.5 in.

Weight: 5.5 lbs.

Price: $439.95

The DigiTech DSP 16 Effects Processor contains 128 MIDI changeable programs utilizing 16 different reverb and delay effects; a 3-band EQ provides tailoring of the sound.

Dimensions: 1.75 in. X 19 in. X 8.5 in.

Weight: 4.5 lbs.

Price: $299.95

LT SOUND

The ECC is a digital delay system with microplate reverb. Delay and reverb may be used simultaneously or independently; delay range is from 1 ms to 1 s; effects include doubling, chorus, flange, plate reverb with delay, acoustic chamber and tremolo.

Dimensions: 1.75 in. X 19 in. X 7.5 in.

Price: $995.00

PEAVEY ELECTRONICS CORPORATION

The Ultraverb II is a digital multi-effects processor with 15 kHz bandwidth; 256 internal programs; 128 user editable effects; real time MIDI control; each preset transfer step reversible up to last keystroke; full MIDI access.

Dimensions: 1.75 in. X 19 in. X 6.5 in.

Weight: 6 lbs.

Price: $349.99

All effects of the AddVerb II, except reverbs and specials, may be modified and stored at any of 199 program presets; full MIDI control capability; 50 reverb presets; 40 programmable delay/echo and modulated presets; 10 combinations; presets may be mapped to any of 128 MIDI program numbers.

Dimensions: 1.75 in. X 19 in. X 8 in.

Weight: 6 lbs.

Price: $319.00

The Multifex contains four 16-bit, digital, multi-effects modules in one 19 in. rack mount package. Each module delivers user-adjustable echo; pre-delay; early reflections; room size; tonal color; reverb time; left and right stereo channel delay; left and right stereo echo feedback; chorus rate; depth; delay time; feedback and multi-effects algorithm facilities.

Dimensions: 1.75 in. X 19 in. X 9.125 in.

Weight: 7 lbs.

Price: $1,099.99

ProFex is a programmable MIDI controlled multi-effects preamp featuring digital stereo multi-effects processor; switchable for line level input of instrument level; independent effect blocks can be combined in series or parallel in any order to form multi-effect chains; each effect block has independent mix and level control; programmable noise gate in all programs; 128 presets mapped to 128 programs for front panel, MIDI or footswitch access.

Price: $799.99

The DSR 1000 is a MIDI capable digital stereo reverb/multi-effect processor; six powerful multi-effect algorithms; all effects re-mappable; full suite of echo/chorus/reverb facilities; 16-bit processing.

Price: $349.00

The QFX is a 4-channel digital multi-effects processor with full MIDI implementation; 16-bit processing; stereo/mono; 1 I.U. 19 in. rack package; re-mappable effects positioning; up to 2.75 seconds of digital delay available.

Price: $1,099.00

REVERBS

ALESIS STUDIO ELECTRONICS

The Quadraverb Plus features 1.5 seconds of delay memory for sampling; independently adjustable multi-tap delays; programmable panning; new ring moduator and resonator configuration along with the 20 K bandwidth reverb; delay; chorus; flanging; parametric EQ; leslie simulator; and comprehensive onboard digital effects mixing system of the original Quadraverb.

Price: $499.00

The Microverb III, a 16-bit stereo digital reverb and effects processor, has 256 preset programs: 112 reverbs; 32 gated/reverse reverbs; 80 delays; and 32 multi-tap and effects programs. The 19 in. rack mountable unit features 15 kHz bandwidth and two bands of EQ (100 Hz and 4 kHz) for fine tuning of programs.

Price: $249.00

The Midiverb III is a digital stereo multi-effects unit capable of generating four effects at a time: delay; reverb; and chorus or flange. Features 200 memory locations, with 100 reserved for factory presets. Real-time MIDI control.

Price: $399.00

APPLIED RESEARCH AND TECHNOLOGY

The Multiverb ALPHA, Model 470, is a 24 bit full 20 kHz digital signal processor capable of combining seven effects at once. Has programmable seven band EQ; reverb; two octave of Pitch Transposing; 20 delay types including sampling.

Dimensions: 1.5 in. X 19 in. X 9.25 in.

Weight: 11 lbs.

Price: $499.00

The Multiverb LT, Model 420, is a studio digital effects signal processor with instant access to 192 pre-programmed presets of up to three effects at once. Effects include reverb; delay; chorus; flanging; gated and reverse reverb and panning.

Dimensions: 1.5 in. X 19 in. X 9.25 in.

Weight: 10 lbs.

Price: $299.00

EVENTIDE, INC.

The H3000KS Kitchen Sink Ultra-Harmonizer has all SE and B features plus Vai Presets and HS322 Internal Sampler Board (23.71 seconds mono/11.35 seconds stereo sampling, pitch shifting and time compression/expansion, more).

Dimensions: 3.5 in. X 19 in. X 13.5 in.

Weight: 13 lbs.

