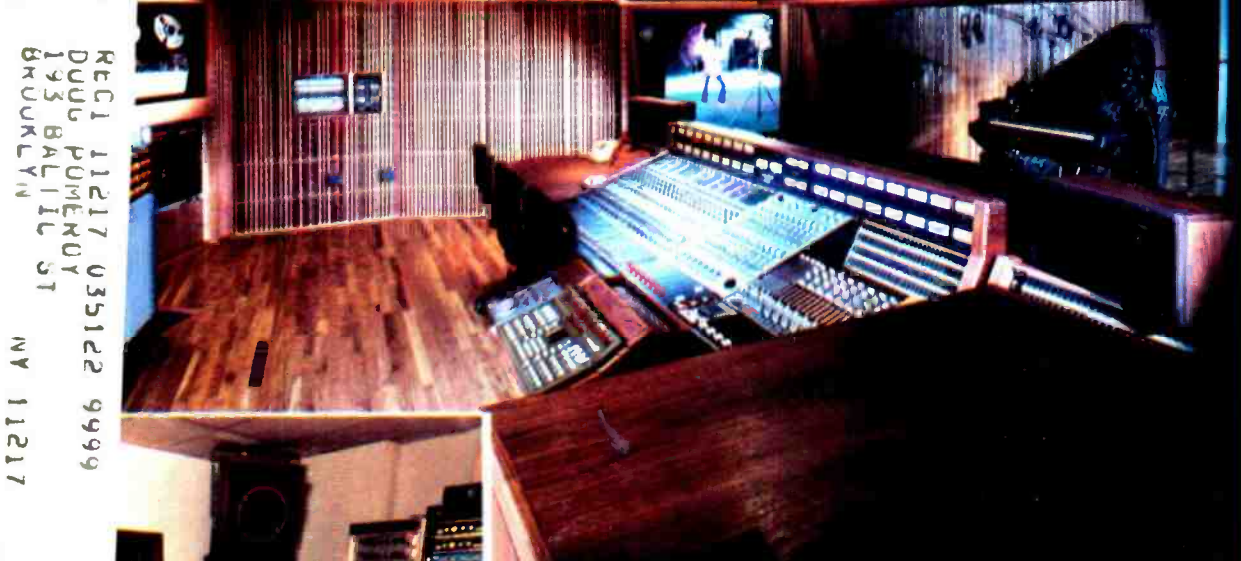


RECORDING

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Volume 15 — Number 4

PRODUCING AUDIO FOR • TAPE • RECORDS • FILM • LIVE PERFORMANCE • VIDEO & BROADCAST



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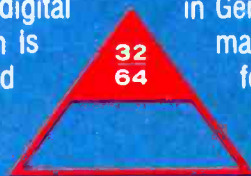
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— The Cover —

Taking as our theme the diversity of today's recording industry, this month's cover features three recently completed studios whose in-house facilities go beyond those normally provided for conventional session work. Shown *top* is Gary Brandt's new Alpha Studios, now housed in the spacious Burbank complex formerly owned by Leon Russell. The main room will specialize in audio-for-video sweetening and re-recording session, as well as rock, string, and horn dates. Shown *left* is Control Room B at Unique Recording, New York City, which currently boasts not only an impressive array of outboard equipment, but also an enviable collection of synthesizers, including an Oberheim XP-1, Roland MPU-401 sequencer for use with an IBM PC, PPG 2.3 and Waveterm, Yamaha DX-7, Sequential Circuits T8, and Roland GR700/707 guitar synth. Shown *right* is Star Trax Recording, a new studio located in Orland Park, Illinois, and designed by George Augspurger to provide a "sound that closely resembles the natural 'living room' sound." Further details of these three interesting studios can be found in the "Studio Update" pages, beginning on page 94.



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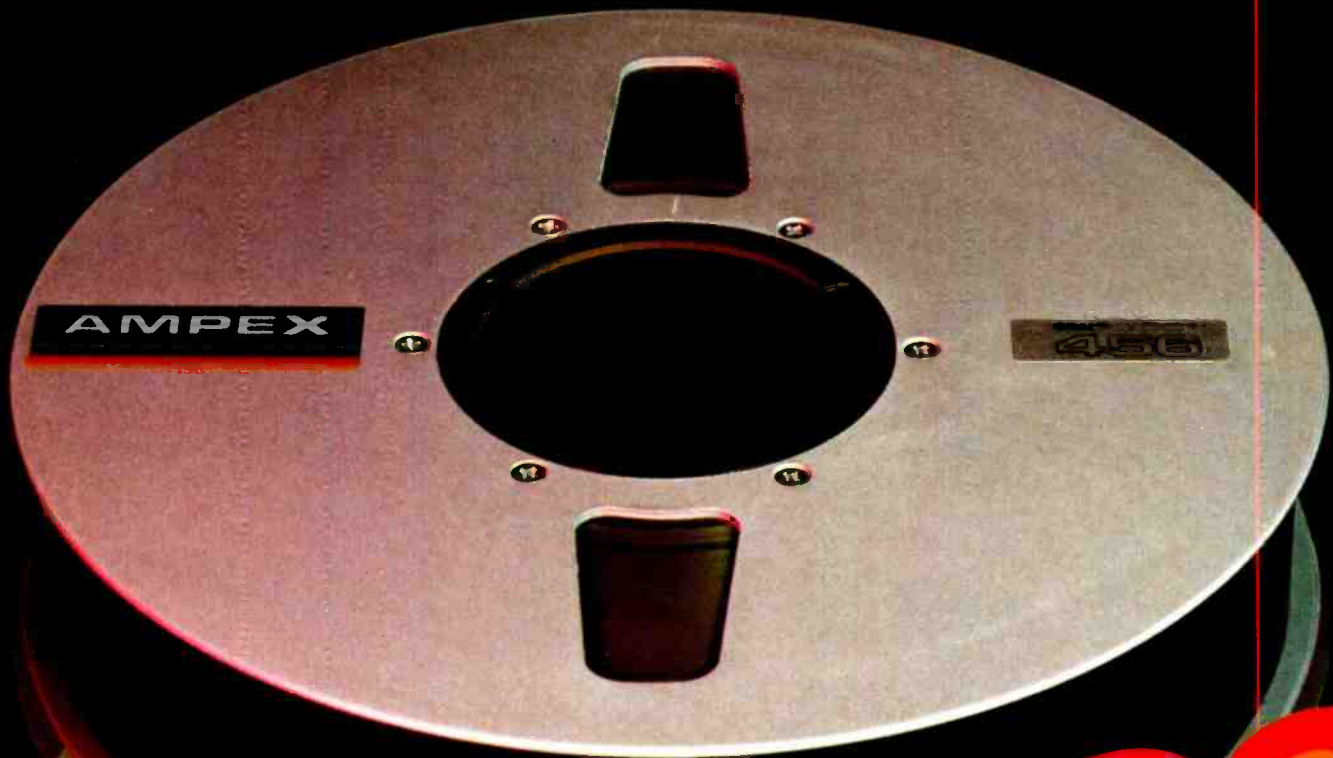
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August 1984 □ R-e/p 11

News Letters Views

XLR-3 POLARITY

from: **David Moore,**
communications manager,
MCI, A Division of Sony
Corporation of America,
Fort Lauderdale, FL

I have followed John Roberts' "Exposing Audio Mythology" section in *R-e/p* with great interest; I believe that John is performing an extremely useful industry function by continuing this fine series.

I would like to clarify the MCI position on the "Which pin is hot?" piece that appeared in the April issue. There appears to be some confusion in this area, and as the manufacturer we would like to make a definitive statement concerning MCI products.

All JH-110As and some early JH-110Bs had pin "3" as the hot terminal. In mid-January 1982 we changed production on 110Bs so that henceforward all machines had pin "2" as the hot terminal. JH-24s have always had pin "2" as the hot terminal. As John points out in his chart, it is, of course, possible to move the wires around on the molex or the back of the XLR connector to give you a choice — but I just thought I would point out how we are shipping our machines today. □□□

AMPLIFIER PATENT

from: **Welton H. Jetton,** president
Auditronics, Inc.
Memphis, TN

If you will permit me, I would like to use *R-e/p* to notify the industry-at-large of Patent No. 4453131, applied for September 30, 1982 and granted to Auditronics, Inc. effective June 5, 1984. The subject is (and I excerpt from the text of the patent) "A transformer coupled amplifier circuit that eliminates transformer induced non-linearities by way of a dual feedback path without sacrificing any of the inherent attributes of general transformer coupled amplifiers", and is, in fact, essentially identical to the circuit detailed by Don Wolford in the page 108 sidebar of the April 1984 issue, with the exception that operation amplifiers other than the 990 are utilized. This circuit has been the basis of our claim "transformerless specifications while retaining the benefits of a transformer", (typically 0.02% THD, 20 Hz; 0.007% THD, 30 Hz; and 0.0045% THD, 200 Hz and above, all measured at +24 dBm output level; or 0.003% THD, 100 Hz to 15 kHz, measured at normal operating levels) and has been and is currently standard in several Auditronics products.

While Auditronics has no intention of challenging Sunset Sound, or Mr. Wolford, on their use of this circuit in the previously constructed console described in the article accompanying the referenced sidebar, we would like to take this opportunity to alert other designers to the existence of this patent, and to our intention to avail ourselves of the rights so granted.

Copies of the patent are available through the usual channels to those willing to investigate further, and inquiries regarding licensing are invited. □□□

LOUDSPEAKER CABLE ANALYSIS

from: **Paul A. Magil, P.E.**
Paul Alan Magil Associates
Costa Mesa, CA

The article "Loudspeaker Cable Analysis by Microcomputer," by Scott Burnham [February 1984 issue] was indeed interesting. If Mr. Burnham is willing to sacrifice a little accuracy, I strongly suspect the following information and "rules of thumb" would prove useful in simplifying his program, and in making quick, approximate calculations in one's head:

1. Reference: 1.00 ohm per 1,000 feet of #10 AWG (at 75 degrees).

2. The resistance of 1,000 feet of all other gauges of copper conductors (at 75 degrees) is very close to 1.26** (G-10), where G is the gauge of the given wire. It should be noted that 1.26 is the cube root of 2. Accordingly:

3. The resistance of equal lengths of wire doubles for every three (3) gauges. Hence, 1,000 feet of #13 AWG wire is extremely close to 2 ohms; #16 AWG, 4 ohms; #19 AWG, 8 ohms; #22 AWG, 16 ohms.

4. *Do Not Forget:* Inasmuch as each circuit comprises two conductors, it is perhaps best to remember that 500 LOOP FEET of #10 AWG wire is approximately 1.00 ohm at 75 degrees. In turn, all other cable runs should be computed in terms of loop feet.

Using the above, the nominal impedance of the load, the acceptable percentage loss of power delivered to the load, and the distance of the run will yield the minimum acceptable wire gauge. If an acceptable power loss is 10%, the total cable resistance must be less than 1/10th the load impedance. For a 1% maximum power loss, the cable resistance must not be greater than 1/100th the load impedance.

Looking briefly at the example given on the first page of the subject article, wherein #16 AWG wire is available to serve a load of 4 ohms with an accepta-

ble power loss of 10%, we conclude that the cable (loop) resistance should not exceed 0.4 ohms. We know that #16 AWG wire is $2 \times 2 \times 1.00 = 4$ ohms per 500 LOOP FEET. Then $0.4 / 4.0 \times 500$ LOOP FEET yields 50 LOOP FEET.

Clearly, there is nothing profound about any of the above, other than that its convenient to remember 1.00 ohms/1,000 feet (or 500 LOOP FEET) and that the resistance doubles for every three gauges. □□□

DESIGNING HEADPHONE DISTRIBUTION SYSTEMS — An Update

from: **Rick Simon,** president
Simon Systems
Sylmar, CA

Apparently, Alan Fierstein has misunderstood my article "Designing Headphone Distribution Systems" [published in the April 1984 issue]. In his "Letter to the Editor," published in the June issue, he first claims that I "... make the point that two-watt pots are needed with a 250-watt amp, because such an amp puts out 44.72 volts RMS." He then concludes that this is only necessary if one were to apply a constant tone at full power output.

In the section of my article he refers to, I recommended using a specific 1 kohm audio taper, conductive plastic, two-watt power pot. In making this recommendation I point out that the pot is "very high quality, and the two-watt rating makes it capable of handling 44.72 volts RMS (which is the full power output of a 250-watt/8-ohm amp)." The point is that this pot could be used in virtually any practical high-impedance headphone distribution system and, because of the two-watt rating, it would take the full undistorted continuous output voltage from a 250-watt/8-ohm amplifier (44.72 volts RMS) to reach the pot's rating. To clear up any confusion regarding the handling of power dissipation in the pots, I will elaborate on this subject. There are essentially two methods for handling power dissipation:

1. Design protection circuitry into the system so that the maximum power rating on the pot(s) is never exceeded; and
2. Analyze the absolute worst-case conditions, and design your system accordingly.

The first method is fairly straightforward. If you choose a pot with a certain wattage rating, the amplifier may, under some conditions, output a waveform which exceeds that rating. One way to prevent damage is to design protection circuitry into your system. There are many ways to do this, among them:

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Practices for Digitally Controlled Equipment." Which means the interfacing problems between video, audio and film equipment will be problems of the past. This Sony "Sync Master" synchronizer has a built-in distributed intelligence network that makes it able to talk to an entire universe of diverse machines developed by diverse manufacturers.

So before you invest in a synchronizer that just solves today's problems, perhaps you should first examine the one that will also solve tomorrow's.

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Letters

voltage limiting (at amplifier input or output); lowering the amplifier's voltage gain; or even fusing the pots. While protection circuitry is a viable alternative, it can be cumbersome and often as expensive as buying higher power pots.

Method #2 allows you to design your system without protection circuitry, and rest assured that the worst case will not result in disaster. Music, of course, is very complicated in nature, and the article points out that typical average listening levels are small, but that we must be aware of the worst case when choosing a pot and an amp. If, for example, an amp puts out 125 watts into eight ohms just before clipping (31.62 volts RMS), the maximum undistorted average power dissipated by the recommended 1 kohm pot is 1 watt.

You may presume that a two-watt rating is overkill. Well, consider the absolute worst case, which can occur when the amplifier goes into hard clipping, and puts out squarewaves that swing ± 44.72 volts. The power dissipation in the pot now goes up to exactly two watts! Thus for any given input signal to this amp, the two-watt pot will be able to handle anything that the amp puts out. For an amp that puts out 250 watts into

eight ohms just before clipping, a four-watt 1 Kohm pot would handle its worst case.

As a rule of thumb the worst case power dissipation in a pot is essentially twice the power dissipated just before the amps clips a sinewave. So you can select a pot with a rating and be sure it will never be exceeded.

You may ask: Can the worst really happen? In a correctly used, well-designed system, it is definitely not the norm, but there are instances. I have seen cases where studios have blown pot because they were hooked up to an amp and cue send, but with no headphones connected. The send level was accidentally turned up full, and the amp was hard clipping into significantly underrated pots. With no headphones connected the problem went undetected, and the pots blew out. No one became aware of the damage until the next session, when someone plugged headphones into a blown box.

There have also been cases where the test oscillator was patched into the cue send, and the level turned up enough to cause damage to the pots. Remember that the amp's output voltage is always across the resistance of the pot, regardless of where you set the level.

The maximum power output of an amplifier does not always dictate the size of the pot in worst-case design! If the level from the console send can only swing a certain amount, you may never

reach the amplifiers' full output voltage capability. Let's say, for example, that we design our system with 1 kohm pots, and a power amp with a typical voltage gain of $AV=22.35$ (27 dB). Now consider a console that puts out a cue-send level of 1 volt RMS just before it clips (some older and smaller consoles are of this order). This output signal from the cue send will be amplified to 22.35 volts RMS, which corresponds to 0.5 watts into the 1 kohm. The absolute worst case here is when the send level clips at ± 1.414 volts peak-to-peak. The amp multiplies this to ± 31.62 volts peak-to-peak, and that puts 1 watt across the pot. Therefore, because of the console's low output level, we can design with a one-watt pot. Moreover, no matter how powerful the amp gets, as long as its voltage gain is less than or equal to 22.35 (27dB), you will never exceed the pot's power rating.

It should be pointed out, however, that most modern console cue sends are designed with op-amps that typically have ± 15 volt supply rails; their outputs can swing within a few diode drops of the rails. In this case the worst case voltage is determined by how far the amp can swing.

As pointed out earlier, you can select a pot with a rating that will never be exceeded by your amplifier. But what if you use that cue box on a higher power amp? Taking again the two-watt/1-kohm pot, we remember that it can withstand any output from the 125-watt amp, and the full undistorted output from the 250-watt amp. Even though the worst could happen, I would most likely not hesitate to use these pots on a properly designed distribution system using up to a 250-watt amp. I would do this because if the headphone distribution system is correctly used, the worst that typically happens is a freak event where clipping occurs in fast peaks. In this case a good quality pot can withstand the instantaneous peak power. Remember, however, that the only way to be sure that you will not exceed the pot's rating is to design for worst case, or protect them.

Alan Fierstein also suggests that using audio tapered pots is a "serious mistake," because they pad the signal 20 dB at midpoint. He assumes that musicians will set them there, that the amp could be putting out full power output (just before clipping), and that to some musicians the sound is not loud enough. So they complain to the engineer, he turns the level up farther, hard clipping results, and all of the pots burn up! Instead, Alan recommends using linear tapered pots which are only 6 dB down at midpoint.

The use of linear tapered pots is a severe compromise. Mr. J. Fletcher (of Fletcher and Munson fame) proved that the human ear does not hear linearly. In 1937 Fletcher published studies which show that for sound levels whose loudness range from comfortably audible to unpleasantly loud, an increase in loud-

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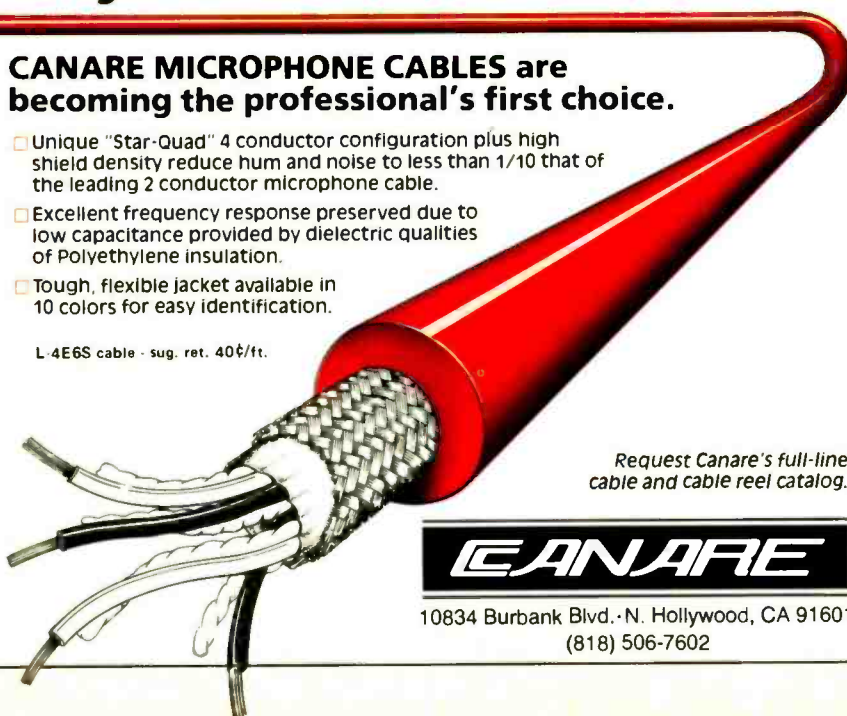
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Letters

ness of 10 phons is approximately equal to doubling the subjective loudness. The actual empirical approximation over the range of 40 to 100 phons is:

$$\text{Log } 10(L) = 0.033 (LL-40)$$

where, L is the loudness in sones, and LL the loudness level in phons. What all of this means is that it takes 10 times the level (20 dB) not twice the level (6 dB), for a sound to appear twice as loud. Which is why in virtually every volume control application, audio tapered pots are used. I have replaced linear pots originally fitted to cue systems with audio-taper ones, because when working with linear-pot cue systems, the musicians complained that as they first back down the gain, they detected almost no change in volume. Then, as they got nearer to the end of the pot rotation, the sound died away so quickly they had only a tiny range of rotation to adjust their headphone volume.

As for burning up the pots with a clipped signal, I refer to my previous explanation on handling power dissipation in the pots. As I pointed out in that section, even for cases of accidental misuse, you can design a system and be sure you will never exceed the pot's rating. Furthermore, since the amp's output is always across the entire pot, it is just as easy to burn up a linear-taper pot whose rating is exceeded, as in the case of an accidental test tone.

The real solution to avoiding a clipped signal to the cue box is to use the pots correctly. In the owner's manual for my passive cue box, I recommend that you begin use with all of the level controls turned up full (this makes it look like the pots are out of the signal path to the headphones). Then the engineer should bring up the cue-send level, and the people who feel that the sound is getting too loud should back down their levels. The send level should be increased for those who want more volume, and those who want less should further back down their levels. I believe it is the responsibility of the engineer to instruct the musicians in the best ways of setting their levels properly, so that they won't get in the habit of starting them at midpoint or any other incorrect location.

In conclusion, I believe that with proper design and correct use, you can get the benefits of audio tapered pots without worrying about destroying them or someone's ears. The original article was based on analysis and experience, and was intended to be simple enough to be understood by non-technical people; I hope that this letter has helped to increase the understanding of those who read it.

P.S. I really thought someone would write in about the typesetting errors on the power equations (the square terms were missing), and the split supply vol-

tages (missing the minus signs). My thanks to R-e/p for printing the corrections in the June 1984 issue. □□□

MICROPHONE ASSESSMENTS

from: **John St. John**
Coconuts Recording Co., Inc.
North Miami Beach, FL

I found it very difficult to gain any useful information from the article "Objective and Subjective Assessments of Twelve Studio Microphones," in your April 1984 issue. Admittedly, it was interesting, and the descriptions of each microphone informative. However, all that could be concluded from the exercise was that for the University of Iowa School of Music the results of these tests were inconclusive for the following reasons:

Firstly, no information as to the impedance termination was given. The sound of a microphone can sound quite different when not loaded to match the impedance for which they were designed. (For example, older mikes were designed to "see" a 150- to 200-ohm input — today's consoles usually have a nominal 1K impedance. Some require transformers; some don't.)

Secondly, the close proximity of the microphones to each other in the cluster (as illustrated) can influence their response characteristics; polar patterns can change, phase cancellation can occur, and therefore the sound altered. These effects are most pronounced if each stereo pair is summed to mono.

Thirdly, none of the mikes are exactly the same position from the floor. Phase changes in early reflections can also make a microphone sound different.

Fourthly, the chart depicting the frequency response of the control room monitors was meaningless, as the listening sessions did not take place in the anechoic chamber, but in the control room. No reference was given to the response of the control room, which I find difficult to believe is non-reverberant; "Dead-End" I can believe.

Finally, no data is given as to the temperature and humidity factor at the time of this test. Changes in atmospheric conditions can radically influence the character of a microphone.

Admittedly, the effort was an admirable one, but with so many variables in the test situation I personally would not recommend using the University's results as a yardstick to choose a microphone. I appreciated the University's effort to try and attract loans or donations of microphones. However, unless they are prepared to conduct tests in a more scientific manner I doubt whether they will be taken seriously.

Lowell Cross,
Professor of Music and
Director of Recording Studios
at the University of Iowa's
School of Music, replies:

John St. John's letter raises certain valid points, as well as other issues which relate to the practicalities of this, and any other, recording situation.

1. The nominal input impedance for microphones in each of the transformer-coupled channel amplifiers in the Neve 5315/24 console is specified by the manufacturer as 1,200 ohms. Some of the microphones do indeed have user-adjustable impedance settings (50/200 ohms, etc.) but all units that were evaluated, including the vintage 77-DXs and U47s, were used with their "rated" impedances in the 150- to 250-ohm range. The accepted audio practice of matching microphones into load impedances at least four to five times higher than the "rated" impedance of the source was therefore followed in each case. Of course, the actual source impedance is often lower than the "rated" impedance: the Shure SM81 specification sheet states "rated at 150 ohms (85 ohms actual)." Complete and reliable impedance information is rarely, if ever, supplied by audio manufacturers.

2 and 3. As stated in the article, it is obviously impossible to configure 23 microphones (one stereo and 11 pairs) in such a way that they all receive *exactly* the same acoustical information. It is my belief that any minute aberrations and differences in response produced by the presence of other microphones, or by slightly different arrival times of floor reflections (one millisecond or less in this instance) are definitely secondary considerations in comparison to the properties of the microphones themselves. I maintain that the clearly audible difference among these diverse units as heard in the evaluation are primarily attributable to their various frequency, polar, transient, and phase response characteristics, and to their noise and distortion (i.e., dynamic range) criteria. If the concern about the presence of small reflective or absorptive surfaces in the vicinity of microphones is carried to an ultimate conclusion, then one would have to dispense with stands and booms altogether and instruct performers on the type of clothing to wear. These are steps that I am unprepared to take, especially when attempting to demonstrate microphone techniques to students in an actual, practical recording session.

4. I have carefully auditioned the evaluation tape using a pair of AKG K-141 stereo headphones, thus eliminating the factor of our control room acoustics. My own reactions to, and "rankings" of, the 12 microphones (to which I gave the greatest emphasis in the article) did not change as a result of this second, and different, method of monitoring. I regret that I did not report upon this additional factor in the article, but no test information was available on this pair of headphones at the time of writing. Even though headphone testing is a controversial issue in itself (the problem of

... continued on page 23 —

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ECHO TIMES



QUEEN'S AWARD

Advanced Music Systems are very pleased to announce that on the 21st. of April 1984 they were advised that they had won the Queen's Award to Industry. This award is made to fewer than 100 companies each year to recognise significant levels of export achievement. A.M.S. would like to take this opportunity of thanking all their overseas distributors whose individual efforts have resulted in this extremely prestigious award being bestowed on the company.

BKSTS Honour Founder Members of A.M.S.

Mark Crabtree and Stuart Nevison have been awarded the Charles Parkhouse Award by the British Kinematograph Sound and Television Society. The award is usually presented to a technician or technicians who have made a significant contribution in either the Laboratory or Sound Recording branches of the industry served by the Society. Mr. Crabtree and Mr. Nevison would like to thank the Fellows of the Society and members of the Honours Committee for recommending them for the award.



PROGRAMMES ON BARCODE

A.M.S. have continuously provided both hardware and software updates for their DMX range of digital audio processors as well as their RMX 16 digital reverberator. The latest update is an addition for the RMX 16 remote terminal being a bar code reading wand and associated software. The remote terminal already performs two functions, firstly providing remote



control of the RMX 16 using a normal jack cable. Secondly the remote terminal can store up to 99 user programmed settings in its own non-volatile memory allowing disconnection from one mainframe and transference of preset data to a second mainframe. By adding additional software to the remote terminal it is possible to connect a bar code wand and A.M.S. are already supplying new programmes for the RMX 16 in the form of sheets of bar codes.

Along with this new update comes the possibility of storing four programmes in the RAM of the remote terminal and an additional three soft programme locations in the reverberation mainframe. This new configuration means that as well as the standard nine factory set programmes stored in the RMX 16, three additional locations are available which can contain programmes of the user's choice.

All programmes will fit onto a standard A4 sheet of paper and the average time to load a new programme should be less than a couple of minutes. ■

PETER GABRIEL



Pictured (left) are Peter Gabriel and Larry Fast during a recent visit to A.M.S. To say Peter takes his A.M.S. unit everywhere with him seems a bit of an under-statement! Both Peter and Larry had taken time off from a very busy schedule to pass opinion on the latest A.M.S. software additions for the RMX 16 Digital Reverb and the DMX 15-80S DDL Pitch Changer. The couple have previously provided invaluable help with their comments, and this occasion proved no exception. ■

Product brochures available in different languages

Brochures describing the RMX 16 and the DMX 15-80S are now available in the following languages: English, Japanese, Swedish, German and French. These brochures are available from distributors in these particular countries, or directly from A.M.S.

PEOPLE IN THE KNOW

"There was a sax solo on the Hall & Oates album *Maneater*. There's a helluva' long repeat on it. It didn't have that there to start with. We were playing it through and I was frustrated because I didn't like the sax solo that much. I thought it needed more, it was so laid back. I thought: sod it, I'll completely fill in the gaps.

"So I got the old A.M.S. digital delay out, changed the sound a bit so that the repeat sounded as if it was coming from somewhere else and just stuck it in." Daryl and John thought the effect was great and said it was something they hadn't even considered.

Hugh Padgham. Studio Sound.

The quality of engineering design and sound is up to the highest standard, whilst the 18kHz bandwidth and 90dB dynamic range can only be gazed upon with awe. The only problem I can see with this machine is that I've got to give it back after reviewing it! *H.S.R. Magazine.*

Stuart Neale leaves the addition of effects to the sound man and his A.M.S.

One Two Testing on Kajagoogoo.

The A.M.S. Digital Reverb is a general all-round tool, and I've tried other manufacturers' equipment in the digital reverb line and I think the A.M.S. is the cleanest and most usable if you are only going to have one of those.

Ian Anderson from an interview in Home Studio Recording.

I don't think any of us ever got rung up by people saying: 'Do you fancy trying out a new piece of equipment?'

"A.M.S. have phoned me once or twice; actually they're a good company like that. When they were developing their digital reverb, they mentioned the drum sound we got on Gabriel's album. They thought we'd done that electronically with some device but it was just acoustic really. They wanted to include something like it. They've got ambience programs and backwards things now, which can sound quite like squashed compressed rooms and stuff.

Hugh, Padgham Studio Sound.

I was first introduced to digital audio by the A.M.S. digital delay line.

Gus Dudgeon in an interview in the Sony Compact Disc Owners magazine.

"A.M.S. units are quite simply the very best."

Jean-Michel Jarre



THOMPSON TWINS

The Thompson Twins have been around in different forms for quite some time but success really only came their way after a visit to Compass Point a couple of years ago and the release of their album "Quick Step and Side Kick". The latest album "Into The Gap" went straight to number 1 in the UK album chart and at the time of writing a single was steadily climbing the US charts. Tom Bailey greeted A.M.S.

from a sumptuous couch in the stars' dressing room before a concert in mid March.

T.B.: Oh hello, pleased to meet you. I've just been watching Steve Levine on BBC TV explaining how A.M.S. are revolutionising the recording industry with their DDL Pitch Changers – and I thought it was my secret!

A.M.S.: Tom, we've had an interest in you and the group since we read an article in a magazine where you discussed the "fantastic discoveries" you'd made in A.M.S. equipment.



T.B.: Yeh – we've been A.M.S. fans since the first day we used the gear. We couldn't believe it. We were recording at Compass Point and we went bananas over it. Originally there was just one unit between the two studios and every day it was a case of who would fight hardest to get it for their session. The "Quick Step And Side Kick" album is just covered in A.M.S. effects. The units are fantastic for predominantly synthesiser music when layering of track upon track can result in a finished product that is just a mush. By careful use it is possible to preserve the individual instruments and prevent the mush. Whilst out in Nassau I visited Robert Palmer at his home, when we went through to his front room there were even A.M.S. units there!

A.M.S.: That album was finished off at RAK wasn't it?

T.B.: Yes, we went out to Compass Point to work with Alex Sadkin but we didn't have enough time to finish so we came back to the U.K. I've got some photographs from Rak that I should send you of stacks of A.M.S. units that we had when we were mixing.

A.M.S.: Apart from the normal use of the systems did you make use of the lock-in and Loop Editing System on the DMX 15-80S?

T.B.: Oh yes. Successful musicians don't always have a lot of time to play around in

PHIL COLLINS

Amongst some of the first people to be asked to pass comment on an A.M.S. product were the English rock group Genesis. That first approach was made concerning the analog DM2-20 flanger. Now Genesis as a band, and separately as individuals, own different pieces of A.M.S. equipment. Phil Collins is probably one of the most respected rock drummers of our time and besides his key role in Genesis he has a very successful solo career and is also in great demand as a freelance producer.

A.M.S. met up with Phil at the Townhouse Studios in London shortly after his return from Montserrat where he had been producing the new Eric Clapton album.

P.C.: I've got to say straight away that the best thing A.M.S. have done for me is to allow me to reproduce studio sounds live. A.M.S. pitch changers are definitely the best around and of course they are in

the studios and it is pretty much left to the engineers to introduce us to things like LES. I now consider things like LES as part of the process of making music and for me there isn't such a thing as "back-room-stuff" that I don't need to know about. We've used LES to maximum effect on our soon to be released new single – "You Take Me Up" – all the machine noises are natural sounds trapped in the AMS edited and triggered. We are continually replacing drums by locked-in ones and the snare on the single "Hold Me Now" is a good example of that. One of the other things we seem to get good results from is when mixing 12" singles it is possible to lift bass or snare drums from the tape, lock them into the A.M.S. and then manually trigger them during the mix so we end up with drum beats in the mix that aren't on the multitrack.

A.M.S.: Does it affect the way you write songs having knowledge of such units as A.M.S. and the techniques that are possible with them?

T.B.: Yes very much so. We write directly onto 8 track tape and consider this as our demo. We build it up layer by layer and many times we won't bother trying to get "the great sound" because when we lock-up to the 24 track with the 8 track material we like we always know the A.M.S. equipment will be there – problem solved! ■

every studio I go in. I started to use the RMX 16 on my solo tour, I'd seen Showco using it and whilst playing around with Craig Shertz it became obvious that it could open up whole new areas and allow me to do things live that previously just hadn't been possible.

A.M.S.: Which songs in particular?

P.C.: "In the Air" was probably one of the first songs I used the RMX 16 on to maximum effect. After that songs like "Keep It Dark" and "Mamma" were songs that relied heavily on the drum sound and just couldn't have been done without the unit. The Nonlinear programme is my favourite as I'm sure you realise.

A.M.S.: But do you use the units in the studio – when you are producing yourself?

P.C.: Oh yeh! For instance doing this new

with the A.M.S. equipment it gives me a lot more scope.

A.M.S.: Do you write to percussive sounds?

P.C.: Oh yes and that is very important. The classic example being the track "Intruder" on Peter Gabriel's third album. That started with me sitting on the drums and Hugh Padgem playing around with compression and gates, which is now of course the Nonlinear sound. The effect of what Hugh was doing determined the rhythm and that just came naturally – boom boom chick, boom, boom chick. There wasn't a song at that time and I said to Peter that I would use it if he didn't want it, but as we all know by now it ended up as "Intruder". I've still got a 10 minute drum backing track to that at home! Interesting to see who was in on that session – there was me and Peter,



Eric Clapton album. I really don't think there is a track that doesn't have the A.M.S. reverb on it. It is particularly good for getting a very big sound out of a snare drum. I also like the small room sound – it really does sound like a small room with a mike in it.

A.M.S.: Why did you choose to own a couple of A.M.S. units yourself?

P.C.: Well when I record I start at home with a small 8 Track. Because I only have a small room I've tended to work with drum machines and the like. Now I can do what I like doing which is playing the drums hard and in conjunction

Hugh, Steve Lillywhite and even Nick Lornay I think

A.M.S.: There is obviously a Phil Collins sound now. How does that affect you?

P.C.: It's very nice because I get asked to do all sorts of things. When I ask people if they know what they are getting they say of course – the Phil Collins drum sound. That is good because it's a starting point and there are allsorts that can be done with equipment like the A.M.S. units. Anything that allows a producer to muck around with perspective is great and that is really what A.M.S. lets you do. ■



Steve Levine

Steve Levine has just won the U.K. producer of the year award and is particularly noted for his work with Boy George and Culture Club. He owns what must be the largest memory A.M.S digital audio processor in the world having over 25 seconds of memory.

Steve Levine: As far as I am concerned it's not just consoles that should be available "customised" – it should be everything, particularly systems like the A.M.S. I like having a rapport with manufacturers or suppliers because I also like having the first of anything new. You may lose the odd day here or there by experimenting with new pieces of equipment but the end result is always worthwhile.

A.M.S.: You certainly seem hell-bent on doing everything you can to ensure you get the ultimate quality product into the

hands of the customer – even to the extent of owning your own Sony digital multitrack machine! How does that affect your choice of digital audio processors?

S.L.: Well put it this way I never use anything other than A.M.S. I haven't used anybody else's delay lines or harmonisers for over 2 years. I've even been in a couple of sessions when for one reason or another there were no A.M.S. units around – I'd rather do without than have to use any other system!

A.M.S.: What about the RMX 16 reverb, how much use does that get?

S.L.: Well as you can see my technique of recording is normally D.I. to the digital multitrack. It is very important to give the material the feel that it isn't D.I. and one of the easiest ways is to add the feel of a room by means of the RMX. It is particularly important on material from the Fairlight because the addition of programmes with very short decays can

really separate the different sounds. Again I think the unit is definitely quieter than other units I've used, like the Lexicon, which is so important because it is even possible to hear desk noise on the sort of things I work on. With George's voice, I use tube mike and put the reverb on as we go – that really gives a pleasant sound.

A.M.S.: Tell me a little more about your recording technique.

S.L.: O.K. Even with the digital it's quicker for me to record all my backing vocals onto a spare piece of tape – mix them on to a Sony F1. and then dump them into the DMX 15-80S and edit to exactly what I need. I can then use the Fairlight to trigger the A.M.S. 80S exactly on the bar when I need that particular vocal. So the length of the chorus is determined by however much memory I have! This is a dream for me – it is absolutely brilliant! ■



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Letters

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making an "average" artificial ear, etc.), I am having these headphones measured with B&K microphones mounted in a "KEMAR" dummy head installed at the University's anechoic chamber, and hope to report upon these findings in a followup article in *R-e/p*. However, even this additional information may not appease Mr. St. John's concerns, because subjective elements — including my own personal hearing apparatus — will still remain in any evaluation such as this, as stated in the article.

5. The temperature and humidity in Clapp Recital Hall are controlled withing narrow limits, with 68° F (20° C) temperature and 40% to 60% humidity maintained as closely as possible the year around. The maintenance engineer for the building has stated that the humidity in Clapp Recital Hall on December 14, 1983 was almost certainly between 40% and 50%, since this was during the heating season with its lower humidity. Other information: the barometric pressure in eastern Iowa on December 14, 1983 was 29.32 inches of mercury (744.7 mm Hg or 99.3 kPa), which is rather low. Iowa City, Iowa is nominally 660 feet (201m) above sea level. Clearly, all microphones were subjected to *exactly* the same temperature, humidity, and atmospheric conditions, all of which were close enough to "nor-

mal" for any of the units evaluated.

If I thought that this procedure was invalid, in spite of its carefully stated subjective elements, I would not have published the article. My principal reason for a feeling of confidence in this enterprise is the fact that there were no real surprises in the outcome. Having worked with all of these microphones on many occasions before, I can report that the U47s on this tape did indeed sound like U47s, the MKH405s like MKH405s, and so on. If for example, the 77-DXs had sounded more transparent than any of the very fine AKG, Neumann, or Shure microphones, then I would have doubted the validity of the entire undertaking, and would not have bothered to report upon it. (See: the manufacturer's frequency response curve for the 77-DXs reprinted on page 190 of H. Tremaine, *Audio Cyclopedia*, second edition.) This procedure permitted the evaluation of microphones by directly comparing many units to each other. Most equipment reviews in *R-e/p* and elsewhere deal with a given product in isolation, and the test reports are almost always favorable.

I have just completed additional evaluations of microphones from AKG, B&K, Calred, Crown, Milab, Neumann, and Schoeps, for a supplementary article planned for a future issue of *R-e/p*. The manufacturers and importers of these brands apparently have found some merit in my procedure, for they all have been extremely cooperative — and even insistent — in loaning me their microphones for evaluation and direct comparison. □□□

EXPOSING AUDIO MYTHOLOGY

Laying to Rest some of the Pro-Audio Industry's more obvious "Old Wives Tales"

by John Roberts

We will re-open our discussion of digital audio from time to time as issues rise to the top of this boiling debate. (New readers are advised to check out my June 1983 column for a background discussion of digital trade-offs and related questions.) This month we will re-examine sampling frequency and dynamic range considerations. In part two we will wade back into the "Golden Ears" glossary project.

Digital Sampling — Is 44kHz Enough?

As would be expected, there are two schools of thought on this subject. One group sternly invokes the name of "Nyquist," and will slap your wrist with a slide rule if you so much as suggest that two samples per cycle might not be adequate at the top of the passband. The other group argues for a higher sam-

pling rate, claiming that the output doesn't look or, even worse, doesn't sound like the input.

Well, this is one of those cases where both arguments are more right than wrong. You may recall from my June 1983 column (Compromise #2½: Anti-aliasing filters) that the severity of the anti-alias filters are a function of the desired passband and sampling rate. A 20 kHz passband with a 44.1 kHz sample rate requires a filter that goes from a flat response at 20 kHz to maximum attenuation by 22 kHz. For the benefit of you readers who don't design filters for a hobby, that's a *steep* filter. Filters of that order can cause distortion¹, generate large amounts of phase shift², and reduce A/D headroom because of overshoot. In theory, all of these problems can be controlled, and some second

... continued overleaf —

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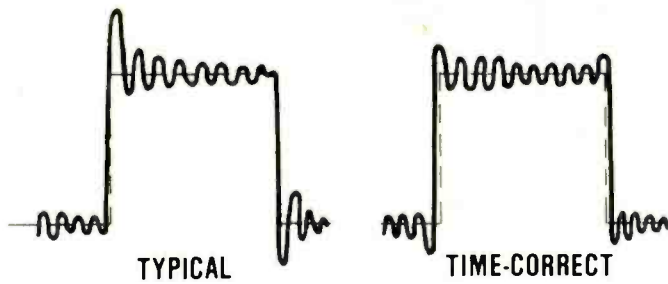


Figure 1: Square wave response of lowpass filters.

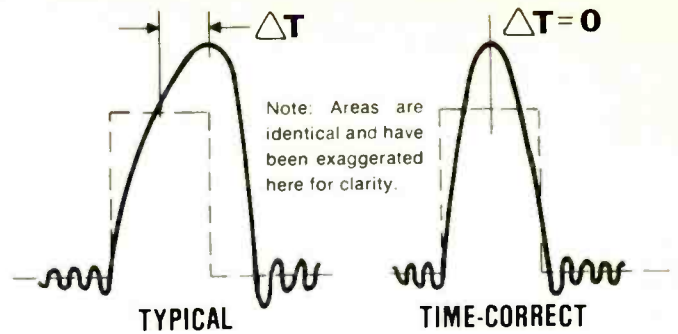


Figure 2: Impulse response of lowpass filters.

(third?) generation Compact Disc players are much improved in this respect.

When Is A Ring Not A Ring

While ringing is considered a form of distortion, a "time correct" filter will also appear to ring (Figure 1). However, upon closer inspection you will note that the "ring" is evenly distributed before and after the impulse or wave edge. This ring-like waveform is known as "Gibb's phenomenon," after Sir Willard Gibbs, and mathematically predicted by Fourier analysis of a perfect square wave or impulse with all harmonics above filter cut-off (20 kHz) cleanly removed.

