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APRIL 1985
VOL. 11 NO. 4

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**24 PHIL COLLINS:
NO JACKET REQUIRED**
by Susan Borey
Artist/producer Phil Collins is a man who has done just about everything when it comes to the recording industry. For starters, he was the front man for the highly acclaimed Genesis. He has collaborated on projects with such people as Peter Gabriel, Brian Eno, and Robert Plant. In addition, he has produced such artists as Adam Ant, Frida (ABBA), and Eric Clapton to name only a few. *MR&M* was lucky enough to catch an opportunity to speak with Phil about his new album, *No Jacket Required*, his method of songwriting, pre-production recording, and his theories on videos and their relation to music. So come along and learn a little something from Phil Collins' great and varied experience.

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Cover and spread photos (p. 24) are courtesy of Atlantic Records.

MODERN RECORDING & MUSIC

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Letters

The Best Man For a Job...

I just finished reading your column, *Sound Advice*, in the November issue and had to write to you. The interview with Steve Fisher was excellent and covered a lot of good points. The one point that hit home was on female sound mixers in the clubs. I'm a female who has been mixing sound in the clubs in Florida for over 7 years and I have not yet come across another female running sound in the clubs. It has been exceptionally hard to keep steady work as most guys feel that a female just can't do the job. I love working the club circuit and would eventually like to go on to larger places as most clubs in Florida are small. I would also like to be able to travel outside of the state of Florida. So I keep pushing and taking every job no matter how small or underpaid to keep on proving that I can do the job better than about 75 per cent of the people that call themselves soundmen. As I'm basically self-taught, it has been your magazine that has taught me the most. Every time I come up with a new situation I can usually find an article you've printed that helps me out. Thanks for being there when needed and thanks for coming up with *Sound Advice*. It's the best column you could have come up with!

—Sharon Katrenics
Tampa, Fla.

Gee, Sharon, we at MR&M are blushing again. Thanks for your extra kind words of praise. We passed on the word to columnists Susan Borey and Mark Oppat who couldn't be more pleased. We were also glad to hear about a woman sound person striving to get ahead. Keep going cause we have a hunch that you're going to make it!!! We wish you all the best in your career and we'll keep on running those helpful columns and articles!

Twilight Zone

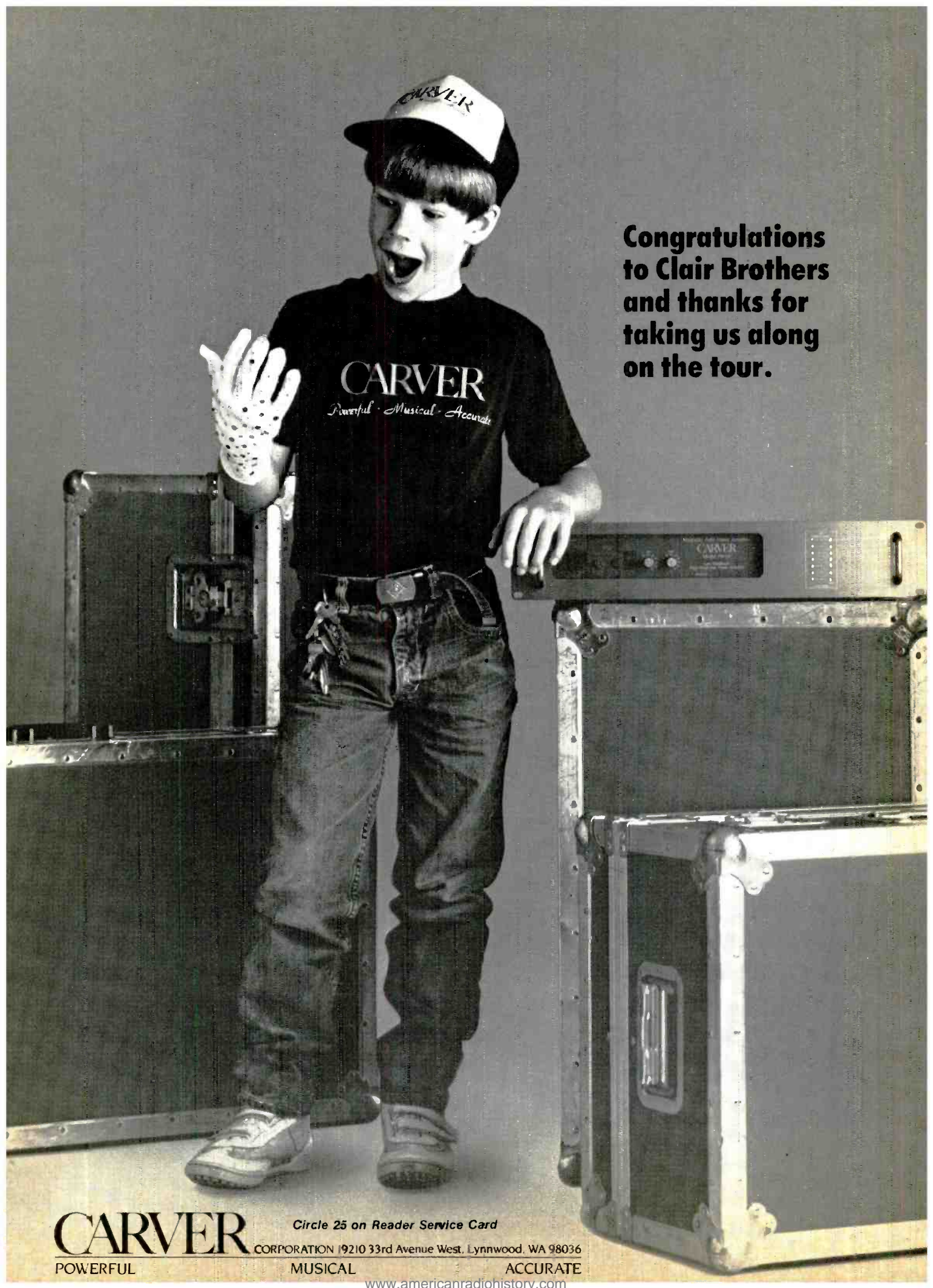
If there was such a thing as "negative sound," would positively measured dB become -dB? Or would it become -Bd?

—R.B.
Providence, R.I.

Now, a word from our technical editor, Jim Corona...

Firstly, I'm not Rod Serling. Secondly, I didn't know if it would be entirely wise to print such a questionable statement. I feel that this letter might be more appropriate in a science magazine forum. I do, however, have one small comment on this topic; If we are speaking of an inverse plane of existence, being from our own plane, wouldn't we still measure sound, light, or any other measurement on our own terms positive or negative? Please send rebuttals to the attention of Jim Corona, Technical/Twilight Zone Editor, c/o MR&M.

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Dear MR&M,

My question is in regard to an article in the Nov. 1984 issue of MR&M. The article was entitled Headphone Distribution Systems by Rick Chinn. Where did Mr. Chinn get the figure "0.0195" for the power value when in the text the power was stated as being "19.95 mW or 0.01995 (.02 W)??

—Jibby Jacob Chacko
Singapore, Malaysia

Good Question!! First MR&M would like to apologize if this error has inconvenienced anyone and we would also like to apologize to Rick Chinn because we found that the error was our mistake. So here's the correction,

A)

$$E = \sqrt{P \times R}$$

$$E = \sqrt{.01995 \times 2000}$$

$$E = 6.32 \text{ volts}$$

B)

$$\text{dBm} = 20 \log \frac{E}{E(\text{ref})}$$

$$\text{dBm} = 20 \log \frac{6.32\text{v}}{.775\text{v}(\text{ref})}$$

$$\text{dBm} = 20 \log 8.15$$

$$\text{dBm} = +18.12$$

C)

$$P = \sqrt{E \times R}$$

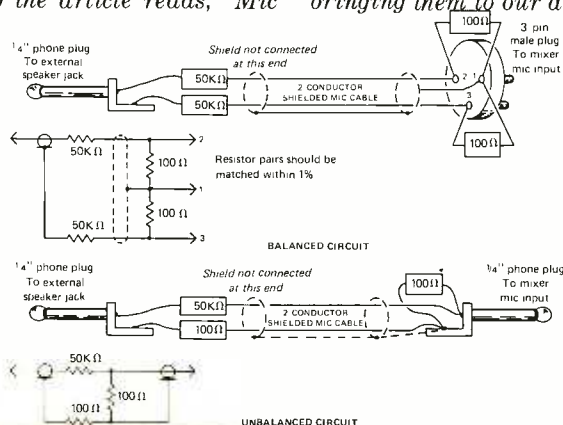
$$P = \sqrt{6.32 \times 8}$$

$$P = \sqrt{50.56}$$

$$P = 7.11 \text{ Watts}$$

Editor's Note: Bruce Bartlett has brought some unfortunate errors to our attention from "Recording Techniques" in the February '85 issue of MR&M. Under the heading of Grand Piano, the article reads, "Alternatively, try a Crown PZM taped to the outside of the lid, in the middle." It should be taped to the underside of the lid. Also, under the heading of Free Special Effects (in the Equalization section) the article reads, "Mic

close with cardioid microphones for a brassy tone." It should read "for a bassy tone." And finally with regrets from our illustrator as well as the rest of us, in Figure 1, the unbalanced circuit, the shield should be connected to the right side 1/4-in. phone plug ground. We humbly apologize for the possible inconvenience that any of these errors may have caused. We would also like to thank Bruce for bringing them to our attention.