Price: $4,590.00

The H3000SE Studio Enhanced Ultra-Harmonizer has 19 algorithms, including vocoder; dense room; multishift; band delay; string modeller; phaser, stutter and patch factory; 200 presets; function generator (programmable parameter modulation); soft functions (user-definable Soft Keys).

Dimensions: 3.5 in. X 19 in. X 13.5 in.

Weight: 13 lbs.

Price: $2,995.00

The H3000B Broadcast/Post Ultra-Harmonizer has 14 algorithms, including TimeSqueeze (stereo time

compression/expansion with machine control); stutter and patch factory (white noise generator, filters, pitch shifters, delay lines and more); 80 presets; function generator, soft functions.

Dimensions: 3.5 in. X 19 in. X 13.5 in.

Weight: 13 lbs.

Price: $2,995.00

The H3000S Studio Ultra-Harmonizer has 11 algorithms including diatonic shift; dual shift; layered shift; stereo shift; reverse shift; swept combs; reverb factory; ultra-tap; dual digiplex; long digiplex; 48 Steve Vai presets; 58 factory presets.

Dimensions: 3.5 in. X 19 in. X 13.5 in.

Weight: 13 lbs.

Price: $2,495.00

KLARK-TEKNIK ELECTRONICS, INC.

The DN780 offers full control over several parameters including predelay time; level and pattern of reflections; low and high frequency decay times; and room size. Supplied with remote controller; has 50 non-volatile user memories. 32 bit circuitry.

Dimensions: 3.5 in. X 19 in. X 12.25 in.

Weight: 16.5 lbs.

Price: $2,865.00

LEXICON, INC.

The 300 Digital Effects System is designed for the small professional studio. Features include two stereo inputs/outputs (balanced XLR) and digital inputs/outputs in the AES/EBU and SPDIF formats. The 300 features 50 event effects recall via SMPTE time code; full MIDI implementation; and 96 dB signal-to-noise ratio; and reverb; ambiance; stereo pitch shifting and mastering type algorithms.

Dimensions: 3.5 in. X 19 in. X 13.6 in.

Weight: 18.9 lbs.

Price: $4,795.00

LT SOUND

The RCC reverb control center is a complete microplate reverb system for use with or without a mixing board. It has 2 mic inputs; inputs for 2 additional stereo sources; and output for a tape recorder, plus 3-band equalization.

Dimensions: 1.75 in. X 19 in. X 7.5 in.

Weight: 7 lbs.

Price: $695.00

PEAVEY ELECTRONICS CORPORATION

The Univerb II has 128 stereo 16-bit effects; bandwidth of 20 Hz to 12 kHz; VLSI technology; remote bypass capability; stereo and mono to stereo capability; single rack space chassis.

Dimensions: 1.75 in. X 19 in. X 8.125 in.

Weight: 5 lbs.

Price: $249.99

ROLAND PRO AUDIO/VIDEO GROUP

The R-880 digital reverb has four independent DSPs; reverb; non-linear reverb; early reflections; chorus; delay; EQ; compression; flat frequency response; 90 dB dynamic range; analog, AES/EBU digital I/O connections; accommodates 48 kHz, 44.1 kHz signals.

Dimensions: 3.56 in. X 19.18 in. X 16.56 in.

Weight: 22 lbs.

Price: $3,995.00

The GC-8 is a graphic controller remote control unit for the R-880 featuring large, 256 X 64 dot LCD; five rotary knobs and numeric keypad for easy programming; memory card slot for storing and loading programs.

Dimensions: 2 in. X 13.125 in. X 6.94 in.

Weight: 2 lbs., 10 oz.

Price: $850.00

Addresses

Alesis Studio Electronics
3630 Holdrege Avenue
Los Angeles, CA 90016

Ashly Audio, Inc.
100 Fernwood Avenue
Rochester, NY 14621

Altec Lansing Corporation
10500 West Reno Avenue
P.O. Box 26105
Oklahoma City, OK 73126

Applied Research and Technology
215 Tremont Street
Rochester, NY 14608

ARX Systems
28271 Bond Way
Silverado, CA 92676

Bryston/Brystonvermont Ltd.
979 Franklin Lane
Maple Glen, PA 19002

dbx Professional Products, a division of AKG Acoustics, Inc.
1525 Alvarado Street
San Leandro, CA 94577

DOD Electronics Corporation
5639 South Riley Lane
Salt Lake City, UT 84107

Electro-Voice, Inc.
600 Cecil Street
Buchanan, MI 49107

Eventide, Inc.
One Alsan Way
Little Ferry, NJ 07643

Furman Sound, Inc.
30 Rich Street
Greenbrae, CA 94904

Klark-Teknik Electronics, Inc.
200 Sea Lane
Farmingdale, NY 11735

Lexicon, Inc.
100 Beaver Street
Waltham, MA 02154

LT Sound
7980 LT Parkway
Lithonia, GA 30058

Orban, a division of AKG Acoustics, Inc.
1525 Alvarado Street
San Leandro, CA 94577