Forgetting about mathematical analysis for a minute (or longer), let's look at what's going on with respect to time. In Figure 2 we have superimposed a short impulse with the output of a typical and a time-correct, lowpass filter. Note that

both filter outputs have similar energy, but that the non-corrected filter adds delay to the impulse.

While most of the debate favoring higher sample rate is intuitively based and often emotionally charged (it's no fun being expert in obsolete technology), there is practical merit to raising the sampling rate. Filters would be simpler (i.e. harder to design poorly), and uncorrected time errors (phase shift) would be less. However, for now at least the die is cast, and I believe any problems associated with the 44 kHz sampling rates can be solved.

The time-correction filters described so far are implemented in hardware, mostly for CD playback. I think it's about time we took advantage of digital audio's much touted ability to be manipulated in the digital domain. Not unlike the technique of dubbing tapes

backwards (see: *Letters*, August 1983 issue), high-frequency lead could be added to compensate the lag of the input and output filters.

As there are no standards which I am aware of that describe input/output filters, it may be a good idea to throw a 1 kHz square wave on with your slate tone. This will contain enough group delay information to facilitate future correction. In fact, it wouldn't be such a bad idea to put a square wave onto analog masters, since those machines are far from perfect with respect to phase response.

Dynamic Range and Mastering

Comments have been made recently regarding the desirability of mastering with companded delta-modulation, which is said to yield a 110 dB dynamic range, versus linear PCM with its 90 to



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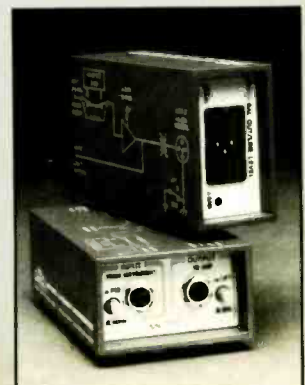
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96 dB dynamic range. While there is no such thing as too much dynamic range, I don't know that mastering is the weak link in the chain that needs cleaning up. For its immediate utility the master need only better the final medium's dynamic range by a few dB; in fact with digital the master *should* be the final product. For archival purposes the master should better the dynamic range of the mix, which PCM already does.

Right now the weak link is the multi-track. Since digital is rather unforgiving about overload, care must be taken when setting the record level of basic tracks to achieve the best signal-to-noise ratio and avoid clipping. Another 20 dB of dynamic range could make the tape machine as invisible to the engineer as it already is to the listener. Of course, after you have wide-range multi-tracks there will be a need for wide-range mastering machines.

There is another facet of mastering called "sweetening." While the practice started some time ago because of the need to limit dynamic range and correct for frequency response irregularities peculiar to vinyl, it has developed into a "fix-it-after-the-mix." To the extent that this "sweetening" isn't going to stop just because vinyl is removed from the loop, there will be a generation loss (yes, digital *is* degraded by each D/A and A/D) when they bring the signal back to analog to run through those tube equalizers. Perhaps we can get them to do the

sweetening in the digital domain or — now here's a wild idea — involve them in the mixdown session, and get it right the first time.

Golden Ears Again

Although the response to my call for a Golden Ear glossary was insufficient for me to put together a set of definitive definitions, I do have enough information to make some generalizations. By far the majority of terms seem to describe spectral balance (frequency response), often with two or more terms describing the same frequency response error, depending upon whether it sounds better or worse to the listener. For example, a response attenuation in the top octave could be alternately described by the listener as "smooth" or "dull;" likewise a boost in the same frequency band could be "sharp" and "clear," or "harsh" and "shrill."

Whether the amplitude error creates a positive or negative reaction depends on what kind of signal is getting boosted or cut (assuming, of course, that the listener has flat hearing to begin with). Usually, boosting distortion will not sound good (see my August 1983 column for more on that point), while boosting weak overtones can be very pleasant.

It is interesting to note that not only does equipment interact with other equipment but, because of this effect, it will also interact with the software being played upon it. It do not wish to

completely discredit listening tests for evaluating equipment; after all, how it sounds is the final gauge of any system. Just beware that when trying to evaluate any one item in a system that its errors can be skewed as a plus or a minus, depending upon the rest of the system's characteristics and software being used.

It is interesting to note that some of the "tweaky-type" audio review magazines have taken up to matching up equipment that compliments each other. For example, combining a cartridge with a hot top-end to a tube amp that is dull, or combining a speaker with a weak top-end to a CD with its hot (read: "flat") top-end.

Imagine what these guys could do with an equalizer! But then everything would sound alike and there would be no need for their publications. I know, there's more to it than just frequency response, but when was the last time you read a review that measured from groove to listening chair?

There is another category of GE terms that do not appear to be frequency-response related, two of which are "sound-stage" and "depth of field." These terms typically relate to speaker dispersion or imaging, but can also be affect in stereo equipment by crosstalk or other interchannel effect that can modify the balance of L+R to L-R. (Note: this may be a factor why some phono cartridges sound different from the way

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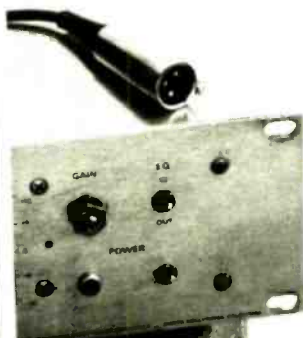
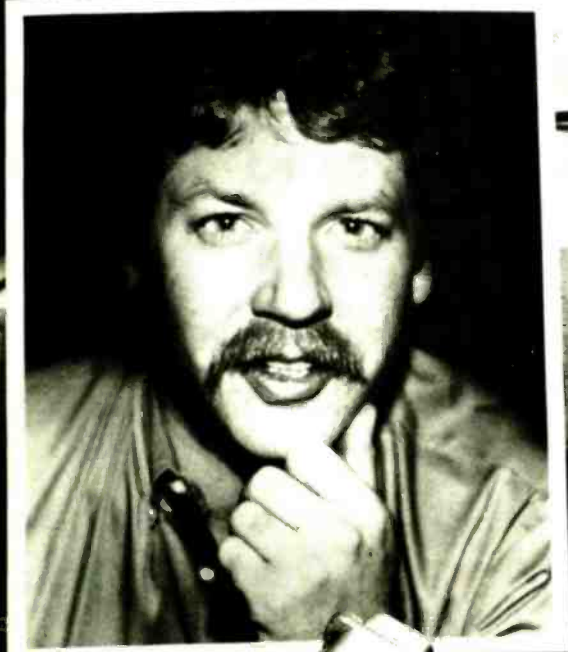
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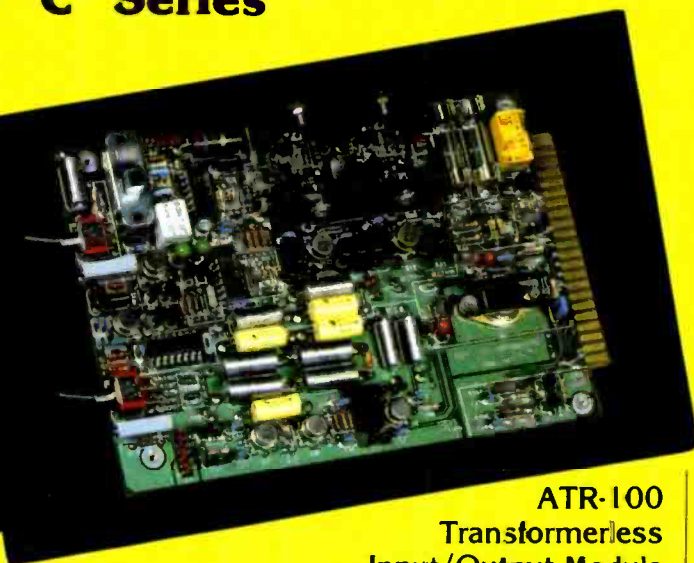


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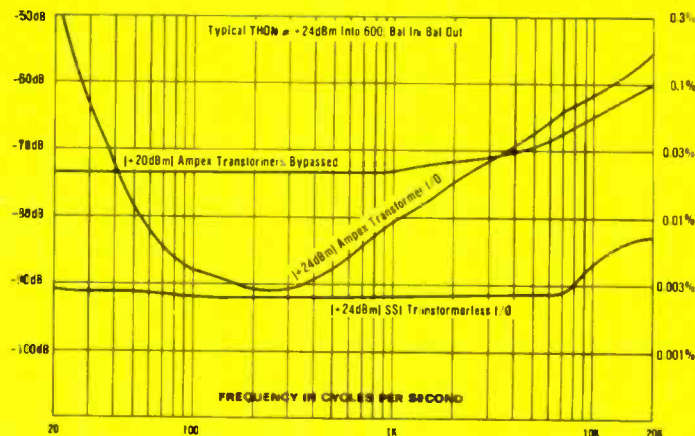
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they measure; difference in vertical and horizontal compliance can affect the stereo image or width of sound-stage.)

There are more of these non-frequency-response related terms, and I will try to describe some more of them in a future column. But first I must try to figure out what they mean.

By the way, I would like to thank Bruce Bartlett of Crown International for sending along a draft of an article he wrote that includes a number of frequency-response related terms and their definitions. ■■■

Reading for Extra Credit:

1. "Distortion in Postive- and Negative-Feedback Filters", by O.J. Bonello; *J. Audio Eng. Soc.*: Vol. 32; pp. 239-245
2. "Time Correction of Anti-Aliasing Filters Used in Digital Audio Systems", by John Meyer; *J. Audio Eng. Soc.*: Vol. 32; pp. 132-137
3. *Network Analysis*, by M.E. Valkenburg. (Prentice-Hall, NJ, 1974); p. 469
4. "Recording Techniques, Part 8", by Bruce Bartlett; *Modern Recording*; November 1982, pp. 28-36.

VISUAL MUSIC SCENE

Video Director Duncan Gibbins on the Aesthetics of Promotional Videos and Concert Shoots

by Adrian Zarin

In my last two columns, I focused on some of the main technical issues affecting today's visual music scene. Now might be a good time to turn our attention to the aesthetics of music video. What follows is the first in an occasional series of interviews with the people that bring together equipment, techniques and talent to make a complete, entertaining piece of Music Video. The overview provided by top directors and producers offers a valuable perspective for everyone currently working in the field.

For our first such interview, I've selected Duncan Gibbins. A relative newcomer to the rock-video scene, Gibbins already has made his mark as the director of such clips as the Eurythmics' "Who's That Girl" and Bananarama's "Robert DeNiro's Waiting." He has forged a distinctive style in his pieces, which places heavy emphasis on narrative and provides ideal vehicles for the young, highly visual British artists with whom Gibbins tends to work — people such as ABC, Wham, JoBoxers, Nick Kershaw, and Hazel O'Connor.

The director brings to his work with these artists an ample background as a director of documentaries and a script writer for British television. Although he discounts himself as "an absolute clutz technically — sort of the Inspector Clouseau of music video," Gibbins proves an informed and provocative commentator on the various aspects of making videos.

"Originally I was a journalist," he says, "and then I worked for the BBC as a freelance director/producer for quite a few years and did a couple of successful documentaries in England. I suppose a great advantage I derived from that time was spending some five or six years in the cutting room. When I made a film I was able to sit with the editor hour after hour and cut the film with

him. I learned a lot about editing, which I think is very important in the film-making business. Sometimes on a music promo or commercial, 60 or 70% of what you achieve is in the editing.

"The sort of documentaries I used to do were situations where I'd create an ambience that would let the subjects relax and get into a state where they would forget that the camera was there. From there, you simply let the camera do the work. I used to pick my cameramen very carefully: people who could stand on their feet for hours and pull focus while other things were happening.

"So I suppose the most important thing that documentaries taught me is the importance of creating the right atmosphere, especially with rock artists, who are not used to performing in front of a camera or being asked to do things of a performance nature other than actually playing an instrument and singing. They feel exposed; it's like they're naked.

"I've been very, very lucky with the groups I've worked with, though. I suppose I tend to work with people who can act a bit. They've seen my show reel and they've said, 'I like that style of work; I can do that.'

"While we're on the subject, I'd like to stress that we're very fortunate in England at the moment in having some great technicians: lighting people, cameramen, directors of photography, cinematographers, etc. Because England hasn't got such a large television industry, we really have a great deal of talent that can't be absorbed by TV or by movies. So they do commercials — very good commercials — and they do music promos.

"The group of cameramen I work with includes Ricardo Coll, Peter MacKay, Chris Ashbrook, Chris Morphet, Richard Greatrex, Nick Knowland and John



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August 1984 □ R-e/p 29

Metcalf. My first assistant, Tony Heindriks is wonderful; I recently watched him keep five thousand screaming Wham fans at bay for eight hours. It was like watching somebody break in a wild horse, shouting through a megaphone. A director needs a good team. It's basically like American football... the director is the quarterback. He calls the shots and everybody protects him.

"I get very annoyed when somebody says 'I directed this,' and 'I did that.' Okay, he may have been pivotal to the whole thing; it may have never happened without him, but ultimately it's a team effort. And anybody who doesn't realize that is severely kidding himself.

"Ninety percent of the videos I do are shot on 35mm; the other 10% is 16mm. I never use videotape, because it doesn't give any sort of quality — I find it just doesn't look good.

"Why do I use 16mm? Sometimes, to be honest, it's a budgetary consideration. It normally costs an extra \$5,000 to shoot 35mm, and sometimes the budget won't accept that. Also there are production values that you need to establish, and which suck up any extra money that's around. You have to have a balance, so you say to yourself, 'Is it really worthwhile shooting 35mm for this one? Because if I do, I'm going to lose so much production value, which I need.'

"The other thing is that 35mm equipment is slightly bulkier. If you've got a



— Video Director Duncan Gibbins —

very energetic band, like JoBoxers, that you're going to need an awful lot of shots for — 100 to 130 odd set-ups — then 16mm gear is *much* more flexible and maneuverable. And you can get more of a documentary or 'cinema verite' style.

The 16mm camera is easier to hand-hold, of course. I suppose one of the classic examples of that in my work is in JoBoxers' 'Johnny Friendly' video. There's a chase across the rooftops in which Dig, the lead singer, is pursued by a gangster. It was done entirely with hand-held camera; I don't think the 35mm would have given quite the same effect."

Do you like to cut on film, or do you transfer and edit on videotape, I asked?

"We transfer from the negative onto one-inch videotape," Gibbins explains,

"and then edit directly onto one-inch. We don't off-line first. I like the feeling that you've got control; if you know what you want, then it's quicker doing it that way. The other problem is, if you do a rough cut, then the record company and everybody else starts adding *their* input, and you can end up, sometimes, with a terrible compromise.

"I used to edit exclusively on film, which I love to do because you can do a rough cut and then fine-cut it. It was quite an adjustment to start editing on one-inch, because you have to fine-cut almost immediately. But an advantage I've found is that I can cut a 20-second segment and then constantly review it to see how it fits in with the rest of the piece. Quite often, it's a matter of pacing. A cut may work wonderfully on its own, but *not* at all when you play the whole piece through. By the same token, a borderline cut — one that doesn't quite seem to work on its own — may look fantastic when you review it in context.

"It's also a lot faster working with videotape. Take the Eurythmics' 'Who's That Girl.' We talked about it on a Monday afternoon, shot on Thursday, and were finished by Sunday. I like to know that I've got what I need on film, and then the editing comes as an incredible bonus. Rather than the attitude where you go in, shoot anything, and then 'fix it in the mix;' I hate that. I like to *know* I've got the 'mix' there on the raw footage. Then I can use editing to add the

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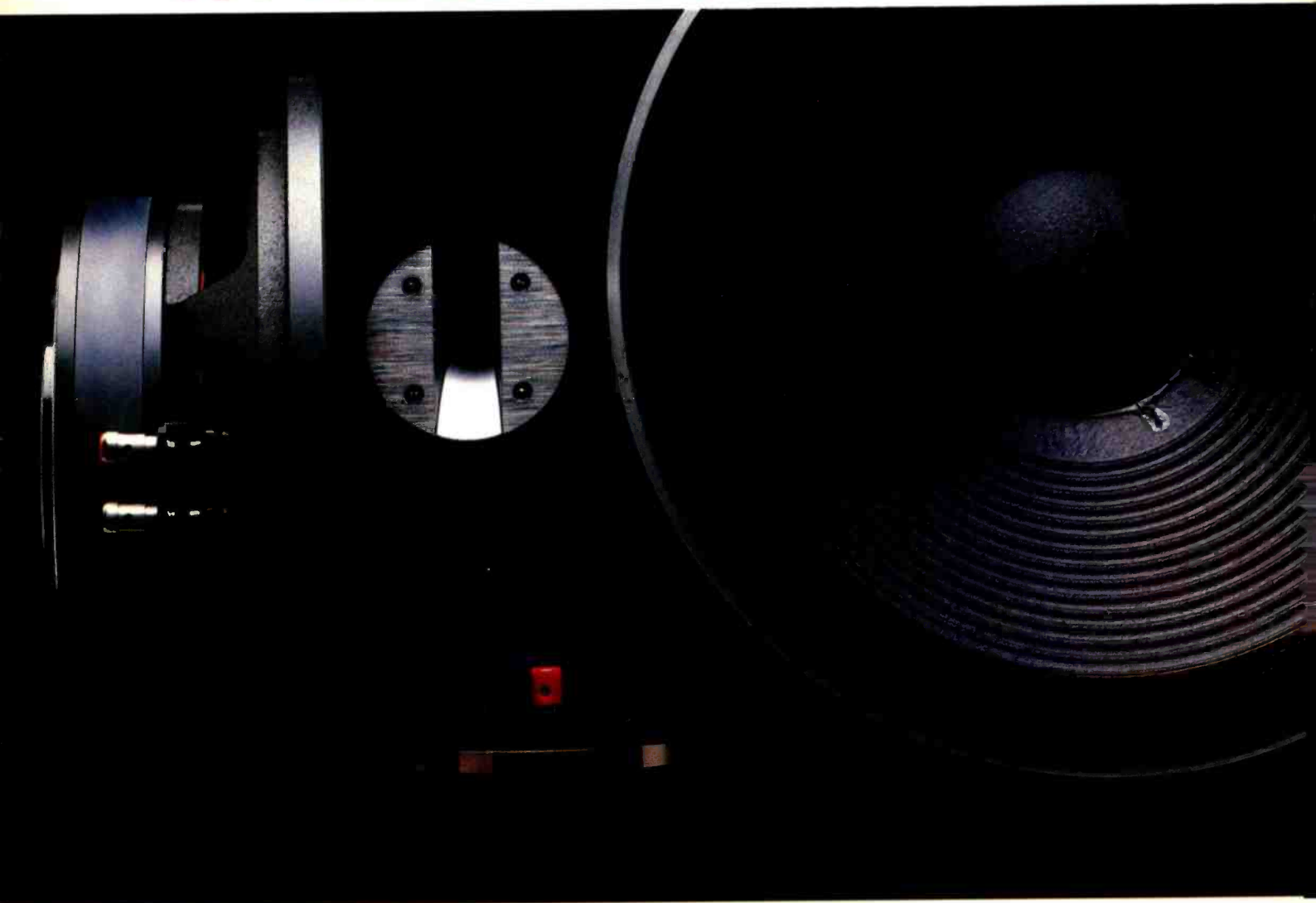
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fairy dust, a bit of 'Walt Disney' magic to make it come alive."

On the whole, I offered, you don't seem to be a very effects-oriented director?

"No. What drives me mad about MTV is that *every* time they want to highlight something, they put on *some* effect. Now in video, effects are great if you've got the money to spend; there is nothing worse in the world than a *cheap* effect. You can ruin a whole piece by putting in one tacky effect. So my attitude — and the attitude of quite a few British directors — is that, to tell a good story, getting a good performance and good photography are the main concerns. We will only use an effect if: one, there is enough money to do it; and two, it is absolutely essential."

When it comes to storytelling, a video clip is hardly a form that's conducive to narrative. You've only got a few minutes; you can't really use dialog, although some people work some in. How do you get over these limitations in your narrative clips?

"It is difficult," Gibbing concedes. "But there are *always* certain points in the music that you can use to move the story onward. Instrumental breaks are wonderfully useful. I gradually started to develop a short-hand style whereby people could do something with just a look or a piece of action, which can say what otherwise would take half a page of dialog. What I also try to do is spend a lot of time casting. When I do a narrative piece, I try to bolster the musical artists with one or two good professional actors as well."

"Too often, I see videos where people go completely over the top with their performances. I try to do it more subtly — a flick of the eyes, that sort of thing. One of the most satisfying things for me in 'Who's That Girl' is one of Annie Lennox' closeups, where she turns her head away from the camera. The look in her eyes clearly says, 'you son-of-a-bitch...' Because she is a great performer she can do something like that with just one look. Whereas another way of doing it — the wrong way, I think — would be to have really, really big action: the hands flying, the eyes going — completely over the top."

"Which, unfortunately, is the way that 90% of rock videos are made. Too often, you see dramatic things happen for no apparent reason, as though the director said, 'Oh, it's been 20 seconds; we'd better have something *dramatic* happen.' He's throwing things against the wall and seeing what sticks. It's a different style — I'm not knocking it — but it's not *my* style; I try to be a little more subtle, which I think pays dividends in the end. It also means you can watch the piece a lot more. I don't think you should understand a promo absolutely 100% the first time through."

A video should be like a record maybe, with different hidden things in the mix?

"That's right. You're sitting there listening to an album at four o'clock in the

morning, and suddenly say 'I've never heard that *sax* before!' A video can achieve the same kind of thing."

"The other important thing is building up momentum — that's what gives the viewer a feeling of satisfaction in the end. He should have the feeling that the video is moving somewhere, and that there's going to be some sort of conclusion; not a summing up or whatever, but some sort of stylistic conclusion."

"Too many clips on MTV have five or six different styles to them, and look like they've been thrown together. It doesn't look like anybody really thought anything through. I see a lot of clips that I think would be much better if they were

re-edited, and the elements juxtaposed a different way."

Has your background as a scriptwriter been of help in achieving narrative and stylistic continuity?

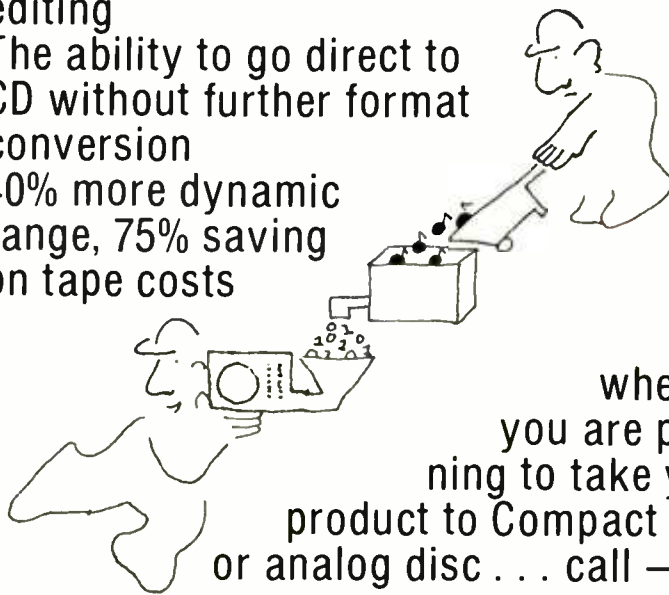
"I suppose you're either a storyteller or you're not. It really is like launching out on a major swimming event; once you start out, there's no turning back. You've got to say to yourself, 'I'm not going to compromise. I'm *not* going to cut to a forward shot of the band. I'm *not* going to cut to the vocals. Instead, I'm going to make this story work and blend it into the song.'

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concert video work. You recently completed one with Nick Kershaw?

"Yes, it was a 50-minute show. Nick is a very good musician and he's also extraordinarily good in front of a camera. We shot a regular concert, with about three or four thousand people there. I hadn't done that kind of shoot for years; not since I did the Clash in '79 for the BBC. That was something — I was spat on! We went to Scotland for two weeks, and the band was great; we got along really well."

What sort of special demands does a live-concert shoot make on a director?

"Certain people have said that doing a live shoot is really quite easy, which it is, in some respects. Basically, most of your work is done before the concert begins. In some concert halls, you have to be very shrewd about where you put the cameras. In a sense, you are really sort of a team coach: you've got to have the personality to make sure everybody knows exactly what they are doing."

"There's a lot of funny little things you learn. Like if you've got hand-held cameras moving about, you ask the crew to dress in dark colors. If you don't, you see all these guys in colored T-shirts wandering about on your master shot. Whereas if they're wearing dark T-shirts, they're not as visible."

"Talking to the artists and going to concerts beforehand is another part of the advance work. Obviously, there are certain things in certain concerts that

you must get. With Nick Kershaw, I went to two or three of his concerts before I actually shot one, so I knew pretty well what the show was like. I always found that once the concert started up, there was a great sense of relief, because I thought, 'Well, there's not much I can do now.' We're all in radio communication with each other throughout the show, but up to a point the guys are all on their own. You just try to pick the best possible cameramen, and put the cameras in the best possible positions."

Do you pre-plan cuts from one camera to another, or do you put each camera on an iso and assemble everything later on in editing?

"There are obviously some shots you can pre-plan. For example, I wanted some track shots on the Kershaw concert, so we laid some track at the front of the stage. I was in radio communication with the cameraman and I'd say, 'In a second, I'd like you to track as pre-discussed; OK... Go.' But that sort of thing is very difficult to coordinate when you've got something like seven or eight cameras roaming about all over the place. So, in a sense, the concert itself is a creative black hole. You're doing a lot of creative work beforehand, and then you're doing a lot afterwards in the edit stage. You just make sure you've got a good editor working on it, and then you can come in and fine-cut it with him."

Did you edit the Kershaw concert on

one-inch tape?

"No, we didn't actually. This one is being edited on film, because it's a longer process. A lot of the time in concert editing is spent just syncing up the film and finding the right shot or the right section. We shot something like 40 or 50 rolls of film for that concert. To sync that up and get the sound married to the picture is a massive job. If you were going to do it on one-inch, it would be costing you over \$400 an hour. And for the first 24 hours, you'd just be syncing up the film which means that it would be almost impossible to edit a piece of that length on video without going through the roof on the budget. Editing on film is a lot slower, but it's a lot cheaper."

"Because there is not an absolute deadline on this project, we can edit on film. It's up to the film editor to assemble a rough cut. Then, when I go back to London in a few weeks, I'm going to sit in with him and we'll do a fine cut."

It seems that, up until now, attention has been focussed on video promo clips. Do you think that the growth of the home market will cause a boom in long-form programming, like concert video-tapes?

"It's very difficult to say. I know England has got more video players per head of population than any other country in the world. It seems strange, in fact, that a lot of people [in Southern

... continued on page 150 —



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STEVE LEVINE

Sessions with Culture Club . . . a solo album . . . digital recording

Interviewed by Ralph Denyer

Although Steve Levine rose through the ranks to eventually become a full-fledged engineer at CBS Studios, these days he generally works at Red Bus Studios, also located in London. But, having done some synthesizer programming outside the studio, when the time came to continue with the recording of his own solo album — a project upon which he has been hard at work — Levine discovered that Studio One at Red Bus was booked. No more problems of this nature in the immediate future though — he's block booked Red Bus until the end of 1984.

When *R-e/p* spoke to Levine in early June, his first solo single, "Believing It All" was beginning to edge into the UK Top 100. A week later, however, it had dropped off the chart, and he was deciding which tracks should be released as the follow up. Levine has been taking his solo project seriously because he would like to

make the transition from producer to credited artist for an album, in much the same way as engineer/producer Alan Parsons did a few years back. But Levine is a realist, and wants to stimulate interest with a single success before releasing an album.

Levine is most definitely an Eighties record producer. His background is technical rather than entrepreneurial, although he is more than capable of dealing with the high pressure demands of modern business, and strives toward being simply a "professional." This writer found him to be assertive and energetic, and a man who doesn't hold too many punches when expressing his opinion, even to the point of abrasiveness. This point is, of course, that Steve Levine delivers, and at times he appears to do it with deceptive ease. While mixing in the studio one day, he was also dealing with telephone calls and visitors until the late evening, and appeared to be one step ahead of them all. (An example: a client phones about some tapes

he needs; the producer tells him they were ready the day before.)

Levine has come to prominence during the past couple of years as Culture Club's producer. In 1983 he received the coveted *Producer of the Year* award from the British Phonographic Institute, as well as a similar accolade from *Music Week*, Britain's equivalent of *Billboard*.

Prior to working with Boy George and Culture Club, Levine had considerable UK chart success with singer David Grant, who, before going solo, was one half of Linx, a moderately successful jazz-soul-funk duo. Levine produced Grant's hit soul-disco UK singles, including "Love Will Find A Way," "Watching You Watching Me," and "Organise."

Levine is a member of a vanguard of British record producers that have embraced digital and computer technology with open arms. Looking around CBS Studios, a casual obser-

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STEVE LEVINE

ver might be forgiven for mistakenly thinking that one of the top established bands was recording there. The studio itself was filled with over 40 flight cases of equipment; the name "Steve Levine" is stencilled across every one. He owns his own dedicated digital recording system and an array of synthesizers, all of which are linked together via MIDI and SMPTE time-code. On the recording side, a Sony PCM-3324 digital multitrack and a PCM-1610 digital processor are prominent. On the synthesizer side, the heart of Levine's system is a Fairlight CMI that serves as "mothership" and controller for a battery of equipment, including the first Yamaha DX1 to be imported into Europe, a Sequential Circuits T8, and about 80% of the other synthesizers in serious use today.

He worked on demo sessions with many of the British New Wave bands of the late Seventies, including The Jags and Secret Affair, gaining invaluable experience in the process. In those days Levine used to write "Do Not Erase" on the tape boxes resulting from his moonlighting demo sessions. Apart from the obvious reason, this was done to make sure that nobody paid much attention to material that probably would be thought of as equipment test tapes. It was a nice touch when Levine decided to call his now successful production company "Do Not Erase" Productions, just to remind him of his earlier days.

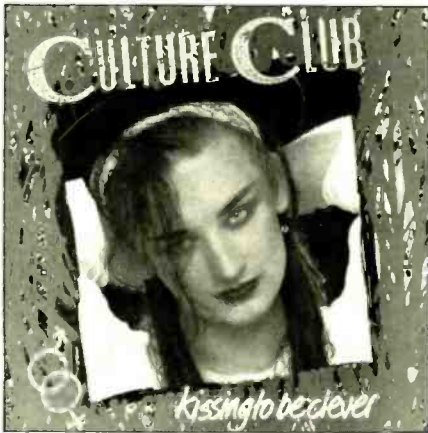
Levine's first successful releases were with David Grant, followed by Culture Club. He has just finished producing an album in Jamaica with the Melody Makers, a vocal group that features Rita and Bob Marley's children. The first single by Culture Club singer Helen Terry has now been released in the UK, and threatens to be a substantial hit. To round things off nicely, he recently was contracted to produce a Beach Boys album.

— the Author —

Ralph Denyer became a professional singer/guitarist towards the end of the Sixties as a founding member of the British group Blonde On Blonde, whose debut album *Contrasts* was released on the US Janus label. During the early Seventies he was a founding member of Aquila. In-between jobs have included everything from tour managing for Del Shannon, to making harpsichords. During the mid-Seventies he began to spend more time writing and taking photographs, while continuing to play guitar on the occasional session, as well as working solo. His photographs and feature articles have appeared in many books and magazines around the world. Denyer is perhaps best known for *The Guitar Handbook*, which to date has sold in excess of 150,000 copies.

I suggested that although he was not an initially obvious choice to produce the famed Sixties band, in fact it could prove to be an inspired and creative pairing. Levine's first contact with the band was with Bruce Johnston during the Seventies. Johnston produced an album for the British band Sailor at CBS Studios in London; Levine engineered some of the tracks. Subsequently becoming close friends, Levine in fact credits Johnston for providing the encouragement to make the move from engineer to producer. And he is obviously excited about the prospect of working with the band. "Can you just imagine the potential of all this digital equipment and all those brilliant, harmonizing voices? I just can't wait to do it — the theory *alone* looks brilliant," Levine enthuses.

When asked why the Beach Boys chose to work with him, Levine



modestly suggested that he can only presume they like his "style of production" and the sounds he achieves on record.

Hands-on Technical Experience

Levine attended a technically oriented high school and has a preference for the practical as opposed to the academic. His "worldly attitude" was learned in the recording studio, he says, stressing that "you can't learn to be an engineer at school," and pointing out that quite a slice of his life has been spent behind a recording console. "I've caught up — in terms of hours in the studio — with people that are a lot older than me because I've just been working so hard, constantly, for many, many hours."

He adds that he's not praising himself for any particular hard-work ethic, but simply points out that "producing records is something I *enjoy*. I could never do anything else; I never *wanted* to do anything else. I've not drifted into music, which a lot of people do — they sort of become musicians because they float into it.

"I enjoy producing; I feel very at home in the studio. I don't like going to pubs. I'm not anti-social or anything, but I feel at home in the studio. I'd rather be making records."

If you're used to a smokey atmosphere and a control room littered with take-outs and beer cans then, by comparison, the general environment on a Levine session is a little different.

"I don't drink or smoke," emphasizes the producer. "I don't take any drugs, and most of the people around me don't either." Levine recalls that, originally, guitarist Roy Hay was the only member of Culture Club that smoked cigarettes; he became "so sick and tired of filling the control room up with smoke," the producer says, and giving himself headaches, that he joined the others in becoming a non-smoker.

In summation, Levine accepts long working hours as an intrinsic part of a record producer's lifestyle, but tried to keep as physically and mentally healthy as possible in order to stand up to the daily high pressure demands.

Digital Recording Technology

By anyone's standards, Levine has a huge amount of high quality recording and playing equipment at his disposal. But why did he decide to buy it for use on his projects, rather than lease or rent it for a specific session, we queried?

"First of all," he considers, "producing records is my *hobby* as well as my career; making records is incredibly exciting, and *very* stimulating. Also, it's a very competitive industry. I wanted to make sure that I can offer the bands I work with a service which would be unsurpassable in terms of my expertise as a producer, and to offer them the very latest in technology.

"There are lots of bands interested in digital recording. But, because of the high costs involved, they can't afford to go digital. Working with me means they have access to an impressive array of equipment, *without* having to make a massive initial investment."

But another point arises. Not so very long ago, the majority of recording and sound-processing equipment could be hired to achieve a certain result on a session. Hire in some of today's equipment and, in many cases, if you haven't used it before you could still be reading through the operator manuals, little the wiser, a week later. Levine feels that it is essential to also offer the "knowledge and understanding" needed to get the best results from a piece of equipment, not just access the relevant hardware.

"And that knowledge only comes from owning the equipment and using it continually. A lot of producers tend to just call up the equipment rental company and rent an X, Y, or Z synth, but don't *really* know how to get the best results from it. So, if I want to go for a certain sound on a track, I know *exactly* which synth to use to get that sound. It doesn't waste so much studio time; it just sounds better, and hasn't been a headache to achieve. I'm *not*



STEVE LEVINE

really into suffering for one's art. I'd like it to make it economically as well."

Because Levine does not currently own his own studio, his personal-use Sony PCM-3324 digital multitrack has been modified to pack into two flight cases, so the producer can transport it to wherever he is working. "I normally have Red Bus solidly booked, so the machine isn't moving around that much. But, when I do need to move it, it is very convenient. For example, when I recorded the Melody Makers in Jamaica, I took the Sony with me, and it worked a treat. I literally set it up, plugged it in, recorded, packed it up, and came back to England. Absolutely perfect. There wasn't a single drop-out, which I think shows how reliable it is; you just turn it on and use it. Once you've lined up the Sony with whatever desk you are using — and I normally use MCI desks — the input and output levels are fixed and away you go."

Regarding digital console technology, Levine says that he is not impressed with what he has seen to date. As with his digital multitrack, he will wait until the Japanese pick up on the technical advances developed outside Japan, and develop a reliable and user-oriented digital console.

Levine also has built up a team of people with whom he works all the time, including engineer Gordon Milne, as well as synthesizer players Julian Lindsay and Ian Ritchie.

"Julian is a talented keyboard player. He went to the Royal College of Music; he reads and understands music beautifully. We are very close and I want to maintain the relationship."

Lindsay did a string arrangement for one of the Melody Makers tracks. The producer is so pleased with the result that he hopes to use him as often as possible in the future. "The more I can keep things in-house, the better," Levine concedes. "With his musical knowledge — which is immense — and with my technical knowledge, the two of us work very well together, it's an excellent team."

Levine says that he has a far more simplistic approach to playing which tends towards the more commercial. When he needs some backup in terms of knowledge of harmonic structure, however, Lindsay is the person he turns to for input. "On the other hand, Julian sees the value in the perhaps more direct commerciality of my keyboard abilities, and we basically play off each other."

Although Ian Ritchie handles quite a lot of session work outside of the Levine camp, particularly synthesizer programming, the producer still des-

cribes him as being "very much part of the team."

Computer-based Synthesizers

The importance of having a good understanding of modern technology is accentuated by Levine's extensive experience of working with the Fairlight CMI digital synthesizer. "The important aspect to consider when working with the CMI," Levine says, "is that you need an *experienced* operator. It's all very well hiring a Fairlight, but it is *very* complex to operate. Having now had one for nearly two years, I'm really coming to grips with it.

"There are a few hardware changes I've had made during the two years, including new voice cards that improve the fidelity. The difference in sound quality is *incredible*. But the majority of the changes have been software-based — you just get a new disk. It's a very, very good system."

And the CMI's sampling capability has proved very useful, provided that sufficient care is taken during the sampling process. "The machine is only as good as the sample you get into the machine. If you get a really good sample, it sounds really good. I've got some sounds which are really staggering, and others that just will not work!

"It can sound pretty close but, because of the Fairlight's own limitations, you have to do certain things to get a good sound into the machine. There are certain bandwidth limitations, and the CMI's quantization. Now Fairlight has plans — probably by the end of the year — to go 16-bit with a much higher sampling rate [up to 48 kHz]. Which means the fidelity will be about the same as a [Sony] F-1.

At the moment the sampling is about as good as a Revox running at 7½ IPS, which is well useable.

"Only certain sounds give you problems, like very low-frequency bass. Very low-frequency drums will not sample at all; there's so much noise left on them. By the time you filter the noise out the signal sort of goes [capping hands over his mouth and muf-fling his words] like that."

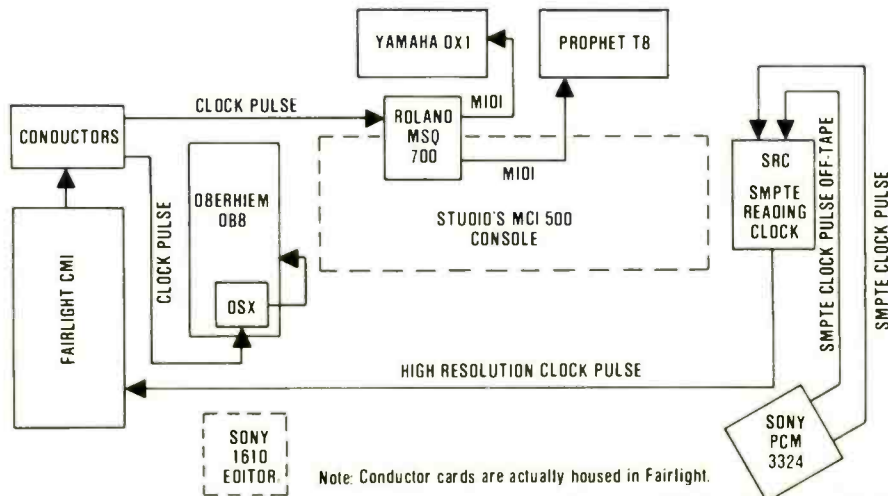
Levine has discovered that the most recent generation of digital-to-analog cards from Fairlight have made some of the high-end easier to sample. "I've even got samples of triangle that are as good as the original. By sampling them at a slower speed, and using the high sample frequency, you get about a 15 kHz bandwidth, which isn't bad."

Because he records everything digitally, and therefore doesn't lose any fidelity during the process of recording on tape and then mixing them down, many sounds derived from live samples loaded into the Fairlight are of a very acceptable quality. In fact, Levine has few reservations about the Fairlight, and describes it as a "brilliant tool."

But applications for the CMI do not stop at just sampling or generating digital sounds. Levine also uses the device as a master control system for the other synthesizers, through a series of customdesigned circuit boards developed by a friend of his, Steve Rance. [The resultant units, sold under the brand name "Conductor," are now available from Fairlight's UK agent, Syco Systems, Ltd., 20 Conduit Place, London W2 — *Editor*.]

"I run a SMPTE code onto the 24-track," Levine explains, "and the Conductors provide all the clock pulses for each of my instruments. Each board is

Basic Layout of Main Elements in Control Room showing how the Synthesizers are operated in conjunction with the Digital Recorder. There are two Conductor Interfaces, each with two outputs. Variations and additional equipment are employed according to musical application.



Note: Conductor cards are actually housed in Fairlight.

... continued on page 46

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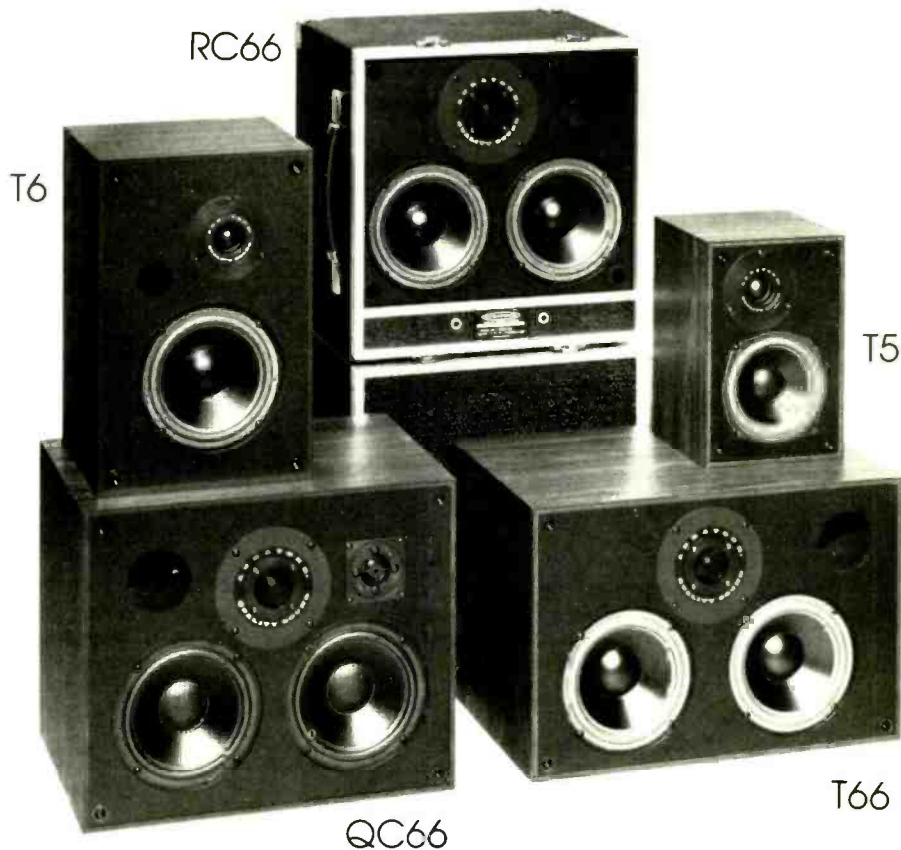
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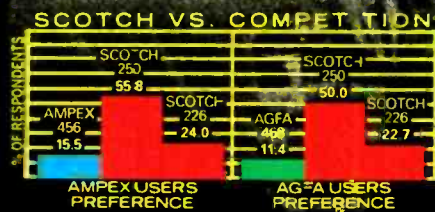
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STEVE LEVINE

— continued from page 42 —

designed specifically to work with one sort of instrument: I've got one channel dedicated to just the LinnDrum; one channel to Roland equipment; and so on. All the delays and clock pulses are absolutely right, so that there are no timing errors at all on the track. And, because the system is SMPTE-based, if there are any timing changes — because sometimes I like to shift the 'feel' of the whole song around a bit — then you can just put in an offset.