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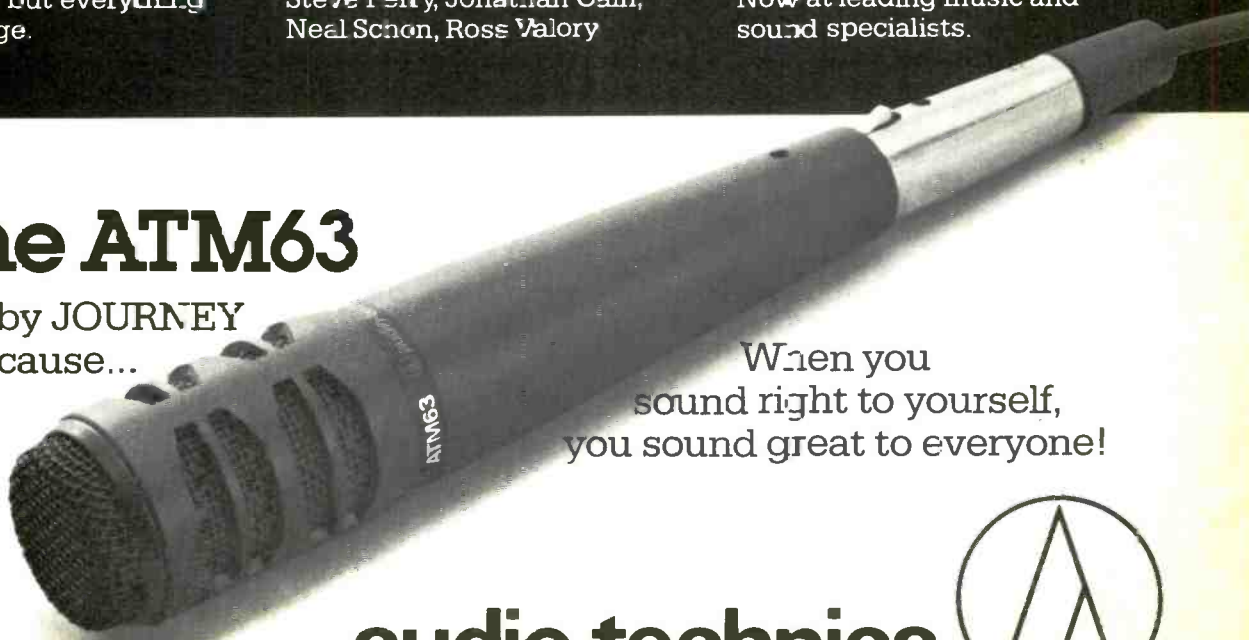
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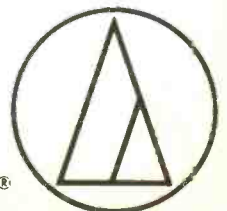
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Talk Back

In responding to Charles Ray Allen's questions about level calibration, I believe that Bruce Bartlett missed two important points about this procedure. I'm sure that Mr. Bartlett is quite aware of these points, but he seemed to overlook them in his reply.

First, while Mr. Bartlett did mention that the dbx-encoded signal at the recorder will cause the meter to "move" less than at the console, I have found that the compression of the dbx process makes using the console's meters for level-setting quite difficult. In a system (like Mr. Allen's) where the dbx signal is simultaneously encoded and decoded on either side of the recorder, the console output meters will always read higher than those on the tape recorder. Likewise, any meters connected to the dbx decoder outputs will also read higher than the tape machine. In our (inline) system, we monitor **ONLY** from the tape recorder (decoded dbx), and consequently must be able to look at the recorder to set levels—even though the system has been calibrated for complete coherency with a 1kHz tone.

My other observation concerns the method of setting recorder playback level. I realize that Mr. Bartlett was trying to keep his procedure simple and practical, but the recorder output levels

cannot be properly set without an **alignment tape**. If the recorder's inputs are set to read "0," and the outputs are then set **based on a tape being recorded**, the resultant calibration will likely be erroneous, causing the machine to produce different readings in "source" and "tape." This is due to the lack of a **REFERENCE** to which the machine is being set; i.e., the alignment tape. As Mr. Bartlett surely knows, the playback levels must always be set **FIRST**, and everything else based on that setting.

The more accurate procedure would require playing of the alignment tape's 1kHz portion, setting playback levels and metering. **THEN** sending the machine a 0 VU signal from the board and setting the inputs (while setting the dbx calibration, as described). Also, the **PLAY** side of the dbx has similar calibration, and should be set using the alignment tape signal (or a level determined **after** use of the alignment tape).

This procedure is more complex, and necessitates the purchase of an alignment tape, but it is by far the most accurate—although use of dbx will still cause the machine and console meters to be apparently out of whack.

—Eric Wenocur
ROAR Productions

Bruce Bartlett's reply to Eric Wenocur's letter:

Eric, you guessed correctly that I was keeping the procedure simple. I assumed that Charles probably did not have an alignment tape, and that he was not trading tapes with other studios. I also assumed that the factory calibration of his recorder was adequate for his use. (I may be wrong on both assumptions!)

If an alignment tape is available, the proper alignment procedure is as you described. Thanks for pointing it out. This procedure was mentioned in the Feb. '83 issue of *MR&M*, "Recording Techniques: Tape and Tape Recorders."

Here's some advice to *MR&M* readers abouts level setting with dbx: It's OK if the console meters read higher than the recorder meters, as long as you don't exceed 0 VU on the *recorder* meters. Tape saturation must be avoided so that the dbx can "track" level changes accurately.

The console meters should peak as high as possible without distortion occurring on playback. The proper record levels for various instruments can be determined in advance by making test recordings.

Watching the console meters is convenient, but requires that the console and recorder are consistently calibrated with each other. Otherwise it's safer to watch the recorder meters. And, if you need to know the actual recorded level on tape, watching the recorder meters is a necessity.

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Sound Advice

How To Make More Out Of Less

Sound Advice is a question and answer column that focuses on the procedures, products and problems associated with live audio engineering. We cover topics that primarily pertain to mixing in venues that seat less than a thousand, and have geared Sound Advice to run on reader input. Do you have a question, a particularly sticky problem, or an interesting experience in the world of sound to share? Pick up a pen and do it right now! Write to:

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This month we spoke with Danny Kapilian, a live sound engineer, concert producer and tour manager who lives in New York City. Danny works in many of the area's clubs, is the house soundman for the Apollo Theatre, and spends time on the road as well. He recently taught a course at the New School For Social Research entitled *Rock and Roll: The State of the Art*.

We discussed ways that a soundperson can optimize his or her resources, deal with problematic conditions, and make the best of inadequate, faulty, or downright disgusting equipment.

Modern Recording & Music: Do you have a basic philosophy of audio engineering?

Danny Kapilian: I think in terms of what I call "rock and roll reality," which combines an acceptance of Murphy's Law with a dry sense of

humor. Expect everything to go wrong. However, the important fact is that problems keep coming at you so that you can keep coming up with creative and ingenious solutions. In that light, the problems that arise from difficulties are turned into positive situations.

MR&M: When you walk into a club for the first time, how much information about the facility have you been supplied with?

DK: I usually know what the capacity of the club is, and I usually know how many channels there are on the house board. If I walk in and find that there are less channels available than what I need, my first question to whoever is in charge is, "What kind of mics do you have?" If you need to consolidate channels, you'll want to retain the highest possible fidelity out of each instrument, and you're at a great advantage if you have good microphones. With an act like Steve Forbert, who I work with, getting a good vocal sound is of paramount importance. Steve's voice must cut through.

Having the right microphones is also crucial to getting a good drum sound. A lot of small clubs have invested in nothing more than Shure SM 58s and SM 57s, which are good standard mics, but I will never get the drum sound I want with them. I've purchased several items which I bring to every gig I do, an Electro Voice RE20 and a pair of Sennheiser 421s. I use the RE20 for the kick drum. It has fantastic low response and a built-in roll-off which I prefer.

The AKG D12 would be another good choice for a kick drum. If the house has SM58s, I'll put one of my 421s over the rack toms, and the other one over the floor toms. I also have a Countryman direct box which I use to get a beautifully clean acoustic guitar sound.

MR&M: Will you use the SM 58s for vocals?