Oxmoor Corporation
2111 Parkway Office Circle
Birmingham, AL 35244

Panasonic Pro Audio Systems
6550 Katella Avenue
Cypress, CA 90630

Peavey Electronics Corporation
711 A Street
Meridian, MS 39301

Rane Corporation
10802 47th Avenue West
Everett, WA 98204

Roland Pro Audio/Video Group
7200 Dominion Circle
Los Angeles, CA 90040

Sabine Musical Manufacturing Company, Inc.
4637 Northwest 6th Street
Gainesville, FL 32609

Sound Concepts Inc.
Post Office Box 135
Brookline, MA 02146

Soundcraftsmen
2200 South Ritchey
Santa Ana, CA 92705

Summit Audio, Inc.
P.O. Box 1678
Los Gatos, CA 95031

Symetrix, Inc.
4211 24th Avenue West
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White Instruments
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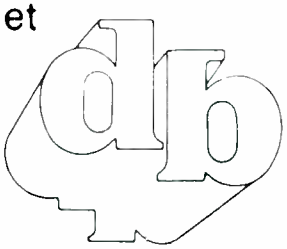

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● *The question was:*
At times, I've been a bit lax in maintaining my old analog decks. Will these habits cause problems with my DAT recorders? How often should a DAT recorder be cleaned? How do I know for sure that I better clean it or else? Is there a preventive maintainance schedule and what is it?

These questions were quite a bit beyond our own knowledge, so we turned to an acknowledged expert John R. French of JRF and now also running its spin-off, NXT Generation. John's answers:

Analog tends to be much more forgiving than digital. The old machine, even when the heads were marginal, could still be tweaked and also shimmed. But when a DAT machine reaches the problem stage, it can get very unfriendly and with very little advance notice.

Manufacturers of DAT machines usually proved cleaning and preventive maintenance instructions which closely resemble those for professional video recorders. This means cleaning thoroughly the head drum and tape-path components—on a *daily* basis. those who have ventured inside their machines for cleaning "by the book" are well aware that a DAT transport is small, precise and intricate. Compared to an analog machine, cleaning a DAT can be tricky and time-consuming.

Typical symptoms (other than outright failure) which may be intermittent include:

1. Dropouts
2. Noticeably increased distortion
3. High error rates
4. Problems loading or unloading tapes
5. Visual tape damage
6. Interchangeability problems (now won't play tapes from another machine it used to.
7. Speed (pitch) variations

John R. French

We note that NXT Generation now offers 1,500 and 6,000 hour overhaul service for DAT recorders.

Contact them at 249 Kennedy Road, Greedell NJ 07839.

Historical Perspectives

Editorial

Some of you are seeing db Magazine for the first time, having picked up your copy at the AES Convention. Hopefully, you like what you are reading and will join our growing family of professional audio subscribers. Whether you have entered this industry for only a few days or for many years, we have something for you. Welcome.

On the pages that follow, we are reprinting a (then)state-of-the-art story that originally appeared in our November 1967 Premiere Issue. There will be more reprints in our next anniversary issue.

We had asked a number of industry authorities to give us their impressions of the state-of-the-art in their disciplines. It's interesting and informative to take a new look 25 years later on just how accurate they were and how much technology has moved forward in the last 25 years. It should also be noted that, in almost every case, the original author is no longer associated with the company mentioned. In fact, several of the companies no longer exist!

What will the next 25 years bring to pro audio?

The Recording Studio

—George Alexandrovich*

This state-of-the-art picture of the recording studio is the preamble to a series under preparation. In this installment the author ranges wide to cover much of what is likely to be encountered in the studio. Future installments will tend to concentrate on specific areas of interest.

The past decade has seen advances in the field of electronics no one has expected. New discoveries in the field of semi-conductors have led to new technologies and changed most of the design concepts overnight. Gradually new technologies are making their way into the audio field, awakening audio engineers and specialists to the advantages of the new concepts over the older kind, a kind inferior in performance reliability and convenience.

The advent of semiconductors into audio closely coincided with the development of the stereo disc. This led to further developments of multi-track tape recording. Such tape machines in turn led to the redesign and rework of the mixing consoles and control rooms. As a result, the problems of the recording engineer and maintenance man suddenly increased two fold. Several channels of audio now had to be recorded simultaneously and monitored at the same time, each channel individually as well as the total mono mix, to be sure of proper phase relationships. Instead of caring for one channel only, maintenance had to be pulled on several, keeping proper balance, frequency response, phase and separation.