"Everything stops and starts from the Fairlight, and the Conductor provides stop and start positions as well; once I've programmed everything, I can type [into the CMI] what I want, and away I go. My customized system makes it very convenient to use in the studio." [Rumor has it that Fairlight will be releasing its own MIDI control card and SMPTE interface for the CMI during the summer — *Editor.*]

In effect, Levine virtually takes his own "studio" with him wherever he is working, only using the facility's mixing console, control room and recording area. He also carries his own racks of sound processing equipment. Interestingly, AMS customized a DMX delay line especially for Levine to provide the producer with up to 25 seconds of storage capacity. "That gives me 25 seconds of loop editing, which is very versatile when used in conjunction with the Fairlight."

In fact, when Levine only wants to repeat a short sound — as opposed to playing a sample at a higher pitch, or altering it in some other way — he often uses the custom AMS delay line because the 16-bit sound quality, he says, is better than the Fairlight. The AMS is sometimes used to store snare drums, vocal backings and other short sounds in this way.

MIDI — Simplified Synthesizer Control

As one might expect, Levine hasn't wasted much time in assimilating and using MIDI control for his bank of synthesizers. "All my synths, including the Fairlight, are converted to or have MIDI as standard — even my old [Sequential Circuits] Prophet Five. This allows me to play a part on the Prophet, and I have an Oberheim, for example, play it. Syco Systems [UK Fairlight agent] have built me an



analog-to-MIDI convertor; analog comes out of the Fairlight, goes into the little box, and comes out MIDI. The only thing I have to do is offset it by about 40 milliseconds because of the [analog-to-MIDI processing] delay."

(A couple of weeks after this interview took place, Levine acquired an additional control voltage-to-MIDI interface for the Fairlight, manufactured by J.L. Cooper Electronics, California — see page 128 of the December 1983 *R-e/p* for further details of the MidInterface I and II.)

"I use certain sequencers for different things," Levine continues. "For instance, the Oberheim DSX — which I think is the best sequencer in the world — is just so logical and so brilliant a design; it's very good for polyphonic chord parts and little rhythm parts. It was designed for doing eight notes beautifully. A lot of the other sequencers begin to use up a heck of a lot of memory when you start using lots of chords and things.

"I tend to use the Oberheim for the more lush sound — the chordal effects. And then I obviously use the Fairlight more for the rhythm parts, because the eight channels of Page R are very useful for more rhythm-oriented sounds.

"I've just got the new Roland MSQ-700 sequencer, which I've also found quite good for certain chord progressions. I don't think the MSQ records particularly well in real time; the time correction really fouls up the part — I have found that it is better to record the sequence in step time. The Oberheim DSX, because the device is correcting as you go, if it starts to foul up the part you can hear it and change your feel a little. Whereas when you

correct afterwards with the MSQ-700, you have to be *really* accurate. Otherwise it goes a little bit funny."

Levine regularly uses session musician/programmer/keyboard player Ian Ritchie to program a Roland MC4 MicroComposer, which in turn is used to control other synthesizers in the studio. "That way Ian can sit in the corner and program the MC4, and I can do one of the others. Although programming in the studio eats up a lot of session time, you're ready to go once it's finished."

Many times, Levine says he will spend close to an entire day programming the various synths, and then be ready to record in the evening. "It's solid programming from maybe 10 a.m. until 7 p.m., but then we put the whole track down in two hours. That's how I worked with David Grant, and also on my own album. It's not quite the same with Culture Club though. Then we're using just as many machines early on in a song, but we also overdub as we go. When recording my material, we know more or less the end result we want, and can program more parts in one take. With Culture Club, we're continually developing the multitrack tape, with everyone in the band developing concurrent creative input."

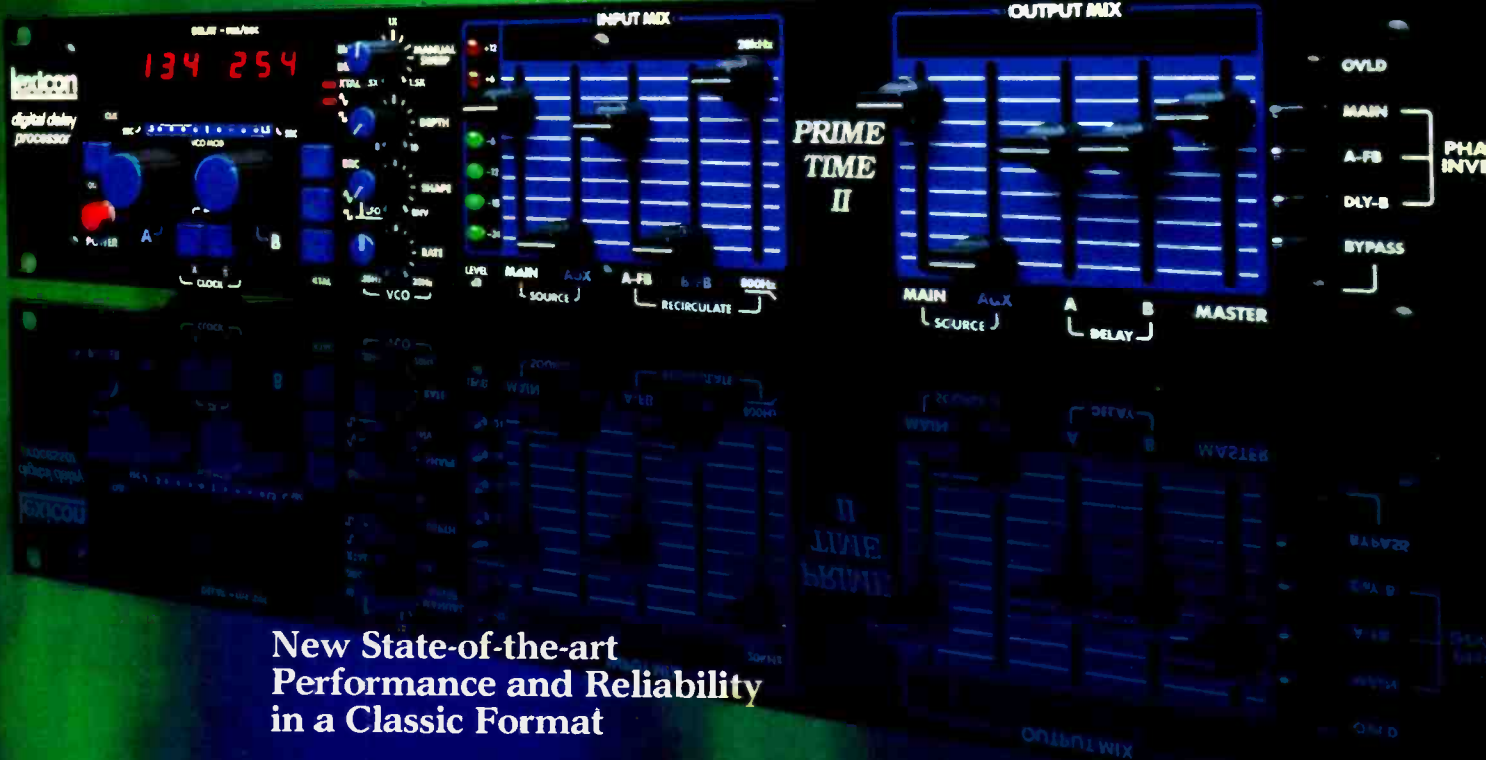
Culture Club Sessions

Three of this writer's favorite Levine productions of Culture Club are the 12-inch single versions of "White Boy", "I'll Tumble 4 U" (US re-mix), and "It's A Miracle — Miss Me Blind" (US re-mix). (These three tracks also turned out to be among Levine's favorites.) "It's A Miracle — Miss Me Blind," in particular, is an interesting production of which the producer is rightly proud. And it's a track that made specific use of his custom-designed 25-second AMS delay line, as he explains: "I fed 'Miracle' into the delay line and started to re-mix 'Miss Me' for the 12-inch. I then added bits of 'Miracle' on top of the mix as it was going down, by replaying the sections from the AMS. The mere fact that I had so much storage in the AMS meant that I could achieve that effect, which I couldn't have done with its standard capacity."

And the remixed "I'll Tumble 4 U" single? "I quite like that one. Because it was one of the first tracks we recorded, I had to go back to the old [analog] multitrack and mix it onto half-inch tape purely because of the higher sound quality, and amount of

"When recording my material, we know more or less the results we want, and can program more parts in one take. With Culture Club, we're continually developing the multitrack tape, with everyone in the band developing concurrent creative input."

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STEVE LEVINE

editing involved. I didn't have any digital editing facilities in the studio at the time, and was a bit concerned because the release was going to be made up from all these edits — all the

fast 'da-da-da-da' [drums and bass] are bits of tape about two inches long.

"It was interesting for me to come back to that track after so long a time. It was completely different from the original single, and I had a different attitude towards it because we were going for a 12-inch."

Recording Vocals

Just about every Levine production

RECORDING VOCALS, DRUMS, AND WORKING WITH COMPUTER-CONTROLLED SYNTHESIZERS

A Conversation with Steve Levine's regular session engineer Gordon Milne

Engineer Gordon Milne has worked with Steve Levine for the past two years. Originally employed as a staff engineer at Red Bus Studios in London, Milne went freelance to enable him to work on all of Levine's sessions, including those at other studios. Since the producer keeps him busy six or seven days a week, at the moment Milne is virtually his exclusive assistant. His previous work as session engineer and assistant engineer included the first Duran Duran and Human League albums.

Having worked with him for two years, Milne has a pretty good idea of how Levine likes things to sound; as a result, virtually all of the basic recording and miking is left to him. Levine can then focus his attention on setting up the synthesizers and computer-controlled interface, production, and final mixing.

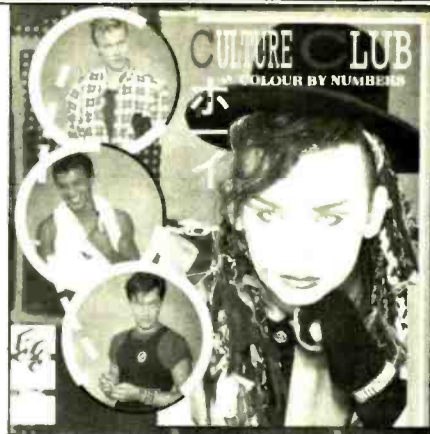
"Boy George has a very good natural sounding voice," Milne says, referring to the Culture Club's lead singer. "But it's not totally straightforward to record. There is a hump in his voice at about 4 or 5 kHz. The AKG Tube also has a slight rise in frequency response in the same general area, which can lead into a few sibilance problems." A little careful use of EQ on the board is all that is usually required, the engineer offers.

For Culture Club drummer John Moss' kit, Milne uses an Electro-Voice RE20 for bass drum, Sony C-36P mikes on the hi-hat and snare, C-35P on tom-toms, and a Neuman KM84 on each of the two cymbals. "If there is anything in particular that Steve wants — even regarding frequencies — he'll let me know. We use more EQ on drums than anything else, since they are usually quite close miked. Any additional ambience is achieved using the PZMs, or a Quantec [Room Simulator] to give a good room sound. But most of the work is done in the control room, having taken care with the mike positioning.

"Ideally, we want as much separation on tape between drums as possible. Each drum is usually recorded separately, worked on a bit more after its been recorded, and then bounced down to two tracks.

... continued overleaf —

Gordon Milne (left) with producer Steve Levine at Red Bus Studios.



features very effective vocal backings and textural vocal effects. In general, his use, treatment and recording of vocals are particularly effective. His productions feature a whole gambit of — albeit at times subtle — approaches. At the time of *R-e/p*'s interview, Levine was mixing tracks for his own album, which includes lead vocals from Chris Rainbow, Colin Blunstone, and David Grant. Also, when working with Culture Club, both George O'Dowd (a.k.a. Boy George) and Helen Terry's excellent vocals are skillfully interpreted by Levine.

"Vocals are the icing on the cake with any record," he enthuses. "The first thing people pick up on is the vocals, which delivers the main melody. Although, occasionally, there may be an instrumental element, in most cases the vocals are the instigator of a melody. I think that it is *very* important that vocals are not only well recorded, but also well harmonized and put together well.

"While I cannot sing myself, I do know which components are necessary to create a good vocal sound, with good vocal texturing. I like to work with people that can sing — so that I don't have to tell them how to do their job — but I can offer advice and ideas as to where the vocals should go. I work best with really good singers who simply need arranging, if you like.

"The vocal styles on my new album change from track to track. Obviously there is a certain tone in my mind that I go for, which presumably will be noticed on the album. So, regardless of who the singer is, there will be certain elements that sound similar because of the way I hear vocals. Everyone hears things in a certain way; the Beach Boys, for example, sound the way they do because Brian Wilson happens to hear vocals that way. But the reason for that is that Brian is deaf in one ear, and only hears certain vibrations and balances."

And, according to Levine, regular use of his Sony digital multitrack has a strong influence on the particular vocal sounds he records. "A lot of people have asked me why my productions sound so clean. Even on the radio you can hear the difference: a clarity,



STEVE LEVINE

particularly on vocals, that can only be attributed to the digital machine."

What about his use of vocal effects to add tonal colors and textures, I queried? For example, the introduction to

"Do You Really Want To Hurt Me," by Culture Club. "Some of that is very synthetic," he offers. "Some of it is very multitracked, and couldn't be done live. I sometimes use the Fairlight for vocal texturing; mixed in there subtly, the sound can work quite well. But it depends on what you're going for. Sometimes the pitch changes quite dramatically, and all



A CONVERSATION WITH GORDON MILNE — continued ...

"We use a very basic set-up on drums. The RE20 is a very solid mike, and can stand knocks and bumps. The Sony 36P on the snare is very directional, and doesn't pick up the rest of the kit; same with the 36P on hi-hat.

"You pick up a lot of the low frequencies with Sony pencil mikes. But there's nothing fancy up at the top, so you have to push the higher frequencies. They are ideal for toms because they have an extra low boost and, as long as the drum resonates, the mike will pick it up without also picking up too much of the other drums. If there is any further EQ required on the toms, isn't a problem.

"We use standard KM84s on the cymbals, because they're a good, bright condenser microphone, and again, are also quite directional. I tend to mike underneath the cymbals rather than on top, since John [Moss] uses double-headed shells and I mike the toms from above. He is quite small, and sets up his kit fairly low. Pointing the KM84s down towards the cymbals could therefore cause phasing problems, if they pointed in the same direction as the tom mikes. So I tend to go underneath with the cymbal mikes so that you get less tom spill, and no phasing problems."

As a guide to miking distances, Milne sets the toms and the 35P mikes between five and seven inches apart, while the 36P is placed at a distance of about three inches from the hi-hat, and the KM84s about four inches underneath the cymbals. The RE20 is set up right inside the bass drum; if needed, a blanket or pillow is used to tighten up the sound.

Given that Levine and Milne are always trying out new idea on sessions, in broad terms about 80% of the backing tracks for an album might be played from the control room, leaving some 20% or so to be tracked live in the studio.

"Most of the electronic percussion is played in the control room now," Milne relates. "If real drums are required — even if it is cymbals or hi-hat — that's done at a later stage. The basic drum track is layed down with the Fairlight, LinnDrum, or one of the other drum computers. Once that's sorted out, sometimes a rough keyboard pad will go down, and possibly a guide vocal just so that everyone can hear the song's structure. Then the next day, John [Moss] will play some crashes, or overdub some toms.

Live backing tracks are usually recorded to a clicktrack, or a rough pattern laid in from a LinnDrum. The duo also record backing tracks on which Culture Club's drummer John Moss sets the temp. "The whole reason for working to a clicktrack or LinnDrum," Milne concludes, "is simply to allow us to add whatever we require at a later stage using the computer-based instruments and synths." □□□

the harmonics go a bit peculiar.

"Also, on David Grant's track for my album there is quite a lot of actual words done on the Fairlight because I wanted a specific sound. Normally I only use it for very few vocals."

Regarding specific vocal processing techniques, Levine recalls that on Culture Club's "Mr. Man," all of Helen Terry's backing vocals were recorded with varispeed to sound about a tone-and-a-half higher in pitch during playback. "Helen's got a very deep natural voice, and George has got a very high voice. A lot of the vocal backings are multitracked, with four or five parts. Not all the parts have different harmonies, because some of them are octaves. Apart from that, everything is double-tracked to produce a thick sound, and also recorded in stereo."

Only very occasionally, if he has had to record a mono vocal, will Levine use an electronic delay; instead, whenever possible, he prefers to record them in stereo. If it is a mono vocal, he'll use a touch of AMS RMX-16 stereo reverb, or something similar, when bouncing or mixing down the tracks.

Had he realized, right from the start, what a good voice Boy George pos-

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Mike

CROWN

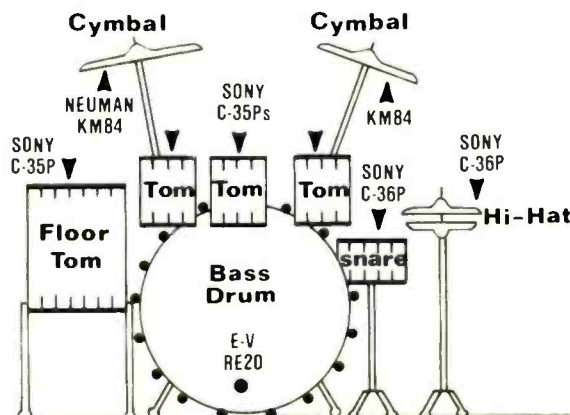
PZM

Mike

MIKING FOR JOHN MOSS' DRUM KIT DURING CULTURE CLUB SESSIONS

Engineer: Gordon Milne.

Studio: Red Bus "A," London.



Note: Area is partially mirrored to achieve a "larger" drum sound.

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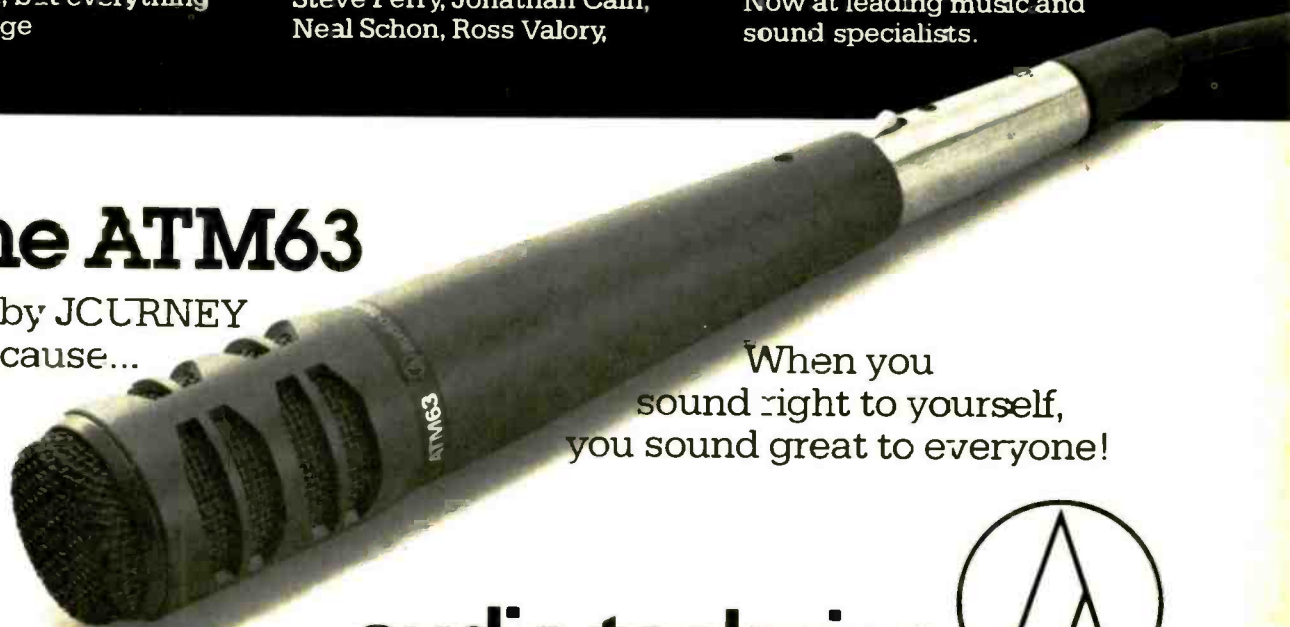
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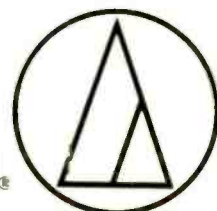
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STEVE LEVINE

esses? "Mmmm," was the producer's response, as he paused for thought for the first time during our interview session. "From the tapes I heard of the first rehearsals, I definitely didn't. When I got him in the studio, it was fairly obvious that he could sing in one take. And I think his voice has developed over the years, although he's still got a long way to go: his breathing is not as good as it should be, which would improve his voice no end. But there's a potential there that is astronomical."

During tracking dates, Levine explains, Boy George's lead vocals go virtually straight through the desk with little EQ or processing, apart from a touch of reverb or echo. Vocals are recorded in a fairly live area of the studio that has been partially mirrored. An AKG Tube serves as the main vocal mike, and is augmented by a couple of Crown Pressure Zone Microphones taped to two opposite walls on either side of George, perhaps 15 to 20 feet away. The PZMs are used occasionally in a mix as backup to the Tube.

Does Levine ever use varispeed on Boy George's voice? "No," he replies, "apart from 'Take Control,' on which there is one harmony that was varispeeded. Normally, George's vocal is very untreated. There are very few drop-ins: it's normally one take and — with the exception of one or two of the early tracks where there was the odd bit of double-tracking — I don't do any double-tracking at all with him. It's not worth it because, his voice doesn't sound *any* different when it's double-tracked. That's why we use Helen to do the vocal backings, because her voice is distinctly different. She actually has quite a deep voice, whereas George has got a very high voice with a very fast vibrato, which could indicate that a varispeed might have been used, even though it wasn't.

"Obviously, we get a 'sound,' but I don't tamper with it at all really in terms of sound processing or effects. Most of it is this room [Red Bus' Studio One], using the fairly bright area. I don't have to add very much artificial



Steve Levine considers synthesizer player and arranger, Julian Lindsay (right), an important part of the production team.

reverb to them afterwards, because there's quite a lot of natural echo in the room itself. Really, his voice is very simple to record."

Outside Influences

Levine, along with just about everyone else working in the UK music business, has great respect for the work of producer Trevor Horn. "I think the standard of Trevor's work is very high. I particularly like 'Owner Of A Lonely Heart' [from the Yes 90125 album.] I think the song 'Relax' [by Frankie Goes To Hollywood, a new band that's taking England by storm] is great, but it suffers because I don't think the song is brilliant. It's a great production and a great track that shows off Trevor's work, but I do like the overall record to be satisfying. I think 'Owner Of A Lonely Heart' does just that.

"Obviously, there are other producers I admire from my teens, people like Tom Bell and Quincy Jones. I've admired Quincy for a long, long time,

not just for his recent material with Michael Jackson, because I don't think that's the best work he has done. Some of Quincy's own albums are stunning but, because they haven't sold, people don't notice them; they only take notice of your hits.

"I love 'Stuff Like That,' which is on Quincy's *Sounds* album; the vocal arrangement and the sound of that track are brilliant. That's an example of a really good track that wasn't a hit. And I love the production on the Patti Austin albums. He's done some good things, but only seems to have been noticed by the general public for his work with Michael Jackson.

"I've admired Tom Bell for many, many years. When I was a teenager the Philly Sound and all those kinds of records were the ones I used to groove to. His arrangements are fantastic, because he gets melody in *every* part of the record — so that if the vocals aren't doing it, the strings or the brass are." ■■■

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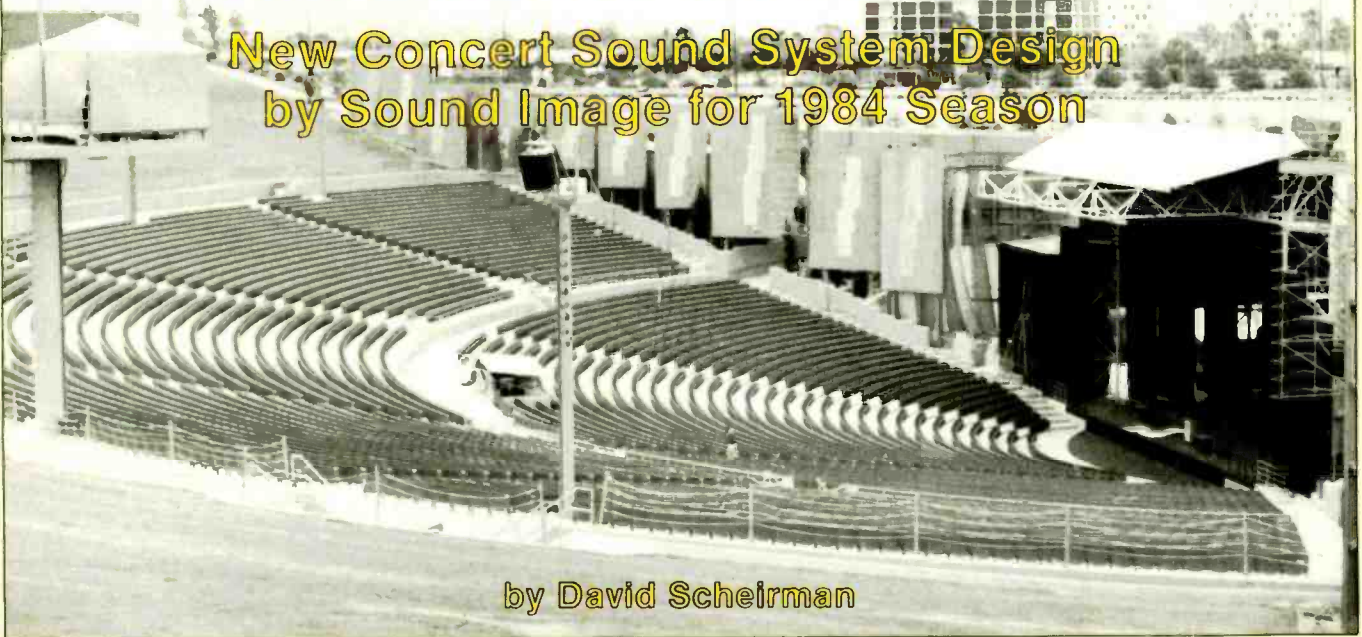
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ANATOMY OF AN INJUNCTION:

PACIFIC AMPHITHEATRE FIGHTS NOISE LEVEL COMPLAINTS

New Concert Sound System Design by Sound Image for 1984 Season



All photography by David Scheirman

by David Scheirman

When entertainment venues are situated in close proximity to residential areas, sound-pressure levels from musical events often become a local issue.

In the past, various acoustical consultants, architects, sound-system designers and theatre managers have collaborated to solve this sort of problem in many different urban areas.

The Pacific Amphitheatre, located in

Costa Mesa, California, bore the brunt of so many complaints during its first year of operation in 1983 that a class-action lawsuit is still pending.

First opened to the public for the 1983 season after construction workers met a photo-finish deadline for a late-July

opening date by pop singer Barry Manilow, Costa Mesa's Pacific Amphitheatre has seen more than its share of sound-pressure level meters.

The open-air venue was originally planned to seat 16,200 patrons, but was expanded to accommodate a crowd of 18,765.

Before . . .

Outdoor theater protests mount

Los Angeles Times

PACIFIC: Residents Threatening to Sue

The Register

NOISE: Residents mad at amphitheater

Operators of Amphitheater Urged to Soft-Pedal Music

Costa Mesans sue Pacific Amphitheatre concert noise

Costa Mesa Concerts Draw Complaints

Amphitheater's Neighbors Say Noise Is Not So Joyful

By ROXANE ARNOLD and PETER M. WARREN, Times Staff Writers

When mellow balladeer Barry Manilow took to the stage in Costa Mesa last week to inaugurate Orange County's new state-of-the-art outdoor amphitheater, many residents in a nearby neighborhood decided to be noisy. They set off their horns. They honked. They honked. They honked.

Amphitheater issue will go to Deukmejian

Residents Threaten Action Over Noise From Amphitheater

By KENNETH F. BUNTING, Times Staff Writer

R-e/p 54 August 1984

SCOTT . . . George Deukmejian can't expect to receive later month protesting Pacific

By PETER M. WARREN, Times Staff Writer

The Pacific Amphitheatre operators, about to begin their third weekend of concerts, have been urged by their Orange County Fairgrounds landlord to tone down the volume of their concerts, which have provoked widespread complaints from neighboring residents.

ing baffles and fabric could be installed around the stage area. That work, except for two small triangular-shaped areas, was completed Wednesday, he said.

"There should be a very noticeable reduction this weekend," he said.

Recording Sound Levels This weekend, acoustical engineers will record the sound emissions and around

INDUSTRY STANDARD

CHAPTER II

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PACIFIC AMPHITHEATRE

rock acts like Aerosmith and Sammy Hagar. A total of 27 shows were produced during its first three months of operation, with an average attendance of approximately 10,000 persons per event.

Within a short period of time, local residents in Costa Mesa banded together to protest event noise levels at the venue. A group calling itself the Concerned Citizens of Costa Mesa was formed, with complaints centering on the issue of noise pollution. In January 1984, the Concerned Citizens filed against the Orange County Fair Board and the Nederlander-West Corporation in Superior Court, charging that the defendants had failed to order sufficient environmental studies for the Pacific Amphitheatre.

Noise Ordinances

The Noise Control Ordinances currently in effect in the Costa Mesa area were adopted by the Orange County Board of Supervisors on October 24, 1978. Included in the General Provisions of this Act is this definition of a decibel:

"Decibel (dB) shall mean a unit which denotes the ratio between two (2) quantities which are proportional to power: the number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio."

(Orange County Noise Control Ordinance, Article 1, Sec. 4-6-2.)

Exterior noise standards prescribed in the Ordinance are as follows:

Noise Zone	Noise Level	Time Period
I	55 dB(A)	7:00 a.m. to 10:00 p.m.
	50 dB(A)	10:00 p.m. to 7:00 a.m.

"In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A)." [Our emphasis added — Editor.]

Figure 1 is a graphical representation of Ordinance noise standards.

During the Pacific Amphitheatre's 1983 season, Costa Mesa police kept a log of telephoned noise complaints for each show. More energetic performance acts such as Donna Summer rated 30 complaints, and Aerosmith gathered 66 calls; quieter shows such as Johnny Cash had as few as two. Fixes made by the sound-system contractor during the 1983 season included the dropping of high-frequency components from the upper of three scaffolding tiers to the

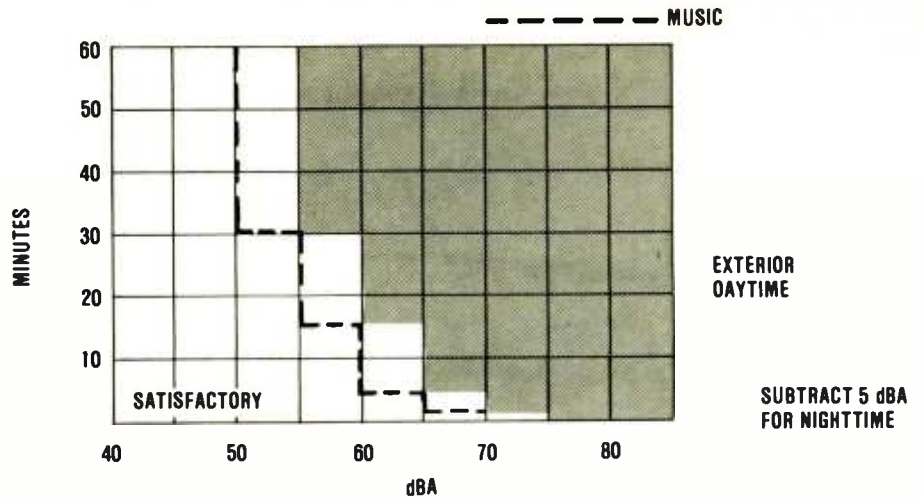


Figure 1: Orange County Exterior Noise Ordinance Limits. (Shaded area is daytime levels; 5 dBA above night-time levels shown dotted.)

middle level in an attempt to prevent HF spillage into the adjacent residential areas. In addition, a special noise-deadening roof with a lead lining was installed over the performance area.

In 1983, acoustical consultant Dave Brown monitored noise levels in the neighborhood of the theatre. Results were presented to the Costa Mesa City Council. For the most part, it was found that the amphitheatre's events did not actually break the noise levels set forth in the Noise Control Ordinance, but complaints still poured in, nevertheless.

As system levels were dropped within the amphitheatre's confined area, however, a problem of a different sort was made apparent: many live-mixing

engineers employed by contemporary touring musical groups felt that the sound level at the mixing console must be sufficiently high for the show to feel "right."

"With many touring engineers, it just doesn't work to tell them that they have to mix the show at a certain dB level," notes Stephen Redfearn, general manager for the Pacific Amphitheatre. "As a former live sound mixer, I am personally very much aware of how important it is to feel right about the mix... to feel that the sound of the show is creating part of the excitement."

"The system which we contracted for last year's season was of sufficiently good quality, but it became apparent

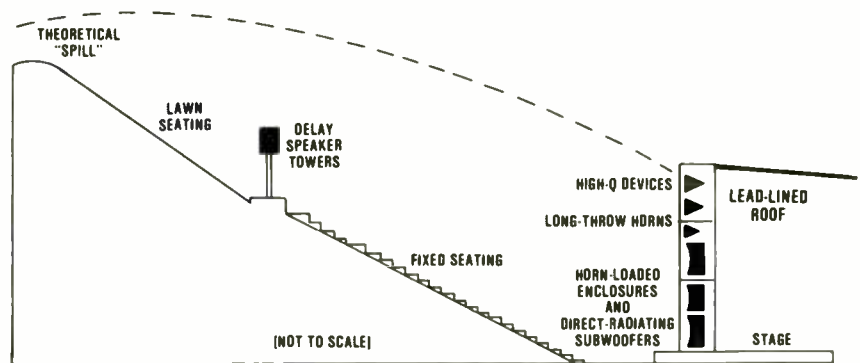
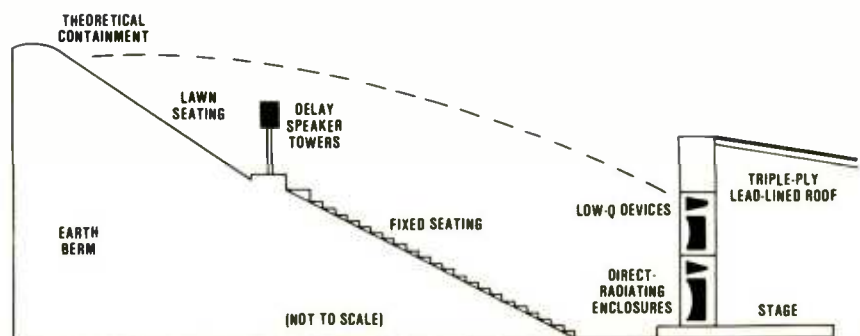


Figure 2 (above): Sectional view of sound system for 1983 Pacific Amphitheatre's season; and Figure 3 (below) the redesigned system for the 1984 season, with long-throw horns removed, and increased sound absorbing in stage roof.



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that when we dropped the level of the sound system so as to not move the dB meters out there in the residential areas, the sound of the show in the confines of the amphitheatre itself was not sufficiently exciting in the opinion of many visiting engineers, particularly at the console.

"Also, after the many problems we went through with the noise complaints from the dissident members of the community last year, I felt it was important to have more personal involvement with the sound system installation here from whichever company we contracted. This season, we have put in a different type of sound system than we had last year. The contractor is Sound Image of San Marcos, CA."

The Sound System

The sound reinforcement system supplied to the Pacific Amphitheatre for 1983 was stacked on three separate tiers per side (Figure 2). The system was a popular type that had been used to good advantage at other similar outdoor venues. Vented horn-loaded enclosures and long-throw, high-Q mid- and high-frequency devices were utilized. Direct-radiating subwoofers were also supplied.

"One of the first things we decided to try in this situation was a reduction in the overall height of the sound system components," explains Ross Ritto, owner of Sound Image. "Apparently,

the upper tier of speakers in use last season was allowing some sound spillage over the earthen berm behind the seating area. As the various sound mixers operating the system for each show pushed the system to get more level in the bowl, it leaked out into the neighborhood." (See Figure 3.)

Loudspeaker enclosures provided by Sound Image for the Pacific Amphitheatre comprise two identically-sized boxes for the low bass and mid-bass frequency bandwidths.

The front-loaded direct-radiating low-bass cabinets house four JBL Model 2220, 15-inch loudspeakers. Four cabinets were installed per side, for a total of 32 low-bass transducers in the system. The mid-bass cabinets each house four JBL Model 2220 loudspeakers, with six of the cabinets per side adding up to a total of 48 transducers assigned to the mid-bass frequency band. In addition, in each mid-bass cabinet, four JBL Model 2405 high-frequency units are positioned in opposite corners. Mid-range horn/driver combinations in use include a total of 16 JBL Model 2350 and 16 Model 2355 radial horns, all mounted on JBL Model 2441 compression drivers (Figure 4).

"The JBL 2350 90-degree radial horn was certainly not intended to be a low-Q device when it was first introduced years ago," comments Michael Adams Sound Image's system engineer assigned to the Pacific Amphitheatre. "However, when you compare it to some of the more highly-directive horn devices available on the market, you could call it that. What we needed here was a horn section for the system which gave fairly broad dispersion. We did not want to use diffraction lenses, but it was our intention to keep the throw of the system's upper frequency bands within reasonable limits."



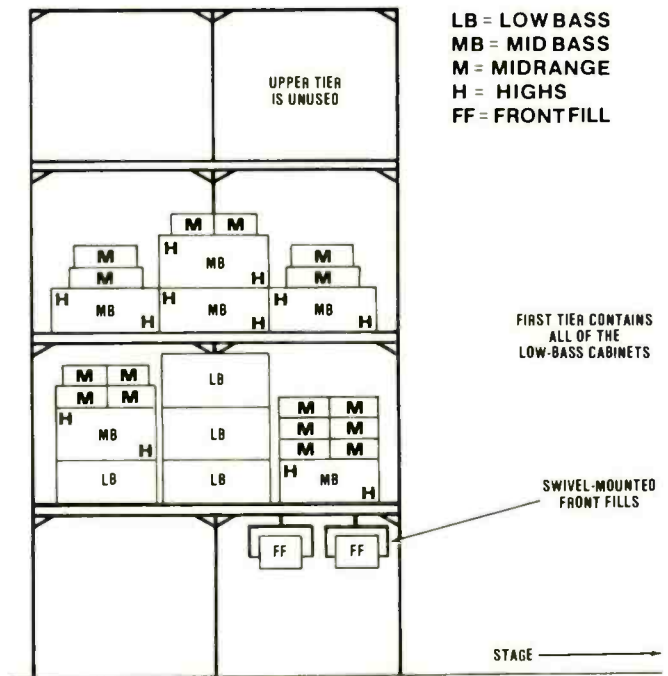
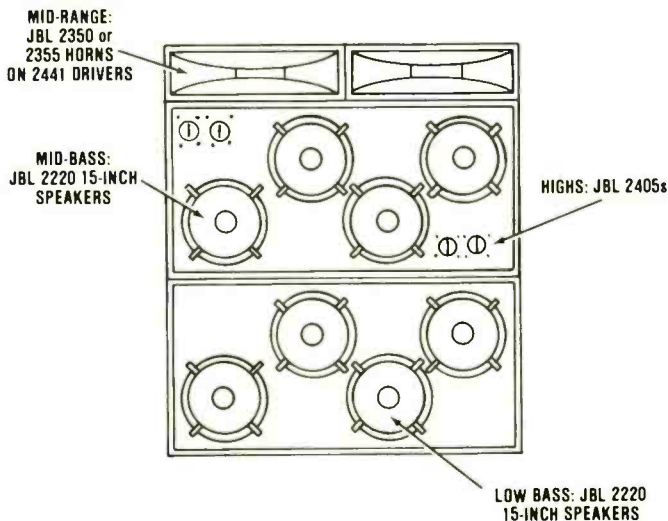
Figure 6: One of seven delay-line speaker towers serving the lawn seating area. Cabinet houses a 15-inch Fostex bass driver, and a two-inch Emilar compression driver and horn.

One method used to prevent excessive horn "beaming" in the amphitheatre was the spreading of the radial horns throughout the speaker stacks. "In no instance are there more than three horns stacked vertically at any one location in the stacks," points out Adams.

"The first day we set the system up, we had vertical arrays of up to six horns,

Figure 4 (right): Internal layout of stage-right loudspeaker stack, utilizing low bass, mid-bass, midrange, high and front-fill drivers and cabinets.

Figure 5 (below): Loudspeaker/cabinet configurations for 1984 summer season at Pacific Amphitheatre; sound system design by Sound Image.



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stacked and splayed. We took sound-pressure level readings out in the neighborhood while putting playback material through the system, which averaged 104 dB at the console area. Then, we re-stacked the horns into their current configuration. We found that we were able to have an increase of 4 dB of program material at the console, while getting the same readings in the neighborhood as before." (See Figure 5.)

Lawn Area Speaker System

More than half of a full-capacity crowd is seated on the lawn area behind the fixed seating rows. A steeply rising earthen berm places the rear of the lawn area at a level higher than the top of the loudspeaker stacks. Loudspeaker coverage for this area comprises seven separate delay towers, arranged in a gentle arc at the back of the fixed-seat sections. Approximately 24 feet high, each speaker pole supports an integrated loudspeaker cabinet housing a single 15-inch Fostex bass speaker and an Emilar horn and driver. Power amplifier and crossover for each speaker cabinet on the outer poles are housed in a weatherproof case, which is chained

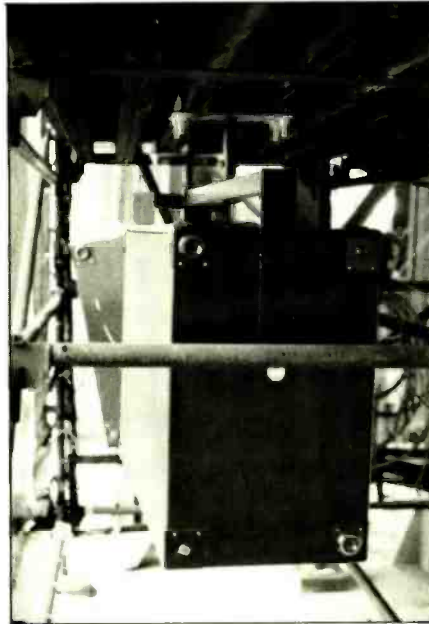


Figure 7: Swivel-mounted front-fill cabinets may be directionally adjusted as necessary.

into position atop the pole with the cabinet (Figure 6).