DK: Yes. I never have qualms about using 58s for vocals in any setting whatsoever. They've never given me problems. The 58 is a beautifully well-rounded mic with an unbeatable high mid peak. They're also incredibly durable. The new Shure 87 is beginning to make a name for itself as an excellent vocal mic, too.

MR&M: How can you consolidate your use of channels on a board?

DK: Normally I mic each individual drum. If I have to, however, I'll mic four toms with two mics, the 421s, which will sustain fidelity and resonance. There are certain inputs that can be Y-ed together in certain situations, especially in a very small club where I'm not as concerned with the separation. For example, with Steve Forbert I usually mic the keyboard's Leslie [speaker] with two mics, high and low channels. In a small place I can Y those two inputs together with an XLR Y.

MR&M: What about a real emergency where you only have six or seven channels available?

DK: That's not as unusual as you might think. There are some places with incredibly bad systems. I



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worked at a club once with Steve Forbert that had a 12-channel board with five channels out. For a house EQ there was a 10-band that was at least ten years old. It was completely crudded and rusted through. You couldn't even move half of the faders. Fortunately, we had rented a 31-band EQ to help Steve balance out his acoustic guitar sound. The lead guitarist, John Levanthal, also carries a 6-band EQ pedal that he normally doesn't use. During the sound check the system sounded awful no matter what I did. I finally went to Steve and told him that if he used John's 6-band EQ on his guitar and let me use the 31-band for the house, he'd gain ten times in the house for what he'd lose on his guitar. We did it, and it worked beautifully. The owners said the system sounded better than it ever had, but given the situation, that was a half-assed compliment.

MR&M: But how did you make do with only seven channels where you usually need twenty?

DK: It was a small place. I mic'ed the three vocals, the acoustic guitar went direct, the accordion went direct, and I mic'ed the kick and the snare drums. Those drums would

have been loud enough by themselves, but mic'ing them gave me the flexibility to alter their tone. We didn't mic the two guitars. The keyboard player monitors his instruments through a Yamaha 4115 power bottom, and I just had him direct his monitors a little more towards the audience, and turn up his volume a bit.

MR&M: Besides inadequate sound systems, there are other problematic conditions to prepare for. How can the shape of a room affect a job?

DK: As far as that goes, it's important to look out for high and low ceilings. With a high ceiling there's a tendency for the system to blare at the high midrange, and you should watch the house EQ to make sure it's not peaking. With low ceilings, you should automatically prepare for losing the high end, and roll off the EQ from 10k on if it's a wooden hall. If your mixing position is under an overhang, you'll lose both high and low response.

If it's an old bar with lots of wood, that's good, because the room will absorb sound. One of the worst experiences I've ever had happened with the Jim Carrol Band. We played in a club that was actually the lobby of a 50-year-old art deco office building in downtown Pittsburgh. The walls were 30 feet high and sheer marble. It looked beautiful, but the sound just bounced everywhere. All I ended up mic'ing were the vocals. I turned everything else off, but it was still a nightmare. I couldn't sleep all night. If there are high ceilings, it's nice to have baffling there to help prevent the sound from bouncing in all directions.

You should also concern yourself with whether a room is wider than it is deep. The Peppermint Lounge in Manhattan, for example, is at least four times wider than deep. The mixing position is opposite the stage across the narrow depth and you can never get far enough back from the PA system to objectively hear what you're mixing.

MR&M: Can't you walk around the room and listen to the system?

DK: Absolutely. It's imperative in order to hear what's going on and to discover the dead spots.

MR&M: What can you do when crises occur during the show? What if a guitar amp breaks?

DK: Go direct. I try to have extra direct boxes handy. They're a great thing to have on hand. They don't take up much room. Always keep

your eyes on them though, and after the sound check, take them off the stands and lock them up until showtime. I also suggest bringing your own headphones.

MR&M: What if feedback becomes totally unbearable?

DK: If there is a house EQ, go to it immediately. If you're a good enough engineer, you'll be able to recognize the frequency that seems to be feeding back. Pull that frequency out and gradually bring it back up until just before the feedback starts. If it's a small EQ with only ten bands, however, there's a pretty wide width between frequencies, and you may not catch it.

Next, you want to isolate the problem. If you have the luxury of a board with solo buttons and a decent pair of headphones, check the mics one by one. If you can't do that, start making educated guesses. Look at the stage. Is there an awkwardly placed microphone somewhere. You'll eventually find the source, and be able to correct your problem.

MR&M: What if a mic goes?

DK: If it's a band with one lead vocalist, always have a back-up mic ready. If there are backup singers, I don't have to worry as much, since the lead singer can grab someone else's mic if his goes.

MR&M: What are common problems encountered with monitors?

DK: A lot of small clubs don't have separate monitor boards. The monitors usually come from one or two sends off the house board. Be prepared for awful fidelity when you mix monitors this way. My advice is, if you are mixing a vocal band, to just make sure the vocals are in the monitors. Chances are that the monitors will not sustain a lot of low frequencies anyway, and you may end up blowing drivers. Either you'll be responsible for it or it will affect whether the band plays in that club again.

If you are deprived of monitors, and you have someone on stage who plays both electric and acoustic guitars, with the acoustic going direct into the board, you can route the acoustic signal into the electric guitar's amp and provide the guitarist with amplification on stage.

MR&M: I guess it's important to remain calm in the face of any difficulty.

DK: Of course. Just keep looking for ways to turn your problems into positive situations. The solutions are always there to discover.

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You're mic'ing a drum set. Where should the microphones be placed to achieve a certain tonal balance? Where should they be placed for best isolation?

I performed an experiment to answer these questions. The results, described in this article, may help you achieve your desired drum sound more efficiently.

First a little background. The *tonal balance* or *tone quality* of a musical instrument is its bass-midrange-treble balance. When you describe the tonal balance of a drum, for example, you might describe it as being bassy, bright, full, dull, thin, etc.

Tonal balance is the perception of the spectrum of a sound source. The *spectrum* of a musical instrument is

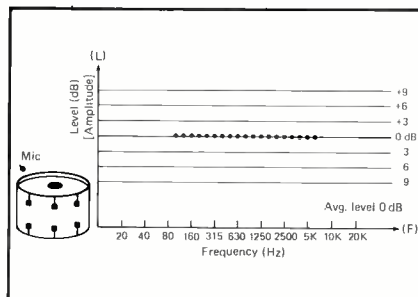


Figure 1-A. Tom tom reference spectrum. Mic'ed 2-in. over the rim.

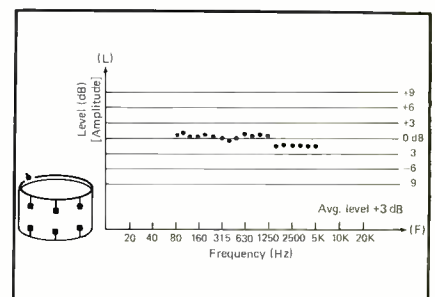


Figure 1-B. Tom tom mic'ed 2-in. over the head, 2-in. in from the rim.