Disc cutting rooms had to be fitted with new equipment capable of stereo. Recording and cutting personnel had to be trained to use stereo equipment as well as to maintain it. Enormous new problems arose when semiconductor circuits were applied to the design of audio equipment, because of the inability of a majority of maintenance men to grasp immediately the basic operating principles of these new circuits. For quite some time a negative attitude existed among audio engineers and management toward the transistorized equipment. True, the first transistorized circuits were not designed with the same degree of sophistication as they are now, at times leaving more to be desired from their performance. At this time, the advantages of transistors over tubes have still not been recognized by many professionals. Many not yet set to accept semiconductors are those that were probing for faults in the equipment available at an earlier time and, as a result, continue criticizing it. Some of these criticisms are utterly ridiculous; for example, the claim that transistorized equipment does not produce "air around the sound."

I can prove that this is not so and that transistorized equipment can outperform tubes in distortion, frequency response, noise, in stable operation and reliability. As far as the air around the sound is concerned I need only say that transistorized circuits with their extended performance range reproduce information more faithfully than tubes without creating any side effects. True, they reveal more faults in the recording than do tubes, leaving the impression that tube circuits are cleaner sounding because of poorer transient response and restricted frequency range.

These innovations and changes in operating as well as in maintenance procedures have met strong opposition for another reason. Up to this time, recording was more often an art, with skill in it acquired more through experimentation and cut and try methods than through a proper scientific approach and knowledge of what conditions have to be met in order to achieve good recording. Today, new technologies require more science prerequisites for the audio man; he must have more theoretical knowledge and skill.

Advances and improvements have been made in every branch of audio recording. The most significant are in the design of the *equipment*. This inevitably has affected *operating procedures* and *techniques*. With new equipment and new technology *maintenance* gets the lion's share of the changes in procedures and requirements. It is my intention to use these three topics for future discussions, developing each one into an individual review of the tasks and problems facing the audio recording engineer today.

And those problems are numerous. As systems become more complex, operating procedures have to be more precisely controlled, maintenance of unfamiliar equipment and circuits becomes more painful. It is my goal to guide you men in the studio, behind the mixing consoles, and in front of the editing machines or disc-cutting lathes, to the correct approach used in solving the myriads of individual problems. I would like to shed light on the facts about the new equipment and operating methods showing how much their flexibility offers chances for a successful session. I want to cover the methods of preparation of the studio and control room for a session; how to conduct the session; proper storage of recorded information; mixing and editing; preparation of the master tape and master disc. Some topics will be discussed in greater detail than others; I hope to be able to share with the reader a few "trade secrets." These

*Vice-President, Engineering
Fairchild Recording and Equipment Corp.
Long Island City, N.Y.

secrets are nothing more than short cuts to the solution of problems or ways in saving money that may turn out to be important to smaller studios with limited budgets. I will direct my efforts to be as down to earth in these discussions as possible so that every recording man can understand all that is being talked about. And there is a lot to talk about.

Today you can hardly find a studio not already in possession of a multi-track recording system (or at least contemplating acquiring one). A few studios are still operating on two tracks, more are set for four tracks and some for eight tracks. Since eight-track machines are possible because of miniaturization with transistorized equipment quite a number of professionals are now thinking of eight and even fifteen or sixteen tracks on one- or even half-inch tape.

The advantages of an entry into multi-track narrow tape recording should be obvious to every engineer as well as his management. The ability to record virtually every microphone on a separate track offers an easy re-mixing job with better chances for correction if during the take balance between the microphones was other than acceptable. Equalization, reverberation, and other effects can be added at will to an individual instrument or groups.

With the help of selective recording, better known as *selsync*, recording on the multi-track machines can be economical. One or more tracks can be recorded independently of each other. When the remaining tracks are to be recorded, the previously recorded ones are played back through the record head and fed into a separate circuit. This output is fed into the headphones placed on the heads of performers so that perfect synchronism is achieved between all tracks. In this way a few performers proficient on several different instruments can be used, eliminating the need for large group, yet achieving the same results. If the take is unsuccessful one track or any number of selected tracks can be erased and re-recorded again without affecting other tracks.

Almost all of the newer consoles incorporate separate equalization on each microphone channel, with separate echo or reverb feed, sometimes compression, as well as many other features. But it is important to know how and when to use these features. For instance, compression during the original take should be used *only* as an overload protection rather than for altering the dynamics. It means that the threshold of compression should be set above normal operating levels in the console. Equalization should also be used with discretion. In the original recording it should be used only to improve crosstalk by restricting the frequency range or as a means to better noise figures.

With multi-track recording there is a strong trend to record and store audio information with the least amount of deviation from the original sound. This way original performance is always at hand and special effects can easily be added during the remixing session.

The storage medium for original recording or tape has also seen numerous improvements. Electrical as well as physical properties have been affected. Tapes are manufactured today from better materials (Mylar) and coated with oxides capable of carrying higher magnetization forces and producing lower electrical noise when fully demagnetized. They also offer less friction with the recording heads. All of this produces a wider dynamic recording range.