An additional loudspeaker is hung approximately 60 feet out from each main speaker stack on a swivel-mount. These peripheral loudspeaker units are driven with a separate dedicated send from the house mixing position, and serve to cover the extreme edges of the fixed-seating area.

Beneath each main speaker stack,

two front-fill units are also hung by swivel-mounts for additional near-field coverage in the forward rows and the seating areas directly in front of the stage (Figure 7).

"The addition of these speakers provides good, clear full-range reinforcement to the forward areas," explains Adams. "Typically, opening the front-fill send just a bit will make the show more enjoyable to the front rows. There is a lot of concentrated, low-frequency energy going right over the heads of the forward rows, and this musical information helps to counteract that effect."

System Electronics

"It should be obvious that we have taken a different approach to covering this venue than many sound companies would," Adams stresses. "We look at this audience area as if it were two different listening zones. The fixed-seating area is covered by what is stacked on the scaffolding, and we don't really want much of the sound from the main stacks to get up onto the lawn, although more than half of the audience is sitting up there.

"The key to making the shows work here for both the audience and the neighborhood seems to be having enough control of the different parts of the system, so that loudspeaker units are not used unless there are people sitting in front of them. To make that concept work, I use a Rane SM-26 splitter mixer. It's my favorite new tool. It has six mono inputs and six mono outputs, with level controls and pan pots." The

MULTIPLE STAGE INPUTS: 40-PR. SNAKE

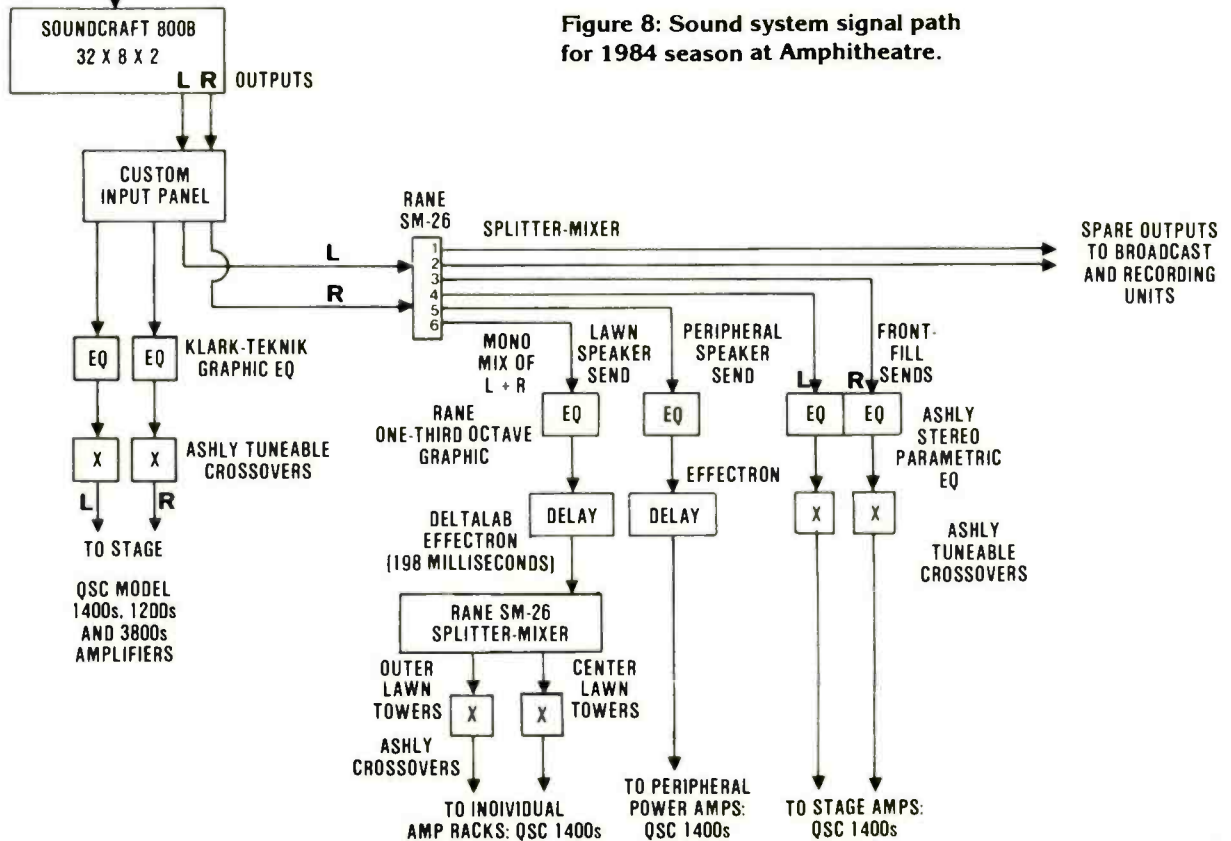


Figure 8: Sound system signal path for 1984 season at Amphitheatre.



Figure 9: Sound Image technician Michael Adams at Soundcraft 800B console.

master left and right inputs and outputs give the unit eight discrete signal paths.

Adams has set up the Pacific Amphitheatre system so that the lawn speaker units are further divided into two zones. The left and right peripheral speaker units are controlled with their own send, while the left and right front-fill speaker units are given two sends (inner and outer fill) — see Figure 8.

The main mix console is a new Soundcraft 800B, purchased specifically for this installation (Figure 9). "We chose this console because it offers great flexibility for something in its price range, and is probably more familiar to most touring sound mixers this season than just about anything else," explains Adams.

The left and right main outputs of the Model 800B are fed into a custom input panel and sent on to a Rane SM-26 splitter mixer to feed the multiple speaker zones. Left and right feeds for the two main stacks are passed through Klark-Teknik DN-360 graphic equalizers and Ashley four-way tuneable crossovers before heading down to the amp racks (Figure 10).

Power amplifiers for the system are by QSC; each amplifier rack houses two Model 1400s and three Model 1200s (Figure 11). "We have had excellent support from the amplifier manufacturer," Adams notes. "QSC's plant is located just minutes away here in Costa Mesa. On the few occasions that I have needed something from the factory, I have had instant response. The amps used in this system were ordered new within the month prior to installing the system, and the large shipment on short notice was not a problem."

System Operations

A venue as large as the Pacific Amphitheatre attracts entertainment groups that are prone to carrying full production on the road. Oftentimes an entire semi-trailer truck of sound equipment arrives with the show. Such systems are rented by the week, or on a per-show basis. It is in the interests of

each touring sound company to provide full services for their customer. So why use the house system?

"Number one, it is an excellent system," advises the Pacific Amphitheatre production manager Rick Merrill. "I find that it works out best to give the traveling sound crews plenty of advance notice about just what we can offer, and then I keep in touch with them right up until showtime. Some shows will send in an advance man from their management office. What works out best, however, is when the person who will be

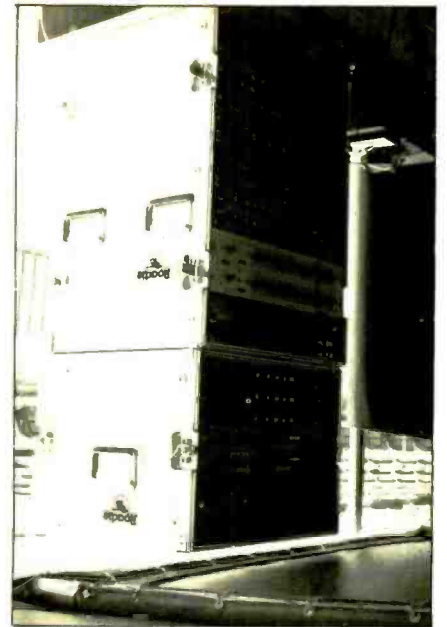


Figure 10: House system electronics rack, containing Rane SM-26 splitter mixers, Ashley crossovers, Klark-Teknik graphics, and DeltaLab Effectron delay units.

actually doing the mix for a specific artist is able to come in and hear the system. Invariably, that makes things much easier."

Of all shows booked for the 1984 season, only three have elected to bring in

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and use an entire touring sound system. "Most acts do travel with, and expect to use, their regular stage monitoring system," notes Merrill. "Whichever sound company they are paying for has it right there on the trucks, so they go with it. However, we do make available an entire stage monitoring system, including an eight-mix Ashly stage console with parametric EQ, a variety of floor slants and complete side-fill monitors. We also offer a full complement of microphones, stands and cables. However, the traveling shows usually unload the stage gear they are carrying with them. And most don't find it necessary to bring in any supplementary house gear."

The console area is set up so as to offer a quick interface with the temporary front-end electronics occasionally brought in. "Shows which are traveling with a full system will often set up at least their own house mix console out here," explains Adams. "All of my gear here is easily removable, if need be. Typically, the shows which set up a monitor



Figure 11: Amplifier racks house two QSC Model 1400s, and three 1200s; Model 3800s are provided for low frequencies.

system being carried with them will also set up a house board and effects racks. Many sound mixers like to use the console they are familiar with. However, we do have a lot of shows which go with the Soundcraft."

Processing devices available for use with the house system include a DeltaLab Effectron and a Lexicon Super

PrimeTime delay unit. Additional Effectrons supply delayed output sends that feed the lawn area speaker towers and the peripheral units.

"It is really up to the traveling soundman what he wants to use in here," notes Robert Breault, master sound for the amphitheatre, and a member of Local #504 of Anaheim (IATSE). "And it is my responsibility to make sure that *everyone* gets what they need. If a show comes in and has no gear at all, we can give them full support for the performance. If they come in and just absolutely *have* to use everything they brought in the trucks, well, that's all right, too. It will be much more complicated and costly due to the extra labor involved. And the sound will not be as consistent."

Part of Breault's responsibilities include a constant monitoring of each performance event with a Bruel & Kjaer sound level meter (Figure 12).

"It is important to bear in mind that if a mixer is not happy with the sound of the system he is working with, it may affect the way he feels about the show," stresses Breault. "We had a good system in here last year. Many different things were tried in an attempt to solve the noise problem in the neighborhood, and we had some excellent input from Wylie Labs, an acoustical consulting firm hired to work with the situation.

"However, the sound system this year has been able to measurably increase

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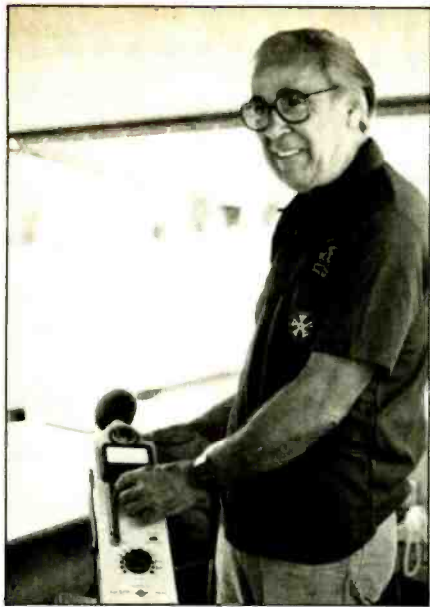


Figure 12: Master Sound Robert Breault monitors SPLs in venue with Bruel & Kjaer meter.

the sound-pressure levels at the mixing console while still keeping the overall levels within the legally prescribed limits. And that has been important in keeping the traveling sound mixers happy.

"My background includes many, many years of indoor mixing, spending hours at the board with a system, listening to the same monitors day after day. But [with] this business of touring sound, where a guy is in one venue one night, and a completely different one the next . . . it is a completely different art. It is a very specialized skill. And we try to make it as easy as possible for those traveling sound mixers."

The Final Outcome

"Sound men don't get encores . . . bands do," comments general manager Stephen Redfearn. "And it is of utmost importance to satisfy the artists who are

actually giving the performance. At the same time, a sound mixer needs to feel good about the system he is using. And in this situation, when you look at the added dimension of needing to keep an entire community happy, it adds up to a big job."

Michael Adams notes that the venue has a very good natural "sound" to begin with. "Everyone likes to play outdoor shows, when the conditions are right. You don't have a lot of surface reflections. You have a very open sound to everything, and you can really stretch out and see what a system will do."

Unfortunately, perhaps, the Pacific Amphitheatre is not the best place to "stretch out" a sound system. "We could do shows here with half as much gear as we have up, and still have people complain," remarks Redfearn. "When we put this contract out to bid for the 1984 season, many different ideas were submitted for system design. And most of them involved too many speakers. We asked the large touring companies such as Clair Bros, Showco and Maryland Sound for proposals. We had strong bids from several companies, including McCune Sound. A-1 Audio of Hollywood made an excellent proposal. However, my primary concern was to have someone come in who *really* understood what the problems were, and offer some solutions. And I think Sound Image is doing it."

Berault finds that keeping the traveling sound mixer happy at the console is a key to making the shows go smoothly. "With the calibrated B&K meter right here, we can let the guys see exactly how their board mix affects the SPL. When the Soundcraft console hits zero VU, the B&K reading is averaging just about what can be put out there without having the telephone complaints come pouring in. So far, cooperation from the guest mixers has been very good."

When this writer first heard of the noise-level situation at this particular

venue during the 1983 season, I was quite curious to see how things turned out. For 1984, I have seen a willingness on the part of all individuals involved with the sound system and staging to solve the "problems." The ability of the system operators to adjust listening levels in different speaker zones provide optimum control of the loudspeaker system to compensate for varying sizes.

When the house-sound crew demonstrated the new Sound Image system to me, I noted with interest that playback program material sounded very smooth and natural. Real-time analyzer readings showed no glaring frequency-response aberrations, with no system equalization patched in between console and crossovers. As I explored various areas of the listening area to the beat of Michael Jackson's "Thriller" (this seems to be the year for it . . .), I found even, smooth horizontal coverage. The lawn system sounded exceptionally good for a venue of this type.

Walking out into the parking lot and into the adjacent neighborhoods, the sound of the system dropped off sharply and dwindled to nothing. As one newspaper article noted, "Crickets drown out the sound of the concert."

Area residents do have genuine concerns about such problems as parking, crowd control, and event content (Boy George playing Costa Mesa?). However, I have never seen the sound-pressure level meter which had a scale marked "cultural bias." With good luck, perhaps someone will tell it to the judge. ■■■

Editor's note - In May of this year, as a result of the venue's first concert of the season featuring the Scorpions, Costa Mesa City Council issued three citations to the owners of the Pacific Amphitheatre. All three of the citations reportedly were thrown out of court. Studies are currently underway to determine better methods for establishing whether or not a musical event breaks the Noise Control Ordinance.

Amphitheater's Noise Criticism Fading Away

Costa Mesa Police Report Only 2 Complaints on Thursday's Concert Featuring Johnny Cash

By PETER M. WARREN, Times Staff Writer

Noise complaints by neighbors of the Pacific Amphitheater were all but eliminated during Thursday night's Johnny Cash concert, and the Costa Mesa police report only two complaints on Thursday's concert featuring Johnny Cash.

Neighbors of the amphitheater installed sound-dampening equipment last week, and the police report only two complaints during the concert.

"We think the roof prevented sound from coming out," said one neighbor referring to the special that now surrounds the stage.

"We are very pleased to see 20 complaints to two."

Costa Mesa police received 20 complaints during the concert at the level of the stage.

Neighbors complained about the sound during the concert last week.

Amphitheater noise complaints quiet down

Majority enjoy amphitheater

By Kay Cooperman, The Register

COSTA MESA — Neighbor complaints were down last weekend at the Pacific Amphitheater according to police and theater officials. Monday it would be premature all the credit on last week's audio rearrangement.

"I can't say the (noise) problem is solved," General Manager Gene

Concert Noise Softens

While complaints of noise from the new Pacific Amphitheater dwindled to five, last night's residents' neighborhood complaints on the concert were down.

Neighbors will be glad to hear the general manager of the amphitheater, Gene Miller, said the sound level was down during the concert.

Neighbors of the amphitheater are upset with the noise, but the needs and wants of the community appear to be coming first. I live in the East side, almost under the flight pattern of the Orange County airport, and many times I have heard from Costa Mesa residents, on the other side of town, what a convenience the airport is for them. Of course the airport is convenient for you, just as being three minutes from the amphitheater is convenient for me.

I, too, live with noise, plus airplane pollution, but I would rather put up with a noisy concert than the roar of both commercial and private jets as they pass overhead, day and night, seven days a week.

Costa Mesa at long last has a magnificent amphitheater and hopefully the program next year will include some classical music, which would truly put us on par with the Hollywood Bowl.

MRS. G. BELFORD
Costa Mesa

Officials Monitor Neighborhood

Amphitheater Noise Tour: Crickets Drown Out Rock

By DAN NAKASO, Times Staff Writer

Over the sounds of jet airplanes, nearby traffic and even crickets, a group of Costa Mesa and Pacific Amphitheater officials strained to hear the British rock group Culture Club—but missed much of their music.

The music spilled onto the neighborhoods surrounding the amphitheater Wednesday night and could be heard clearly more than one-quarter of a mile away, but crickets drowned out by conver-

To the Editor:

As a 20-year resident of Costa Mesa, I am thrilled that we finally have our own amphitheater. My daughter and I attended the Friday night opening concert of Barry Manilow and yes, the music was loud, but then we were sitting dead center in the fourth row. My daughter went back late Saturday night, just before the box office closed, to get tickets for the Sunday night performance and she couldn't hear any music until she was in the parking lot.

It is unfortunate that the neighborhoods around the amphitheater are upset with the noise, but the needs and wants of the community appear to be coming first. I live in the East side, almost under the flight pattern of the Orange County airport, and many times I have heard from Costa Mesa residents, on the other side of town, what a convenience the airport is for them. Of course the airport is convenient for you, just as being three minutes from the amphitheater is convenient for me.

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THE ACOUSTIC INTERFACE

Achieving Realistic Spatial Stereo Effects in the Studio

by James C. Cunningham, president
Studio Technologies, Inc.

Now that the producers of the Compact Disc have promised us a near-perfect record/reproduce chain, with some extra goodies to come along later, the time has arrived for all good engineers to focus on the "Acoustic Interface." That expression covers a lot of ground, from microphone placement to the final mixdown, and it is the thrust of nearly every article published in *R-e/p*. There is one area, however, that has received less than worthy attention: Spatial Stereo. This is opposed to directional stereo, which is achieved mainly via the ubiquitous panpot; essentially a mono device. To illustrate the point, a recent survey of FM rock stations reveals that roughly a third of the supposedly stereo records played were, in fact, mono — mono/stereo switch making relatively little difference to the sound. The other two thirds of the records played contained a combination of spatial and directional stereo, and therefore exploited the medium to a greater extent.

Origins of Spatial Stereo

There may be some value then, in listening to the grumbings of some who say that about 25 years ago the pop music industry took a wrong turn. The scenario goes something like this: Just about the time stereo microphone techniques were being refined, along came multitrack with its close-mike techniques, overdubbing, and isolation-conscious engineers. Separation became *the* watchword, and nearly everyone thought that must be good because, in the early days of stereo, phono cartridges were evaluated by the amount of stereo separation they could achieve. Acoustically dead studios with traps of all kinds did away with crosstalk. This new technique became known as "True

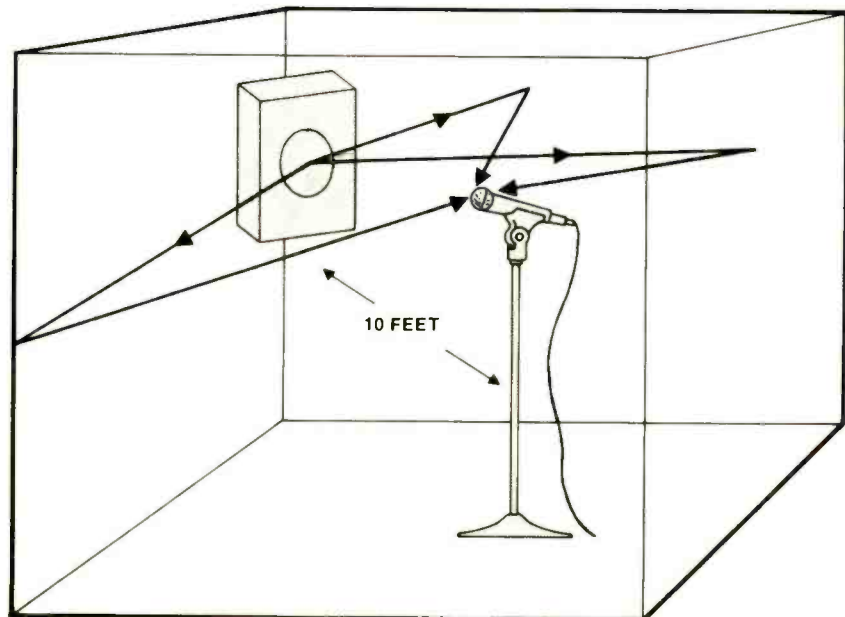
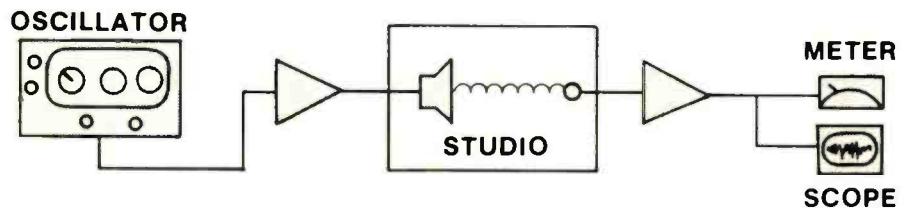
Stereo." Then someone, no doubt well-intentioned, compounded the disaster by introducing the panpot. Accommodating console makers put them everywhere — even on the echo returns — making it possible to remove the last trace of the old spacious stereo.

While there may be some truth in this

diatribe, more than likely, changing styles of music have interacted with the advancing technology to diminish the need for stereo-microphone techniques. After all, what's the point of using two expensive mikes on a cheap, hummy, mono guitar speaker? A direct box makes more sense. Same thing for those electric keyboards. Certainly one mike is enough for the vocalist or, for that matter, any soloist. This leaves a few dozen mikes unused over in the corner of the studio, so these will get used on the drum kit. Now when the time comes for overdubs of the strings, vocal group, etc. there aren't enough tracks left, so a few of the drum tracks with leakage (spatial stereo) will have to be bounced to make room for the overdubs.

Admittedly these arguments are a bit one-sided, and certainly many spectacular sounding hit records have been made using such techniques, so who needs Spatial Stereo? Well the tides may be changing — the largest-selling solo album of all time, Michael Jackson's Grammy-winning *Thriller*, is also perhaps the best stereo record of all time. The engineer, Bruce Swedien, began his career before multitrack took over, when you had to learn stereo-miking because many stereo record albums were made directly to two-track. The established engineers of the time were men like Bill Putnam and the late great C. Robert Fine, whose recordings still stand as models of spatial stereo. They had the luxury of time to make the studio acous-

Figure 1: Equipment setup for measuring frequency response of a studio area.



THE ACOUSTIC INTERFACE

is to use stereo mike and other ambience-enhancing techniques.

Actually, as we have suggested, a combination of these techniques may be the best solution for most types of pop music: the panpot for special effects, and Spatial Stereo for definition as well as the blend of instrumental sounds that convey the emotional power of the music.

In his marvelous book *Room Acoustics*, Heinrich Kuttruff lists four conditions for spaciousness in a room. For sounds of a continuous nature these are:

1. The reflected sound as it is perceived by a listener must be mutually incoherent;
2. The delay times of the reflected sound must not exceed 100 milliseconds;
3. The reflected sound must not be masked by the global reverberation; and
4. The reflections must arrive from lateral directions.

Obviously Kuttruff meant these admonitions to apply to rooms, but they are also the keys to unlocking the mysteries of Spatial Stereo.

Let's go back to the first condition: "mutual incoherence." This means that if two signals are related (in other

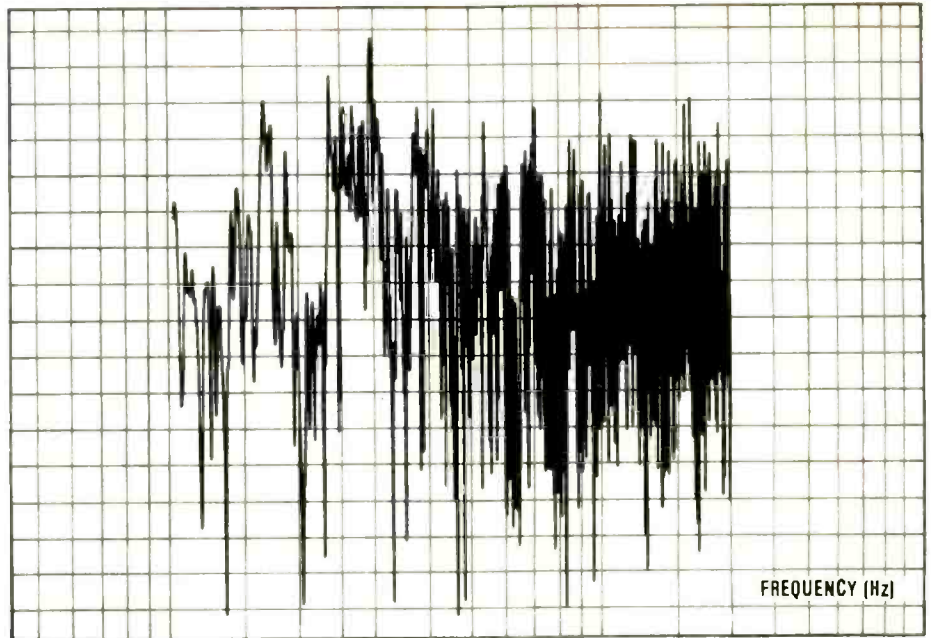


Figure 3: Differences in level (L-R) occurring at two different points in a room in response to a swept sine wave input signal.

words, have the same source) but different (have their character changed by phase cancellation), they are incoherent. The "acoustic soup" mentioned earlier is the perfect place to find this incoherence. Each "point" in the space of

this room has a curve like Figure 2; since each "point" is different, two different points, such as your two ears or two microphones, might look like Figure 3. These differences in phase, harmonic content, and intensity are very complex. An analogy with vision might be useful here: the two eyes look out on the world from two different points in space and, by virtue of this, can perceive depth. In a similar way the brain performs a cross-correlation analysis with the two different sound pictures at the ears to gain a perception of depth and spatial dimension.

Practical Applications

Back in the real world, and referring to the four conditions for spaciousness offered by Kuttruff, we can speculate on some possibilities of mike placement. For the moment let's assume you have a pair of microphones (either spaced or coincident), and you are going to overdub something like a string section, or a vocal group. The musicians are placed in the live part of the studio, and the mikes positioned so that they pick up not only the musicians properly, but also some of the side-wall reflections. As can be seen, conditions #1 and #4 are related; by picking up the lateral reflections you will have more incoherence than if you picked up vertical ones (overhead), which would tend to produce equal monaural sound pressures at the two mikes. If conditions #2 and #3 are met, the later arriving reverberation, either from the room itself or that added from an echo chamber, will not mask the early incoherence. This implies that the proper microphone pattern, as well as subject-to-microphone distance, has been observed.

Before we proceed, a couple of asides



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need to be made. First, loudspeaker stereo has several drawbacks: some of the sound from the left speaker reaches the right ear, and vice-versa; also the listening room acoustics tend to mask some of the incoherent sound. Such problems can be overcome by the degree of incoherence you achieve — but don't go too far or you'll be back to mono, albeit two-channel mono. Second, whether you use spaced or coincident mikes depends on how much mono compatibility you need. Unless the direct to reflected ratios are low, transit-time differences between spaced mikes can produce terrible comb-filter effects in mono. Coincident mikes can be easier to work with, as long as their directional characteristics are flat with regard to frequency, and the patterns arranged to effect optimum incoherence.

As an exercise, it might be of value to imagine what you would do if called upon to record a large orchestra (not classical — that's a whole different bag) using the principles put forward here. For one thing you would have to arrange the multimiked pairs and the grouped musicians in such a way that the left signals from one group didn't get into the right mike of another group, and vice-versa. This is the art of putting the leakage where it belongs.

There are some synergistic effects resulting from these principles that at first may not be apparent. Not positioning the mikes too close to an instrument allows you to capture, through the reflected sound, most of the directive overtones lost in close miking. As we have seen, the reflected sound alters these harmonics by phase cancellation, thereby creating subtle but pleasing changes in timbre that are actually dimensional. Because of this effect, even a solo instrument, such as an acoustic piano, can benefit from spacious-stereo mike techniques.

Synthesis of Stereo

There are many musical instruments the engineer has to record that are monaural; this is, they generate tones electronically, or use vibrational pickups, and, as a result, no acoustics are involved in their studio application. For this reason it is advisable for an engineer to have synthetic means at his or her disposal for the generation of Spatial Stereo.

The simplest way to generate incoherence from a given signal is to delay it. If, for instance, the direct signal is presented on one channel of a stereo recording, and a 20-millisecond delayed version is fed to the other channel, a feeling of space is created, because comb filters are generated at the two ears of the listener. Another more sophisticated use of delay that is often employed is to insert a slight pitch change on one channel. Both these methods, however, may suffer from a lack of mono compatibility; in mono a comb filter is created, which may sound rather ugly. One way to overcome this problem is to mix the

output of the delay with the direct sound, in-phase on one channel and out-of-phase on the other. This generates the classic interleaved comb filters, which mono up with no loss. Unfortunately, these comb filters are evenly spaced, so that one channel eliminates all the odd harmonics, and the other, every harmonic. Some nasty sound may result if an instrument plays a note that lands in one of the notches.

The Studio Technologies Stereo Simulator makes use of this basic principle, but distributes the combs so they are *irregularly* spaced. In addition, the user can control the number of combs and thus effect the size of the stereo illusion. The device limits the minimum number of combs, so that almost no coloration is heard when one channel is auditioned without the other.

A more complex and more obvious way to synthesize Spatial Stereo is to put out a loudspeaker and two microphones in the studio, and feed the track to the speaker. Although somewhat colored, the sound reaching the mikes will have classic incoherence. As of this writing there is one device, the Quantec Room Simulator [distributed in the U.S. by Marshall Electronic — Ed.], that can perform this digitally without adding reverberation. Since the outputs are 50% incoherent, there may be some loss of level in mono.

Such stereo enhancing techniques are applicable to electric guitars, synthesiz-

ers, electric pianos, etc., or even with tracks that somehow were relegated to mono for lack of room on the multitrack. Naturally, reverberation should be added where applicable to complete the stereo process. A pre-delay should be used because most reverb devices in use today are, in effect, small live rooms with high echo density in the first 100 milliseconds, which tends to violate Condition #3.

As we mentioned at the beginning of this article, the Compact Disc has capabilities not yet in use, one of which is the addition of more channels. If this ever becomes a reality, it is hoped that the old quadraphonic method of putting four speakers in the corners of the listening room is not exhumed. In light of the overwhelming evidence given in Kuttruff's book indicating the importance of lateral reflections, side positions for the added channels would be far more appropriate.

The careful reader will have noted that we considered only sounds of continuous nature in this discussion. Consideration of transient conditions would vastly complicate matters, and we feel, make the subject less accessible. Nevertheless it is hoped that the information will prove stimulating to all who are interested in advancing the art of recording. ■■■

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The convergence of film- and tape-based technologies in audio post-production in its wake has brought both convenience and confusion. As time goes on, the confusion no doubt will subside, and the convenience increase, as film and video professionals explore the possibilities of each medium. In the interim, one-stop production facilities like Compact Video, based in Burbank, California, are helping to bridge the still-existing gap between mag and tape post production techniques.

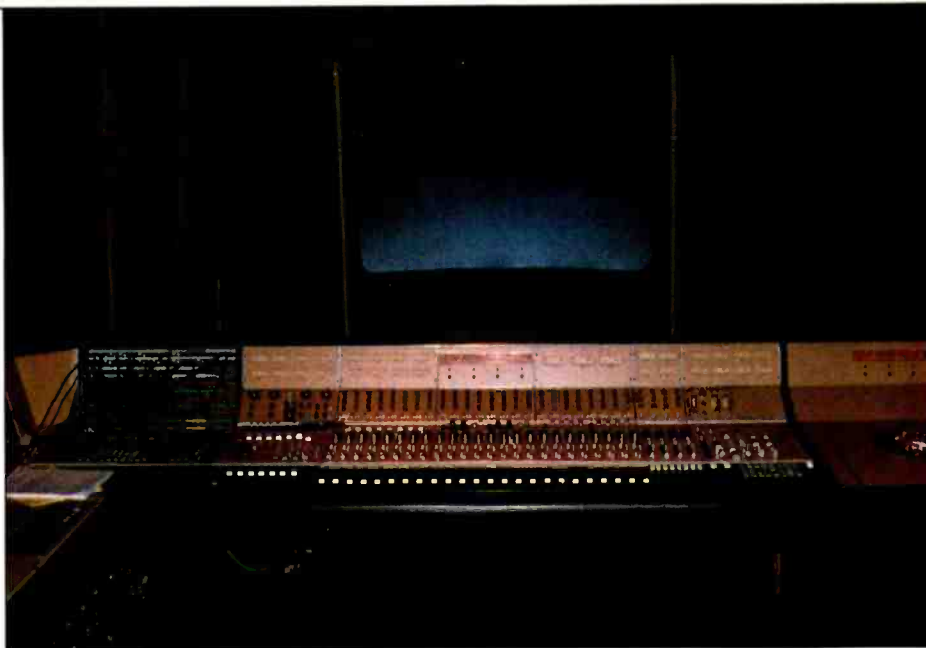
"One thing that we try to do here is offer the best of the film world and its operating techniques, combined with all the technology of a recording studio," says Jerry Clemans, a veteran post-production mixer, and long-time staffer at Compact. "We're going to try to do more finishing of film shows on videotape — carrying two interlocked 24-track tape machines and doing more one-man mixes, instead of the typical three-man [music, effects and dialog] film mix. Also, with rock videos, concert shows and the like, music and visuals are coming together in a new and exciting way. And they're coming together on videotape."

Throughout Compact's film post-production facilities, there is ample provision for handling audio on multitrack tape machines, as well as on conventional 16 and 35mm mag dubbers. Between production dialog, looped dialog, Foley effects, library effects, music, etc., it is not uncommon for a project to involve a variety of audio sources, some of which are recorded on multitrack tape, and some on mag stock. Each room must be capable of handling any combination of formats.

Each of the two film dubbing stages at Compact are equipped with Ampex MM-1200 16- and 24-track machines, a Magna-Tech 35mm six-track and a four-track recorder, and 24 Magna-Tech replay dubbers. Two of the 35mm dubbers feature both six-track and four-track replay capabilities, eight will handle four-track replay, and the remaining 14 will accommodate single-stripe only. On both dubbing stages, tape machines and film dubbers work with a Harrison PP-1 post-production console.

The ADR/Foley room in Compact's film department is similarly equipped with a combination of Magna-Tech dubbers and Ampex MM-1200 multitracks, along with the ability to handle ADR and Foley recording to either a film or video picture. The facility selected a 32-input Trident Series 80 console as the heart of its ADR/Foley room. SMPTE synchronizers both here and throughout Compact are EECO MQS-100s, which were chosen in part for their ability to handle multiple time-code formats.

"We can go 24, 25 or 30 frames per second," says the facility's film sound



Photography by Jeff Diperna

COMPACT VIDEO

Cross Fertilization of Film- and Videotape-based Post-production Techniques

by Adrian Zarin

chief, Tex Rudloff. "We have to accommodate a wide variety of materials. We do a lot of work for companies in Canada, and a lot of material that comes from Europe. On a lot of films, the scoring will be done somewhere in Europe [at 25 FPS] but they will send it over here for transfers because of the quality of our work, and also because of the capabilities we have."

Those capabilities also extend to transfer facilities. Compact features two Westrex-equipped optical transfer rooms: one for a Dolby Stereo optical transfer, and a second for mono optical negative transfer. Two mag transfer rooms are available, each of which is outfitted with Magna-Tech equipment, plus Ampex MM-1200 multitracks and ATR-100 four-tracks. Both mag transfer rooms are equipped with EECO and BTX Shadow SMPTE synchronizers.

"There seems to be an awful lot of people who, for the quality of it, are shooting on film — commercials, some TV shows, and things like that," Rudloff comments. "Sometimes these people will edit on videotape, but sometimes you get dyed-in-the-wool film people who are just a little afraid of video. They will edit on film, but the final product may be transferred via Telecine to videotape for actual airing. On the other hand, you have a lot of video people who are very wary of editing on film. It's all a

matter of what you are comfortable with.

"The nice thing about Compact is that we can accommodate everyone, and give them a chance to work with equipment which may have been alien to them before."

Compact's audio-for-video facilities consist of three videotape mixing-sweetening studios, two laydown/layback rooms, and two pre-lay rooms. The studio has recently consolidated all of its audio-for-video facilities onto a single floor of a new wing recently added to its Burbank complex, moving two of its existing sweetening studios from an older wing.

The video sweetening studios and laydown/layback rooms are all equipped with Ampex MM-1200 24-track transports equipped PERC on each machine. Ampex' proprietary Pick-Up Electronic Record Card accessory for MM-Series multitracks, once set up and adjusted correctly, enables gap-free and inaudible punch-in and -out recordings to be made in the middle of a track. In addition, each room contains two ATR-100 two-tracks, and ATR-100 four-track, six ITC NAB cartridge machines, and approximately 1,000 effects carts. The studio is about to install a new, custom Neve console in one of its sweetening rooms, Studio A (more about this later). If satisfied with the new Neve board, the

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cal to do the job. But that is only a recent development, whereas we have been working on this system for 10 years."

The MQS-100 reads timecode and sends impulses to the Triple Q via a parallel timecode line. "The timecode," explains Kotera, "is sent out as four, 4-bit words: frames, then seconds, then minutes, then hours. That happens every time there's an update which, at play speed, would be every frame."

The Triple Q then makes all the necessary computations and sends the appropriate series of roll, stop, park, punch-in and punch-out commands to the tape machines. The master video machine is a BVU-800 U-Matic deck, and the slaves are two Ampex MM-1200 multitracks. The system can synchronize these three machines, and control an additional 10 machines without synchronization. If any additional machines do need to be synchronized — an increasingly common demand, according to Clemans — a BTX Shadow is added for that machine.

Along with all of its normal functions, the computer system has a specialized program for ADR work, as Clemans explains: "You just type in the appropriate numbers and the system will park the tape at any given address, generate a beep tone, and then start rolling. You select which channels you want to keep, and which you want to record."

As part of its standard operation the system works in conjunction with the PERC facility fitted to the Ampex tape machines, computing the time needed for the machines to reach full bias during a punch-in. If a timecode address is typed in corresponding to the point at which the machine should start recording, the computer system will put the machine in the record mode just prior to that timecode address, and just in time for the machine to have arrived at full bias when it reaches the designated punch-in address. It will do the same on a punch-out, thereby ensuring a full signal up until the exit address.

"The computer system comes in very handy when you're taking a rock concert or Broadway play and editing all the music tracks together before you do the final mix," says Clemans. "Before you actually start mixing, you've made up and edited 24 or 48 tracks that perfectly match the show end to end. This is much better than mixing up to an edit, changing reels of tape, making your edit, and so forth. It gives you the freedom to mix the show as one piece."

Compact is currently looking to expand the system by finding a synchronizer that can handle more than three tape machines. According to Clemans, the industry has reached a point where productions routinely involve more than that number of video and audio transports.



Video Sweetening and Remix Studio C features computer control of SMPTE synchronization and cueing (above) plus a full effects library on NAB cartridge (left).

"With film shows," he explains, "you get a 16-track full of music cues, a 24-track full of sound effects, another 16-track that has dialog and replacement dialog on it, plus you might want to carry your ADR and Foley separately on a piece of four-track tape. Then you need four tracks to mix down to."

"We are therefore starting to look for synchronizers that will carry five to eight machines. We're just starting to ask for it, but we haven't seen one yet that will really do the job for us in an expeditious manner. There are synchronizers that will handle five machines, but they can't intermix different timecode formats. Obviously, that doesn't work for us. When the customer walks in the door, we have to be able to handle whatever he gives us. You can't tell him: 'We can't do the job because the edited master is drop frame, and all of your other materials are non-drop.' We'd be out of business!"

Simplicity of operation is another crucial factor for Compact in choosing a new synchronizer.

"A lot of our design is predicated on the guy who has got to work all night long on a project," Clemans comments. "At hour #18, you don't want to be fumbling. We feel we have to keep the system straight forward. It appears that a lot of the people who are designing syn-

chronizers are not keeping that in mind. But in our industry it is a *very* valid concern."

As mentioned previously, Compact will be integrating the NECAM 96 automation fitted to its new Neve console with the facility's existing computer system. Discussion is currently underway on the best way to accomplish this, according to Clemans, who strongly advocates a modular design approach. "I don't care for one big system. I prefer modules. If one component breaks down, you should be able to bypass it and keep going with the project. With the advent of satellites, things are becoming more and more immediate in the business. It's almost getting back to a live situation, so to speak. You get a show mixed, then lay it back to the edited master, run it down the hallway, put it on a machine, and they're feeding the networks. With that kind of time frame, a system that is based around a single computer is *not* the safest way to go."