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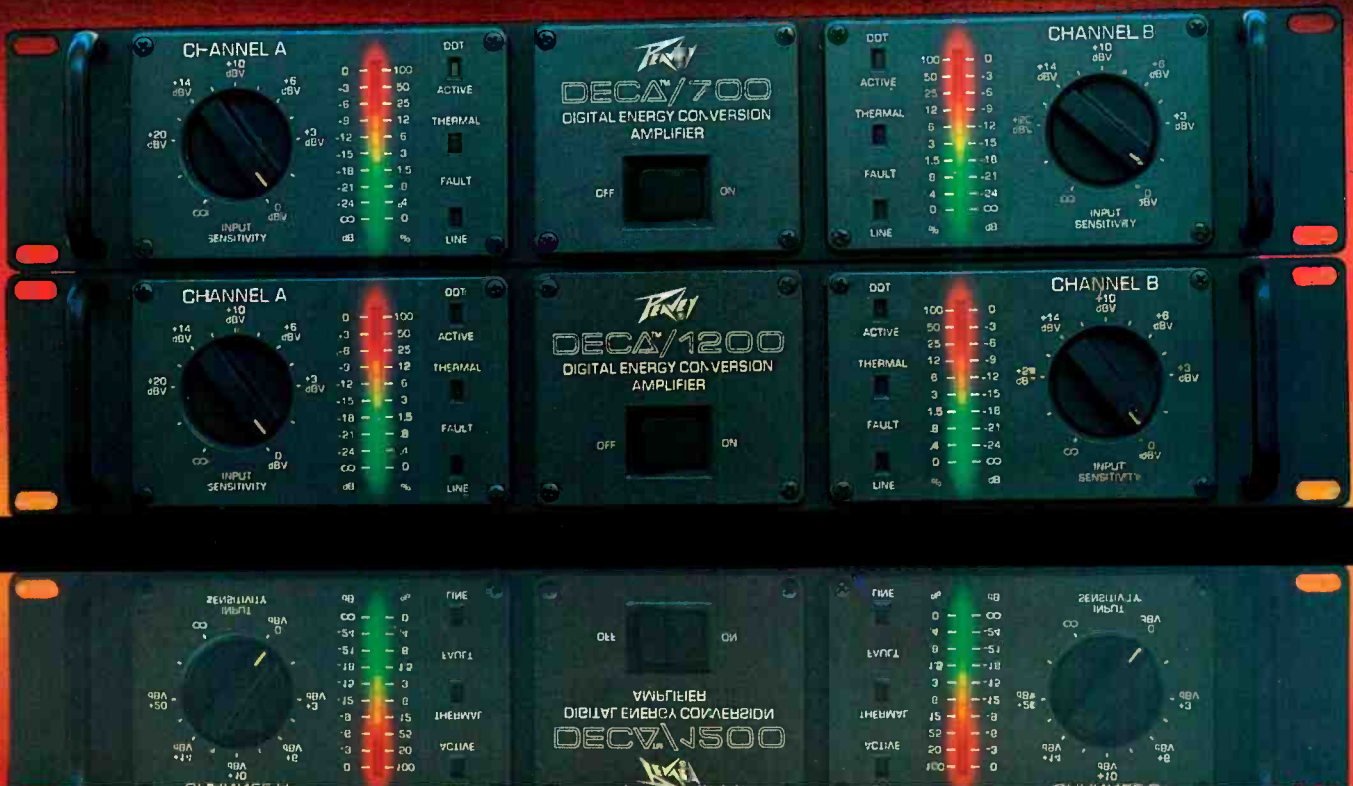
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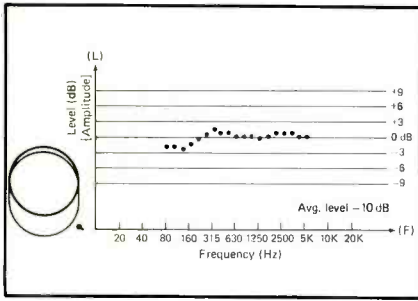


Figure 1-C. Tom tom mic'd from the center of the drum set, near the snare.

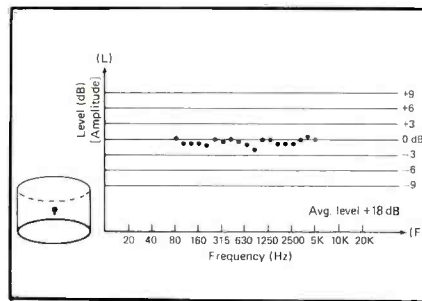


Figure 1-D. Tom tom mic'd inside shell, 1-in. from head.

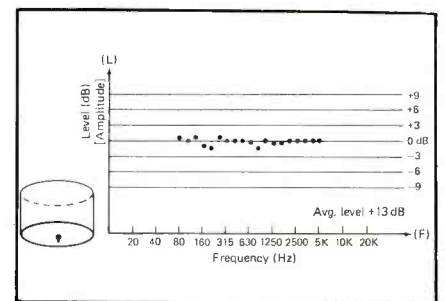


Figure 1-E. Tom tom mic'd inside shell, 1-in. from open end.

its output vs. frequency, the relative levels of the fundamental frequency and overtones.

One way to measure the spectrum of a musical instrument is to pick up the instrument's sound with a microphone, and measure the microphone signal with a real-time spectrum analyzer having 1/3-octave frequency bands. This measurement

corresponds fairly well to the perceived tonal balance of the instrument. In other words, the 1/3-octave spectrum measurement that indicates the tonal balance of the musical instrument being measured.

The spectrum and tonal balance picked up by the microphone depends on where the microphone is

placed. That's because a musical instrument radiates different spectra in different directions, and from different parts of the instrument. For example, a mic placed outside the rim of a tom tom picks up a "thin" sound (with weak low frequencies); a mic placed over the head of the tom tom picks up a "full" sound (with strong low frequencies).

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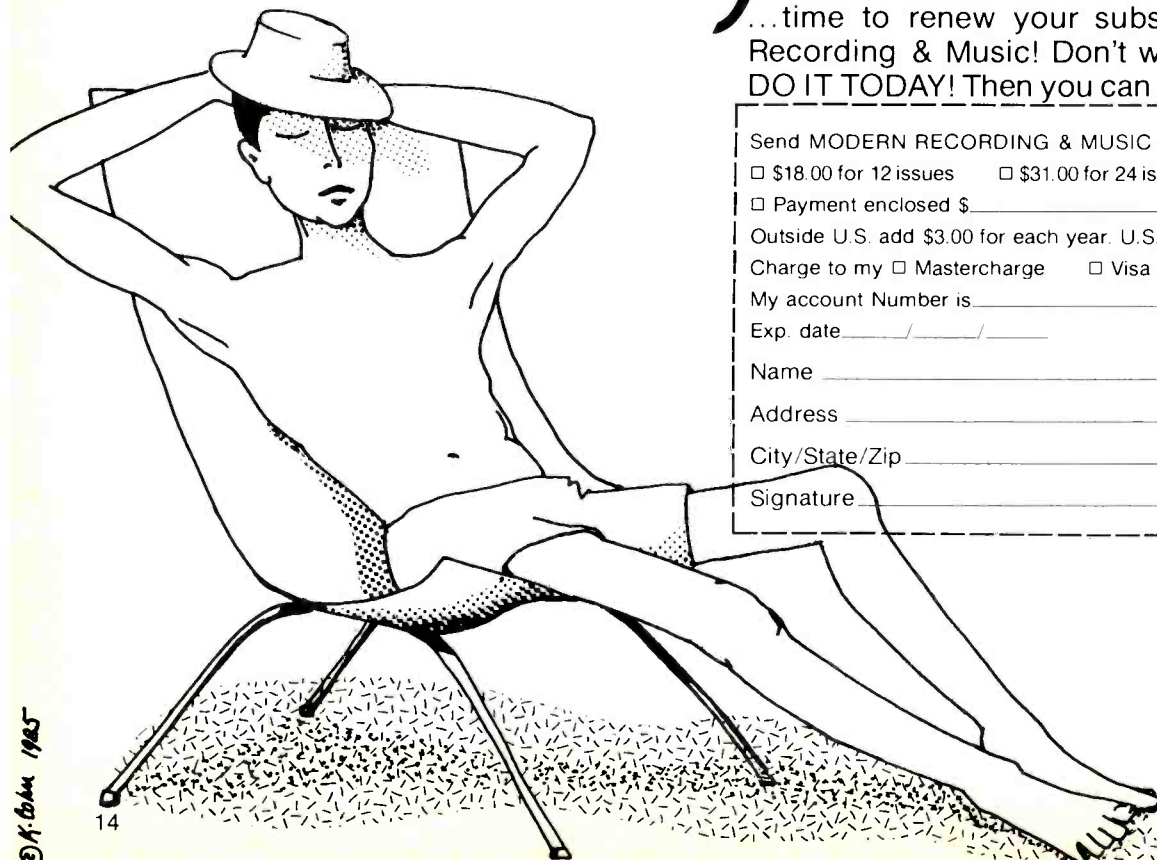
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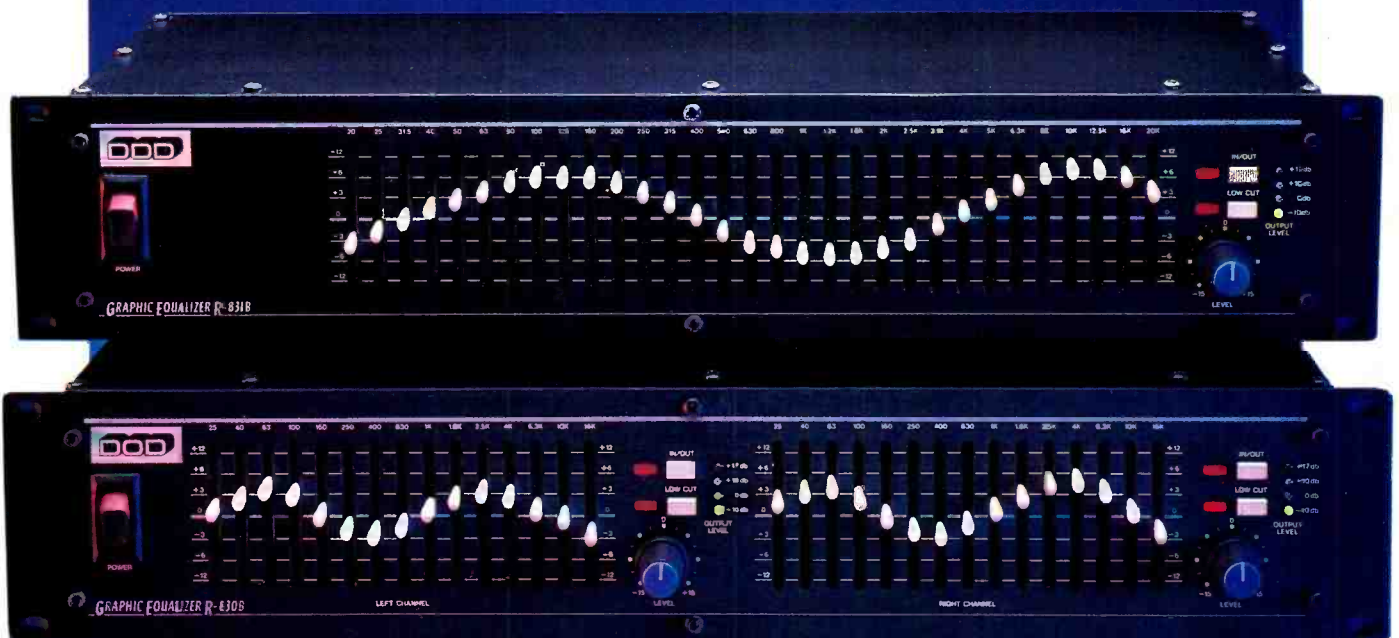
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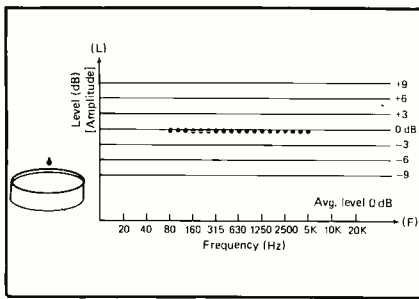