Work is being done on high frequency bias to lower the hiss level normally generated by the bias currents. Networks, producing predistortion into the recording, compensate and cancel 3rd harmonic distortion caused by the tape itself when it is being recorded with levels approaching saturation of the oxide. Naturally this predistortion would vary with the type of tape used and should be adjusted for each individual brand. This technique can improve the dynamic range of the recorder up to 6 dB with attendant low distortion.

To ease the tasks of phase control, equipment has been developed to insure proper mike placement in the studio. Phase detection monitors are used in some installations to avoid phase cancellations at low frequencies.

All these improvements allow the recording engineer to work with wider margins of safety for better recordings.

A great deal has been accomplished in the past decade in the field of tape recording. Nevertheless, disc recording and disc pressing are still with us and are sure to remain for a long time to come. With the advent of the stereo disc, a multitude of new problems arose. Precision control of groove geometry and position as well as stylus alignment for best channel separation and minimum distortion calls for an increased ingenuity by the cutting engineer or technician. Earlier I talked about the conversion of an art into a science in general, but this part of sound recording belongs in a separate category, since there is still much "know-how" and ingenuity as well as experience required of a cutting man. Every step in setting up for cutting stereo is a critical one. In order to achieve optimum results in both the sound and the appearance of a record one must be thoroughly familiar with all facets of this skill. This part of recording contains the most trade secrets and shall be treated as such in a future separate section on disc recording. Many recording engineers can benefit from the information that has been assembled from many cutting rooms and as many ingenious operators and technicians.

I have reviewed hastily the basic problems of sound recording and some of many improvements that have been made in this field in the past few years. But no equipment is immune to mishandling or misuse. One of the biggest handicaps of studio setups today is the lack of maintenance and quality control. This might be through incompetent personnel or simply because of an absence of trained technicians.

It is quite common to find multimillion dollar installations without a good 'scope or signal generator; never mind looking for a distortion analyzer. Commonly, there is an absence of any maintenance records or studio block diagrams.

On numerous occasions it has been found that because of the lack of maintenance or negligence the best equipment was operating as poorly as the worst kind. Hum, noise, susceptibility to clicks, crosstalk, and intermodulation distortion have been found as results of wrong terminations and a lack of proper grounding. Correct phasing, proper wire identification, good soldering, and wire dressing as well as equipment location, are major items which shouldn't be forgotten. Maintenance may well make or break the studio, so I will continually place special emphasis on proper maintenance.

Let this short review be an introduction into the coming series of talks about the wide field of practical professional audio engineering.

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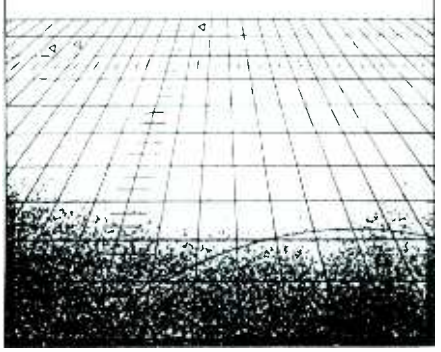

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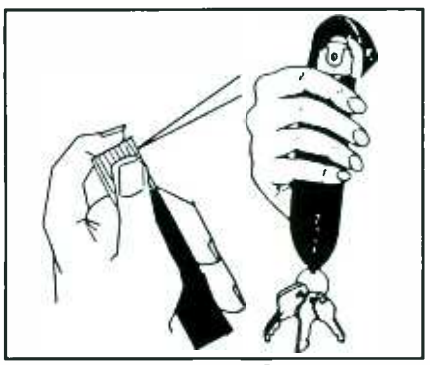

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PEOPLE, PLACES & HAPPENINGS

● In July of this year, the 6th Chamber of the Frankfurt Provincial Court in Frankfurt, found the firm **Behringer** guilty of infringement of their German patent covering the **Aphex Aural Exciter**. The court determined that all past and current versions of the Behringer versions of the "exciter" infringed on the Aphex patent. The lawsuit was instituted in 1987 by **Aphex Systems Ltd.** and **AKG of Munich**, Germany, who is the exclusive German distributor.

Marvin Ceasar, the president of Aphex Systems Ltd. said, "It is unfortunate that it took so long to put a stop to this theft of our technology. It gave Behringer time to copy other products and become established in the marketplace. I hope consumers, dealers and the press will now be aware of the true nature of Behringer's business practices. This verdict should encourage other manufacturers to protect their intellectual properties."

"We are very pleased with the results," was the comment of **Heiner Groepke**, manager of AKG in Munich. "We hope that the judgment will make all those merchants who supported proprietary rights feel confirmed in their beliefs."

In a previous case, Aphex and AKG obtained a letter from Behringer containing an admission of copying the manual for the Aphex Model 612 Expander/Gate, and a promise not to sell any more units with the purloined manual.