"Also, you don't need 100% video sophistication on every single project. With a lot of systems, you're always locked into using all the sophistication the system has, and it can slow you down on some occasions. For a very simple project, you may only need to synchronize two machines, and control

... continued on page 80



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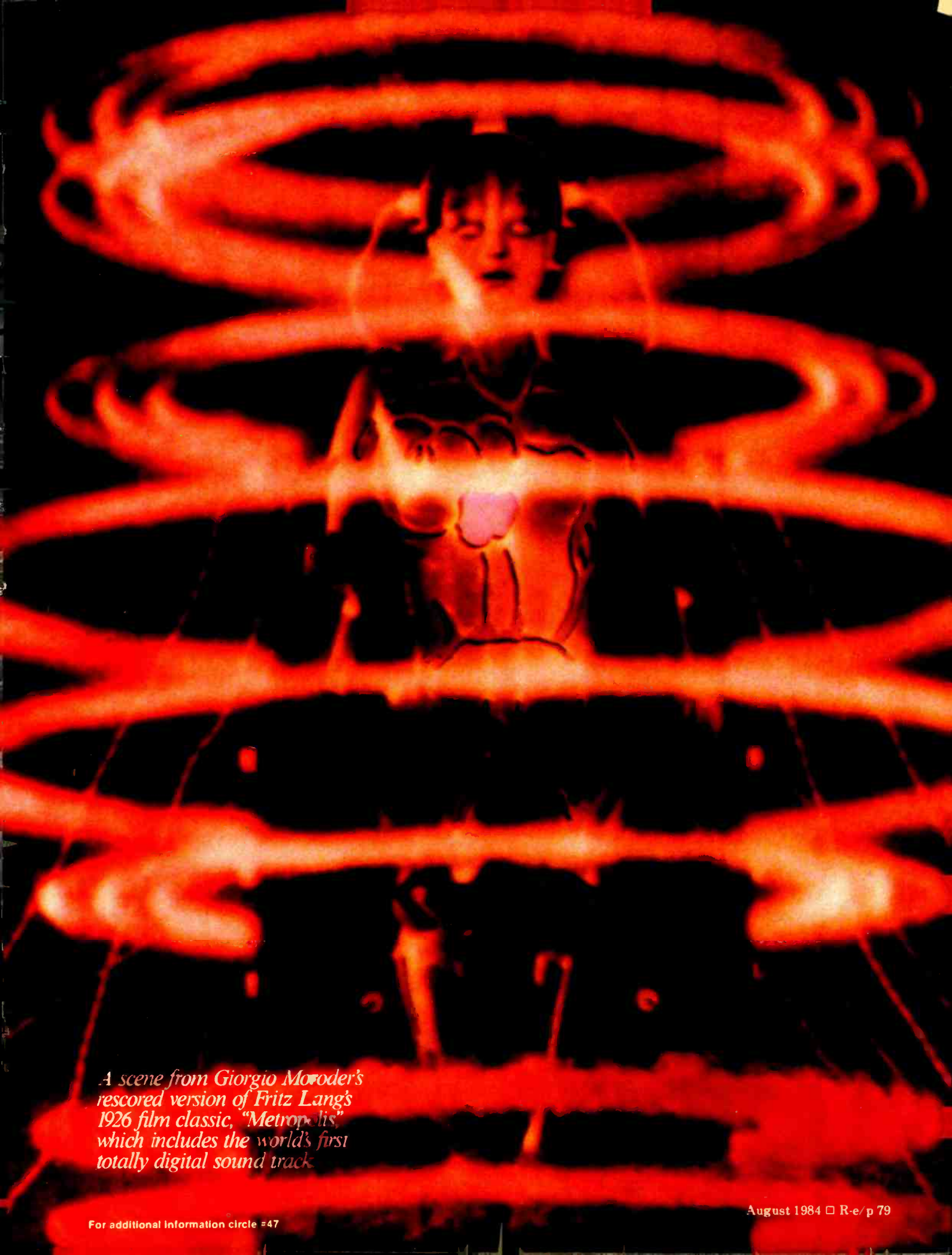
“Listening to digital is truly an ear-opening experience. You can’t even tell if what you’re hearing is a first generation track or a tenth. The fidelity is absolutely incredible.”

And these are just a few of the reasons why so many top recording artists and producers, like Moroder, Phil Ramone, Neil Young, Elliot Mazer, Frank Zappa and Nile Rodgers now own or use Sony DASH-standard digital equipment.

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*A scene from Giorgio Moroder's
rescored version of Fritz Lang's
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COMPACT VIDEO

levels and some minor EQ. You don't need the full extent of the automation and everything else. Why should you be forced to use it?"

Advent of Digital

Like most industry professionals, Compact Video has a strong interest in digital recordings. The facility has been involved in several projects to date, including the recent *Stevie Wonder Comes Home* television special, which was finished at Compact. These projects, however, have been handled on digital recording equipment rented for the occasion. The facility has no immediate plans, according to Clemans, for purchasing digital machines. "There is no standard machine yet. Sony has its digital machine, Mitsubishi has one, 3M has one; but there's no real standard yet.

"You have to remember that you're looking at a facility that has three studios, each of which requires two machines. At over \$100,000 per machine, when we do make our decision, it has to be the *right* one. For the time being, we're relatively well interfaced to handle just about any digital machine brought in from the outside."

"Also, most of the product at this point does not dictate digital. Stereo television will force a lot of changes, and you will see broadcast-audio quality improve because the networks and stations are going to have to buy some newer equipment. But the broadcast medium hasn't gotten there yet.

"NBC is getting ready to do stereo this fall, they say. And yet you read in the same article that most of the cable systems will not have the bandwidth to pass a stereo signal. So if you live in a reception void, and have to depend on



— Layback room for transfer of mono/stereo mix to one-inch videomaster. —

cable to get your network shows, you will not be able to get NBC in stereo."

As an intermediary step into digital audio, Clemans indicates that Compact is looking forward to digitizing its entire sound effects library onto a disk system, thereby offering total random access to any audio segment. "The technology has grown up to the point where putting effects on Laser Discs, and using multiple players instead of cartridge tape machines, might not be too hard to do. That's an area where I think you're going to see major changes in the next three or four years."

Moving onto more speculative ground, Cleman's points out that there is still a lot to be done in the area of digital effects and processors for the post-production field. "Things have come a

long way with digital echo units and whatnot. But what I'd like to see is some digital processing equipment — filter sets and equalizers. Present-day dip filters work, but they are fairly archaic. A device that would enable you to display a signal, digitally extract the components of a hum, and then re-assemble the rest of the signal minus those components would be of *immense* value in post production. One of the main things that we do is eliminate hums, buzzes, and things like that. A digital tool for doing so would help immensely."

Integrating Film and Tape Elements

The television series, *Fame*, offers a prime example of how 35mm film footage and a myriad of audio sources come together on videotape. Because *Fame* involves a lot of pre-recorded musical segments, the show is a little more complex than your average sitcom. But Compact and the series production crew have developed a system that allows film and video experts alike to use their respective media to its fullest capacity and still end up with a finished videotape product.

The show is shot on 35mm film stock, using "all the techniques that have been used since film began," according to Clemans. The musical segments are pre-recorded at a 24-track recording studio. A quarter-inch Nagra copy of the music recording is furnished for shooting the lip-synched visuals that accompany the music. The 35mm negative is delivered to Compact, where it is transferred to videotape and prepared for editing. Meanwhile, the audio tracks are premixed and delivered to Compact on a reel of 24-track tape.

"Instead of just being a mono mix, as you might expect, the music comes to us on about eight to 12 tracks," Clemans

— Control room of Video Sweetening Studio C with API console. —



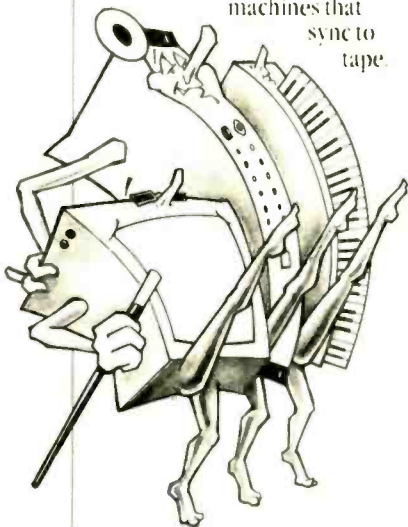
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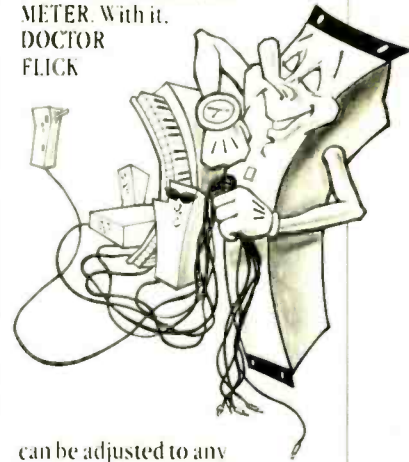
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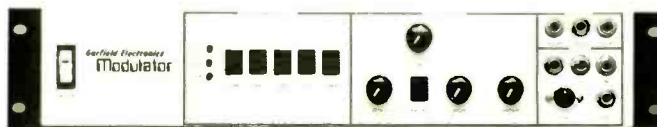
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Our Only Business Is Getting Your Act Together.

explains. "The orchestra is broken down into sections. All of the vocals are separate, and still unprocessed."

ADR tracks are delivered on a four-track tape, and the Foley tracks come in on second four-track tape. Both are then laid across to the 24-track tape that already contains the music.

"This is where we start to feel the need for bigger synchronizers," Clemans comments. "The customer doesn't want to go through that extra pass it takes to lay each of these four-tracks onto the 24-track. Coming from the film world, they are used to having 40 dubbers going simultaneously, and they expect the same kind of capability from us. Basically, all the hardware is there to

enable us to use multiple tape machines simultaneously; all that is lacking is a better synchronizer."

Production dialog for the show is recorded on both 24-track and on an additional 16-track. "It's A/B dialog most of the time," Clemans reports. "A/B dialog sounds better for several reasons. By combining two tracks of dialog, you can roll the edges of a cut to make things smoother. You can't do that with a single track and only one fader to move.

"This, incidentally, is another area where automated EQ would help quite a lot. On a busy show, you might have two production tracks and three ADR tracks to combine. The fader moves and EQ

settings can get very complex. It is nothing like a record mix, where many of the faders just stay in the same position."

All of the audio components of the show are assembled into a standard four-stripe mix, and laid back to the one-inch master following all of Compact's usual layback procedures. One audio channel of the one-inch videotape master received a composite of all four stripes. The other audio channel is used for foreign syndication and received a composite mix of everything but dialog.

Synchronization — for many the biggest nightmare of film-tape hybrid productions — does not present a problem on *Fame*, according to Clemans. Compact and the *Fame* technical crew worked out a synchronization system in advance that is as simple as it is effective. As Clemans explains: "A film camera runs at 60 Hz, crystalized. A Nagra recorder is referenced to 60 Hz. When all the prerecords are done at the studio, a SMPTE timecode track is laid down which is referenced to a 60 Hz sync tone.

"Color television, however, runs at 59.94 Hz, so all of the rooms here at Compact run at 59.94, as does a Rank Cinetel Telecine. So when we transfer all of the film — which has been shot to a reference of 60 Hz — to videotape, it is all pulled down 0.6 Hz. The production dialog, which they take from the Nagra and sync to the film when they run the dailies, is also pulled down 0.6 Hz at that point. Then, when we go to resolve the multitracks, we resolve them to 59.94 Hz. The tapes, which were referenced to 60 Hz when they were recorded, are also pulled down 0.6 Hz and everything stays in sync."

This procedure does mean that both the audio and visuals are a touch slower, but Clemans dismisses this as a negligible difference. "There are some people who say that you can hear it, but I've never had any complaints. In theory, if someone is really that worried about it, they can take everything up 0.6 Hz when they do their prerecords."

A system like the one used on *Fame* points the way to the future of television post-production. For Clemans, the ability to handle post production for all television shows on videotape is within easy technological grasp of Compact Video, and therefore a higher priority at the moment than digital or, to a lesser extent, stereo television.

"Obviously you're not going to be doing *Apocalypse Now* the way we do *Fame*," he says. "But there's no reason why episodic television shows — *Dallas* and *Dynasty* — can't be handled that way. The bottom line is dollars in episodic television, and finishing on videotape is cheaper and faster. For all these reasons, the main thrust here at Compact is to have full capabilities for finishing film shows on tape, and then to go full-bore into stereo television." ■■■

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THE TACT FACTOR



Original illustrations by TRICI VENOLA

Keeping Your Cool . . . While All Those Around You are Losing Theirs Part Two: An Ounce of Prevention

by David Brody

In our last episode, the Lone Engineer managed to identify "the Boss," discovered three axiomatic principles of the Tact Factor, and learned the musical value of keeping one's mouth shut and one's ears open — proving there's no cowboy like a Zen Cowboy. Plenty of thrills and chills (some cheap; some expensive) out on the Show-biz Bluffs this time around, as we learn that a nanoWeber of prevention is worth . . .

Production Pathology

The medicinal magic of the Tact Factor, in its purest form, is its ability to transmute a sick situation into a healthy one. Here are a few common illnesses and their suggested courses of treatment:

Super-star Syndrome and Prima Donna Disease. It is presently fashionable (to some extent, it always has been) for musician-artist to assume godlike proportions in the eyes of their beholders — not to mention their own eyes. You and I know, because we deal with them every day, that it ain't like that. A lot of our musician friends are idiot savants (so, too, some engineers). Take the axe out of their hands and they become a whole lot less able to deal with the modern world than the rest of the population. So they cling to the myth. And sometimes, in the studio, the myth wears pretty thin. Your job mission, should you decide to accept it, is to be supportive without being patronizing.

©1984 by David Brody

In dealing with "stars," it's helpful for you, the engineer, to be just flashy enough to win their respect so that your talents are seen as "equivalent" to theirs. They'll certainly feel better knowing that your chops match up to theirs. But *meet* them, don't *exceed* them. Your air of quiet, competent confidence will have a profound effect, not only on the "vibe" of the session, but on the final product as well. The cure for Artist Ego Myopia is moderation on everyone else's part.

The Multiple-Producer Monstrosity. It is said that a committee is a creature with no head, and as many stomachs as there are members. One of the most Tact-taxing situations is the "too-many-cooks" potential disaster. No clear Boss emerges, and the focus will shift second by second, question by question. This usually happens when you get a band full of strong personalities, each of whom has enough knowledge of the studio to want to push for that last ounce of polish (which is obtained by taking any given production choice "to the max"), but not enough experience to realize that, past a certain point it does not matter, because the listener is not going to have access to the way it sounded like before. Hence, the only standard of comparison is with dissimilar product — i.e., someone else's music — at which point the musical decisions are more important than the strict engineering choices. This kind of high-energy interaction between the group members can produce some real good spontaneous creativity; it can also make for some

messy emotion-fraught horrors. And if you're not careful, you, Ms/Mr Engineer will get the blame.

This situation demands extreme competence from you. You must know what the equipment can do, and what it can't. You must foresee what the consequences of any production decision are, and make everyone aware of the trouble spots. Not only engineering-wise but artistically as well — which everyone will resent, so do it *tactfully*. Stick to the facts and softpedal your own opinion. If ever there's a situation which demands Oriental Etiquette from the engineering staff, this is it.

When there's no single producer, the engineer becomes, in effect, the technical producer. You're not being paid for the responsibility. Nevertheless, it will be dumped on you. You can't duck it; if you're too reserved, it looks like disinterest by you and the studio. Face it, you are going to get a share of the blame (and/or a disproportionately smaller share of the credit) for the final product. To save your own skin (and to protect the studio) you must assume the role of moderator. You may not be able to weld the band into a cohesive unit, but you must try to do enough plastic surgery on the product so that it hangs together.

Two Common Forms of Producer Impotence: Rigidity. Producers are generally full of good ideas. They usually see that as being their job — though a case can be made for a producer whose main function is to choose between the good ideas of his or her artists. Sometimes a producer will have a preconceived idea of how something ought to sound, and be convinced that it can be achieved by technical means. We are not yet at the stage where we can transmogrify one sound into another (although it's starting with digital synthesis, and vocoder-type analog techniques). If the producer wants British Rock-sounding tom fills and the drummer has low-tuned hydraulic heads which he/she doesn't hit very hard, no amount of EQ will get it; the most exotic microphone will not hear it that way. Some of the best producer brainstorms are cumbersome for the artists to get their fingers, axes, and minds around. Endless hours of studio time have been spent flogging dead horses. A good producer won't let this happen. A bad producer, when he/she doesn't get it out of the musicians, will expect you and your magic knobs to do it for them. Usually the expectation is silent till the mix, by which time it's too late and the producer may be prone to ranting and raving about your lack of skill and crappy equipment. No good for you — No good for the studio. As with most pathology, early detection is the key to the cure. You may have to (tactfully!) shoot down the producer's flight of fancy at the time of the actual recording. And do it soon; don't wait till everyone is married to the idea.

Premature Congratulation. Wherein everyone loves the take as it's going down to tape, and nobody wants to check a playback because they're watching the clock. Try to get them to listen to it at least once — you can always exercise your prerogative of technical level verification (sounds good, right?). If you



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THE TACT FACTOR

really think it could sound a lot better, try to get them to listen at low volume on cheap speakers with the track in question way out in front of the mix — that's when the crud will show up, if it's going to. Studio monitors sound so much better (or at least louder) than normal listening situations (except, maybe, discos) that the "dazzle-effect" can be huge. (And you remember from your early engineering days how long it took you to get a mix that really sounded as good in the car as you thought it did in the studio.) Now keep in mind that folks who are overly concerned with the minutes ticking by are very likely to be neophytes, and even more prone to "dazzle-effect." It's no wonder: "We love it, let's move on," comment comes too quickly. Your attitude of efficient, relaxed competence will help them get the job done in a way they'll be proud of later.

Sex and The Lone Engineer

Okay gang, here's the one we've all been waiting for. Unless you're already involved in a lover-relationship with someone on a given session, it's best not to start one during that session or project, unless the two of you (three of you; four of you...) can keep it real cool. This might be the ultimate test of professionalism.

Let's be honest about it; we've all lusted after a vocalist or a violinist now and again,



"It is presently fashionable for musician-artists to assume god-like proportions in the eyes of their beholders."

and that's harmless and rather nice as long as we don't get too heavy about it. But none of us should be so naive as to assume that people don't notice when the sparks start to fly.

So the potential for a whole bunch of EFI (Emotional Freakiness Interference — manifesting itself in jealousy and power-tripping) jumps many orders of magnitude. Just like a system approaching feedback with all kinds of interpersonal vectors flying around and super-combining, before you know it you're doing Soap Opera instead of a Best Possible Track.

Not that relationship tension doesn't have its place in the entertainment world. The artist(s) may need it in order to stay in touch with the gut feelings that produce memorable performances. Your contribution may or may not be appreciated right then and there. And the best relationships are worth waiting for anyway, so they say.

Probably the best way to defuse the Time Bomb (or, at least, buy more time on the fuse) is to try to get a "team-approach" or "band-feel" happening, if the "Boss" will go for it. The unspoken tone of the session should feel like: "Everyone here's an equal — everyone's capable of mistakes — let's relax and make music."

The individuals you'll have the hardest time with are the crusty old professionals who think they've seen it all, and don't want to express any emotion at all except in their playing. Be supportive without being patronizing, and don't try to make a cult of it.

Some artists can only get up a good performance if they make eye (or other) contact with their date/mate, producer, stranger-brought-for-the-purpose, or (yes!) even you, the engineer. Other artists have to be completely isolated and "alone with their music." Some male artists have trouble playing to female engineers and/or tape ops; though when the sex roles are reversed, the problem doesn't seem to occur. (We apparently teach our women to endure being on display gracefully in this society.) In the interests of the Best Possible Track, you may have to hand off to an engineer of the opposite sex (where personnel availability and studio policy permits).

You may have to be fairly up front with reinforcement and positive feedback. Just be sure it's called for; be sure to be aware of any ulterior motives in your own head. I've been in situations where I've told the producer what buttons to push (and what not to push!), and when to yell for help; then invited everyone else to join me in the hall outside the control room. This usually works very well — of course, you need to know in advance whether studio policy allows this option.

You'll be able to avoid "too-hot-to-handle" situations if you foster an attitude of mutual respectful professionalism and just enough informality to break the tension, and get everybody up to "concert pitch." Don't go overboard in your stroking — you may get a response you didn't count on. The "team-approach" emotional climate cuts right across the lines of sexual tension. You, the producer, the performers; everyone is just another pro doing their gig, regardless of their sexual plumbing or preference. Look 'em straight in the eye and let 'em know that you understand where they're coming from. Sometimes a well placed bawdy joke can null out a lot of hidden uptightness, as long as it

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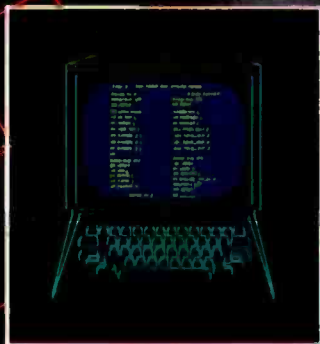
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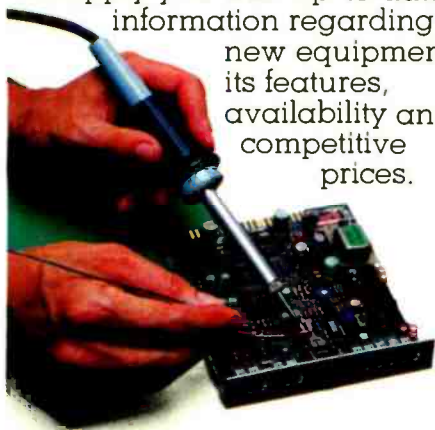
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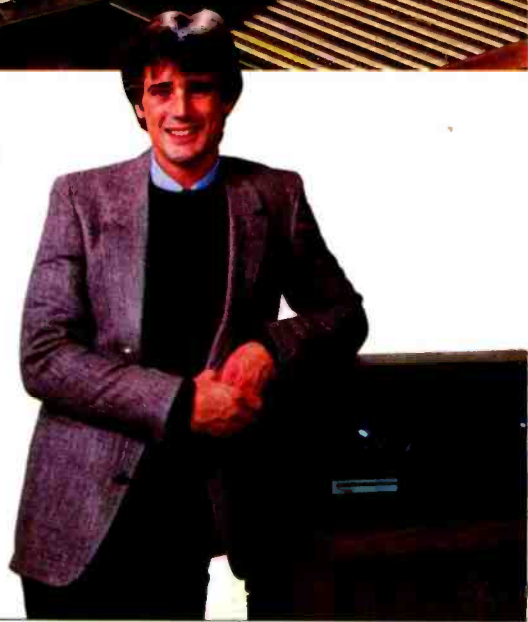
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At this point in the arrested social development of the Human Race, female engineers have to put up with a certain amount of undeserved (often unintended) abuse. In spite of the fact that we have female astronauts and female tech-designers, it's generally assumed (subconsciously) that if a "chick is working the board, her boyfriend taught her how." Maybe if women had gotten in the game first, things would have been different. Imagine patchbays designed as whole arrays of erect little TRS plugs and patchcords as cable lengths terminated by enclosed jack sockets. (Think how much easier it would be to de-funkify the contacts!)

So while the skill of a male engineer is presumed (until he makes a turkey out of himself) in all too many situations, female engineering skill seems to require proof. This is one case where the attitude of other professionals in the situation can really help the engineer. If a male assistant (for example) shows proper deference to his female engineer, nobody will question her judgement. This, of course, assumes that the guy doesn't suffer from, or has managed to work out, any male pride problems he might have had. Which brings us to:

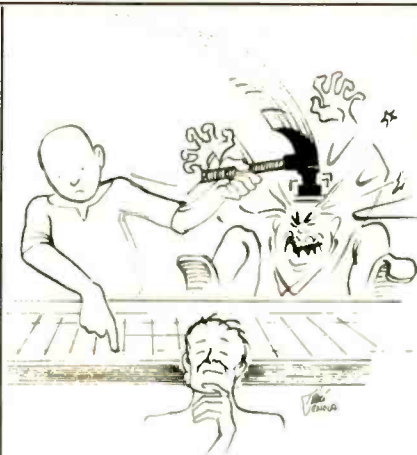
Set-Up Folks, Tape Operators, Assistant Engineers, Gofors, Gaffers & Grunts

First of all, what do you call them? I always refer to anyone helping me on a session as a second engineer. It makes them feel most "solid" (hence attentive) and it makes the client feel they're getting the benefit of additional expertise. If the second engineer ever looks foolish in the eyes of the client, it's generally the engineer's fault for letting the situation happen. Once I'm sure that my second is competent, I stay out of his way and let him do his job. There are more subtle (and better) ways of demonstrating that one has the situation under control than to bark orders at underlings.

When you say to your second: "Instead of just sitting there on your butt, go put some SM-7s on the congas," it does six things (at least):

1. It embarrasses the second engineer. (Bad for efficiency, since technical people always perform better when they're allowed to take pride in their work.)
2. It embarrasses the client. (He/she feels like an intruder at a family fight.)
3. It embarrasses the studio. (Especially if they provided you, or the second, or both.)
4. It makes you look foolish. (Even though it gives you that short-term ego charge enjoyed by bad military commanding officers.)
5. It calls into question your technical competence. (Your choice of microphone may seem to the client like an arbitrary decision made in the emotional heat of the moment.)
6. It shakes the performers' concentration/confidence. (Thus forever immortalizing your error in discretion as an uneasy performance — I've heard it happen!)

Contrary to what some believe, rough treatment of assistants does not make the client feel like someone is taking their best interests to heart — it makes them feel like



"Such things are done with no malice, and without ego."

they've got the wrong engineer and studio.

As silly as this may sound, your second really should be analog Tonto to your Lone Engineer. Second engineers have their own set of skills for which they may be in better practice than you. And they should be the only one on the session who has access to your "secret identity" (your non-professional persona).

Sometimes you walk a tightrope between producer uneasiness and second engineer dignity. Once in a while you have to supercede your second (let's say, in a tight punch-in situation) to make the client happy, and get the Best Possible Track. It should be an

established part of the working relationship with your second that such things are done with no malice and without ego. Develop a "working friendship" so you learn how to cover for each other. A tape operator's/second engineer's job is not an easy one. To do it properly, one should have an arranger's appreciation of musical form, and a librarian's sense of organization, combined with basic engineering knowledge, quiet pride, and a willingness to work. Good ones are worth their weight in Q-tips.

"Cover Your Tracks, Kimosabe"

Here's one of those great taboo areas that nobody likes to talk much about. We engineers are human, and therefore, fallible. Engineers and studios are supposed to be the constant, predictable, dependable elements in the music making. You try to develop a working pattern that excludes mistakes — sometimes you blow it. Everyone has.

A lot of engineers have an ego problem; they need to appear incapable of error. Fortunately for them, most of the little stuff is concealable. If you or your tape operator forgets to put a track in record, you can always stop the take a few second into it and claim a level refinement; just don't do it too often, lest it become a "boy who cried wolf" situation. You take one of the Tact Factor's little risks when you do that. If you're slick enough, it will seem as if you're "striving for perfection." If you're not, it can look obvious and shabby. In many situations, you might be better off "fessin'-up," and lightheartedly

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Of course, in keeping with Bryston's tradition of providing for special requirements, the 2B-LP can be modified or adapted to your wishes on reasonably short notice, and at nominal cost.

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STUDIO FACILITIES EQUIPMENT PEOPLE UPDATE

Northeast:

□ **UNIQUE RECORDING** (New York City) has added a second AMS DMX-15/80S dual-channel delay and pitch shifter, Quantec Room Simulator, Lexicon 224X with LARC, two stereo Neve 2254A compressor/limiters, and two Yamaha DX-7 synthesizers. The facility has also revamped Studio B with the addition of an automated MCI JH-542 42-channel console with eight echo returns, 24 Neve Model 1077 mike pre/EQ modules, and 10 API 550A EQ modules. In the synthesizer corner, Unique has added an Oberheim XP-1 MIDI Expander, and a Roland MPU-401 sequencer for its IBM PC computers. Also added: J.L. Cooper's MIDI Channelizer and eight-channel MIDI Channel filter. 701 Seventh Avenue, New York, NY 10036. (212) 921-1711.



UNIQUE — New Outboards

□ **SHEFFIELD RECORDING** (Phoenix, Maryland) has installed a new Solid State Logic SL400E Series console with Primary Studio Computer, Total Recall automation, and transformerless mike inputs. Also added to the studio's list of outboard equipment is a BTX Soft Touch editing system with Cypher timecode generator, according to studio manager **Richard Van Horn**. 13816 Sunny Brook Road, Phoenix, MA 21131. (301) 628-7260.

□ **LE MOBILE** (New York City) has retrofitted a Neve NECAM 96 automation system to its Neve Model 8058 console. According to owner **Guy Charbonneau**, "A remote truck may seem to be an unusual place to install an automated mixing system, especially NECAM, but this is a very unusual recording vehicle. I've built Le Mobile like a fine-tuned race car, and I maintain it as such. Each piece of equipment is modified to interface well with all the others. As a result, it's as comfortable to use for remix and post-production, as for live audio recording, video or film." As well as recording the music score for a feature film, numerous live concerts, record albums, and TV shows, the truck, Charbonneau says, is being used increasingly for remix sessions. "We don't have a real home base," Charbonneau adds. "We go wherever the artist takes us. And since we've already built a strong reputation as one of the trucks with good studio acoustics, the addition of NECAM 96 automation should attract as many mix sessions as live shows." In addition to its new automation system and Model 8058 console, the truck houses two Studer A800 24-tracks and two B67 two-tracks; two timecode generators; Sony BVU-800 U-Matics modified to read timecode on any track, including the address track; Crown power amps with UREI crossover and custom-built monitors with JBL drivers; EMT 244 and Lexicon Model 200 digital reverbs; three Eventide Harmonizers; plus various Neve and Valley People Kepex limiter-compressors. Six cassette decks also are available, "Because the producer, the musicians and the band leader are always wanting cassettes," Charbonneau explains. 211 West 56th Street, New York, NY 10019. (212) 265-1979.

□ **SONGSHOP RECORDING** (New York City) has added to its equipment rack a Lexicon 224X digital reverb, two Kepex IIs, two Valley People Gain Brain IIs, two UREI LA-4 limiters, an Orban Paragraphic EQ, two channels of Delta Lab Effectron delays, a LinnDrum digital drum machine, and a Garfield Electronics Dr. Click. Also, half-inch/two-track and half-inch/four-track mastering has been enabled with the addition of an Otari MTR-12. For monitors, the UREI 813s, powered by a Carver amp, have been installed. In addition a 3/4-inch JVC U-Matic VCR linked to an EECO synchronizer has been added. 126 W. 22nd Street, New York, NY 10011. (212) 691-2707.

Southeast:

□ **PERFECT PITCH** (Statesville, North Carolina), which was opened by **Marcus Kearns** in March as a personal-use studio, will be made available in August as a pre- and post-production facility. The studio is intended for album projects and film scoring, and has been booked until the end of the year. "But we'll be able to take other projects on a limited basis," assures Kearns. Control-room equipment includes a Studer A80 VU MKIII 24-track, A80 RC two-track half-inch, A810 two-track, and A710 cassette; MCI JH-636-30 automated console; Banner Model 900 and 300 amps powering JBL 4430, 4401, and 4311 monitors; Lexicon 224X digital reverb with LARC; Lexicon 97 Super Prime Time; Eventide H949 Harmonizer; Audio+Design Scamp Rack (dual de-esser, comp/limiter and gates, Exp/Gate, Dual Gate); White equalizers; and AKG, Sennheiser, Neumann, Electro-Voice, and Shure mikes. Available instruments include a Bosendorfer concert grand, Fairlight CMI, OBX-A, Yamaha DX-7, ARP 2600, Yamaha CP-70, Fender Rhodes, DSX Sequencer, LinnDrum, and Simmons drums. Route #8, Box 433-A, Statesville, NC 28677. (704) 872-2360.



PERFECT PITCH — Outside bookings

South Central:

□ **DIGITAL SERVICES** (Houston) has installed an Otari MTR-90 Series II 24-track, supplied by **L.D. Systems**. According to DSI's president, **John Moran**, "We spent a lot of time researching the market. After considering every machine from every supplier, the Otari MTR-90, backed by L.D. Systems made the most sense." 1001 River Oaks Banks Tower, 2001 Kirby Drive, Houston, TX 77019. (713) 520-0201.

□ **CUSTOM MASTERING** (Nashville) has installed a Sony PCM-1610 two-track digital audio processor, a DAE-1100 digital audio editor, and two BVU-800 U-Matic VTRs. Founded 18 months ago by former CBS Records engineers **M.C. Rather** and **Hollis Flatt**, the facility is "committed to offering clients the full range of post-production services necessary today." According to Rather and Flatt, PCM-1610 copying is now an important step in almost all major recording projects, digital copies being circulated by record labels to tape duplicating facilities and available for Compact Disc manufacture. In addition to post-production, the PCM-1610 system will be leased to outside studios for recording projects. "We're extremely pleased with the performance of the Sony system," Rather says. "The audio quality is outstanding, particularly in terms of quietness and stability." 114 17th Avenue South, Nashville, TN 37203. (615) 244-8132.

□ **DARCI SOUND RECORDING STUDIO** (Beaumont, Texas) has upgraded its facilities with the installation of a Tangent Model 3216 console, along with a Sansui X-1 PCM and Sony VO-2600 3/4-inch U-Matrix, according to owner **Ray Murphy**. **Hank Lamb** of Associated Productions of Texas handled the installation. 2736 N. 11th Street, Beaumont, TX 77703. (409) 898-4556.

□ **MUSIQUE PRODUCTION ASSOCIATES** (Sunnyvale, Texas) is the name of a new production company founded by former Dobie Brother **Michael Hossack**, and independent engineer/producer **Jon Early-Ligon**. All sessions will be recorded at **Studio Southwest**, which will be home base for Musique. 2611 North Belt Line, Sunnyvale, TX 75182. (214) 266-1789.

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STUDIO FACILITIES EQUIPMENT PEOPLE UPDATE

□ **DIGITAL ASSOCIATES** (Nashville) is the name of a new digital audio rental service set up by engineers **Rick Horton** and **Mike Poston**. The company will specialize in Mitsubishi X-800 32-channel and X-80 two-track recorders. According to Poston, the Mitsubishi system was chosen because of its "superior audio quality, and the fact that the reel-to-reel-based system is familiar and easy to use. Additionally, the razor-blade editing feature of the X-80 is very convenient, and alleviates the need to using a video editing facility for routine editing." Horton has served as studio supervisor at Woodland Sound Studios, director of operations for Sound Emporium, and is currently an independent engineer. His credits range from Gordon Lightfoot and Waylon & Willie, to the recent NBC documentary, *China; Other Voices*. Poston has experience as an installation and maintenance technician for Studio Supply Co., and as chief technical engineer for Sound Emporium Recording Studios. P.O. Box 422, Spring Hill, TN 37174. (615) 256-4487.

□ **RPT PRODUCTIONS** (Houston), headed by **Richard Paul Thomas**, will concentrate on original music scores for theatrical performance, commercial release, and soundtracks. Current projects include an album for composer/performer **James Patrick Farrell III**; production of three titles for **Sarah Joe M. Phillely**; and musical direction for Merrilee Shopland's play *Jive Angels* with a scheduled first performance in August 1984. 2600 Southwest Freeway, Suite 850, Houston, TX 77098. (713) 526-5199.

Midwest:

□ **MARK LEE PRODUCTIONS** (Minneapolis) is now under new management, and offers multitrack production services for both audio and video. **Michael S. Peterson**, the facility's new owner, and president **Mark Lee** have appointed a new chief engineer, **Jeffrey Schiller**, who served as chief engineer for Sight & Sound, Inc., Omaha, and whose production credits include work for NBC and RKO radio networks, AT&T, American Airlines, Godfathers Pizza, Bozell & Jacobs, Cargill, and a wide variety of industrial, broadcasting, and advertising clients. Newly remodeled and MCI-equipped sound studios are available for 8-track audio production, voice recording, music editing and mixing for AV, video and industrial soundtracks, commercials and demonstration tapes. The company also offers complete music and sound effects libraries, and high-speed reel-to-reel and cassette duplication in all formats. 730 Hennepin Avenue, Minneapolis, MN 55403. (612) 333-2241.

□ **STAR TRAX RECORDING** (Orland Park, Illinois) is a 24-track studio that features acoustic design by **George Augsburger**, with 14-foot high ceilings and a 40-by 27-foot recording area. The control room is equipped with full bass trapping and geometrical design to "provide a sound that closely resembles the natural 'living room' sound," according to owner/manager and chief engineer **George Luif**. Recording equipment includes an Otari MTR-90III 24-track, an Otari MTR-10 two-track, and Nakamichi and Pioneer cassette decks. The custom-designed mixing console is a Neotek Series III 28-in/24-out, and monitor amplifiers include BGW, OSC, Edcor and SAE models. Luif says he returned to Chicago from the West Coast to open his facility, because "I felt Chicago-area musicians needed a quality option to the big, expensive downtown studios." A veteran engineer and producer, Luif has worked in California at Cherokee, Russian Hill, and Wally Heider. Current staff include engineers **Jeff Luif** and also **Harry Brotman**. 15602 South 70th Court, Orland Park, IL 60462. (312) 429-2760.



STAR TRAX — New studio opens

Southern California:

□ **CONWAY RECORDERS** (Hollywood) recently retrofitted the first production GML servo-controlled automation system in its 48-input Neve 8108 console. The modified control room now features Perreux power amplifiers driving an Augspurger-TAD monitor system. Other additions include a Lexicon 224X digital reverb and a Audio-Kinetics Q.Lock synchronizer for SMPTE lockup to the facility's Studer A800 24-track. 655 N. St. Andrews Place, Hollywood, CA 90004. (213) 463-2175.



CONWAY — GML Automation System

with solar glass. Construction for the new project is scheduled to begin in the Fall of this year. 7165 Sunset Boulevard, Hollywood, CA 90028. (213) 851-8070.

□ **BROOKHILL** (Sherman Oaks) a new 24-track facility owned by **Tim O'Brien** and managed by engineer **Steve McDonald**. The studio features an Ampex 24-track and a Dynamix 3000 32/8 console. A full complement of outboard gear includes products by dbx, Aphex, Eventide, Lexicon, Valley People, JVC, and Delta Lab. The microphone selection includes models from Neumann, Beyer, Sennheiser, Sony, Altec and AKG. Musical instruments available are LinnDrum, Fender Rhodes, Memorymoog, Pro One, and Fairlight CMI. 13715-A Ventura Boulevard, Sherman Oaks, CA 91423. (818) 788-0300.

□ **SOUND AFFAIR RECORDING STUDIOS** (Santa Ana) has added several pieces of outboard equipment, including an Eventide SP2016 digital processor, Lexicon Super Prime Time, Studio Technologies Ecoplate, UREI 535 graphic EQ, UREI 1176 limiter, Audio Kinetics Q. Lock, AKG Tube, and an Ampex ATR-102 half-inch two-track. 2727 G. Croddy Way, Santa Ana, CA 92704. (714) 540-0063.

□ **DLA PRODUCTIONS** (Van Nuys) recently installed a new Hybrid Arts MidiTrack System capable of driving and controlling 16 MIDI-equipped devices, which allows recording, sequencing and editing of 16 tracks in digital format. The studio also plans on updating its MIDI software library with the various Hybrid Arts systems; it recently purchased three synthesizer extender software packages that enable storage, retrieval, and editing of synth patches onto floppy disk. The new system and various MIDI software is being extensively used on Cathy Wyatt's new album project, headed by producer Alan Hart. 16824 Saticoy Street, Van Nuys, CA 91406. (213) 786-1683.

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STUDIO FACILITIES EQUIPMENT PEOPLE UPDATE

□ **WALT DISNEY PICTURES** (Burbank) plans to spend \$3.1 million to reconstruct its main screening theatre and orchestra scoring stage, for which project the studio has retained **Jeff Cooper Architects** as architect and acoustical engineer. The project will combine restoration methods with the latest acoustic design techniques, according to studio president **Richard Berger**. The goal will be to integrate the Art Deco-style of the original buildings with state-of-the-art audio and film technology. "We expect the theatre to be the prototype of a new generation of showcase theatres," Berger says. "We hope to affect theatre design trends in Los Angeles, and perhaps throughout the world, in the years to come." In addition to housing 600 seats, the theatre will continue to handle soundtrack re-recording, and will retain the present Harrison dubbing console. The second half of the project involves an extensive upgrade of the orchestral scoring stage, to enable the facility to record both large symphonies and smaller group sessions. The new scoring facility will include a Jeff Cooper-designed control room, automated console, and digital multitrack. Reportedly, the recording hardware will comprise a 56-input Neve Model 8128 console with routing to 48 output busses. As well as 32 multitrack sends and eight cue/foldback sends, the new board is expected to be modified to provide a dedicated, independent eight-channel film mix, in addition to simultaneous multitrack, mono, and stereo outputs. The Model 8128 will be equipped with NECAM 96 console automation, with the addition of six independent group masters and full compatibility with floppy-disk automation data generated by NECAM I and II systems. A separate 24-input/four group Neve submixer also will be available for premixing strings and keyboards, plus an as yet unspecified 26/12 dedicated foldback console. As well as the facility's present complement of 3M M81 digital 32-track machines, the new facility is expected to incorporate additional analog multitracks. (Studer and Otari transports are said to be currently under consideration.) The new monitor system — with three speakers located in front of the mixing position, plus surround channels — is expected to comprise a Meyer 833 System, augmented by Boston Acoustics surrounds. Mag machines include a pair of six-track Magna-Tech recorders, and five playback dubbers capable of handling six-, four-, and single-track formats. Multitrack and 35mm mag interlock to video and film transports will be handled by an Audio Kinetics Q.Lock 3.10 SMPTE synchronizer incorporating custom software. Construction for both projects is scheduled to begin in late Fall this year. 500 S. Buena Vista Street, Burbank, CA 91521. (818) 840-5151.

□ **ROC SHIRE RECORDING STUDIOS** (Anaheim) has named **Mark Goodman** as its new studio manager. Born and raised in Memphis, Goodman's career spans 15 years in the recording, radio, and television industries. His credits range from over 6,000 jingles to a Cleo award for music videos, and in 1981, he received a Grammy for the Blackwood Bros. album. He has completed over 70 album projects, working with artists such as Roy Orbison, Charlie Rich, Steve Cropper, and Booker T. Jones. 1240 N. Van Buren, Anaheim, CA 92807. (714) 632-5046.

Northern California:

□ **THE PLANT STUDIOS** (Sausalito) has appointed its chief engineer, **Jim Gaines**, as the new general manager. Gaines replaces former general manager and current sales manager, **Paul Broucek**. Gaines, in addition to his current chores as chief engineer and production manager, will now oversee the entire three-studio complex in conjunction with the new owner, **Stan Jacox**. 2200 Bridgeway, Sausalito, CA 94965. (415) 332-6100.

□ **STUDIO C** (San Francisco) has added two new Audiotronics re-recording consoles to the facility. Studio 2 now has a 24/8 re-recording board, 16 film playback channels (16/35mm) and a two-inch 16-track equipped with timecode synchronization. Studio 2 has also been re-equalized to match the ISO curve for theatrical mixes. The facility offers seven fully equipped editing rooms with KEM, Steenbeck, or Moviola tables; two sound transfer suites capable of handling numerous audio formats; sound effects library; ADR and Foley studio; and two mix stages. Staff include owners **Luther Greene** and **Will Harvey**, along with engineers **Andy Wiskes**, **Larry Oatfield**, and **Marian Wallace**; facility manager is **Ruby Yang**. 1338 Mission Street, San Francisco, CA 94103. (415) 864-2825.

Northwest:

□ **WOMACH RECORDING STUDIOS** (Spokane, Washington) has added a new MCI JH-110B two-track, Ursa Major Stargate 323 digital reverb, Deltalab ADM-1024 and ADM-64 digital delays, two Gatex noise/gate expanders, and mikes by Shure and Sennheiser. According to studio manager/engineer **Cary Wakeley**, the new purchases reflect the 24-track studio moving towards the recording and production of album projects. E. Montgomery, P.O. Box 5378, Spokane, WA 99205. (509) 327-7784.