Figure 2-A. Snare drum reference spectrum. Mic'ed 1-in. over the rim.

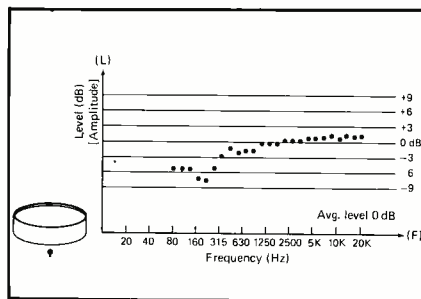


Figure 2-B. Snare drum mic'ed 1-in. under the rim of the snare head.

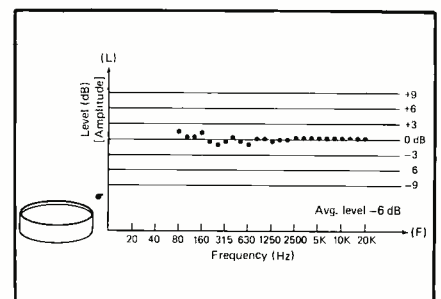


Figure 2-C. Snare drum mic'ed from the center of the drum set (3-in. above and 4-in. to the side).

Test Procedure

For each element of the drum set, I wanted to quantify the tonal differences of various microphone placements. To do this, I used a miniature omni condenser mic plugged into a real-time analyzer. I recorded the spectrum of a drum or cymbal in a "reference" position, then compared that spectrum to the spectra picked up in several other microphone positions.

For example, the spectrum of a tom tom was measured with the microphone two inches over the rim

as an arbitrary reference position. Then the position was moved to a new position and a new spectrum recording was made. The spectrum picked up at each new position was compared to that of the reference. In other words, the analyzer subtracted the new spectrum from the reference-position spectrum. The difference between the two spectra showed how the spectrum *changes* with microphone position.

I also noted the average signal level produced by the drum at each microphone position. This level measurement shows how much isolation each microphone placement provides. The higher the drum's output level, the greater the isolation (i.e., the louder the pickup, the less the leakage).

In addition, a tape recording was made of each element of the drum set as mic'ed with various techniques. The recording was played back for listening-test comparisons.

Results: Tom Tom

All the plots in this article are spectrum-difference measurements. They show how each microphone placement differed from the reference placement. Let's explain each one, starting with the tom tom.

In *Figure 1-A*, the microphone was placed in the reference position, two inches over the rim of the high rack tom tom (Pearl 12" diameter, 8" shell). The bottom head was removed and the drum was undamped. The spectrum-difference plot is flat because the spectrum was subtracted from itself. The average level at the reference position was called "0 dB."

In *Figure 1-B*, the microphone was moved two inches inward toward the center of the head. The average level increased 3 dB and the bass increased slightly. This is a popular microphone position, and now we see why: The sound is full and the isolation is good.

In *Figure 1-C*, the microphone was mounted in the center of the drum set, about three inches above and three inches to the right of the snare drum. This position was investigated because it provides a one-mic pickup of the entire set.

The spectrum-difference plot shows that the tom tom was picked up with a little less bass in this position, and listening tests gave the same result. There was also more audible stick attack, an effect not shown in the spectrum-difference plot. The average level was down 10 dB compared to the reference. Thus, mic'ing the tom tom from the center of the set would pick up 10 dB more leakage than mic'ing it two inches above the rim.

In *Figure 1-D*, the microphone was inside the tom tom, mounted PZM-style on the shell, one inch from the head. That is, the microphone was taped to the inner shell so that the microphone diaphragm faced the shell and was spaced about 0.030 inch from the shell.

The spectrum and tone quality were similar to the reference. Listening tests indicated slightly more ringing or a longer decay time. I heard less stick attack with the mic inside than with the mic outside, although the spectrum-difference plot didn't show the difference in attack.

The average level was 18 dB higher than the reference. This means that isolation would be excellent. This is a good place to put the microphone to reduce cymbal leakage because the tom tom is so loud inside.

In *Figure 1-E*, the isolation was inside the tom tom, mounted PZM-style on the shell, one inch from the open end. The spectrum and tone quality were similar to the reference, but the average level was 13 dB higher. This is another good mic position to reduce leakage. Placing the

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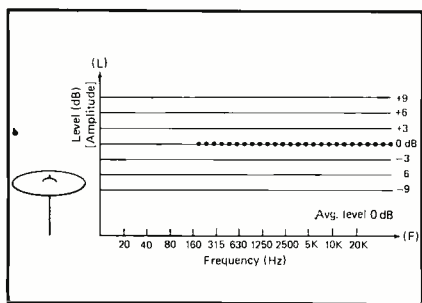


Figure 3-A. Cymbal reference spectrum. Mic'ed 2-ft. overhead.

mic near the open end, rather than near the head, provided slightly more stick attack (as heard, not measured).

Snare Drum

Now let's turn to the snare drum. In *Figure 2-A*, the reference position, the snare drum was mic'ed one inch over the rim. Its average output level was called "0 dB."

In *Figure 2-B*, the microphone was one inch under the snare head, even with the rim. The low end was reduced and the high end was boosted. Listening tests indicated a thin, snappy tone quality. This mic position sounded unpleasant or unnatural compared to the reference. Still, many engineers like to mic the snare top and bottom to control the bril-

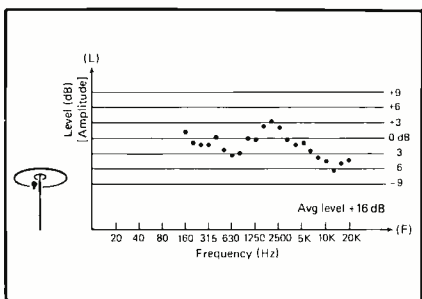


Figure 3-D. Crash cymbal mic'ed directly under center.

liance or snare "crack." The bottom mic should be wired or switched out-of-phase with the top mic.

In *Figure 2-C*, the microphone was mounted in the center of the drum set as described before. The spectrum and tone quality were similar to the reference, but since the level was 6 dB lower than the reference, the leakage would be 6 dB higher.

Cymbals

In *Figure 3-A*, the cymbal reference position, the microphone was placed two feet over a 24" diameter ride cymbal as shown. This is a typical microphone position used on-stage and in the studio.

In *Figure 3-C*, the microphone was moved to six inches below the cymbal,

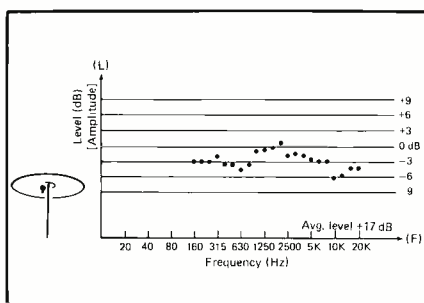


Figure 3-B. Ride cymbal mic'ed directly under center.

on the cymbal stand. The results were similar to mic'ing directly under the center, but less pronounced. There was some low-frequency emphasis that could be compensated by a low-frequency rolloff on the recording console.

In *Figure 3-D*, a 16" diameter crash cymbal was mic'ed directly under the center. Again there was a low-end boost and a mid-range peak. *Figure 3-E* shows the results of placing the mic six inches lower on the cymbal stand—a bassy, dull tonal balance.