Aphex Systems Ltd. also announced that they had been awarded a U.S. patent on the High Frequency Expander in their Expressor compressor/limiter. The exclusive High Frequency Expander (HFX) allows higher ratios without the "dullness" of other wideband devices. The inventor of record is **Gary Liden**, a longtime Aphex engineer.

● **Steven C. Rypka** has been appointed the technical director of entertainment for the 3,174-room **Las Vegas Hilton**. He had been the head audio engineer for the 1,500-seat Las Vegas Hilton showroom. (See **db Magazine** March/April 1990—*The Las Vegas Hilton Showroom Audio System*). In his new role, Steve Rypka will have oversight responsibility for all technical elements of the property's extensive entertainment and special events program, working with artists and crew on audio/visual and lighting effects and requirements.

Steve Rypka has been a veteran of 20 years and a recognized authority in sound engineering, having joined the Hilton in 1981 after serving as house audio engineer separately for **Paul Anka Productions** and for **Liza Minelli**. During his career he has worked with several of the top stars in show business, installed and operated state-of-the-art systems in many venues around the country, and ha has consulted with other Hilton properties, including the Hilton Hawaiian Village and Flamingo Hiltons in Las Vegas and Reno.

● **Eastern Acoustic Works** of Whitinsville, Mass., has opened a western regional sales office at 8855 Atlanta Ave. Ste 312, Huntington Beach CA 92646-7100, phone number 714-374-0202 and FAX is 714-374-0201. **Greg Hockman** will be in charge of the EAW sales center comes from positions with Electro-Voice, Soundcraft and QSC. He has a strong background in technical sales to sound contractors and acoustical consultants and has also done some design work on his own. Therefore, he understands the challenges faced by consultants and contractors. This new western office will represent EAW's full line of professional loudspeaker systems to acoustical consultants, sound rental companies, contractors and dealer in California, Arizona and Nevada.

● **Muzak**, the world renowned background music company, recently included the 572 SPL Computer among its purchases from **Symetrix**. The background music installation is being completed for the **Moreno Valley Mall** in Riverside, California. The 572 SPL Computer senses changes in crowd noise and raises or lowers the system volume to ensure every word is intelligible but not overbearing.

● Among the first United States facilities to purchase the **Scenaria, Solid State Logic's** complete digital soundtrack production system, are **Producer's Color** in Detroit and **Avenue Edit** in Chicago. In London, both **Saunders & Gordon** and **Tape Gallery** have purchased the production system, as well as **Voss AG** in Dusseldorf, Germany and four facilities in Japan, announced Marketing Director **Colin Pringle**. The Scenaria incorporates a 38-channel digital audio mixing console, 24-track digital audio recorder, multi-track audio editor, multiple machine controller, automated routing system, and random access video system in a single product. For the first time, recording, editing signal processing and mixing can be carried out to picture, entirely in the digital domain.

● The new **Alamo Dome Stadium,** currently under construction in San Antonio, has purchased the **Crown IQ System 2000** computer control hardware and soft-

ware to control the entire audio system. The Alamo Dome, which will seat more than 60,000, will feature a system that is IQ controlled and utilizes more than 90 Crown amplifiers. **Proshow U.S.A.** of Seattle will be installing the system, construction beginning in September. **Bruce Main**, executive vice president of Proshow said that they will be using several Crown SMX-6 intelligent multiplexers for some of the conference areas around the stadium, as well as employing a variety of Crown amplifiers, including a the Macro-Techs and Com-Techs. Proshow successfully used a Crown-EV combination at the **Seattle Kingdome** and will again be using this combination by using Crown amplifiers powering the main speaker clusters which will be composed of **Electro-Voice** MT-4 and MT-2 manifold systems The Alamo Dome will be the home of the World Football League's San Antonio **Roughriders**, the National Basketball Association's **San Antonio Spurs**, and will also host the **Olympic Festival** in the summer of 1993. The Dome is scheduled to open in early 1993.

In a related item, **Rane Corporation** has become the latest company to take advantage of Crown's offer for licensing the **IQ System**. Crown decided to offer licensing of the IQ after concluding that the adoption of a universal computer control standard does not seem likely. **Dr. Clay Barclay**, developer of the IQ System said, "With the increasing emergence of computer control throughout the audio industry, it's vital to open compatibility." **T.C. Electronic** and **White Instruments** reached licensing agreements last month.

Ray Bloom, director of sales and marketing at Rane, licensing was sought because Rane is pursuing development of a line of IQ-compatible products that will debut later this year. With IQ licensing, Rane's future computer control products can offer all of the various functions provided by IQ software. Bloom said, "Rane has been an innovator in the audio industry for nearly 11 years. Working with Crown, another longtime innovator, seems like a natural step in the evolution of our product line."