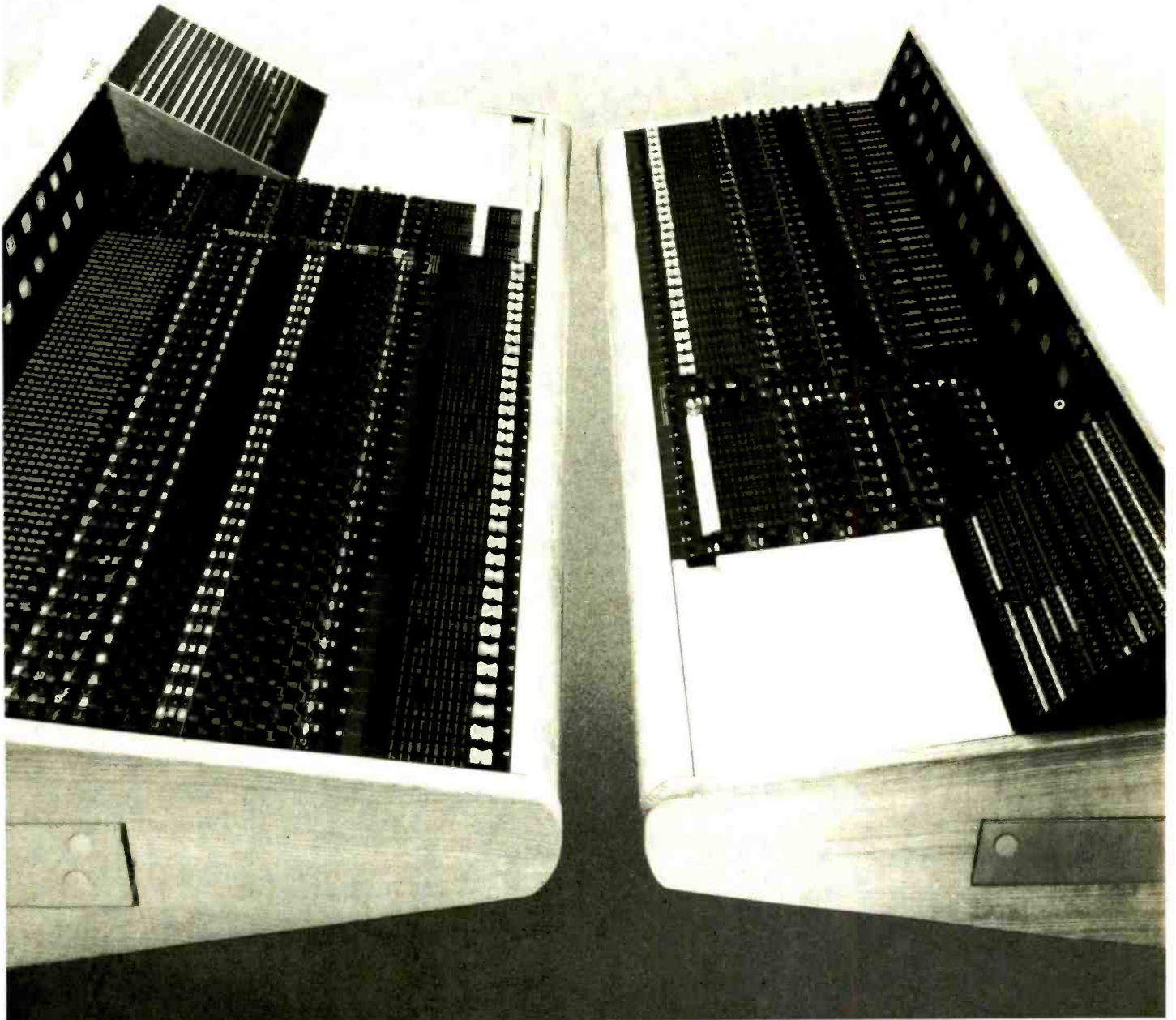
□ **HORIZON RECORDING STUDIO** (Washington), a 16-track facility owner by **Roger Wood**, has taken delivery of an E-mu Systems Emulator digital synthesizer and Drumulator. Both instruments are available for clients at no extra charge. Real instrument sounds that can be loaded into the Emulator and played from the keyboard include violins, trumpet, sax, flute, Hammond B3, banjo, tympani, and a variety of usual drum sounds. In addition to the many sounds of commonly used instruments, which the studio keeps stored on floppy diskettes, Horizon now has a comprehensive effects library of unusual sounds, said to be of particular value in commercial production. Under supervision of **Bob Holden**, the control room monitoring system has been real-time analyzed, tuned, set up for accurate response. Also, the studio's 3M M56 16-track heads have been reconditioned, and the entire electronics updated. Six extra return modules have been added to the Audiotronics Model 501 console enabling full use of the 16-track, while still leaving plenty of options available for patching in outboard effects during mixdown. 1317 S. 295th Place, Federal Way, WA 98003. (206) 941-2018.



WOMACH — Outboard upgrade

□ **TRIAD STUDIOS** (Redmond, Washington) is scheduled in early August to open Studio B, which will occupy a total area of 5,000 square feet. According to owner **Jim Loomis**, control-room hardware will include an MCI JH-24 24-track and JH 110B two-track, Otari MX-5050 two-track; a 28-in/24-out Neotek Series III console; Hafler DH220 and DH500 amplifiers powering JBL 4430, 4312, Auratone 5C, and Yamaha NS10M speakers; Ursa Major Stargate 323, Lexicon PCM 41, and Orban de-esser; plus dbx Model 160, UREI 1176 and Symetrix compressor-limiters and noise gates. Also Studio A now features an MCI JH-110B half-inch, two-track mastering machine. 4572 150th Avenue NE, Redmond, WA 98052. (206) 881-9322.

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STUDIO FACILITIES EQUIPMENT PEOPLE UPDATE

Western Activity:

□ **RED CAR EDITING** (Hollywood) recently has completed *Album Flash*, a half-hour documentary produced by **Limelight** for **Teddy Pendergrass**. The special features three individual videos: *In My Time*, *So Sad the Songs*, and *Choose Me*, which are integrated into a documentary-style video combining freeze-frame and photo repositioning scenes from where Pendergrass grew up, plus photos and film footage of his concerts. "This isn't the first time we've used Red Car," comments Limelight's **Tim Clawson**. "They've edited most of our major videos, and have developed a strong feeling for what we are trying to say through our music videos — they are geared very much towards the music producer's needs. Their sound quality is s

□ **ALPHA STUDIOS** (Burbank) has opened its new Multi-Media Complex, which houses a fully equipped Audio-Post/Sound Studio coupled to a live-performance stage. The control room features a 32-input/24-bus API console. Monitors are the TAD TSM-1 systems. A computer-controlled BTX Softouch will synchronize up to 72 tracks or any configuration of video one- or 3/4-inch machines for mixing, sound effects, ADR, and music sweetening. Two Ampex VPR-2 one-inch, C-format videotape recorders are also available for layback and transfer. The studio measures 42 by 22 by 12 feet, and the control room 20 by 24 feet. The sound stage is 48 by 42 by 12 feet, and includes a 105-way lighting grid, with control room and patch bay. The entire facility will be available for bookings on August 31st, while the audio portion has been on-line since mid-July. 4720 Magnolia Blvd., Burbank, CA 91505. (213) 670-2825.

□ **ACTION VIDEO** (Hollywood) handled post production for **Sparks'** new video, *With All My Might*. Produced by **Jill McDonald** of **Exposure Film and Tape**, and written and directed by **Graeme Whisler**, the video is styled after an old Roy Rogers western mini-musical. "It's our first music video," says McDonald. "Relying on Action, from transfer to Ultimatte to on-line, took a lot of weight off our shoulders. It was a two-fold shoot, having to blend the shots of the band in the foreground over the miniatures in the background, and keep the effective balance between comedy and style." 6616 Lexington Avenue, Hollywood, CA 90038. (213) 461-3611.

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VOICE DESIGN FOR GREMLINS



A personal recollection by Mark Mangini, with Larry Blake

All Gremlins photography © 1984 by Warners Bros., Inc.

There can be little doubt that the success of one of this summer's blockbuster movies, Steven Spielberg's presentation of *Gremlins*, directed by Joe Dante, can be attributed in part to the excellent sound design of the mischievous and malevolent title creatures. In this article, co-supervising sound editor Mark Mangini provides a unique insider's view of the intricate research, recording, and realization of the languages for the film's soundtrack.

Although we had received a copy of the *Gremlins* script in January 1983, I didn't start work on voice design until the first week of September. My partners at Thundertracks, Richard Anderson and Steven Flick, and I agreed that for *Gremlins*, I would create the creature voices, and Richard would handle the sound effects.

At one time we didn't know if Richard could even work on the film, because of his previous commitment to *Streets of Fire* and, had Richard not been available, I would have to handle sound duties for the entire film on my own: the Gremlins' voices and all the sound effects. Subsequently, I began doing a lot of the groundwork for the sound effects, recording sounds that I knew we'd need for the film, in addition to those for the Gremlins' voices.

Finally, Richard managed to work out his schedule so that he could supervise the sound effects, Foley, and all the production dialog, and allowed me to handle just the voices, which was a great

relief. Richard is one of the great sound effects editors of all time, and it was a great benefit to work with him on this film.

It's very important to line up your crew as soon as you can, and get them thinking about the film, even if you can't hire them immediately. I feel very strongly about making people feel involved and part of the process. Every editor has different sensibilities, and I picked sound editors that I thought were best suited to this film. We hired Dave Stone and Warren Hamilton as our chief sound effects editors. I had worked with Dave at Hanna-Barbera and knew he had a great cartoon sensibility, as does Warren.

One of the big problems of being a supervising sound editor is the multiple duties that you have. On *Gremlins*, I had creative responsibility for making the voices, coming up with weird sound effects, as well as the actual physical editing of the soundtrack. In addition, I was responsible for the "sound" of the soundtrack, which can entail picking

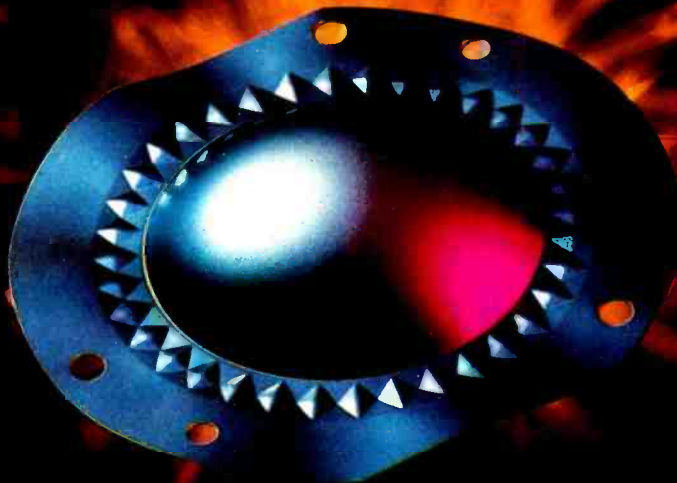
the dubbing stage; selecting the re-recording format; choosing the way to transfer material (35mm single-stripe versus fullcoat); whether or not to use noise reduction; checking the 70mm prints; plus making sure the stereo optical sounds okay, etc.

Obviously, the creative work comes in the selection and editing of the sounds that actually make it into the film. The composer writes and records his score, and he often goes away and forgets about it. (If he *does* come to the dub, it's just to see that the music gets played loud; that's about the extent of it.) The rest of the soundtrack is really your responsibility — the dialog, sound effects, Foley, and everything else. It's in the supervising sound editor's best interest to see that every aspect of the sound process, from the original recording of production dialog, all the way through to what the lab does after you've completed your dub, is done in a quality fashion.

Language Research

Gremlins was a challenge because the script made no reference at all to what the title creatures would sound like. As supervising sound editor with particular responsibility for voice design, I didn't know where to begin.

One of the first things director Joe Dante thought we'd do is invent a Gremlin language. Although the script never made reference to Gremlins talking, I



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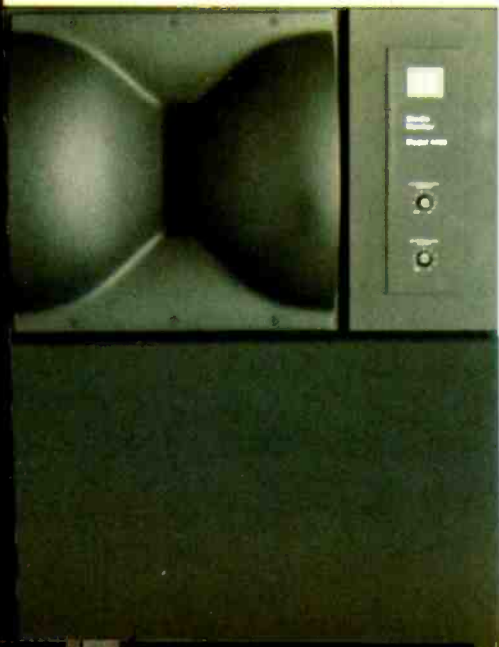
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GREMLINS

imagined them having a very elaborate language. We needed to personalize them much more than had been indicated in the script, which simply described all the nasty things they would do. I knew pretty early on that the Gremlins would have to speak and that, through words, we could get a lot of laughs. People have always seemed to be interested in made-up languages, witnessed by the work Ben Burtt has done with the *Star Wars* creatures, such as the Wookiees and Jawas.

My first inclination was that Gizmo, the only Mogwai not to turn into a Gremlin, would speak Chinese, because he's owned by an old man in Chinatown. Thinking at one point that I'd create a pidgin Chinese, I had my friend John Dunne (who has lived in Taiwan) translate a list of all the words that Gizmo might say, such as hello, goodbye, sad, light, happy, yes, no, hot, cold, food, and hungry — a total of 35 words that delineated the Gremlins' actions and needs.

Gremlins, as opposed to Mogwai, are obviously nasty creatures, so I thought they would have a nasty word for human beings; I wanted the equivalent of "honky" — an ethnic slur. According to Johnny Dunne, Chinese slang for honky is Baigwai (pronounced *buy-gway*), which means "white ghost." If the creatures were to speak Chinese, they would call human beings "Baigwai!"

We had to eliminate a lot of the words, however, because the Gremlin puppets couldn't form certain vowels and consonants. We couldn't use the word Baigwai for this reason, since a "W" sound, which entailed the equivalent of an "O" or "circle" mouth, was impossible for the puppets to mimic. The Gremlins could do nothing more than open and close their mouths like hand

Richard Anderson in Thundertracks sound effects library



puppets, with some tongue and lip articulation. In fact, puppets could be made to draw the lips back over their teeth, but not much more than that.

Because of this restriction, in terms of creating a language we really had to work backwards by determining what letters they could *visually* pronounce. Guttural sounds, like "Ks," "Gs," and "Ls," worked because they come from the throat, and don't require lip articulation. Any sound produced in the throat would work, or any open/closed mouth sound, like an "M," as in "Mama," or a "B," as in "Billy," whereas a long "E" or a long "A" would not. "Os" were completely out, as were "Vs" and "Ws." So, even though the Chinese language intellectually seemed interesting, it didn't pan out.

Another early discovery was that 35 words were too many for the audience to have to deal with. You discover that you have only two hours in which to tell the story, which is certainly the most important part of a film; sound is only one small element of the total process. If you think that the audience is going to figure out a language that you've invented, and understand all 35 words, well, it just isn't going to happen. So, although perhaps two dozen others are used just once, the first thing I did was to limit the word list to seven key words. These, I believe, were: "glub-glub" (water), "light-bright" (light), "yum-yum" (food), "Gremlin" or "Mogwai," "ca-ca" (bad), "hola" (hello), "woof-woof" (dog), and "gusto" (used for beer in the bar scene).

At one point we wanted the Gremlins to imitate sound effects so that they could trick people. For example, they could be offstage and make a sound like a door creak or a dog bark to fool the on-stage actors. But that, too, was a concept we could never sell, because you'd have to see the creature do it on camera at least once. We also thought that they would have the ability to imitate words, like (in the theatre scene) when the Gremlin next to Stripe says "Milk Duds!" or when a Gremlin says "Dolby" in the projection booth, and in the bar when they say "gusto."

I also studied Hawaiian Creole and Chinese Creole, which are very primitive, almost childlike languages. Studies on Hawaiian Creole have shown that it uses the same syntax adopted by five-year-olds who are just learning to construct sentences, which tied into our idea that Gremlins were like mischievous kids. However, Hawaiian Creole was too much like English, and didn't really have any meaning unless you used an entire sentence and heard how silly the structure was.

The first word I invented was "chum-chum" (which became "yum-yum"), the name of a dessert on an Indian restaurant menu. It occurred to me after the fact that all the words I ended up inventing were very childlike, play-language words. My one-year-old son, for example, would make up two-syllable rhym-



Mark Mangini (right) with colleague John Dunn

ing words like "ca-ca," "yum-yum" and "glub-glub." That realization tied into a subconscious aspect of the Gremlins' character that director Joe Dante and I had never really verbalized, which was that the Gremlins are very childlike because they're mischievous, playful, and not very sophisticated. As a result, they would speak in a silly, kind of sing-songy language.

(*Gremlins* producer Mike Finnell tells me that the word "Mogwai," which is the name of the cuter version of the Gremlins, stands for "red devil" in Chinese. In Japanese, however it stands for that well-known, four-letter word, a fact we discovered well after we were immersed in making the movie. I wonder how Mogwai will be translated into Japanese?)

Animal Recordings

Doug Hemphill, who runs the transfer bay at Thundertracks, and I did a considerable amount of field recording of many kinds of exotic animals. Oddly enough, we never went to a zoo. From previous experience we have found zoo staff to be incredibly uncooperative when it comes to recording; the animals aren't trained; the keepers can't get them to do anything on command; and

Doug Hemphill in 35mm mag transfer bay at Thundertracks



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the environment is too noisy. Instead, we went to animal services, where the animals are trained for commercials and movies. You can record quite a variety of animals at such places, ranging from hyenas to coati-mundis. The fees vary between \$25 and \$300 per session,

depending on how long you work an animal and how many trainers you need.

One of the things that animals do well, but which people just never seem to be able to do, is *scream*. You can never get a really gut-wrenching, frightening sound out of a human being — at least I haven't heard a great one yet. In *Gremlins* I used baboon screeches for instances when light shines on the creatures, since it had been established early in the movie that bright light was harmful to Gremlins. When Gizmo is exposed to light, the accompanying sound was



Sound editor Warren Hamilton

THE INFLUENCE OF THE DIRECTOR ON A SOUND TRACK

The attitudes of the producer and the director greatly influence the work that sound editors and re-recording mixers do on a soundtrack. Because of *Gremlins* producer Mike Finnell and director Joe Dante's realization of the amount of work that creating the voices would entail, Mark Mangini was brought on nine months before the film would be released, giving him plenty of time to do the necessary research.

During the shooting of the film, as had been the case with the script, there was little attention paid to exactly what might come out of the Mogwai and Gremlin mouths. "We knew that there was going to be some kind of sound coming out, but we didn't know what they were going to be saying," Finnell recalls. "Every once and a while we would say 'Have them do this [move mouth] on this take. We tried to cover our bases because we had no idea what we would come up with [on the soundtrack].'"

As director Dante remembers, their approach made for some "interesting" silent dailies. "When people ask us how hard it was to make this film, the first thing we think of is the work with the visuals on the set. Because we didn't spend that much time with Mark, we forget how much effort went into getting a soundtrack for this movie. He must have recorded every known animal doing every known thing.

"We couldn't even cut the footage very well without taking some kind of sounds and putting them in the film. Looking at all the *Gremlins* silent, you couldn't tell whether the movements were correct or not."

Mangini provided Dante with cassettes he had recorded during the Gremlin voice auditions. The bulk of close-up Gremlin photography was done after principal photography, and listening to the voices (on a Walkman-type personal stereo) proved a comical experience for Dante: "The crew figured I was listening to Boy George, and John Hora [the director of photography] came up to me and said, 'What are you listening to all of the time?' I had been making notes; a serious music critic. I put the headset on him, and it was probably playing backwards baby belches. He listened, nodded his head, and said, 'I like classical!'"

Mangini remembers that sometimes Dante would hear a Gremlin voice, "and it would sort of magically fall into place with something one of the puppeteers was doing on the set. He got a first-hand idea of how these voices were working with the image of the *Gremlins*, instead of just hearing a wild tape."

An early cut of the now-famous bar scene included almost all of the footage shot for the scene. To better judge how to cut it down, a quick temp dub was made of that scene only. As Dante remembers, "On the dubbing stage we would see, within the context of the sequence, how one voice played against another voice, and whether we had to have the voices all be very similar or very different.

That was a key turning point in figuring out what the *Gremlins* were going to sound like. A lot of stuff became extremely funny with the right noises. All of it was wild stuff from audition that Mark had synced to the picture.

"It was quite an amazing job, to the point that when we did the temp dub [of the whole movie, in late January 1984] we left this stuff alone, because it was good enough to stand on its own merits. We didn't get into doing that scene over again until we did the final, which also retained a lot of the original material."

Throughout the months of experimentation, Mangini credits Dante with "putting me at ease, saying 'Don't worry about it, none of us know what the *Gremlins* sound like. If we don't get it right the first time, we'll do it until we get it right. If we don't get it right at the dub, we'll change it after the preview, and if we don't get it right after the preview, we'll change it again after that.' He knew full well that every process would yield rights and wrongs and dead ends and liv-? ends.

"Joe is one of those rare directors who knows what he wants, and when he doesn't know what he wants, he lets you know that he doesn't know. Many directors will cover and fill when you ask questions, and will say something just to appear to give their stamp of approval. Joe is not that way. He's very open, and he really makes a film a collaborative effort. Of course, as the director, he's the final arbiter of the quality of the sound." □□□

either a sped-up baboon scream (to make it higher in pitch and sound smaller), or a little-baby or a little-baby scream. Babies are so uninhibited; when they scream it *always* sounds natural. You can't expect an actor on an ADR stage to give you a convincing giant wail.

We used many animal sounds throughout the film. The sound of pit bulls, of which I made several good recordings, ended up as several Gremlin vocal effects, including the "Flasher" and the "Bandit" characters in the bar scene, and the "Microwave" and "Mixer" Gremlins in the kitchen. Other animal sounds included the aforementioned baboons, hyenas, and red foxes, the latter being used for Gizmo's voice.

Voice-design Dead Ends

Even though I explored many dead ends, I'm convinced that they are a key factor in this sort of R&D process, in which sounds are being created that don't exist anywhere else. In essence, you just don't know what works until you find out what *doesn't* work.

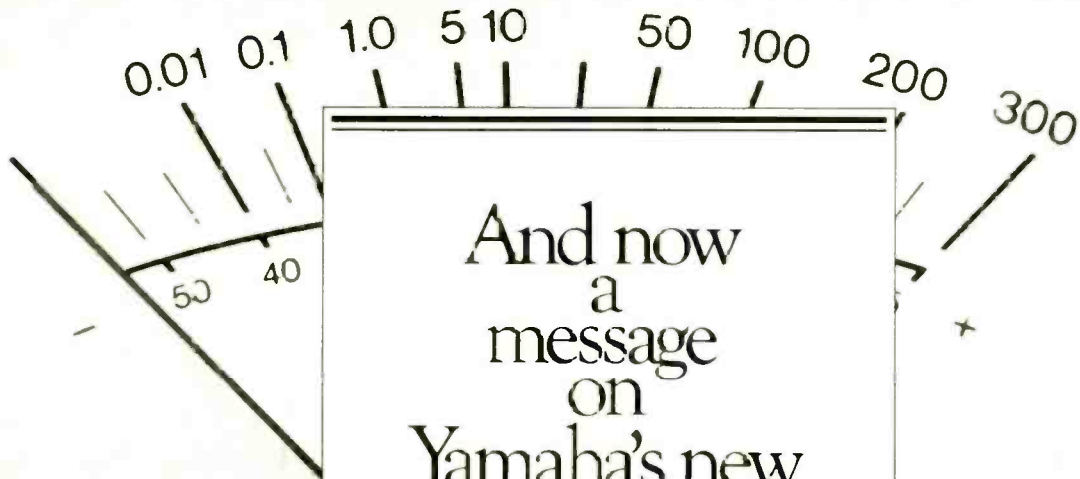
One idea that didn't work was the use of parrots, which obviously can be trained to talk. We originally thought the *Gremlins* would mimic and imitate people's voices like parrots. I began

Sound editor Dave Stone



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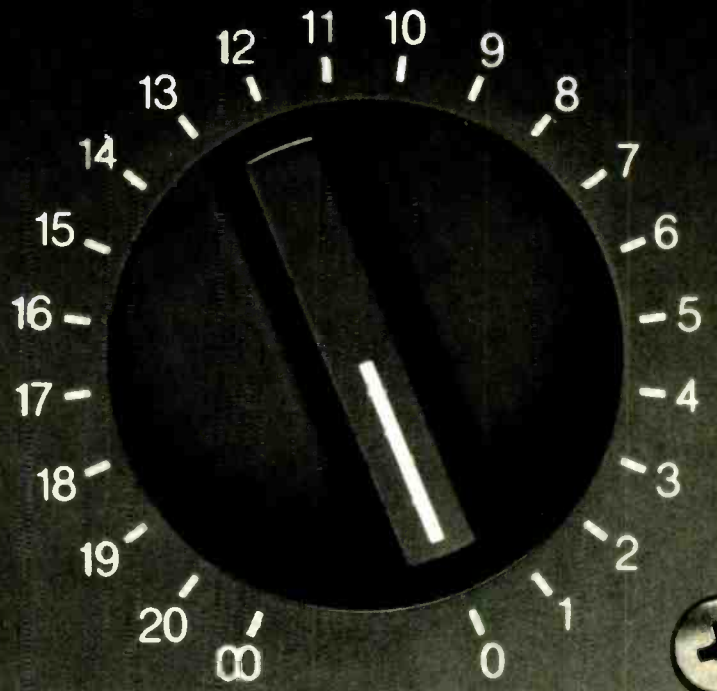
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SPECIFICATIONS

		PC2002/PC2002M
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FREQUENCY RESPONSE	10 Hz to 50 kHz, 8 ohms, 1W	+0dB -0.5dB
TOTAL HARMONIC DISTORTION	Stereo 8 ohms 120W Mono 16 ohms 240W Mono 8 ohms 350W	1 kHz 20 to 20 kHz 20 to 20 kHz Less than 0.003% Less than 0.007% Less than 0.01%
INTERMODULATION DISTORTION	70 Hz and 7 kHz mixed 4:1	Stereo 8 ohms, 120W Mono 16 ohms, 240W Less than 0.01% Less than 0.01%
INPUT SENSITIVITY	Input level which produces 100W output into 8 ohms.	0 dB (0.775 V rms)
INPUT IMPEDANCE	Balanced and unbalanced inputs, maximum attenuator setting.	25 k ohms
8 OHM DAMPING FACTOR		1 kHz 20 to 20 kHz Greater than 350 Greater than 200
S/N RATIO	Input shorted at 12.47 kHz Input shorted at IHFA	110dB 115dB
SLEW RATE		Stereo 8 ohms 60V/μsec Mono 16 ohms 90 V/μsec
CHANNEL SEPARATION	8 ohms 120W 8 ohms 120W	1 kHz 95dB 20 to 20 kHz 80dB
DIMENSIONS (W×D×H)		18-7/8×16-1/4×7-1/4" (480×413×183 mm)
WEIGHT		PC2002 44 pounds (20 kg) PC2002M 45 pounds (20.5 kg)

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investigating talking birds, and made quite a few recordings of them. But this approach turned out to be a dead end, because . . . they sounded like birds. Even though this was one of *many* dead ends, they never seemed like a waste of time because we were quickly learning what we didn't want.

Upon first seeing the script, I thought I could do the movie with just growls and purrs, and all sorts of exotic animal sounds that people had never heard. I hoped to process the animal sounds and make them really unusual. The first time I viewed the film and saw that Joe Dante had them acting like crazy little *human* beings, it became obvious that animal sounds by themselves were not going to contain the kind of personality needed to make the Gremlins come alive. I would have to use human voices, combined with animal sounds, to make entire performance. Weird animal sounds tell you that you are hearing the voice of a creature you've never seen before. But you need the *actor* to provide the overall performance, plus dramatic and emotional range.

Therefore, the trick obviously would be to make human sounds match the animal sounds in frequency range, pitch and timbre so that you never hear the blend between the two.

Voice Auditions

As part of my duties as supervising sound editor, I had to serve as a casting director. For the Gremlin voices, I auditioned 75 different people over the course of three months, seeing four to six people a day, every day. They were either cartoon voice-over people, radio voice-over people, or people who do impressions of animal imitations. We eventually narrowed those 75 down to the nine people used for the final film: Howie Mandel, who ended up being the vocal portion of Gizmo; Frank Welker, who was the vocal portion of Stripe; Mark Dodson and Fred Newman, who were most of our featured Gremlins (except for the two stars); plus Peter Cullen, Mark Berger, Mike Sheehan, Bob Holt, and Mike Winslow.

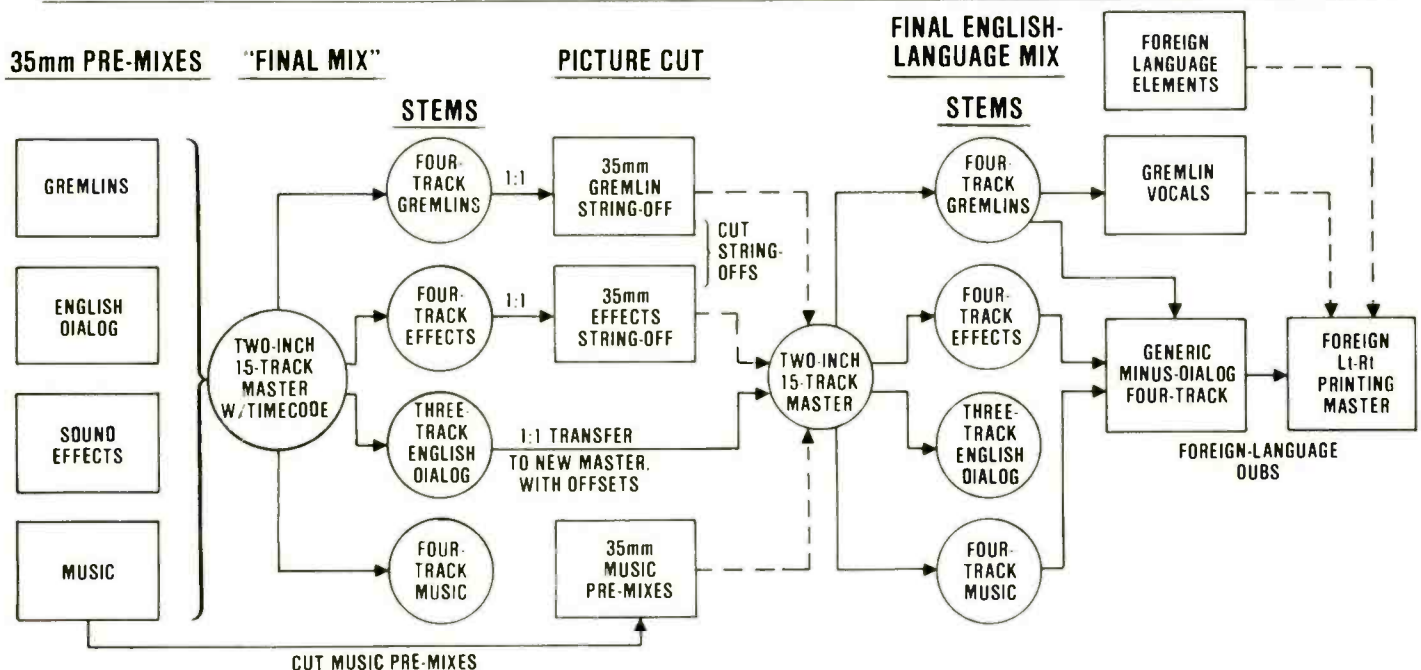
An early concept was to use two great old timers of voice-over, Mel Blanc and Daws Butler. Mel is best known as the voice of Bugs Bunny and all the Warner Bros. characters, and Daws for his Hanna-Barbera voices, including Yogi Bear and Huckleberry Hound. Mel, we very quickly determined, would be a big mistake because his voice is so recognizable. And Daws was actually auditioned but, being the gentleman that he is, respectfully declined the offer saying that he didn't feel comfortable doing this type of voice work.

From virtually my first day on the film, I knew I wanted to audition Frank Welker, and had a hunch that we would rely on him heavily for the vocal (as opposed to animal) portion of the Gremlin voices. I had worked at Hanna-Barbera five years ago, and he was one

of the voices the company used regularly for its Saturday morning cartoons. Inbetween takes, he would be goofing around and doing crazy animal noises and incredible imitations that I'd never heard anybody else do before.

Later, while cutting effects on *Raiders of the Lost Ark*, I was having trouble creating the sounds of the monkey that says "Sieg Heil." The last thing I thought of was having a person do it, but I brought Frank in for an audition and he was just amazing. I had him listen to some monkey sounds I had recorded in the field. Frank imitated them perfectly, and made a *performance* out of it. So he was a real obvious choice for some of the more prominent Gremlin voices.

Therefore, the solution to the talking animal problem was to have actors imitate animals. Even though that originally wasn't a concept of mine, my opinion changed when I had the actors in for their auditions. I played Frank some recordings of pit bulls I was planning to use, and told him how I was trying to give the Gremlins personality with just animal sounds. I then found out that his imitations were so perfect that I could cut a recording of an animal next to his imitation, and you could not hear them bump. I could begin with the animal sounds he was unable to imitate, and then cross-fade into a performance by Frank to give some emotional range that the animal sound didn't have. You would not be able to hear the blend. I now realized I was going to be able to combine these sounds without a lot of electronic processing. *continued overleaf*



USE OF MULTITRACKS DURING THE MIXING OF GREMLINS

Note: The actual Flow Chart varied from reel to reel; shown above is a representative sample. The making of English-language Lt-Rt and six-track printing masters has been omitted because of lack of space.



GREMLINS

When I discovered that some voice-over people possessed these abilities, I began to explore it further. Every time an actor would come in, I'd not only want him to give me a Gremlin voice, but would also ask him to improvise with his voice to find out what kind of range he had. Voice-over people get into ruts; they attend short, five-minute auditions at cartoon studios, where they're asked to do a talking dog or a cave man or some silly voice, and are never able to experiment. I wanted to give these actors a chance to let loose and give me everything that they had.

Howie Mandel, an actor and standup comic, and pretty new to the voice-over field, is a good example of this. When he came in for his audition, he improvised some falsetto singing (including a particularly funny rendition of "Havah Nagilah"). I immediately sensed that he was right for Gizmo, and his improvisatory comedy style was a great asset.

Before I started work on *Gremlins* a fellow by the name of Mark Dodson sought me out. He had done some voices on *Return of the Jedi*, and really wanted to do some more work in this area. He'd make tapes at home on his cassette deck, write scripts and act them out, based on some very vague descriptions I had given him. In the end, Mark became what I think is the sound of the Gremlins; his voice epitomizes their mischievous nature and craziness.

I've always believed that it's important to get the word out about what I'm doing, because I really enjoy the feedback of everybody around me. For



example, I had told a friend of mine I was creating some crazy voices for a film. Two weeks later he called me right out of the blue, saying he'd heard a guy on TV who made all these great sounds with his mouth, both imitating sounds and creating organic effects. Fred Newman, who we ended up hiring, turned out to be a great find, and was somebody I would never had discovered in my conventional voice-casting research.

(On the flip side, some of the people I saw were just unbearable, among them primal screamers, and people who did baby voices. I would know immediately that this was not what I was looking for. I'd want to be on another planet sometimes; I literally couldn't stop these people from performing. They'd go off into another planet themselves, lost in the void of their performance, screaming and wailing in front of the microphone, and doing all these nutty things. Some-

times I'd be laughing at myself with fear. How did I get here, and how can I stop this person? Of course, you have to be fair and diplomatic with everyone, so I was always on my toes having to think of ways to get out of situations.)

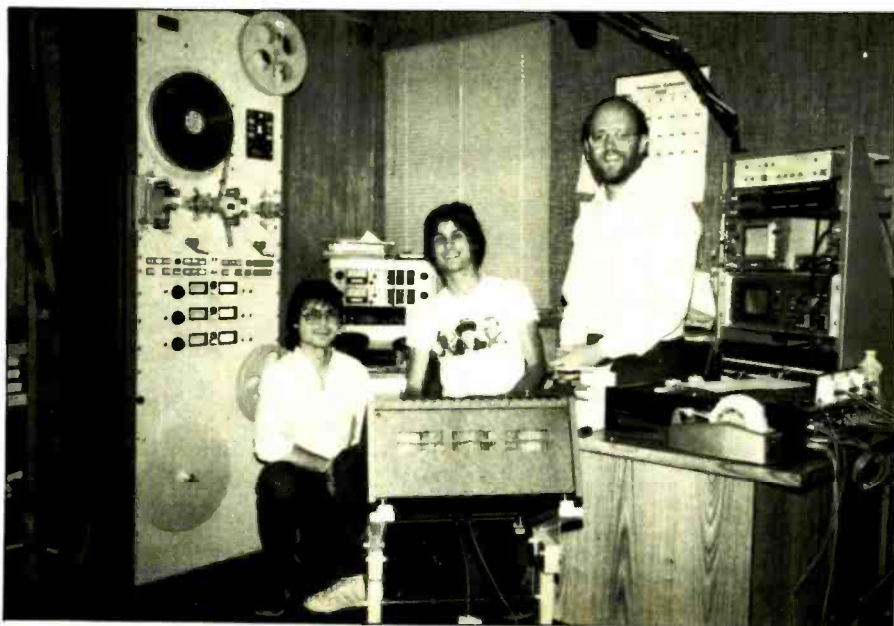
I had recorded all the voice auditions so that Joe could review them. He was so busy during the day with post-production photography of *Gremlins* that he couldn't make himself available for what turned out to be three months of auditions.

In fact, some of the best material in the film came from these audition tapes. I ended up using material from auditions for a good 30 to 40% of the non-animal portion of the Gremlin voices heard in the final soundtrack. We found the actors' performances in the auditions to be much less stiff than those we got while trying to fine-tune the same sounds in the imposing atmosphere of an ADR studio, with directors, producers, scripts, and engineers. I think all this helped in getting really loose, improvisatory performances.

In addition, I learned an important technical lesson from recording the auditions. I kept saying to myself, oh, this is only an audition, I don't have to worry about the recording quality, and therefore I did almost all the auditions on a Sony TC-D5M cassette deck. I ended up going back and using that material, regretting that I didn't have it on 15 IPS quarter-inch. When you have to multi-track, or go through multiple generations for processing, cassette recordings just don't hold up like a good quarter-inch recording. I've now learned that there is *never* such a thing as a "temp" recording of an audition. You do it right *all* the time, because you never know when you're going to need to use a sound.

One of our concepts was to record children, who have nice, small voices. When you speed up their voices, they sounded even more cute and cuddly, which is what the Mogwai had to be. I called my son's pediatrician and had

From left to right: sound-effects librarian John Pospisil, with co-supervising sound editors Mark Mangini and Richard Anderson



him listen for patients that had throat problems like laryngitis and polyps on their vocal cords. I eventually recorded five kids who did have these kinds of interesting, croaky voices.

That all sounds great, but it was mostly another dead end; although the kids frequently made interesting sounds, they were not performers. I had the same problem with the animals: I ended up with tapes that contained short three- or four-second interesting sections, but with a lot of unwanted material inbetween. Even with a massive editing job, the result was a quilt of sound that had no real integrity or continuity.

Babies, however, proved useful, but recording them is very difficult. (Can you imagine some jerk hanging around your house with a tape recorder, pestering your child with a microphone?) For that reason, I used many recordings of my one-year-old son, Matthew. I had been recording him weekly since he was born, and had a wide variety of material from which to choose. For example, at the end of the movie, when Gizmo has crashed in the bushes after Stripe has "melted," I used a recording of Matthew with the croup. He had this wheezy, phlegmy sounding voice, which when sped up sounded like a sick little creature.

My colleague Richard Anderson had the brilliant idea of slowing down these recordings of Matthew, and putting them in the scene outside the bank to make the children, whom Mrs. Deagle is about to evict, seem very sick.

Matthew ended up providing quite a few sounds of Gizmo. Little squeaks, screams, words and phrases when speeded up or processed and isolated out of the context of being a baby sound, became interesting Mogwai sounds.

I went to a lot of trouble matching Matthew and Howie Mandel's voices. In the end, I manipulated the speeds of both of their voices to match each other in frequency range so that they could be intercut. Speeding up a voice decreases the apparent volume of the chest cavity, which is a good indicator of the creature's size. When Howie would talk with his normal voice, it sounded like a big, six-foot-tall human being, and speeding him up seemed like a natural process. This technique enabled us to match the appearance of the little Mogwai. The speeding up paralleled what Joe did with the Gremlin photography. By undercranking, he made the Gremlins move in an unnatural fashion; speeding up a voice made the human voice feel unnatural.

Sound Processing

At the moment, I have a big dislike of using electronic processing equipment as a part of voice design. First and foremost, I don't like the amount of time that is spent in actually fiddling with this gear, versus the results you get. Most of the time I find that, instead of spending three hours to fine tune one

APPLICATION OF MULTITRACK TECHNIQUES DURING POST-PRODUCTION FOR GREMLINS

Re-recording Stage D at the Samuel Goldwyn Sound Facility of Warner Hollywood Studios, where *Gremlins* was mixed, is equipped with six-track and four-track Magna-Tech Electronics 35mm recorders. Final stereo mixes are usually recorded across all 10 available tracks, with left-center-right (LCR) dialog and effects mixes being layed on the six-track, and left-center-right-surround (LCRS) music on the four-track. Sometimes the music surround channel is shared with sound effects.

This format, in which the final mix is broken down into separate stereo dialog, music and effects "stems," is s.o.p. at virtually all major Hollywood dubbing stages. The reasons for its adoption are well-known: if corrections have to be made during the final mix, only the stems that need fixing would be updated, thus saving much time and trouble.

Additionally, because of the separation of the dialog, music, and effects elements, the Dolby Stereo domestic mix can be easily converted into all standard release formats: six-track Dolby Stereo (with selected bass-extension information on tracks #2 and #4); minus-dialog stereo for foreign dubbing; and three-track (DME) Academy mono. Also, problems associated with the (all-too-frequent) recutting of a picture after the final mix are minimized, since each stem can be conformed separately to the picture cuts.

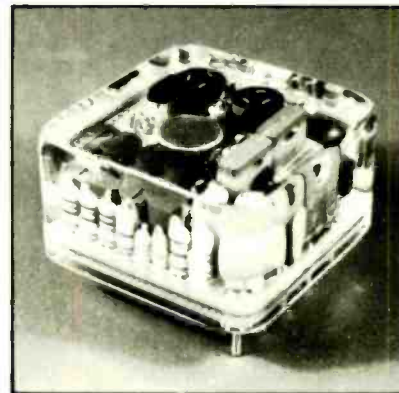
Because the words and sounds made by the title creatures were important, *Gremlins* required that a fourth stem be recorded as part of the master mix. In this way, any changes in the creature voices could be made without also having to update the sound effects, which is where the tracks would normally be bussed on the re-recording console.

To obtain the required number of recording channels, it was decided to record the master mix on two-inch, 16-track tape. For this purpose, Warner Hollywood purchased an Otari MTR-90 Series II 16-track, as engineer Doc Goldstein explains: "We knew we were going to buy a [multitrack] machine, and we wanted to get the best machine that was also cost-effective. And other than the Studer, which is probably the finest machine available, regardless of how much it costs, the Otari is better than anything anyone makes."