Hi-Hat

In *Figure 4-A*, the hi-hat reference position, the microphone was placed to pick up both the snare drum and the hi-hat. The mic was three inches under and five inches to the side of the hi-hat. The hi-hat cymbals were closed and were played with a drum stick.

In *Figure 4-B*, the microphone was eight inches over the hi-hat, halfway in toward the center as shown. The spectrum had reduced high frequencies, and the tone quality was duller than that of the reference position. Apparently the hi-hat radiated high frequencies best toward its edges.

In *Figure 4-C*, the microphone was eight inches over the hi-hat cymbals, over the cymbal edge. The results were similar to those in *Figure 4-C*.

In *Figure 4-D*, the microphone was two inches above the hi-hat cymbal and two inches outside the edge. The spectrum had more high-frequency energy than the previous two techniques. Listening tests indicated a bright sound fairly similar to the reference, plus a quiet low-frequency tone that could be EQ'd out if necessary. This is a popular mic'ing technique for hi-hat when the hi-hat is mic'ed separately.

In *Figure 4-E*, the microphone was mounted PZM-style directly under the center of the hi-hat cymbals. As with the ride and crash cymbals,

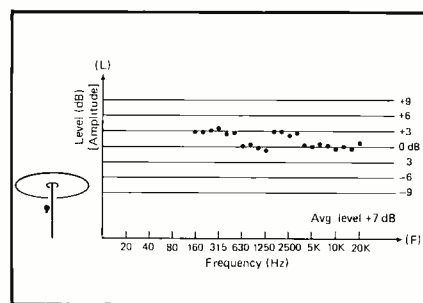


Figure 3-C. Ride cymbal mic'ed 6-in. under center.

there was a mid-range boost that caused an unpleasant coloration.

Kick Drum

Figure 5-A shows the reference microphone position which is even with the front end and centered. The front end was removed and the kick drum was damped with a blanket. To keep the amount of damping constant, a mic-stand base was placed on the blanket. A wooden beater was used.

In *Figure 5-B*, the microphone was two inches from the beater head, in the center of the head—a currently popular position. Leakage was 6 dB less in this position, compared to mic'ing at the open end. The spectrum-difference plot indicated more low

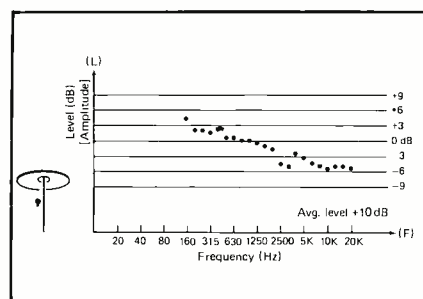


Figure 3-E. Crash cymbal mic'ed 6-in. under center.

end than the reference position. Note: This bass boost was not due to microphone proximity effect, since an omni mic was used. Instead, it was due to the sound radiation characteristics of the kick drum.

Listening tests also indicated a lot of beater attack in this position, a "click" sound that added definition to the beat. This attack did not show up on the spectrum-difference plot because the signal-to-noise ratio of the measurement was low in this portion of the spectrum.

In *Figure 5-C*, the microphone was two inches from the beater head, halfway toward the drum shell. Although the spectrum-difference plot didn't show it, there was audibly less beater attack in this position—a duller thud.

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In *Figure 5-D*, the microphone was taped to the inner shell, PZM-style, one inch from the beater head. Result was similar to those in *Figure 5-C*.

Finally, in *Figure 5-E*, the microphone was taped to the inner shell, PZM-style, two inches from the open end. The spectrum, level, and tone quality were similar to the reference. Such a position could be used as a substitute for the reference position, without the need for a mic stand.

Leakage Comparisons

In this experiment, I mic'ed the drum set with a single microphone in various positions, and compared the relative level of the high tom tom

the snare drum, rejects leakage and ambience by 8 dB compared to overhead mic'ing. The result is a tighter sound. This near-the-snare pickup with one microphone might be a simple, inexpensive way to mic the set for demo recording or sound reinforcement.

Mic'ing the tom tom just over the rim would reduce leakage by another 10 dB, and mic'ing it inside would reduce leakage by still another 18 dB.

For a simple stereo pickup, the set could be mic'ed with two or three miniature omni condenser mics. Place one near the snare and left rack tom; place the other near the right rack tom and floor tom. Put another in the kick drum.

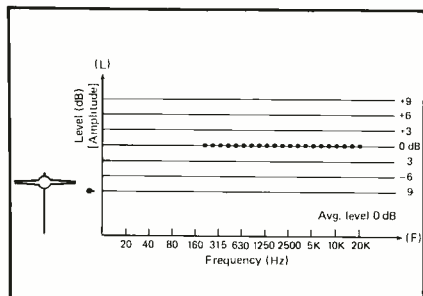


Figure 4-A. Hi-hat reference spectrum. Mic'ed near snare drum, 3-in. under and 5-in. to the side of the hi-hat.

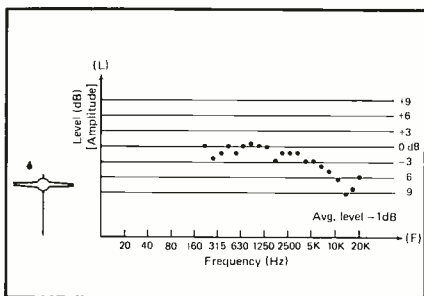


Figure 4-B. Hi-hat mic'ed 8-in. over the top, halfway in.

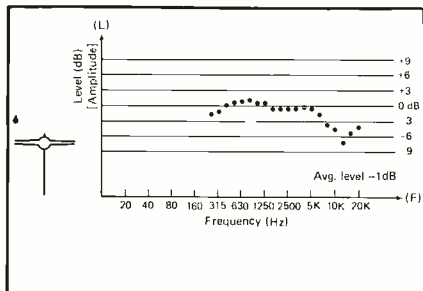


Figure 4-C. Hi-hat mic'ed 8-in. over the top, over the edge.

as picked up in those positions. Here are the results:

Microphone overhead, two feet over the cymbals 0 dB

Microphone in the center of the set near the snare +8 dB

Microphone two inches over the tom-tom rim +18 dB

Microphone inside the tom tom, on the shell one inch from the head +36 dB

As these measurements indicate, mic'ing a drum set from overhead with a single microphone would provide poor isolation from other instruments. That is, if a single overhead mic is used, there will be a lot of leakage in the drum track. Mic'ing the set from the center of the set, near

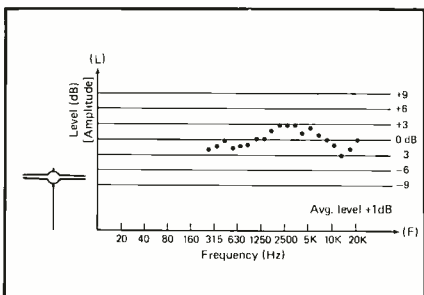


Figure 4-D. Hi-hat mic'ed 2-in. over the edge, 2-in. from the edge.

SNARE DRUM

Reference position: one inch over the rim.

One inch under the snare head, even with the rim: Thin, snappy.

Center of the set, three inches above and three inches to the side of the snare drum: Slightly less bass; 6 dB less isolation than the reference.

CYMBAL

Reference position: two feet over cymbal.

Directly under center: Thumpy; mid-range peak; 16-17 dB more isolation than the reference.

Six inches under center: Bassy; small mid-range peak; 7-10 dB more isolation than the reference.

HI-HAT

Reference position: Near snare drum, three inches below and five inches to the side of the hi-hat cymbals.

Eight inches over the hi-hat cymbals, halfway toward the center: Somewhat duller; 1 dB less isolation than the reference.

Eight inches over the cymbals, over the edge: Somewhat duller, 1 dB less isolation than the reference.

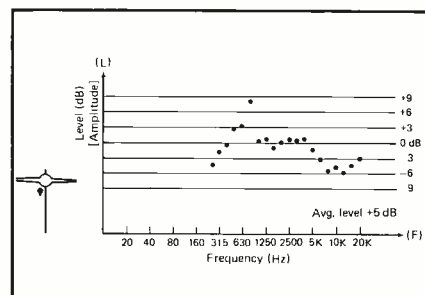


Figure 4-E. Hi-hat mic'ed directly under the center.

Summary

HIGH TOM TOM

Reference position: two inches over the rim.

Two inches over the head, two inches in from the rim: Slightly fuller; 3 dB more isolation than the reference.

Center of the set, three inches above and three inches to the side of the snare drum: Slightly less brass; more attack; 10 dB less isolation.

Inside, one inch from the head: Less attack; 18 dB more isolation than the reference.

Inside, one inch from the open end: Similar to reference; 13 dB more isolation.

Two inches over the cymbal edge, two inches outside the edge:

Fairly similar to reference; 1 dB more isolation.

Directly under the center of the cymbals: Mid-range peak; 5 dB more isolation than the reference.