● **Telarc International Corporation** announced the appointment of **David Bower** as Press and Public Relations Manager. He succeeds **Valerie Thorsen** as of July, 1992. Mr. Bower brings a variety of experience to this position. He was educated at Oberlin College, obtaining a Bachelor of Arts Degree in Music History/Music Theory; and a Master's Degree in Music History at the University of Cincinnati's College-Conservatory of Music. In addition, he has been a writer and reviewer for The American Record Guide and The Music Box. He has been a performer in the Cincinnati Opera Chorus and he has also held a position as Choir Director at Holy Trinity Episcopal Church in the Cincinnati area.

● **Rudas Studios**, one of Germany's most successful TV and radio commercial post production companies, has chosen **DAR's SoundStation SIGMA** digital audio production system with **WordFit** to expand its audio for video and film operations. Rudas Studios, located in Dusseldorf, is the first German company to equip their new SIGMA with DAR's WordFit automatic dialogue replacement system. Unique to DAR, WordFit gives Rudas the advantage of fast, precise operation in lip syncing replacement dialogue. Indispensable for foreign language and dialogue dubbing, WordFit automatically edits the new material, aligning it to synchronize with the original track to produce lip-sync results that would be tremendously time consuming or even impossible to do by hand.

● **Noise Cancellation Technologies Inc.** of Stamford, CT and **Philips Industrial Activities N.V.**, a Belgian subsidiary of **Philips Consumer Electronics B.V.** of Eindhoven, the Netherlands; have agreed to form a partnership which will be called Noise Cancellation Systems N.V., and it will market active noise and vibration reduction systems in Europe.

● **Pyramid Group**, based in Dallas Texas, and consists of **Pyramid Teleproductions, Pyramid Studios** and **Lee Martin Productions**, has made changes to capitalize on the diverse growth of the Group, announced **Lee Martin**, company president. Effective immediately, **Robert Schiff**, current vice president and general manager of Pyramid Teleproductions, will assume the new position of vice president of marketing for the group. Pyramid Group director of engineering, **Roy Howell**, will become general manager of Pyramid Teleproductions. The entire Group offers services in all areas of video and broadcast production, including post and studio production, graphic design and animation, duplication, satellite uplinking and video conferencing, corporate video production and all areas of turnkey production.

● **Christine Farnon**, executive vice-president of **The National Academy of Recording Arts & Sciences** (NARAS), retired August 1, 1992, announced **Michael Greene**, president CEO of NARAS. Ms. Farnon has been associated with the Recording Academy since the year of its founding. In 1961, she was named executive director of the Los Angeles Chapter, and through 1971 functioned as both the chapter's executive director and as administrator of most of the National Academy's activities and programs. In 1971 Ms. Farnon was appointed executive director and in 1989 she was made executive vice president. As national executive director, Ms. Farnon also administered the Hall of Fame Awards and served as a director of the NARAS Foundation. This past February, Ms. Farnon was honored with the coveted **Trustees Grammy Award**, presented to her on the annual Grammy Awards Show.

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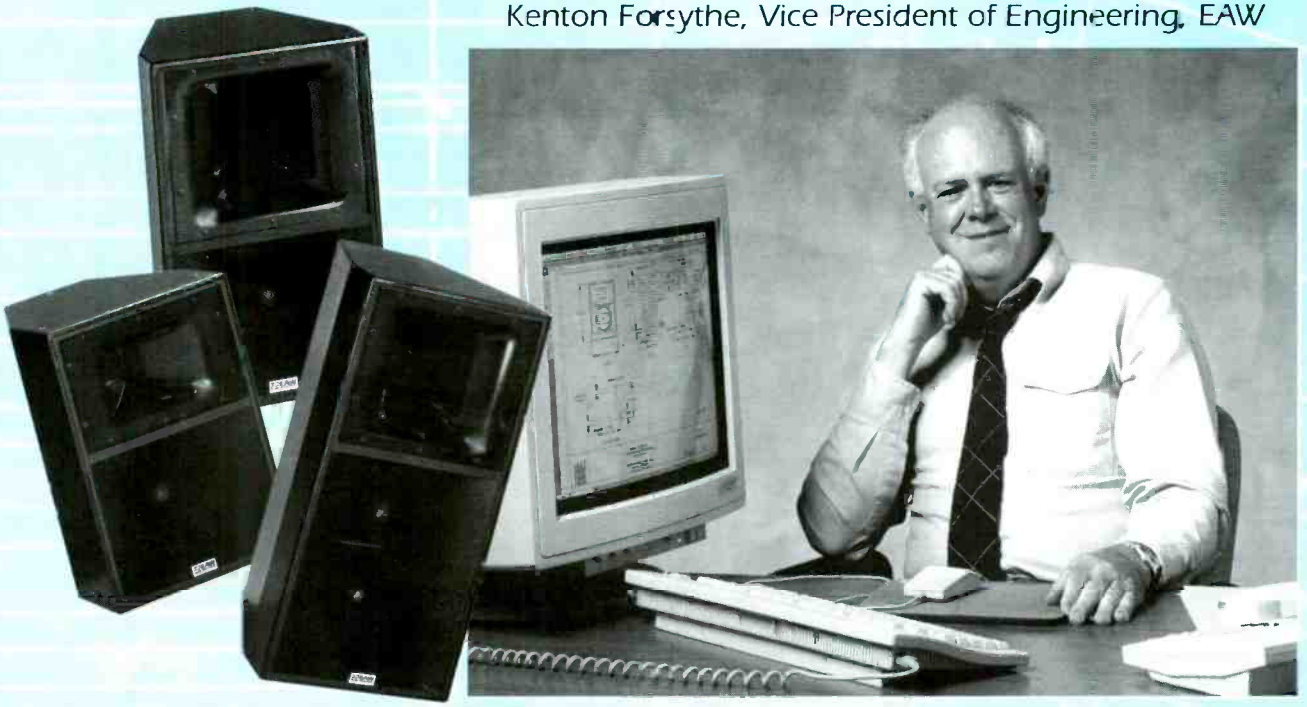