The 15 available tracks were allotted to LCRS music, LCRS effects, LCRS Gremlins, and LCR English dialog (track #16 being taken up with SMPTE timecode). The separation of elements was a big help after the first public preview of *Gremlins*, as supervising sound editor Mark Mangini notes: "One of the interesting things that we learned at the preview was that we hadn't dubbed the Gremlin voices loud enough. We found that in the few instances where people did hear the Gremlins, they really enjoyed what they heard, and

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MULTITRACK TECHNIQUES — continued . . .

wanted to hear more.

"We had made an aesthetic decision that the Gremlins, being very small creatures, had to be soft, and that turned out to be a mistake."

Remixing Multitrack Masters

In the example cited above, the Gremlins pre-mixes could be loaded onto 35mm dubbbers, and the corrections made by punching in on the four-track Gremlin stem. Such a procedure can be followed only when the sound is changed by itself, and is not accompanied by picture cuts. Because nobody was comfortable with the idea of cutting the two-inch, 15-track master, picture changes automatically meant that the mix would have to go one or two extra generations in order to update and remix the reel on a piece of splice-free two-inch tape.

During the final mix of *Gremlins*, picture changes were handled in one of two basic methods: First, the stems from the original mix were transferred to the correct footage, using offsets and punch-ins, on a new two-inch tape. This method added one generation, and could only be used when a stem did not require remixing, and could be transferred 1:1.

Second, if the material did require remixing, the four-track (or three-track, in the case of English dialog) stem was "strung off" onto a separate piece of 35mm fullcoat, cut to conform to picture changes, and then mixed onto the new 15-track master. As this procedure added two "unnecessary" generations, it was not looked upon lightly by all involved, especially considering that a reel might be recut even further, resulting in material that was four or even six generations down from the original master mix.

By way of contrast, if the mix had been recorded on 35mm mag film, the separate stems could have been cut to conform to picture changes, and, assuming that the mix levels were correct, the master mix would stay first generation. This procedure is roughly analogous to method #1, above, which added one generation when making the offsets on multitrack tape. Similarly, only one generation would be added if a master on separate 35mm stems had to be remixed, as opposed to the two added in method #2.

This is not to mention that recutting 35mm film is done by a sound editor using a pair of rewinds and a film synchronizer. Editing is simple and precise. While making offsets using two multitracks can be even more precise, it is nowhere as simple and has to be done in a dubbing studio with the meter clicking off over \$600 per hour. SMPTE synchronizers might be wonders of technology, but \$250 film synchronizers offer stiff competition in many regards.

The only way that a master mix can stay first-generation, regardless of the master recording format, is to recut the 35mm pre-mixes to conform to picture cuts, and remixing the master from scratch. Music was the only stem handled in this fashion during the final mix of *Gremlins*, not only because multiple generations are noticeable with music, but also because, as a rule, music goes to the final mix in two or three stereo elements, and thus is relatively straightforward to remix.

In a few instances, however, the music stem was copied across to a new multitrack master, as Stage D's music mixer Steve Maslow explains: "Sometimes there would just be a four-foot lift [picture cut], and rather than remix a complicated 120-foot [1 minute, 20 seconds] cue, we just made offsets. As a result, the last reel is two or three generations down.

"By the fourth and fifth generations there was a difference in sound texture. It's something that you can't just pinpoint, but if you were to A/B the first generation with the fifth, you could tell the difference."

An obvious solution to this problem would be the use of multitrack digital recorders. Maslow and Goldstein recently had a good experience with the Sony PCM-3324 digital 24-track while dubbing the Talking Heads concert movie *Stop Making Sense*. Although the original recordings were multitrack analog, a digital dubbing master, incorporating edits and offsets, was used in the final mix. This two-track Lt-Rt (Dolby Stereo printing master) was bounced up on the same digital multitrack. The information was then transferred directly to the optical negative used to make the release prints, effectively resulting in the prints being one analog generation away from the original recordings.

Maslow thinks that, cost considerations aside, digital is "the way to go. There is just no difference between the first and fifth generations." Another benefit, notes Goldstein, is that the "transparency" is never lost during the course of a mix. "After a while the high-end begins to disappear in analog. With the digital machine, the sound they had in the beginning was the sound they had in the end."

Foreign Dubbing

Separation of Gremlin voices from the sound effects has been, as planned, a big help during preparation of the foreign-language dubs of *Gremlin*. For the mixing of foreign stereo printing masters, a 35mm four-track minus-dialog mix was made from the 15-track master. Not only does this remove the need to lock up the two-inch machine, but it will also simplify the foreign mixes, since the minus-dialog element is *not* just a combine of the

. . . continued overleaf —



sound by fiddling with EQ, or delay, or whatever, I could have come up with an overall concept to solve a wider group of problems in a more organic fashion. While twiddling knobs it's incredible how you can lose track of the performance at hand, or the continuity of what you're doing.

John Pospisil, our sound-effects librarian, and I experimented with a lot of vocoder techniques. Using a voltage-controlled Harmonizer and a vocoder, we'd have the human voice gate an animal sound using the Harmonizer's pitch-to-voltage follower. These tricky little techniques never ended up working. (I would later discover that an offshoot of this technique would be useful for processing Gizmo's singing.) They always sounded electronic or manipulated, and had no originality or soul.

For voice design, along the same lines, the use of synthesizers just don't work for me. There are a lot of elaborate synthesizers available these days, including the Fairlight CMI, Synclavier, and Emulator, but with most of them you can spend too much time twiddling with a light pen or all the different kinds of knobs and buttons, to come up with just *one* sound. A performance for a creature isn't made with one sound; it's made with a concept. Processing gear is a tool — you could no more build an engine with a single 7/16-inch wrench than you would make a voice with *just* a synthesizer.

Additionally, synthesizers produce an electronic sound because most of them, the older ones at least, utilize filtered oscillator banks. They produce a sound that's non-acoustic in nature, and doesn't sound real; adding reverb and delay makes it sound even more processed or artificial. To my mind, synthesizers just makes weird noises. What you discover is that anything and anybody can make a weird noise; there are millions of weird noises out there.

Early on, I discovered that the creature voices need to be accompanied by sound all the time; you've got to keep the puppets alive or they begin to *look* like puppets. As a result, we decided that the creatures would have to be creating sound even if they weren't specifically saying something.

The first sound that came to mind, and it was the concept we ended up using, was purring — what I call an "idling" sound. Even if an animal isn't specifically making an attack, eating, mating or whatever it does when it makes great sounds, it is still making *noise*. We used purring for the Mogwais, because we really wanted them to be furry and warm and cuddly.

On the temp dub for *Gremlins*, made

in January of this year, I double-cut the purring behind the voice, thinking it would be just an added sound that would blend with the voice. My partner Richard Anderson felt that it sounded like two different things going on at once, which is one of the big problems you have with creature voices. A lot of people mistakenly think that you can mix all these sounds together on top of each other to create a voice. It gets very distracting, and you lose a purity of sound. I realized that I would have to cut the purring *around* the talking part, which helped the Mogwai sound alive.

From what I understand, I edited the cat purring in the same way that Terry Eckton cut Darth Vader's breathing around James Earl Jones' voice in the *Star Wars* films. I cut around the Mogwais talking, and the purring became, in effect, the inhale you take before you speak. In some cases, the purring would overlap by four or five frames, just to create a blend so you could go into the voice.

I knew all along that in several scenes I would have to make Gizmo sing. We liked the purring so much that we wanted to see if we could make him/her sing with animal sounds. We loaded a purring sound into an Emulator and attempted to pitch it across the keyboard, triggering the purring sound instead of an oscillator. Unfortunately, purring was such a random sound, with little tonality, that it never gave the sense of actual singing; it was just noises going up and down. That was a concept that never worked out.

For Gizmo's singing, we finally used a little girl. Jerry Goldsmith, the composer of *Gremlins*' score, found her at the temple he attends. She was about nine years old and had a soft, beautiful, falsetto voice that showed no strain in delivering the high-pitched notes we wanted. Using a little girl (or boy) was a concept I had thought of months ago, but it didn't seem to tickle anybody. When it came down to the crunch, however, it just felt like the logical choice. In the end, though, it *still* wasn't exactly the right sound.

Steven Spielberg was pretty unhappy at the scoring session with the singing sound; he was convinced it just sounded like a little girl, and we knew that we had to do something with it. Luckily, the girl had been recorded in an isolation booth, rather than with the orchestra, so that her singing could be kept separate for later processing. John Pospisil thought up this nifty little system of voltage controlling an Eventide Harmonizer with control voltages from our ARP 2600 synthesizer. We induced a vibrato into the sound of her voice, which was really a steady tone or a steady humming, from the synthesizer and Harmonizer. That gave it that sort of "chirpy" or broken-up quality that sounded less human.

In addition, I cut out and flopped over all of her breaths in between the notes, which gave away the fact that it was a

MULTITRACK TECHNIQUES — continued . . .

music, effects, and Gremlins stems. Many of the words that the Gremlins speak ("woof-woof," "glub-glub," "Milk Duds," etc.) might not directly translate into other languages, and were kept separate from the minus-dialog mix. The animal and non-verbal Gremlin sounds, such as purring, singing, baby noises, etc., were included in the "generic" foreign master. Thus, when making the Dolby Stereo printing master for each language, the decision can be made whether to keep Frank Welker (as Stripe) saying "Gizmo ca-ca" or to use the appropriate foreign translation.

Synchronization Scheme

In addition to the SMPTE timecode recorded on track #16 of the multitrack master, timecode ran simultaneously on a piece of 35mm mag film. Sync lock was obtained with BTX Shadow II synchronizer and Cypher timecode system. Goldstein notes that "In order for the system to run smoothly, we had to have more than just a code-only master. The 35mm code ran through the Cypher, which generated tach pulses and direction signals from it. The tach and direction pulses, along with the timecode from the 35mm film, were looped into the Shadow, which used them as if it were looking at a master machine with all three signals. It saw code, it saw tach, and it saw direction signals — and consequently we got a lock that was iron hard.

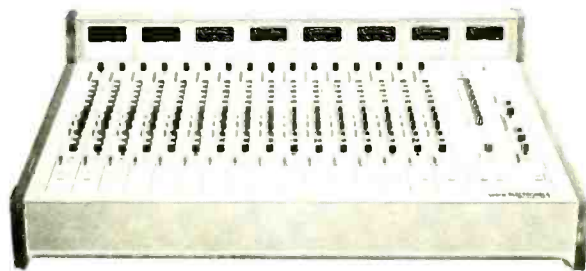
"One thing that was difficult, to the engineering staff anyway, was to make the multitrack machine 'invisible' to the mixers. We had to hook up all of the playback/direct feed controls and the bias switches to the recorders. I had to go inside the Otari remote unit and modify it to hook up with the Harrison [PP-1 console's] tape interface box, so when they punched-in on the Harrison it punched-in on the Otari upstairs. All 15 tracks were controlled by everybody's individual bias switches on the console."

Initially, there were worries regarding the audibility of punch-ins/punch-outs at 15 IPS. Maslow, who had used multitracks on Stage D for the mixes of *The Last Waltz* and *The Jazz Singer*, was pleased with the results: "The punch-ins were flawless. I would punch in on string sustains, which I normally don't like to do, and if my levels were right, it was unbelievable."

With regard to the multitrack master's audio quality, versus what can normally be achieved on 35mm film, the staff at Goldwyn agreed that the multitrack was as good, if not better than film, but note that in any case the difference is not a marked one.

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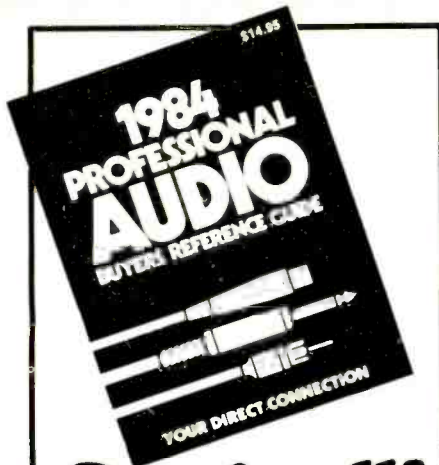
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and whose "It takes a certain kind of guy" dialog is to *Gremlins* what Obi-Wan Kenobi's "Use the Force, Luke" was to *Star Wars*.

We had Doug Hemphill put together a transfer bay for us so that we could transfer our quarter-inch sounds to 35mm for editing. Having the transfer bay right next to where you are cutting frees up a lot of editing time. Previously, we'd turned in transfers to either the studio or to an independent transfer department, and would have to wait to get them back. In the old days, we'd have to anticipate our needs up to two days in advance. Frequently, you just cannot wait that long — you're on a flow when you're cutting and don't want to lose your thought pattern. As a result, you might not stop to transfer something in an attempt to get a sound you really want.

Having a transfer bay at our fingertips proved to be an enormous time-saving benefit. It also provided the security of knowing that everything is being done in a first-class way, and that the important technical qualities of re-recording sound, like frequency response and noise levels, are up to snuff. Because Doug is very conscientious, we knew the transfers were being done properly, whereas at an outside service, quality can *never* be guaranteed.

Sound Editing

While spotting the film on my Moviola, prior to going to the ADR sessions, I created a script of the Gremlin vocal material. Starting with Reel #1, every time a Gremlin appeared in a scene, I would give it a cue number, imagine what he might say, and write down the specific words, like "ca-ca" or "Mog-wai." If I couldn't think of the actual words he'd say, I'd leave it open-ended and say "Gizmo's got to be cute here," or "Gizmo's got to say something about the Peltzer device," and give a general description for the actor to follow once we got to the studio. I knew full well that the actor would certainly have lots of interesting comedic ideas, or that Joe or



I would improvise something on the spot.

I couldn't seem to invent a word for light. So, instead of a word, we just used the same horrifying baboon screams we used when Gremlins attacked people, such as the scene in which one scratches Billy's hand in the lab, and when the creature jumps out of the medicine closet. We realized that some people weren't getting the fact that light was bad for Gremlins, which seemed pretty clear to most of us working on the film.

After the first preview, in San Jose in northern California, we were ordered to come up with a new word for light, for Gizmo anyway, because they were going to shoot a new scene for the end of the movie in which Gizmo looked at the shade in the greenhouse, and realizes that light could kill Stripe. So, in a big brainstorming session after the preview, Steven Spielberg invented the word "light-bright," which of course fell into our whole rhyming, two-syllable word pattern.

Gremlin ADR Recording

Taj Soundworks, the Hollywood facility at which we did the Foley and the Gremlin ADR, created a nifty system that enabled a video transport to be interlocked with a multitrack, and the pair slowed down in tandem, so that we could speed up voices (when played back at standard speed) and still maintain

MULTITRACK TECHNIQUES — continued . . .

Beta-format video recorder. Sadler says that the Q.Lock can be addressed in feet/frames: "You tell it you want to go to 200 feet, it converts the figure to timecode and takes you there. We never have to talk in terms of timecode."

ADR Microphone Selection

To prevent having to cut a cumbersome number of tracks of Gremlin voices for scenes featuring a large number of the little creatures, Mangini wanted to do as much Gremlin group ADR as possible. Sadler recorded these session in stereo, using Crown Pressure Zone Microphones set up on a stereo wedge. "We have begun to do more and more stereo Foley and stereo group ADR," the Taj mixer says. "Commonly, for roomy, ambient situations we find PZMs wonderful in stereo. True stereo will create a feeling of depth and realism that mono or 'futzed' stereo never could."

A favorite mike of Sadler's for standard ADR and Foley recording is the Neumann KMR-82i. "One of the big advantages [of that mike] is that it has a substantially higher output level than most [condensor] microphones. Because of the nature of a lot of Foley material, this is almost essential; otherwise you start fighting the noise level of the microphone and the pre-amp, etc., when you are going for something really small." □□□

sync. [See accompanying sidebar for further details of the Taj multitrack synchronization system — *Editor.*]

It was an idea that I'd had early on, because I knew I was going to speed up a lot of voices to reduce their apparent size, and for frequency matching. Of course, if I recorded the tracks at normal speed (15 IPS), and *then* sped them up, they would no longer be in sync. I'd have to do all of this elaborate stretching-out later with pitch changers and meticulous editing, which would just have created tons of work. The Taj system allowed us to *immediately* review a sound the way it would be heard on the dubbing stage: sped-up, yet still in sync with the picture.

Although we would have the actor literally deliver the line to a video image that was slowed down to what turned out to be 30%, he would actually be seeing his character moving 30% slower and therefore deliver his lines 30% slower.

Later, they would just transfer direct off the 24-track while resolving the SMPTE timecode, and I would get a 35mm copy that was in the same sync as what we saw during playback on the ADR stage.

Coming from an editorial background — specifically ADR and looping — I normally have to have control over sync in a recording situation. Since we recorded the creature voices ADR-style, I felt the need to do it sync all the time. We'd run picture and we'd deliver the beeps in the headphones, Howie Mandel and Frank Welker or somebody would see their character on-screen, and try to lip sync to these little monsters.

As I said, I wanted to walk away with synchronized material that would lay in with a small amount of editing. What we quickly discovered in these auditions was how imposing the whole system is and how it limits the creativity of a performance. Joe Dante and I would have these arguing matches about how we couldn't get Howie or Frank to hit sync properly, and Joe kept saying, "Don't worry, we'll do it wild; we'll get it right." And I would be saying, "No, we've got to do it now. We *have* to do it in sync. We'll never get it right, and I'll never be able to edit all this stuff."

Joe was really right in the end about how wild recording allowed an actor to extemporize on his own, without being locked into having to match sync, and without taking his mind away from the creative performance at hand. During *Gremlins*, I was resistant at first to relinquish the sync recording capability, yet in the end I used a lot of wild track material and threw out much of the sync material. In the future I will deliver a situation to the actor and let him go with it. Wild tracks yield such creative results.

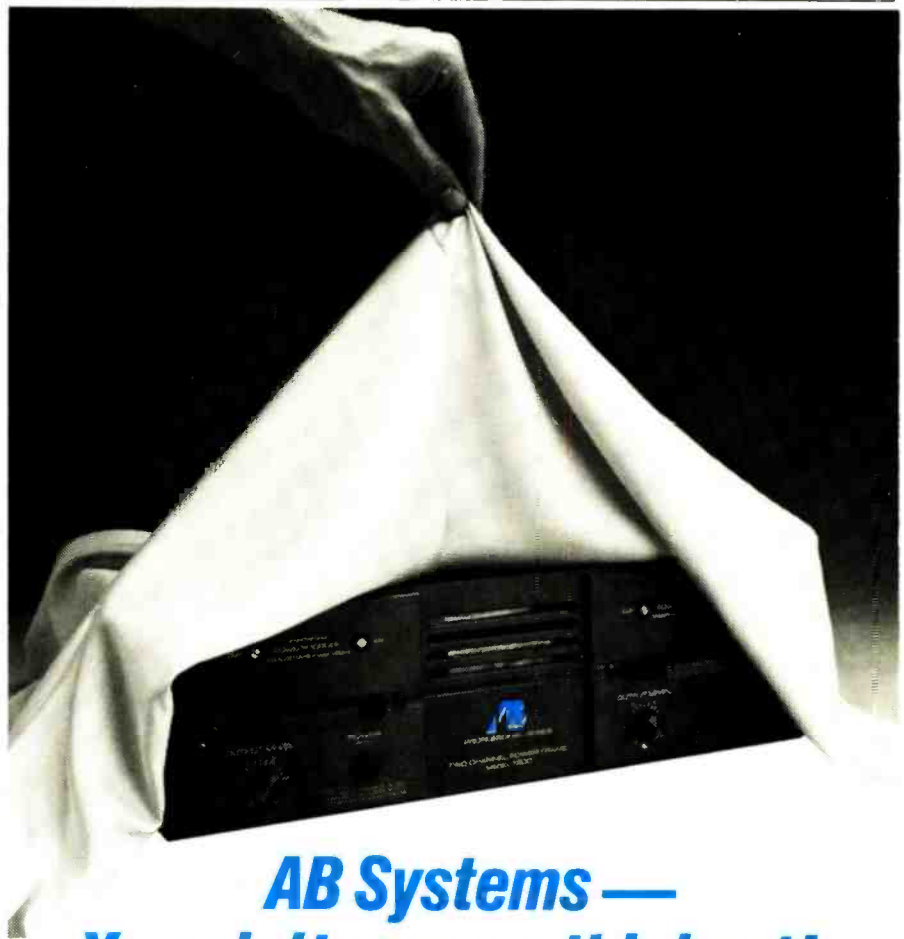
While editing my sound, I would create a cue sheet that represented at what footage and frame any particular sound would start and stop. Of course, many times any one given character

might be created out of several tracks. But you wouldn't want to have the vocal material for Gizmo in the same channel as its animal or cartoon portion, since the sounds might be derived from different sources, with different EQ and different levels, and you have to be able to balance those against each other. Gizmo, more often than not, would be on three to four tracks, and Stripe on two to three tracks. So, for any given reel of the film there would be at least five channels of sound for the Gremlin voices, although they might not be running at the same time.

* * *

I keep discovering in my career and in

my endeavors with sound that I'm constantly re-inventing the wheel. I always want to think that I've braved some new territory or invented some new process, yet I keep discovering that the techniques I've been using have been around since the beginning of sound films. I'm referring to the techniques of slowing things down and speeding them up; substituting animal sounds for humans and humans for animals; and cheating sounds for other sounds by taking a sound out of its context and placing it in a new context. We're using fancier tape machines and similar hardware. While the techniques have been refined, I don't think they've changed significantly over the years. ■■■



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For the last few years, digital technology — from the first studio multitracks and mastering machines, to the Compact Disc players now making an impact on the domestic market — has been heralded by manufacturers as something akin to the rebirth of the music industry. Sadly, the projected widespread acceptance of digital recording technology has been hindered somewhat by a lack of format standardization, the high cost of hardware, and less-than-perfect performance in terms of dependability and sound quality, not to mention cumbersome electronic editing schemes and slow punch-in/punch-out capability exhibited by some transports.

Naturally, most professional engineers, producers, and artists have been cautious about expanding their budgets to support the cost of the new digital technology. After all, they were frequently expected to act as guinea pigs that had to test unproven prototypes which, more often than not, failed to function as promised and, in some cases, didn't function at all.

As with anything new, however, with time digital recording is becoming less intimidating; the bugs are being worked out; and an ever-increasing number of sessions are being recorded, mastered, and/or released in the digital domain.

Recording studios and production facilities currently can satisfy their curiosity in things binary with product from four manufacturers: the 3M M81 Digital Mastering System, available in 32-track on one-inch and four-track on quarter-inch formats [although M81 transports are no longer in production, rumor has it that 3M will be unveiling a second-generation machine in the near future — *Editor*]; Sony's PCM-3324 24-track on half-inch DASH-format machine, and recently introduced PCM-3102 stereo DASH-format deck (Studer also plans to launch its D820 stereo DASH machine by early next year); Soundstream's eight-track on one-inch transport, which finds wide-spread application in classical recording; plus Mitsubishi's X-800 32-track on one-inch and X-80A/X-80 quarter-inch stereo mastering machines.

Recently, the Mitsubishi X-800 and X-80, marketed in the US by Digital Entertainment Corporation, have been used on several interesting recording projects, including Jimmy Iovine's movie soundtrack for *Streets of Fire*; Phil Ramone preparing Barbra Streisand's *Yentl* tracks for album release; Donna Summer's *She Works Hard for the Money*; Jeffrey Osborne's *Stay with Me Tonight*, produced by George Duke (as well as all of Duke's projects with Stan-

ley Clarke); the Julio Inglasias/Willy Nelson duet "To All the Girls I've Loved;" a complex classical project recorded by engineer Jerry Barnes at EMI-Abbey Road Studios, London, and overdubbed/mixed at United Western Studios, Los Angeles (see "Studio Update," June *R-e/p*, page 124, for further details); and various singles and album dates by Rod Stewart, Michael Sembello, Kenny Rogers, Ronnie Milsap, Jo Stampley, Mo Bandy, and Charlie Pride.

Given the fact that an increasing number of artists and producers are obviously finding the Mitsubishi X-800 and X-80 of practical and operational advantage for their recording projects, this article will consider in detail a recent all-digital session that put the company's hardware through its paces.

Grammy Award-winning producer Michael Omartian recently put the finishing touches to Donna Summer's new Geffen Records album, which was recorded on a X-800 32-track, and is expected to be mastered on the X-80 two-track. Omartian's other recent Mitsubishi digital projects include Summer's *She Works Hard for the Money*; Rod Stewart's latest album *Camouflage*, which was recorded multitrack analog and mixed to the X-80 at Lion Share Studios in Hollywood; and Christopher Cross' single release, "One More Chance for Heaven," for the 1984 Summer Olympics.

DIGITAL RECORDING AND PRODUCTION TECHNIQUES

Producer Michael Omartian working
with the Mitsubishi X-800 Multitrack on Projects
with Rod Stewart, Christopher Cross and Donna Summer

by Robert Carr



Photography by Kathy Cotter

Digital Mythology

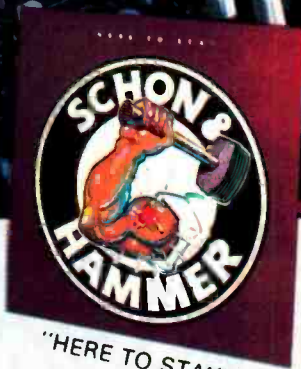
With such a diverse collection of clients, Michael Omartian possesses the unique vantage point of having used digital to record a variety of music styles — from power rock and roll, to mellow rock, to R&B — and has found that digital performed well in every case. As a result, Omartian is discovering that some of the myths about digital recording are just not totally accurate. "Not long ago," he recalls, "I used to think that I needed the analog tape to give me a good 'rock-and-roll' sound. But I *don't* see that as a valid assumption anymore."

The *Camouflage* album is a return to basics, and similar to the type of music to be found on early Faces' albums that Rod Stewart helped make so popular. Although the album contains three or four melodic tracks, about five tunes are described as being extremely aggressive with a hard edge.

"If I had tested the Mitsubishi 32-track before working with Rod, we would have used it for his entire album," Omartian says. "Even though we wanted the 'grit' of a hard-driving rock-and-roll band, there's a clarity with the digital that makes the overall tracks sound so much better. The integrity of each instrument is preserved within the whole, so the listener can pick out everything that's going on."

According to John Guess, Omartian's audio engineer, "The idea that analog tape enhances rock and roll is similar to the opinions held by people who say that [noise reduction] takes the punch

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DIGITAL RECORDING

mono] a lot of stereo tracks that were meant to be stereo, the sound is much better in the final mix. And if we do have to combine tracks, the digital lets us maintain the original quality from copy to copy."

Guess and Omartian report that unless the source is a simple mono input, they're recording almost everything in stereo. "A lot of the guitar parts have been going on in stereo, and so have most of my keyboard overdubs," the producer says. "The only exception is the bass part, or maybe a little line or two that doesn't need any more than the mono send."

Of course, too much of a good thing can have its comical downside as well. "The biggest problem is playing back a track with the monitors turned up really loud," says Omartian jokingly. "When you don't hear any tape-hiss to tip you off, you can't tell if the monitor level is too loud until the music starts to play, and then it may be too late. John almost hurt himself at United Western!"

"I didn't realize how much power they had in their monitor system," Guess explains. "On the first playback, I almost went over backwards in the chair!"

At this point in time, the Mitsubishi



Michael Omartian: "A multitrack recorder with more tracks will have a big input on the sound of records. And . . . digital lets us maintain the original quality from copy to copy."

X-800 multitrack is not set up for tape editing, so the engineer, producer, artist, and musicians have to get the track right the first time. (The X-80/X-80A Stereo machine, on the other hand, is fully capable of supporting conventional razor-blade and electronic editing.) Omartian and Summer have been laying down basic tracks after first mapping out the song structure with a drum machine, which can be recorded as many times as necessary until the form is what they want. Likewise, the music tracks are then recorded and re-recorded against that drum track.

"In addition to me on keyboards, we generally have been bringing in just a drummer and a bass player," says

Omartian. "That's been the maximum-size session we've done lately, and it makes the recording process really easy. It might not work for somebody else with a different concept, but it seems to really work well for us."

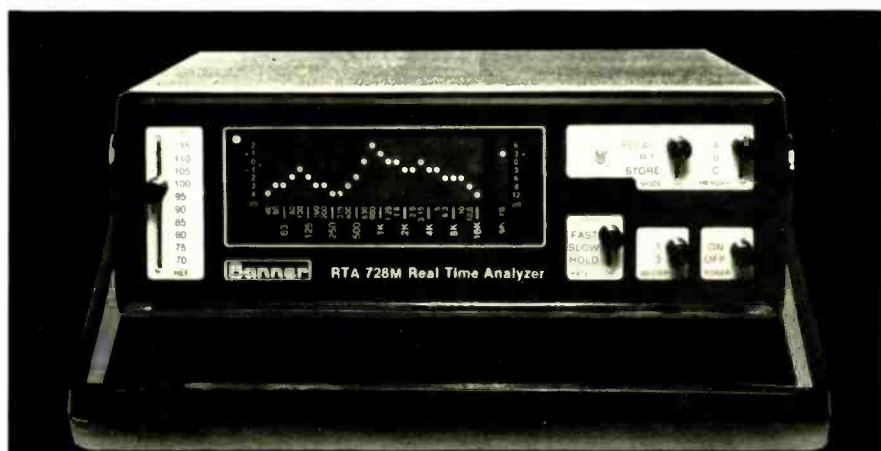
Although the drummer plays along with the drum machine, which comprises eighth- or sixteenth-notes on high-hat for metronome time, the mechanical tracks act only as his guide; the drummer usually writes and plays his own part. The drum machine, however, does provide percussive augmentation in the form of congas, handclaps, and so on.

Omartian is also quick to point out that this type of recording process is not the direct result of how a session must be approached when using the X-800. "I don't want to mislead anybody into thinking that the digital machine has changed the way we do a session. John and I worked this way with the analog machine, too. The technique we use doesn't have anything to do with whether we have a digital or analog machine. Other than the fact that, at this point in time, you can't edit on the Mitsubishi multitrack, it works perfectly. We just like to get the song worked out, and then record it in layers.

"Basically, we're starting out with a synthesizer track, and a drum track and overdubbing just one part at a time," Omartian continues, "so that the storage medium — analog or digital — doesn't really matter anyway. That just seems to be the way most people are recording today, because pop music is getting more electronic, with a lot of synthesizer parts. To tell you the truth, I don't remember the last time I used an acoustic piano on a track; it's been a long time."

Keeping it Simple

Although the overall approach to digital recording isn't that much different than the process used with an analog multitrack, Omartian is discovering another phenomenon that he hadn't expected. Most of the songs on Summer's album consist of only one or two synthesizer parts, drums, a little percussion, and some sort of bass (synthesizer or electric bass guitar). "Beyond that I'm seeing that I'm really hard-pressed



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DIGITAL RECORDING

to find things to do. Whereas when I'm working on analog tape, I'm not. Instruments sound so big and full when they're recorded digitally; there's nothing cancelling anything else out. The sounds are all there."

Omartian goes on to explain his point by referring to an old Paul McCartney and Wings song, "Someone's Knocking at the Door," which was recorded analog, but comprises only about three or four instruments to produce a huge sounding recording. "If I had done that track, I would have been tempted to load up the track with overdubs, because I

would have heard other parts to put on it. Now digital forces me to think along the same lines as McCartney when he produced "Someone's Knocking." I'm looking at the track much more simplistically, and I extract more from the individual parts; each instrument 'speaks' more.

"The first tune I did for Donna, 'Eyes,' had only three instruments in it, and I felt badly about putting anything else on top of what is already there."

The original production gameplan for Summer's album was mapped out during the final days of the Rod Stewart project, and Omartian had felt that some of the energy he was experiencing with Stewart would complement Summer's style very nicely. "Donna

and I had talked about making her music a little harder. Her previous albums with producer Giorgio Moroder have been synthesizer-oriented for so long that she's become known for that type of sound. I wanted to take some of the feel and power we had with Rod's project — like some more rock-and-roll guitar influences — and inject them into her music."

Sometimes, transferring stylistic guidelines from one artist to another is like forcing a round peg in a square hole. Now that the songs sound as big and full as they do with only a couple of instrumentals, Omartian is "hearing" guitar overdubs on only one or two songs. "The song 'Eyes' is a little more rock-and-rolly, but I think it would be a disservice to Donna to go *too* far in that vein, because I don't think it will work.

"The first impression that comes to mind is that the songs would be more New Wave sounding, and I think forcing her to sing that way would be a mistake. Donna has too much facility in her voice to try to restrict her vocals, and when we're writing the songs together, she dictates a lot of direction. She prefers the R&B material, and that gives her the opportunity to really rip. We have to give her the space and freedom to do it."

Omartian's current overdub philosophy is tending toward keeping the songs just as sparse as "Eyes." He plans to hire a Fairlight CMI and a good programmer to lay down some unusual overdubs, as opposed to conventional fills and doodles. "I don't want to try to emulate strings or trumpets, or things like that. And after a couple of days of overdubs, it's easy to get exasperated and fall into the attitude of: 'Well, it needs something in the second chorus; let's put in a string line playing one note, and it will lift the track.' I want to be a little more original than laying down the obvious parts that people always seem to fall back on."

Songwriting and Arrangements

At this point, a word about the writing process might be in order, because it also influences the way the album is being recorded. Omartian sets up his synth rack with drum machine and keyboard, and proceeds to lay down a drum track and a basic synth part. The demo usually has a synth bass line added for fullness and feel to complement the drum machine. The only difference on the final tracks is the fact that Omartian brings in a drummer to lay down the whole kit sound, and sometimes a bass player to liven up the bass.

"Except for occasional horn sessions, I really haven't done a traditional chart since I don't remember when," he concedes. "We don't write out anything for the musicians at all. We just go through the song a few times, and they've got it. Sometimes they make up the parts themselves; other times when Donna and I do the demo, all the parts are already there."

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Most of the writing was done in Lion Share's Studio B, and at Omartian's personal-use studio in his Beverly Hills home. After the basic tracks were cut digitally at Lion Share and United Western, the production team returned to Omartian's studio to record the vocals and a few of the instrumental overdubs.

"The pace of the project has been pretty relaxed," Omartian says. "Donna has been doing a lot of traveling, and she bought a ranch in California that she and her family are working on. Overall, there has been no intensity in terms of pressure from the record company to have the album done tomorrow. I really like what we've been doing, and the way we've been doing it. The project will reflect that attitude."

To facilitate the sessions in Omartian's studio, which is outfitted with MCI analog multitracks, Guess had to

make rough mixes of the digitally recorded basic tracks and lay them onto an analog multitrack at United Western. In turn, those analog tapes are played back on Omartian's equipment, and Summer's vocal tracks overdubbed in the analog domain.

"I'm not sure at this point how we'll eventually mix the album," says Guess, "but I'll probably make a composite of the vocals on the analog here for a master vocal, and then mix them with the digital tracks for the final stereo masters on each song. Of course, the ideal situation would be to keep all the separate analog vocal tracks, interlock the analog and digital multitracks via SMPTE, and then bounce the vocals to a composite track on the Mitsubishi 32-track."

Overdubbing to Analog-Quality Mixes

Once the basic tracks have been recorded digitally on the X-800, one would think that on a psychological level, the quality of the rough mixes on analog tape would affect the overdub process, but Omartian states it is not really a consideration. "We know the quality of the digital tape, and that the analog sounds different. In addition to the change in sonic quality of the digital tape, John has also taken eight or nine tracks of drums and mixed them down to two. So we don't come into this studio expecting the rough analog mixes to

blow us over like they did on the digital tape. We're just overdubbing to something that sonically doesn't sound as great; it's not a real handicap."

"The primary objective," adds Guess, "is to get a mix that is not going to bother you during overdubbing. If you do a poor mix with some strange quirk, you'll have to suffer with it during the entire overdubbing process."

"We get the best mix we can under the particular circumstances," Omartian continues, "and then everybody gets used to it. Once we get away from the digital master tape for a day or two, the rough mix becomes our focus, and that's the sound we get used to. When we listen to the original tracks again, that's when we'll fall over at the great sound."

* * *

At the time of writing, vocal and instrumental overdubs were still being recorded at Omartian's home studio, and no final mixes have been attempted. The sessions are continuing at a leisurely pace, and no completion date is forecast. In terms of how successful the project will be, only time will tell. But, with the talent of such people as Donna Summer, Michael Omartian and John Guess, and the continuing track record of the Mitsubishi digital machines, the end result should be something worth waiting for. ■■■■

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"There is no way that you can get a pure sound from using just two microphones and going direct to two-track. I've always laughed at the audiophile or direct-to-disk approach, because much of it sounds terrible. But I think it's fine that the press thinks we record this way, because it means that I have done my job."

A catchword that keeps re-appearing in conversations with Miller is: "Vision." The vision is usually conjured up during pre-production, and Miller will go to almost any length to capture it during the recording sessions.

"I'll use whatever is necessary to create the illusion and get the magic on record, as long as it doesn't impinge on the artist's creativity," the producer states. "I don't want a perfect sounding record that has had all the life taken from it in the search for technical perfection."

A recording artist himself, it is perhaps not surprising that Miller identifies heavily with an artist, and that his sensitivity permeates his production philosophy. "I had to learn engineering to enable myself to accomplish my vision," he says of his holistic approach to production. He prefers to be a jack-of-all-trades, a direct contradiction to the "theory of specialization" that seems so predominant in today's recording industry. This attitude is reflected by Miller's



— Steven Miller —

unwillingness to work solely as an engineer, and function merely as a technician. "I'm a producer that engineers," he says, "because it is easier to do it myself than explain to someone else what I'm looking for."

Miller works very hard, he says, to avoid the stale recordings found on so many of today's releases. An example of staying "closer to the initial inspiration" can be found on Mark Isham's *Vapor Drawings* album. Although the album has extensive overdubbing and layering, spontaneity was at a premium, since all of Isham's instruments remained miked and assigned through-

out the session, enabling the musician to move from instrument to instrument in search for the desired sound or emotion. Miller preferred to stay close to the spirit of the original demo that Isham had recorded, because the creative process is more direct and attuned to the original vision.

Digital Recordings

Staying closer to the vision of an artist's rendition is accomplished on some Windham Hill releases through the use of the label's modified Sony PCM-1600 digital two-track processor, an example of which is a new Michael Hedges album. Although the album was recorded live at the Windham Hill Inn, Vermont, according to Miller it was still a fairly complex session, and utilized many studio-style techniques.

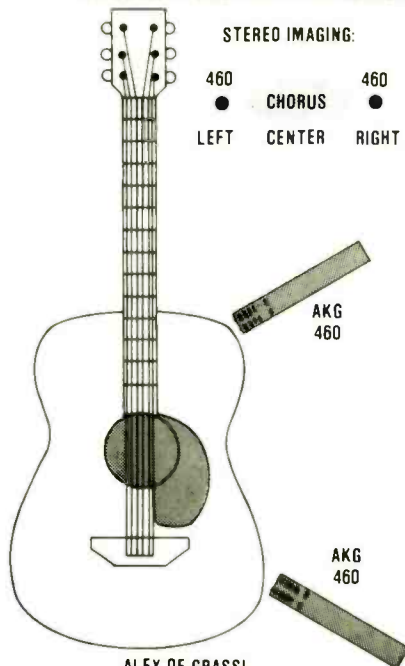
"The listening audience has become very sophisticated, and is not satisfied with dull, boring sounding recordings," he offers. "I'll take a solo guitar or piano and try to make it sound like it's 50 feet tall, or coming from the clouds."

On the Hedges album Miller achieved such affects by combining stereo miking techniques with several direct sources. As can be seen from the accompanying diagram, Hedges' acoustic guitar was miked with a pair of Neumann U87s, and received a mono and stereo pickup; a stereo chorus helped fatten out stereo pickup sound.

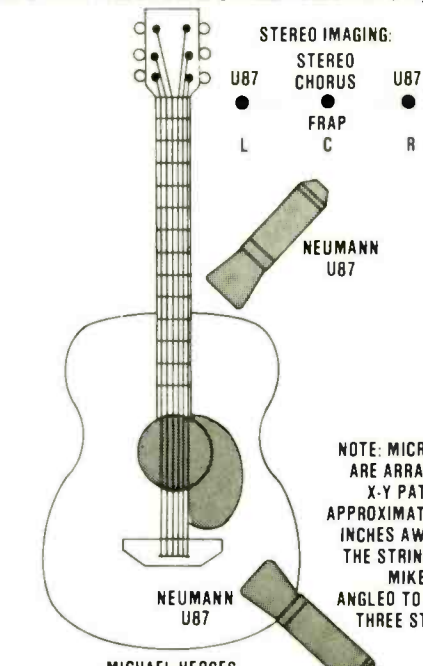
Signals were run from the Inn to the Fedco Audio Labs' remote truck parked outside in the grounds, where Miller mixed the session direct to digital two-track.

Miller, who uses no limiting or compression, and just small touches of

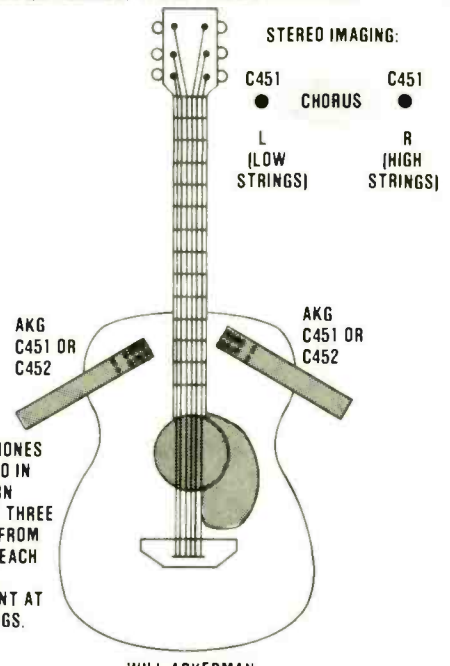
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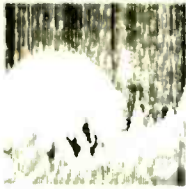
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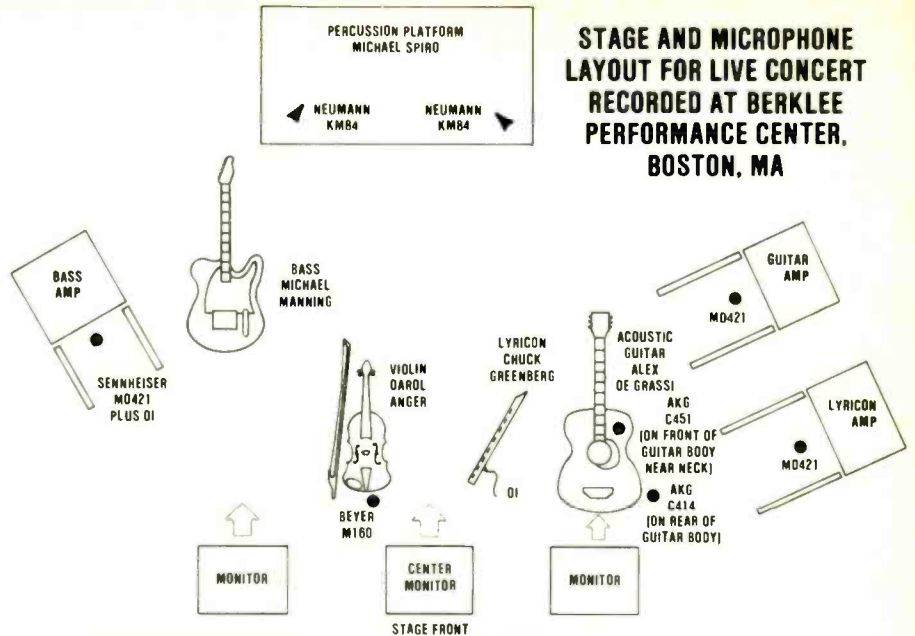
Windham Hill Records

equalization when recording acoustic sources, is not adverse to adding digital or plate reverb to achieve the degree of required space or ambience on a recording. He employs very little ambience miking in his live recording, since the delay times provided in a typical recording venue are not enough for the type of sound he's seeking.