KICK DRUM

Reference position: Even with the open end in the center.

Two inches from the center of the beater head: Fuller; clear beater attack; 6 dB more isolation than the reference.

Two inches from the beater head, halfway toward circumference: Fuller; dull beater attack; 6 dB more isolation than the reference.

One inch from the beater head, on

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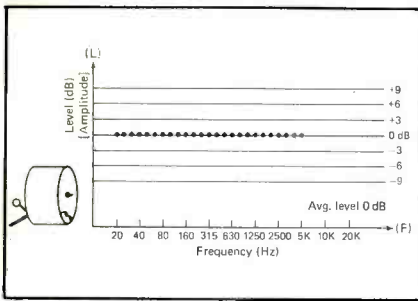


Figure 5-A. Kick drum reference spectrum. Front head removed; drum dampened with a blanket. Microphone even with open end and in center.

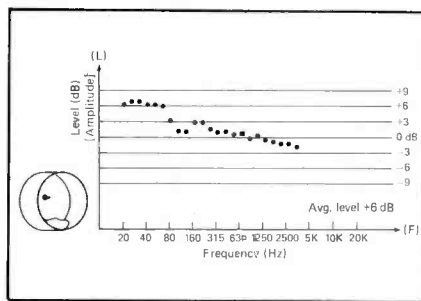


Figure 5-B. Kick drum mic'ed 2-in. from center of beater head.

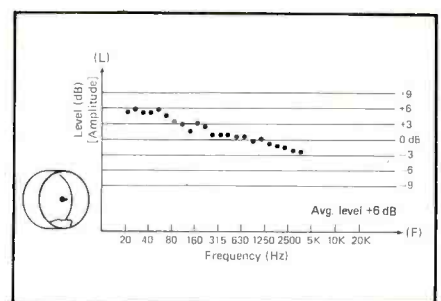


Figure 5-C. Kick drum mic'ed 2-in. from beater head, halfway toward circumference.

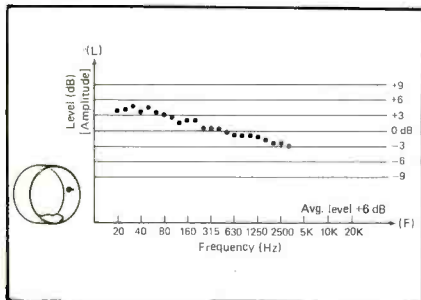


Figure 5-D. Kick drum mic'ed 1-in. from beater head on shell.

the shell: Fuller; not much attack; 6 dB more isolation than the reference.

Two inches from the open end, on the shell: Similar to reference.

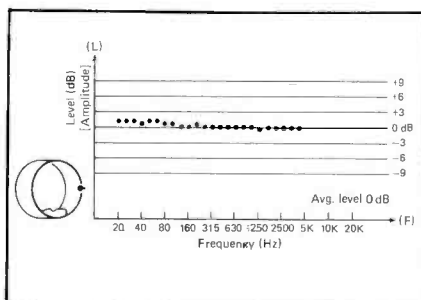


Figure 5-E. Kick drum mic'ed 2-in. from open end on shell.

If you want to pick up the cymbals from underneath with the tom tom mics, place the mics just over the rims of the tom toms, or mic the set from the center near the snare. If you

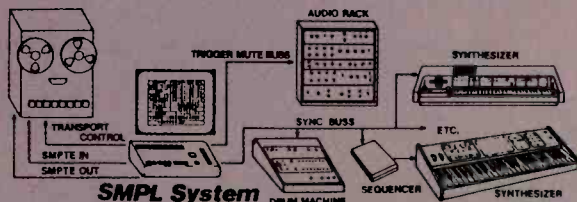
want to mic the cymbals separately, place the mics inside the toms (for isolation), and mic the cymbals overhead.

You may want to make your own recorded comparisons of microphone positions. Use the same microphone for all the tests, and keep the recording level constant. Your results may differ slightly from those described here, because musical instruments and microphones differ. This experiment used a miniature omnidirectional condenser microphone; a conventional cardioid mic would provide different results.

In any case, the results DO NOT indicate what microphone position sounds best. That's up to you!

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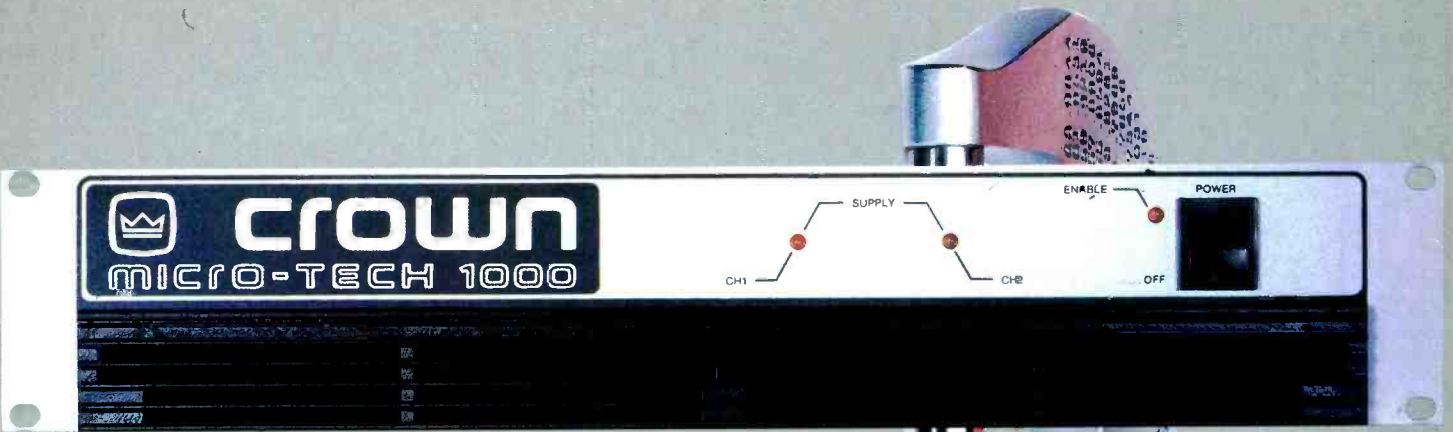
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Phil Collins

No Jacket Required

A scene from Phil Collins' childhood: Onstage as the Artful Dodger in a prestigious West End production of *Oliver*, Collins' voice begins recalcitrantly cracking its way into adolescence. Promptly forced out of his role by the course of nature, the budding man turned his attention to another muse. Since age five, Phil has been knocking about on the drums; his flirtation became a serious romance.

Collins did hit the big screen as an extra in *A Hard Day's Night* (and would quip that he was one of few people who were paid to see the Beatles), but his attachment to drumming proved a consummate bond. To his parents' initial dismay, Collins formed his first group, the much-acclaimed, but short lived Flaming Youth.

Scanning the back pages of *Melody Maker* when barely nineteen, he spotted an ad: "Band requires drummer sensitive to acoustic music." He arranged an audition and the band, impressed by his evident skills, hired him on the spot. It was a fledgling outfit known as Genesis, and Collins made his recording debut with the band on its third album, *Nursery Cryme*.

For four years Collins helped illustrate frontman Peter Gabriel's detailed story images. Genesis drifted into the swelling realm of intricacy characterized by complex orchestration, disparate rhythmic construction and involute harmonies. Ironically termed "progressive," the dense lumbering genre, with its flourishes of church organ and processional passages, was actually retrospective, sounding like hopped-up medieval music. Gabriel's expression was deftly engineered, but increasingly self-indulgent.

As with the Artful Dodger, a change of voice was about to propel Collins in a new direction, but this time the voice wasn't his. Gabriel left Genesis in 1975 to pursue a solo career, and the group deftly slipped

Collins into the lead vocalist's slot without missing a beat.

Bringing his solid pop and R & B influences to the fore, Collins treated the new Genesis with a vital infusion of concise, breathy funk, blowing the denatured filagree from the re-vamped group. His cohorts, Mike Rutherford and Tony Banks, shared his instinct for minimization; the band's greatest commercial success followed.

Although his involvement with Genesis naturally increased at this time, Collins' energy overflowed into another project, an outstanding fusion combo. Brand X was the first jazz-rock instrumental band in the U.K. and, starting with 1975's *Unorthodox Behavior*, Collins' association with the group yielded seven

albums. As if two bands were not enough, Collins joined an impressive array of artists as a sideman, including Brian Eno, Robert Fripp, Peter Gabriel, Robert Plant, John Cale, Rod Argent and Tin Lizzy. He has also been drafted into production chores for avant-folkist John Martyn, Abba's Frida, Adam Ant, Philip Bailey and lately, Eric Clapton.

With Genesis, Collins' musical vision came into focus on *Trick Of The Tail* (1976), *Wind & Wuthering* (1977), *Seconds Out* (1977), *And Then There Were Three...* (1978), and *Duke* (1980).