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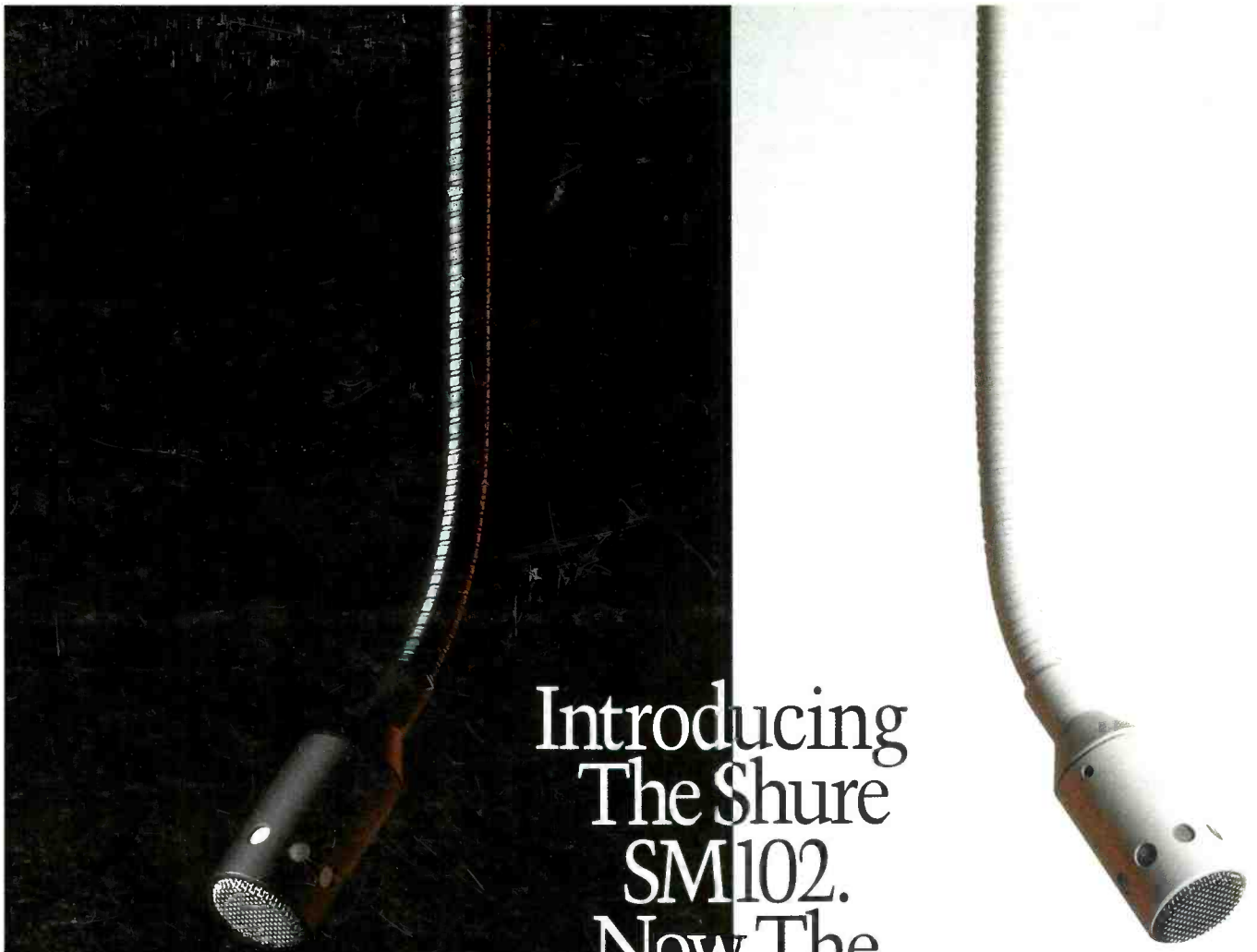

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