Both Ackerman and Miller are highly committed to digital technology, evidenced by the label's recent ordering of one of the new Sony PCM-3102 DASH-format digital two-track, which should be available around the end of the year.

"I don't deny for a minute that digital has its own coloration," Ackerman concedes. "But I don't have a problem with it. Every mike, every amplifier, and every ear has its own coloration and distortion. The question is: Do you like it or not?"

Miller's feeling about digital are equally strong: "There is no question to me that digital sounds better than analog on first generation. For the type of music I'm recording, with its wide dynamics, digital is *the* way to go. For pop and rock recordings, analog and



digital are not that much different."

Although the label prefers to record digitally, analog is still used when the situation demands it. An example of this was a gathering of 10 Windham Hill artists for the *An Evening with Windham Hill Live* album, recorded live to 16-track two-inch at the Berklee Performance Center in Boston. This recent concert album represents a good example of how the label uses the Windham

Hill "umbrella" to market its artists; by having 10 artists on one album, the label can expose many different artists to one audience.

Recalling the *Windham Hill Live* sessions, Miller says the quality of the mix was outstanding. "The multitrack tapes were quieter than any studio tapes I had ever worked on," he recalls, "plus the fact that the isolation between the instruments was great, despite the fact

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that the musicians were quite close to each other. The quietness of the tape was due mainly to the fact that I used 16-track heads, and Bill Straus [Fedco crew chief] really tweaked the [MCI JH-114] machines to perfection; and when you are running tape continuously with two machines, it's important to have them sounding identical.

"In terms of tape noise, it is hypercritical to get the optimum from both the machine and the tape. To fully capture the dynamics of Windham Hill artists without limiting or compression, the majority of the music is [recorded] between -20 and -15 on the meters, so we can catch the peaks without distortion. Down there you can *really* appreciate the difference between 16- and 24-track; as a result, I use only Scotch 250 tape."

"The isolation of instruments, despite their closeness on stage and the high monitor volume — at least for acoustic music — is due mainly to the design of the hall. The music projected out into the hall, without sending a bunch of reflections back to the stage. And on some instruments [violin and saxophone] I used ribbon mikes, which are 'tighter' [offer better off-axis rejection] than any condenser I would have used."

The "Windham Hill Sound" has been variously described as acoustic instrumental folk music, classical-jazz, and laid-back Hippy music. While these descriptions have some basis in reality, the Windham Hill sound is much harder to pinpoint, and can be defined more as an ethos or a life style than a musical style, and is further enhanced by the label's creative album-cover designs.

The once grass root company has been so successful that it now has opened offices on the A&M Records lot in Los Angeles, a move that was preceded by a recently inked distribution pact between the two companies. (Windham Hill's product is now distributed with the rest of A&M's inventory through the massive RCA distribution network.)

With the strength of a major label behind it, Windham Hill is rapidly moving to the forefront of technology. With 10 releases currently available on Compact Disc, the label is reported to have a higher percentage of CD releases, in its admittedly small inventory than any other label. Miller's recent appointment to the quality control board of the New York-based Compact Disc Group — a recently established trade organization that hopes to increase the public and professional interest in CD technology — should ensure an active rather than passive role in the future of the Compact Disc.

"I have a vested interest in the future of the CD," Miller states. "Eight albums that I have produced are available on Compact Disc, and I want these and all CD releases to live up to the full potential of the medium."

"The manufacturers have a great responsibility in making the changeover from vinyl albums to Compact Disc,"

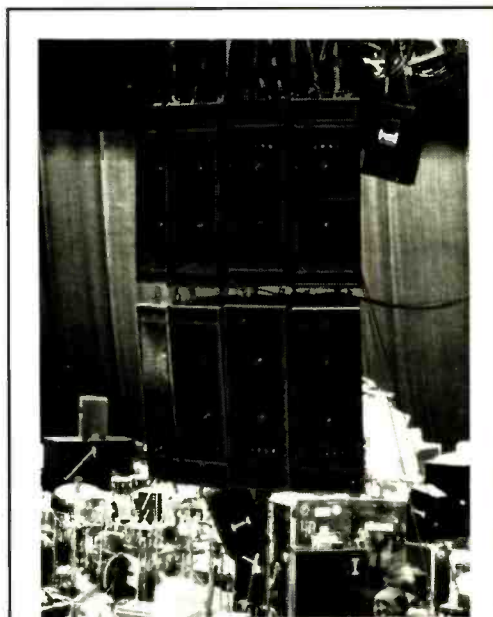
adds Will Ackerman, "and we must take care to ensure that the final product is as good as it can be."

With such emphasis on care and perfection, it can come as little surprise that the label's future is strong. Windham Hill is introducing two new labels to enable the organization to expand its musical horizons. One label will specialize in mainstream jazz, and the other — a first for Windham Hill — on vocal recordings.

"I've opened up the doors to a wider definition," Ackerman explains. "It could be anything from Cyndi Lauper to whatever, as long as it's *good*."

The little label that started as a dream is now a reality, with all the accoutre-

ments of a major label, and the Windham Hill sound has reached a segment of the record-buying public that until now had not been recognized. But the question remains: How many other musical styles and tastes go unanswered by the major labels in their search for the "Mega Artist"? How many other potential Gold and Platinum status artists wait in the wings while the majors try to clone "the next big thing?" The answers will be found in the tape libraries of other small and independent labels that are willing to walk the tightrope over the abyss to greatness or oblivion. Windham Hill is one such organization that took the chance. ■■■



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Schroeder, marketing manager for professional performance microphones, "since the SM87 provides extraordinarily high gain before feedback that permits vocalists to be heard over the loudest backgrounds."



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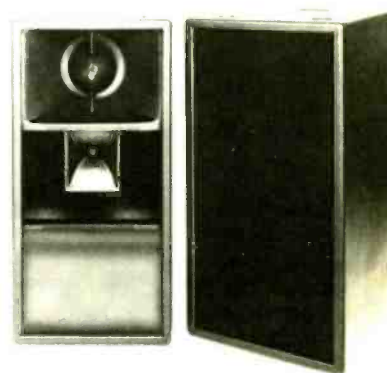
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Like other enclosures in the TMS series,

the TMS-2 uses patented TurboBass and TurboMid™ devices to cover low and mid-range frequencies. Highs above 4 kHz are handled by a one-inch compression driver and exponential horn. The TurboMid device uses a horn-loading technique that enables the proprietary 10-inch driver to cover the full midrange spectrum from 250 Hz to 4 kHz. Unlike a typical system in which two drivers of differing materials are responsible for the vocal range, the TMS-2 design is said to eliminate the midrange crossover point and its attendant problems such as phase cancellation, coloration, and uneven frequency response in the most prominent part of the sound spectrum.



The three drivers are passively crossed-over and arranged in a phase and amplitude-aligned design that is claimed to reproduce transient peaks with high accuracy.

Suggested list price for the TMS-2 is \$1,530.

TURBOSOUND INC.
611 BROADWAY, SUITE 841
NEW YORK, NY 10012
(212) 460-9940

For additional information circle #88

MODEL A100 DIRECT-COUPLED AMPLIFIER FROM NEI

In dual mode, the dual-channel A100 delivers 100 WRMS per channel into eight ohms with both channels driven. In bridged mode, its power output increases to 350 WRMS at eight ohms. A rear panel switch reconfigures the amplifier for dual or mono mode, avoiding the need for special cables and transformers.



Able to safely drive any load, including completely reactive loads, the A100 features high performance, full-complementary circuitry; independent protection on each channel; large SOA (Safe Operating Area) high-speed output devices; and high-density, computer grade, multiple parallel filter capacitors. Distortion is a quoted 0.1% THD at maximum power output, bandwidth 70 kHz, and signal-to-noise ratio 95 dB or better.

Cooled heat sinks eliminate the need for a cooling fan.

Both balanced and unbalanced inputs are provided. Output connections are made via two pair of five-way binding posts, thus ensuring compatibility with all commercial wiring schemes.

NEI
934 N.E. 25th AVENUE
PORTLAND, OR 97232
(503) 232-4445

For additional information circle #89

ORBAN LAUNCHES MODEL 8100B OPTIMOD-FM PROCESSOR

Consisting of the 8100A/1 OPTIMOD-FM plus the new 8100A/XT six-band limiter accessory chassis integrated into its circuitry, the new 8100B system's six-band limiter is said to be most appropriate for competitive pop music formats to achieve a louder, punchier and denser sound with a vanishingly low level of processing artifacts.



The six-band limiter section was derived from the OPTIMOD-AM, and is cascaded with the Orban patented distortion-cancelled multiband clipping system. The result is described as high loudness and remarkable source-to-source consistency, giving the edge to programmers who want to be aggressive in their markets and formats. Existing units may be upgraded via a retrofit kit.

Suggested list price of the Model 8100B is \$6,595.

ORBAN ASSOCIATES, INC.
645 BRYANT STREET
SAN FRANCISCO, CA 94107
(415) 957-1067

For additional information circle #90

GARFIELD ELECTRONICS "DR. FLICK" METRONOME AND CLICK-TRACK SYNCHRONIZER

The new combination digital metronome and click-track reading synchronizer for computerized musical instruments provides calibrations of 24, 25 and 30 frames per second for film and video scoring, with 1/32nd frame resolution and 0.001% crystal-based accuracy.



Doctor Flick is said to be capable of simultaneously synchronizing all brands of sequencers and drum machines through their clock or sync inputs, and produces individual triggers from audio sources for controlling drum machine trigger inputs.

The rack mounting unit also generates the

FSK sync-to-tape codes used by Roland, Linn LM-1, and Oberheim. All functions are accessed via front-panel jacks for easy interfacing to sequencers and drum machines in the control room.

Recommended list price of Doctor Flick is \$1,195.

GARFIELD ELECTRONICS
BOX 1941
BURBANK, CA 91507
(818) 840-8939

For additional information circle #91

URSA MAJOR ANNOUNCES DIGITAL REVERB UPGRADE

The 8X32-MkII, which offers increased flexibility over the original model, is said to have resulted from extensive marketing and technological research, including considera-

ble feedback from users and dealers both in the US and abroad. The new unit features four additional user-modifiable reverb programs: *Cask*, a short, colored program with a maximum decay time of two seconds; *Percussion Plate*, an uncolored program with an explosive build-up and a maximum decay of four seconds; *Chamber*, a bright program especially suited for vocal tracks; and *Reverse Reverb*, a "backwards reverb" program with a maximum decay of 20 seconds. (These programs join the original 8X32's Plate I, Plate II, Hall, and Space.)

The user still has complete control over all reverb parameters within each program, including delay and level of first reflections, time and level of initial reverberation, and length of final decay, as well as separate low-frequency and high-frequency decay. All



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69 Ship Street, Brighton, BN1 1AE
England

Allen & Heath Brenell (USA) Ltd.
5 Connair Road
Orange, Ct. 06477 / (203) 795-3594

For additional information circle #92

August 1984 □ R-e/p 135

August 1984 □ R-e/p 139

For additional information circle #108

New Products

six rotary output sends.

Output channels feature transformer-balanced outputs on XLRs; send/return patch points; four-band equalization with centers at 10 kHz, 2.5 kHz, 250 Hz, and 60 Hz; EQ defeat; mute; PFL; AFL and a 60mm fader with 12-way LED display per output.

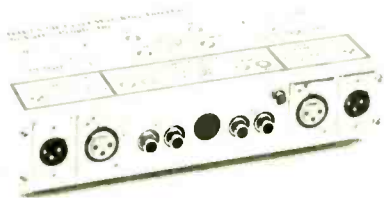
Suggested retail of the 12/6 Stagemix is \$1999.00.

HILL AUDIO INC.
231 MARQUIS COURT
LILBURN, GA 30247
(404) 923-3193

For additional information circle #109

VALLEY PEOPLE HH2x2B LEVEL-MATCHING INTERFACE

A successor to the HH2x2 unit, the HH2x2B is a complete stereo system capable of boosting -10 dB signals to a nominal +4 and +8 line-level output. A stereo attenuator section pads +4/+8 levels by 14 dB to avoid potential overload problems at the input of -10 dB devices. The new unit ensures immunity from RF pickup and hum, thanks to electronic balancing of the +4/+8 inputs and outputs.



According to the manufacturer, electronic balancing was chosen because transformers can cause distortion and ringing, and are susceptible to magnetic flux pickup. The electronically balanced outputs of the HH2x2B are said to offer extremely low source impedances, resulting in excellent waveform fidel-

ity and freedom from ringing.

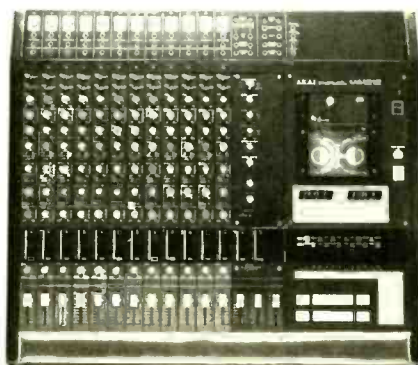
The new unit comes complete with power supply. An optional rack mount adaptor mounts one or two units in 1 3/4-inches of 19-inch rack space.

VALLEY PEOPLE INC.
P.O. BOX 40306
NASHVILLE, TN 37204
(615) 383-4737

For additional information circle #110

AKAI MODEL MG-1212 12-TRACK MIXER/RECORDER AVAILABLE THRU INTERNATIONAL MUSIC CORP.

Following an agreement between Akai Electric Company, Japan, and International Music Corporation, based in Fort Worth, the



new Akai Micro Studio System will be distributed in the US through IMC. The Model MG-1212 12-channel mixer/recorder utilizes a new SGX Lambda multihead which is said to produce a frequency response of 40 Hz to 20 kHz, ± 2 dB, and 97 dB SNR. Based on Akai's long history of advanced audio/video technology, the multitrack recorder utilizes half-inch tape in a VHS-style cassette, plus dbx Type I noise reduction. In addition, the MG-1212 has two extra channels for external control and sync circuitry. Utilizing a multi-function locator system, the MG-1212 provides real-time tape cueing in 0.1-second increments, as well as auto memory, manual memory, search and repeat playback.

Total recording time is 10 minutes at 7 1/2 IPS and 20 at 3 3/4 IPS. Each input channel features mike/line/tape switching, three-band EQ; two effects/cue busses; pan between two recording busses; and a 12-segment LED level meter.

The Akai MG-1212 recorder/mixer has a suggested list price of \$6,995.

INTERNATIONAL MUSIC CORP.
P.O. BOX 2344
FORT WORTH, TX 76113
(817) 336-5114

For additional information circle #111

CROWN MODEL 12 PZM MICROPHONE

The 12SP Pressure Zone Microphone is phantom powered by a supply providing 18 to 48 volts, and features a transformer-balanced, low-impedance output available at an integral three-pin connector; wide, smooth frequency response with high-frequency emphasis for brilliance; low noise and high overload level (150 dB SPL); hemispherical pickup pattern; high sensitivity and excellent reach for clear pickup of distant sounds. A windscreen is included for outdoor or closeup use.



In operation, the 12SP can be placed on a surface such as a floor, table, or lectern; used as a hand-held microphone; or affixed to a surface near a sound source such as the underside of a raised grand piano lid.

Suggested retail price is \$249.

CROWN INTERNATIONAL
1718 W. MISHWAKA ROAD
ELKHART, IN 46517
(219) 294-5571

For additional information circle #112

HAFLER INTRODUCES P220 POWER AMPLIFIER

Capable of delivering 175 watts per chan-

What you see is what you get...

For a catalog and a list of over 60 dealers in the USA and Canada, contact J. G. (Jay) McKnight at:

Magnetic Reference Laboratory, Inc.
229 Polaris Ave., Suite 4
Mountain View, CA 94043
(415) 965-8187

Exclusive Export Agent: Gotham Export Corp.,
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MRL Calibration Tapes are designed and supported by experts in magnetic recording and audio standardization... we helped write the standards. Each tape comes with detailed instructions and application notes.

The MRL catalog includes tapes for all studio applications. In addition to the usual spot frequency tapes, we make single-tone tapes, rapid-swept frequency tapes, wideband or 1/3rd octave-band pink random noise tapes, and difference-method azimuth-setup tapes. Most are available from stock.



Tape Fluxivity Level re Value in Table (overleaf) / dB

nel into a 4 ohm load, the P220 is rated at less than 0.04% THD from 20 Hz to 20 kHz with both channels driven. In the bridged mode, it is capable of delivering over 350 watts into an eight ohm load.

The new amplifier uses a push-pull complementary symmetry circuit design that employs MOSFET output devices, thereby eliminating the need for complex, expensive protection circuitry which can degrade sonic performance. It does, however, contain an AC line current in-rush limiter, a protection relay for DC offset, and a turn-on delay to protect loudspeakers from switching transients.



On the P220's rear panel are five-way heavy-duty binding post output connections; input connections via barrier strip, XLR connectors, and two sets of 1/4-inch phone jacks in tandem; both circuit and chassis grounds, as well as provision for balanced or unbalanced inputs, and a mono/stereo switch.

For cooling, the amplifier is equipped with an automatic three-speed fan and specially designed cooling tunnel which ensures cooling of the entire amplifier. Thermal circuit breakers for each channel automatically shut the amplifier down should it become overheated.

Fully assembled, the P220 has a recommended price of \$599.95; partially assembled it costs \$524.95.

THE DAVID HAFLER COMPANY
5910 CRESCENT BOULEVARD
PENNSAUKEN, NJ 01809
(609) 662-6355

For additional information circle #113

**INOVONICS INTRODUCES
STEREO AUDIO LEVEL METERING
FOR VIDEO DISPLAYS**

Connected in-line with a video monitor, the new TVU inserts a black box in the picture with a pair of vertical bars that represent stereo audio levels. Properly designated scales match the switchable VU (with peak flasher) and PPM response modes that conform to appropriate standards. The audio box may be positioned anywhere in the picture, reduced to a mono display, or bypassed altogether.

The unit is self-contained and easily mounted to the side of a monitor, inside an equipment rack, or rack-mounted in 1 3/4 inches of space with an accessory panel accommodating one or two devices. With eight-bit digital conversion, the TVU features 0.25 dB resolution around zero-VU. The unit is transparent to composite video, and has separate inputs for both balanced studio lines and single-ended equipment.

Professional user price of the TVU is \$500.

INOVONICS, INC.
503-B VANDELL WAY
CAMPBELL, CA 95008
(408) 374-8300

For additional information circle #114

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THE CONNECTION
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For additional information circle #117

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West Redding, CT 06896
(203) 938-2588

Name _____
Company _____
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For additional information circle #118

New Products

DYNAMIX D3000 MIXER FROM AUDIOTECH

The modular 3000 Series is available in various frame sizes to accommodate up to 16, 24, or 32 input channels. Sub-group output formats of 8 or 16 busses, plus two master output, are featured. Flight cases are also available for road uses.

Each input channel features switchable 48-volt phantom powering and microphone phase reversal. Equalization is four-band with a 15 dB cut or boost on all bands. Two overlapping mid-band parametric controls provide a continuous sweep facility from 100 Hz up to 10 kHz. Each input and output module has a separate insert point with individual send and return levels. There are also two pre-fade and two post-fade auxiliary busses.

Metering is provided by 25-segment LED bargraphs, switchable for VU or PPM response. All inputs are equipped with peak LED indicators.



The 3000 series is equipped with PFL monitoring on each input module and sub-group, each with its own status indicator. Talkback circuitry is standard.

AUDIOTECH
96 LAFAYETTE AVE.
HAWTHORNE, NJ 07506
(201) 423-4404

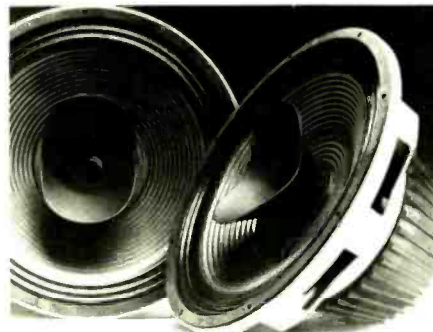
For additional information circle #119

GAUSS INTRODUCES MODEL 3588 SPEAKER

"The new Gauss 3588 is the first computer-designed coaxial," according to Peter Horsman, director of marketing. "But, we know

computers can't hear, so we used a panel of 'golden ears' at the Fall AES to help determine the final sound of the loudspeaker."

The new model features a conservative power rating of 200 watts RMS, and has been tested to continuous program levels of 750 watts. Quoted metric sensitivity is 95 dB for low frequency, and 109 dB for high-frequency ranges.



Because of the proprietary design parameters, both drivers are located in virtually the same acoustic plane, well within the Blauert and Laws criteria, thus eliminating the need for time compensation networks. The new coaxial is designed to work with any standard professional-quality crossover.

A new Computer Aided Time Spectrometry program was developed by Walter Dick, Cetec transducer engineering director, which was used to design the unique *cosh* horn for the coaxial. This design is said to provide an extremely stable image, reduced second harmonic distortion, and virtually no mid-range shadowing.

CETEC GAUSS
9130 GLENOAKS BLVD.
SUN VALLEY, CA 91352
(213)875-1900

For additional information circle #120

TWO NEW SCAMP MODULES FROM AUDIO+DESIGN

The Scamp S30 Expander/Gate features: hold circuit; log/anti-log release network; 60 dB attenuation range; pre-emphasis in side

chain; key input; variable expander/gate slope; and computer-control mute input. The slope/ratio control runs from 1:1 through the range of 1:1.2 to 1:3 into the gating range, 1:4 (soft) to 1:20 (hard).

The range control, while being manually set, will also vary automatically with the slope/ratio selected according to the theoretical *maximum* for that ratio. In the gating modes, a maximum of 60 dB attenuation is possible, reducing to 12 dB on a slope of 1:1.2. Threshold can be varied +12 dBm down to -50 dBm; in addition, the side-chain can be pre-emphasized by up to 12 dB in the HF or LF for frequency-selective expansion/gating. Attack time has three switched positions for 0.01, 5, and 40 milliseconds. Release time has an anti-log mode that speeds up as attenuation increases. The standard release time ranges from 25 milliseconds to four seconds, and incorporates a hold facility variable from zero to two seconds.

The S31 Compressor-Limiter features: ratios of 1:1 to 20:1 (continuously variable); separate limiter threshold; side-chain access; computer-control mute input; threshold down to -50 dBm; and selectable log/lin release. A separate Feedback Peak Limiter can be moved by an indexed 20 position threshold pot over a range of 20 dB from 0 dBm to +20 dBm. The limiter has an Auto-Attack and Release function, and operation is indicated by a single red LED.

The Feed-Forward Compressor has lines ratios continuously variable between 1:1 and 20:1. The threshold control can be operated from +12 down to -50 dBm. Release time is switchable for a Log or Lin response; attack time has three switched positions of 0.3, 2.5, and 25 milliseconds. Make-up gain is via a 20-position indexed pot that will compensate for gain reduction from unity to 30 dB.

The system can be by-passed as well as switched for side-chain access by an equalizer.

AUDIO+DESIGN/CALREC, INC.
P.O. BOX 786
BREMERTON, WA 98310
(206) 275-5009

For additional information circle #121



Simply The Best

Gatex proves that sophisticated signal processors don't have to be expensive or hard to operate. This four channel noise gate/expander affords the user intuitive application with the support of unsurpassed circuit design. And, it sells for about the same price as many single channel noise gate/expander units.

Gatex's low sales price is not achieved through use of antiquated circuitry or by elimination of control functions. To the contrary, Gatex offers state-of-the-art features accompanied by the latest advances in audio electronics to depend-

ably deliver the desired end result time after time.

To obtain fast release times with freedom from dynamic distortion, there's **Program Controlled Sustain**, which automatically lengthens release times as dictated by program content. **Program Dependent Attack** is employed in the Gatex to shorten attack time automatically when required by program content.

Gatex's gating and expansion slopes are optimized to allow the unit to perform noise gating

on the entire range of percussion instruments or to deliver a dramatic increase in dynamic range and attenuation of unwanted noise. The inclusion of Valley People's TA-104 VCA in Gatex ensures that no noise or distortion is ever added to the signal being processed.

Gatex... Simply the best!

USAudio

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Company _____

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City _____ State _____ Zip

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- Recording Studio Sound Reinforcement
- Producer Sound Contractor
- Other _____
- 4) Which of the following describes the functions you regularly perform?
- Owner/Manager Producer
- Mixer Disc Cutter
- Maintenance Engineer Remote Recording
- Video/Movie Recording Sound Reinforcement
- Production Quantity Tape Duplicating
- Other _____

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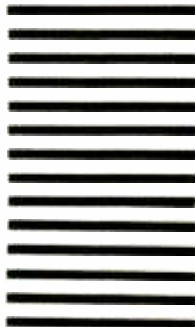
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Address other correspondence to P.O. Box 2449, Hollywood, CA 90028.

News

SOUNDCRAFT SERIES 4 CONSOLES FOR ELECTROTEC

The two series 4 mixers — a 40/8 stereo front-of-house board, and a 40/16 monitor console — were custom made for Electrotec Productions, Canoga Park, CA, in the unique blue color the sound company is known for, and were used on a recent Lionel Richie tour.

Electrotec also handled a recent renovation on the sound system at The Palace, Hollywood, using all Soundcraft boards.

•In a related development, Design Direct Sound was selected by Electrotec Productions to build custom mid-range horns for the company's main tour cabinets. Riki Farr, Electrotec president, says he chose DDS because of its fine construction techniques, including an exclusive spun glass-fiber process for added strength. The new horns are intended for use on the Rod Stewart and Air Supply tours this summer.

COMPUSONICS PATENT APPLICATION IS ALLOWED BY US PATENT OFFICE

The US patent application filed for the CompuSonics professional and consumer digital audio recording and playback system [see June issue; page 165]

has been allowed by the United States Patent Office, according to company president David Schwartz. The Notification of Allowance covers all claims filed by Schwartz on behalf of the system. All claims now being allowable, the US Patent Office has determined that prosecution on the merits of the application is now completed. All that remains is for the Patent Office to grant the official patent for the invention, the issuance of which is expected to be forthcoming. Extensive foreign patent filings have been made for the same digital audio recording/playback system, and they are currently pending.

DIGITAL ASSOCIATES TO RENT MITSUBISHI DIGITAL MACHINES

Newly-formed Digital Associates, based in Nashville, has selected Mitsubishi X-800 32-track and X-80 two-track machines as the only line of digital recording equipment it will rent, according to company principals Rick Horton and Mike Poston.

"In order for Nashville studios and production houses to maintain their status within the industry, we feel a vital need for digital technology to be more readily available," says Horton. "The Mitsubishi systems offer superior audio quality, and the reel-to-reel-based format is familiar to engineers, who are used to working with analog tape."

According to Tom Behrens, mid-America regional manager for Digital

Entertainment Corporation, "Interest has been so positive in Nashville that we expect the 32-track to be rented as soon as it arrives here in July. Digital Associates already has rented the X-80 in the first week on just word-of-mouth alone."

More information may be obtained from Digital Associates, PO Box 422, Spring Hill, TN 37174. (615) 256-4487.

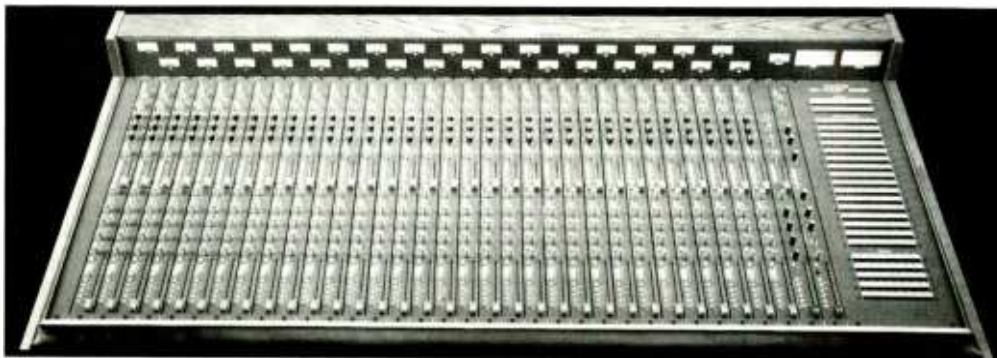
SPARS AUDIO EDUCATIONAL PROGRAMS

The Society of Professional Audio Recording Studios has set up three programs to provide assistance to audio engineering students. During the past year, the SPARS board of directors has participated in interface days with audio engineering students at the University of Miami, and The University of Colorado at Denver. The interface days provided an opportunity for students and faculty to discuss with active professionals the kind of preparation necessary for obtaining employment in the audio engineering field, including recent technological developments, the skills required in the industry, and the ever-changing nature of the recording studio business. SPARS plans to make interface days available to those schools interested in dialog with the professional recording community.

SPARS' president, Jerry Barnes of United Western Studios, Los Angeles, noted the society's concern with provid-

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Mogadore, Ohio 44260
216-784-8022

August 1984 □ R-3/p 145

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For additional information circle #124

GT-4 NOISE GATE

Discover the remarkably simple optical noise gate that contributes no noise or distortion, occupies 1-3/4" of rack space and costs only \$425.00 for four channels.

For more information and a list of dealers call or write

OMNI CRAFT INC.
RT. 4, BOX 40
LOCKPORT, IL
60441
(815) 838-1285

For additional information circle #125

R-e/p 146 □ August 1984

News

ing the "real-world" component of audio engineering education: "We have developed a three-level internship program to provide the serious audio engineering student with regular and continuing exposure to professional situations."

The three-level program begins after the student's second full year of study with a day spent in each of four or five professional studios. At the second-level, after three years of study, the student will observe three studios for a period of three to four days. The purpose of the second-level is to allow the student and the studio to determine a proper match for the third-level, a 10- to 15-week working internship in one of the SPARS member studios.

The third SPARS program will facilitate entry into the job market for the audio engineering graduate. SPARS will publish, twice a year, a resume book of those individuals seeking employment in the audio recording industry. The book will be distributed to SPARS studios and other studios that request a copy.

Schools and individuals interested in participating in any of the educational programs should contact SPARS, Box 11333, Beverly Hills, CA 90213.

SOUNDCRAFT SETS UP JAPANESE SUBSIDIARY

According to Philip Dudderidge, sales and marketing director of Soundcraft Electronics, "The ever increasing demand for Soundcraft product on a worldwide basis, and particularly in Japan, has led us to establish a sales and marketing company to serve their country exclusively. The establishment of Soundcraft Japan in March of this year, in addition to the opening of our New York office in the US in June, serves to illustrate our continuing commitment to our product and dealer network on a worldwide basis."

Hibino Electrosound, Inc. will continue to be the main distributor in Japan. Key personnel are Takashi Saito, president; Minoru Kobayashi, sales and marketing director; and Ryoji Shibahara, financial director.

The new company address is: Soundcraft Japan, Ltd., 4F Yoyogi-Living 12-21 Sendagaya 5, Shibuya-ku Tokyo 151, Japan. (03) 341-6201. Fax: (03) 341-5260.

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... continued on page 150 —

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News

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sell both Calrec and A+D products world-wide.

The new company will trade as Audio+Design/Calrec, Ltd., and will be based in Pangbourne, England. Howard Smith is appointed managing director, and will head the existing ADR marketing team. A+D/C will handle the substantially increased range of standard product now being offered by Calrec, which will continue to handle custom broadcast mixers on a direct basis to existing UK clients.

According to Smith, "The new Calrec music recording console [the first of which was supplied to Polar Studios — see "Studio Update"] represents a design break-through in operational terms, as well as leading-edge music quality."

American Sales associate company Audio+Design/Calrec, Inc. continues to be headed by Nigel Branwell, who will be working in close collaboration with the new UK-based company.

— News Notes —

Sprague Magnetics, which recently expanded to a new 3,000-square-foot facility, has been named a distributor of Ampex tape machine replacement parts. The company's new address is: 15759 Strathern Street, Van Nuys, CA 91406; the telephone number remains unchanged at: (818) 994-6602 . . .

Audiotech Acoustics, based in Toronto, Canada, has changed its name to **Group One Acoustics, Inc.** The majority of the company's previous projects have involved a variety of studio designs and alterations. The company address remains: 4 Budgell Terrace, Toronto, Ontario, M6S 1B4. (416) 769-9641 . . . **Malcolm Hill**, a leading UK-based concert-sound company, purchased 50 Emilar Model EC-320 high-frequency drivers and 50 Model EH-820 horns for the European tour of AC/DC. . . Also, **Flag Systems**, Orange, California, the contractor responsible for sound reinforcement at the Kool Jazz Festival, has specified Emilar loudspeaker components for the live-performance system. . . Company president John H. Roberts reports that **Phoenix Systems, Inc.** has relocated from Manchester, where its shared space with Phoenix Audio Laboratory, Inc., to new quarters in Tolland. Phoenix Audio has expanded into the

VISUAL MUSIC SCENE

— continued from page 36 —

California] don't seem to have VCRs. I suppose they go to the movies a lot. Because of the climate, they also tend to spend a lot of time out in the evening. There doesn't seem to be the same penchant here for actually recording TV programs, or even for watching video at home at the weekend.

"Everybody says that the home market is going to grow and grow and grow; I don't think they know *why* it's going to grow. I think it's a mere case of people just reassuring themselves and their backers that the industry is going

newly freed up Manchester location. For more information contact: Phoenix Systems, Inc., 71 Old Farm Road, Tolland, CT 06084. The company's telephone number remains unchanged at: (203) 643-4484 . . . the Studio Division of Studer Revox America, Inc. has announced the addition of three new dealers: The Audio Broadcast Group of Grand Rapids, MI; Research Associates, Inc. of Colorado Springs, CO; and Audiotechniques, Inc. of New York City and Stamford, CT. Studio products sold through the dealer network include the A810 recorder, A710 cassette deck, A80VU multi-track recorder (four- and eight-track), and 2706 monitor speakers. Also, the Studer A725 professional Compact Disc player will soon be available exclusively through Studer dealers . . .

Klark-Teknik Electronics has appointed **Associated Sales Representatives**, 8969 Yellow Brick Road, Baltimore, MA 21237, (301) 574-0550, to represent the Klark-Teknik and Brooke Siren product lines in Virginia, Washington DC, Maryland, Delaware, Eastern Pennsylvania and Southern New Jersey. Phil Walter, president of ASR will oversee the operation of his staff, including Carey Kress and Ed Portko. In a related move, company president Jack Kelly announced the appointment of **Audio Resources**, 778 Burr Oak Drive, Westmont, IL 60559, (312) 655-1180, as the Klark-Teknik and Brooke Siren representatives for Indiana and Kentucky. . . **Bruel & Kjaer** has released a new, 10-page booklet on the use of its 4000 Series omni microphones. The booklet contains many suggestions on mike positioning, and covers vocals, acoustic piano, percussion, strings, wind instruments, guitars, and drum applications. Copies are available free of charge from B&K sales offices. ■■■

— People on the Move —

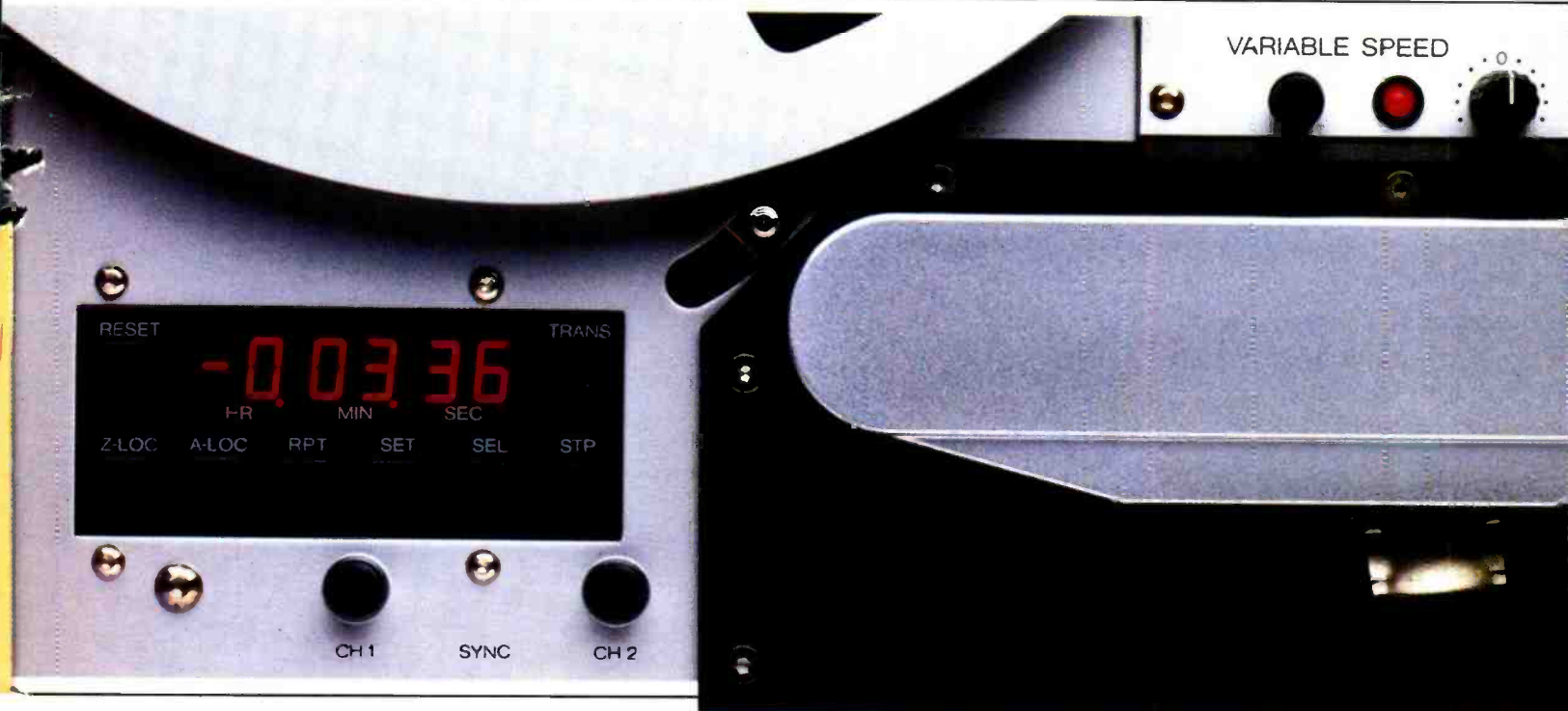
• **Keith Worsley**, formerly of Lexicon, has been named national sales manager for **Klark-Teknik**, according to company president Jack Kelley. Worsley will be responsible for new product introductions, and dealer and sales representative training. His duties also will include generating feedback from the pro-audio market for new product development.

• **Richard N. Macleod** has been named as president of **Biamp Systems, Inc.** One of the original company founders, MacLeod most recently served as vice president and director of engineering, with primary responsibility for the design and development of new products. Before co-founding Biamp in 1976, he was vice president of engineering at Sunn Musical Equipment, and previously worked as an engineer with Tektronix Inc. ■■■

to be there, and that they should continue to invest in it. I really don't know though.

"Gut feeling says it should get bigger and bigger, but it is completely an unknown quantity. The thing *could* burn out. Goodness knows, the record companies are having enough trouble selling albums and audio cassette. And given the price at which some video concerts and promo clips are retailing, I'm amazed that anybody is buying them — especially when you can tape it off MTV. The same thing applies to picture as it does to sound, doesn't it? What part is home taping going to play in this? That's the gremlin in the machinery. ■■■

Swiss Audio: Technical Evolution



On adding time-saving production features to a proven audio recorder design.

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Fast find modes. Press the address locate button and the PR99 MKII fast winds to your pre-selected address, which may be entered from the keyboard or transferred from the counter reading. Press zero locate and it fast winds to the zero counter reading. In the repeat mode, the PR99 plays from the lower memory point (zero or negative address) to the higher point, rewinds to lower point, and re-acti-

vates play mode for a continuously repeating cycle.

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Future perfect. The PR99 MKII also offers a serial data port for direct access to all microprocessor controlled functions.

Much gained, nothing lost. The new MKII version retains all features of its highly regarded predecessor, including a die-cast aluminum chassis and headblock, balanced and floating "+4" inputs and outputs, self-sync, input mode switching, and front panel microphone inputs.


European endurance. Designed and built in Switzerland and West Germany, the PR99 MKII is a product of precision manufacturing and meticulous assembly. Every part inside is made to last.

To discover more about the world's most versatile and dependable budget-priced recorder, please contact: Studer Revox America, Inc., 1425 Elm Hill Pike, Nashville, TN 37211; (615) 254-5651.

STUDER REVOX



PR99 MKII with optional carrying case and monitor panel. Full-around console also available.



"This new microphone is fantastic. I've never used a microphone that made me sound so much like me."

Melissa Manchester

"It's my favorite mic. It gives me a warm, smooth, rich sound and I can get breathy when the song calls for it."

Lee Greenwood

Shure introduces the perfect complement to a singer's voice. The new SM87 Crowd Pleaser.™

Here's the microphone soundmen everywhere are talking about. And we're not surprised—we worked closely with top sound engineers to perfect our new SM87. It's a studio-quality supercardioid condenser mic with Shure's legendary road mic ruggedness.

A sound solution to feedback. A revolutionary new cartridge element is the heart of the Crowd Pleaser.™ Its highly directional supercardioid polar pattern rejects unwanted sound bleed and allows an astonishing amount of gain before feedback. This enables the SM87 to perform flawlessly, even in high gain, multiple-monitor situations.

Natural sound all across the board. The extremely smooth response characteristics of the SM87 offer soundmen tremendous flexibility at the mixing board. Its vocal contoured response permits quick, easy equalization (many engineers think it needs no equalization). The SM87 provides incredibly accurate voice reproduction across the entire frequency spectrum.

A workhorse that handles like a dream. The Crowd Pleaser performs smoothly when other mics

get the shakes. The exclusive Shure elastomer "space frame" shock mount isolates the capsule from virtually all hand-held and mechanical vibrations. And the built-in multi-stage filter minimizes popping and wind noise.

Built for a world of hard knocks. The SM87 will withstand years of use (and abuse) because it's "tough tested" to meet Shure's worldwide reputation for ruggedness and reliability. What's more, the SM87 far exceeds normal specs for resistance to temperature extremes and humidity. Ask someone who owns a Shure mic and you'll know what we mean.

Get on the bandwagon. The coming decades belong to the SM87. To find out why, call or write for our free brochure. Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.

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