In 1981, the funk-inflected *Abacab*, complete with horn section, marked the band's complete about-face in musical direction. The same year, Collins cut his first solo album. The



Genesis 1976-77 (l. to r.) Steve Hackett, Tony Banks, Chester Thompson, Mike Rutherford and Phil Collins. This was the band that supported the first tour with Phil as frontman.

product of several introspective months spent sequestered in his home studio, *Face Value* catapulted Collins into even greater prominence. Nineteen eighty two's *Hello, I Must Be Going* was another potpourri of soulful pop, and sent Collins out on his first solo tour. The album included a startlingly authentic remake of the Supremes' "You Can't Hurry Love" which hit big as a single. At the peak of his aphoristic song's popularity, Collins married. When he returned from his honeymoon, he once again entered his home studio, emerging in five weeks with the backbone of his newest release, *No Jacket Required*.

Extending an already overlong day of rehearsal and preparation for a second solo tour, Collins took time to chat with *Modern Recording & Music* about his vast and varied activities.

Modern Recording & Music: You worked on the "Do They Know It's Christmas" record which benefited the dreadful situation in Africa. What was that star-studded session like?

Phil Collins: It was a bit strange, really. I didn't think it was going to be anywhere near as big as it was. When we arrived at the place to do it, the road was closed off, police vans everywhere, girls waiting for Duran Duran. When we finally got in the door it was wall-to-wall people, camera crews, and every band under the sun. When Bob Geldorf originally rang me about it [Band-Aid], he said that he was doing it along with Sting, and George Michaels. He didn't mention anyone else. But from the time he asked me to that day, several weeks had gone by and everybody else got involved. Everybody and their dog was there. It was quite extraordinary, because I got a chance to meet everybody. We don't have MTV over here, and unless you watch "Top Of The Pops" or read every paper, you don't really know what everyone looks like. It was great fun. Everyone got behind everyone else.

MR&M: Do you think artists are morally obligated to use their popularity to help solve social problems?

PC: In this particular instance, it was a good way to draw attention to a problem and to raise money. With things like the miner's strike, either you're for or against it, depending on what political party you support. I wouldn't get involved with stuff like that unless I really believed in something, but I haven't got any strong political views. But with this Band-Aid project, it isn't political,

MODERN RECORDING & MUSIC

I've got an Allen and Heath Brennell 1-in. 8-track machine. The desk (console) is a Studiomaster. I've got lots of outboard gear which is mainly AMS stuff. I've got a DSX sequencer, and a Roland MSQ, which is a real good sequencer for someone who can't operate the complicated ones. I've got a Linn drum machine and a Movement drum machine, which is the English equivalent. I've got a couple of Yamaha DX-7's, and OBX-α, a couple of Prophets, and a grand piano which my aunt who was a piano teacher gave me. I don't often play drums at home, but I've got a set of Simmons.



it's just good will. It's common sense.

MR&M: The music of Genesis is getting more elemental, more direct. I think you're responsible for the move towards simplicity. Can you tell me how less is more?

PC: Before I get to that, I've got to be fair to the other guys and not take more credit than is due. People associate Genesis with being left over from the 70s. The kind of stuff we did then was "grand" music. Layer upon layer of keyboards and stuff, but

that's what the band was into at the time. I think the change hasn't just been me trying to get them to do something different. They wanted to change, too. Everybody's aware of what's going on around us and we listen to different music now than we did five or ten years ago. We've always been a band of writers, and writers are always influenced by the current that surrounds them. As much as I appreciate the glory, I shouldn't take it all.



Tony Banks, Mike Rutherford and Phil Collins.

The less is more thing is really just making each instrument sound as potent as possible. A drum kit, for example, that has the ambient sound I use, takes up a lot of room on tape. It means that you don't need that much other stuff to prove the point.

The less is more thing is really just making each instrument sound as potent as possible. A drum kit, for example, that has the ambient sound I use takes up a lot of room on tape. It means that you don't need that much other stuff to prove the point.

MR&M: As music gets more basic, the reach of technology is rapidly extending. Do you think those two directions are at odds?

PC: It means that two guys can be a band. It's kind of healthy. All that stuff like the Synclavier and the Fairlight, which I don't use because I don't think I'd be able to operate them, they're all good tools provided that it's done with taste and originality.

MR&M: Where do you stand in the analog vs. digital debate?

PC: I'm in the middle, to be honest. Either way is pretty good if it's used properly. I'm happy to use what the engineer is happy to use. I have an axe to grind either way. Digital takes a little longer because you're always getting dropouts. We were compiling my album the other day and we had a couple of dropouts and had to do the whole side again. With analog, you don't get that kind of problem. But at the same time, if you want to edit something together, with digital you can try numerous edits and never have to cut the tape. You can choose the one you want and go for it. No razor blades ever come out.

MR&M: Here's a question about an even more heated debate. What do you think about the role of video in music today?

PC: I think there's an awful lot of rubbish. A lot of people who don't really know what to do with themselves have become video directors. If video hadn't taken off, and selling red cars had, they would have become red car salesmen. There are too many videos that are over-expensive and under-thoughtful.

I like simple ideas, and I've tried to keep them in everything I've done, but that's because I've been in control of them. I work with directors that I like and respect, but at the same time they know me and know that there are certain things I don't want to do. I don't want scantily clad women, which seems to be a prerequisite.

People remember straightforward things like "You Can't Hurry Love" and "I Missed Again," which I did with just me, no instruments. It sticks out like a sore thumb because everything else around it is so complicated.

I also think that you end up liking

records because of the video. I'm as guilty of it as anyone else. A lot of records which aren't particularly good are successful. It isn't a bad thing, one doesn't have to block certain people out. Maybe to them the video and the music are all one thing. But basically a lot of people are having success with records that wouldn't have otherwise made it, because of catchy videos.

MR&M: Does video put music in the back seat?

PC: It doesn't necessarily. There must be two dozen video programs on television now, along with MTV. The directors of the shows are concerned with having things that are visually good, not necessarily musically so. Obviously, there are exceptions where both the song and the video are great. You've got the "Beat Its" and the "Thrillers" and other very inventive ones. Van Halen make great videos and so do the Police.

MR&M: When you covered "You Can't Hurry Love," you were careful to preserve a sense of the original Motown arrangement. Was this out of respect to the Motown movement, or because you felt the arrangement couldn't be improved?

PC: Both, really. I was a huge

Motown fan in the 60's and that's the kind of stuff my school groups used to play. I always wanted to do a Beatles song, which I did on my first album [*Tomorrow Never Knows*], and I wanted to do a Motown song, which I did next. I had a short list to choose from. I would have done "Goin' To A Go-Go" if the Stones hadn't done it. Me and Hugh [Padgham, co-producer] basically referred to the original to see if we could recreate that kind of sound. We constantly listened to the original tape to get the right echoes, the right harmony sound and the right drum sound.

MR&M: Originally, those Motown songs were recorded with the most primitive of equipment.

PC: That's right. And that is why it's so hard to recreate, because there are no more primitive conditions. With Frida's thing [Abba's Anni-Frid Lyngstad's solo album], we did a Phil Spector track and we listened to his stuff to see if we could get the right echoes and arrangement. We were in Sweden at Abba's studio, which is the lap of luxury with every possible effect and gadget known to mankind. They didn't have a cheap echo room, like Phil Spector had, and it just didn't sound the same.

When I was with Robert Plant, we went to Sun studios in Memphis where Presley and Jerry Lee Lewis did some of their records. The engineer, Roland, took us around and showed us the original lathe that Presley cut his first disc on, and the two-track desk. One track for the instruments, one track for the vocals. It was quite extraordinary. It looked spartan, but, in fact, that's what it's all about. Like the 4-track with the Beatles.

MR&M: If you're ever in Detroit, you should check out the old Motown museum. The original studio has been preserved.

PC: I'd love to. I've got a couple of old videos of sessions there, and books about it, I collect as much as I can about that stuff.

MR&M: What other instruments do you play besides drums?

PC: Really only keyboards, piano mainly. I've got synthesizers, Yamaha DX7's, Prophets, Oberheims, but I'm not really good with manuals. If it's not easy to get on a synth, I don't play it. I just go for sounds, really.

MR&M: Do you approach piano as a percussion instrument?

PC: Most of the time. When I play my parts to a real keyboard player,

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he can't actually do what I do. If someone can't play an instrument, they tend to do different things with it, and whatever I lack technically is made up for by being a bit original.

MR&M: Do you wish you were technically trained on piano, or does instinct suffice?

PC: I would always like the extra bit that I haven't got, just to have more independence.

MR&M: Did you receive formal training on drums?

PC: No, I taught myself to play and when I was about fourteen I tried to learn to read. I thought that I was going to have to play in an orchestra pit or with a big band, and that would have entailed reading. I didn't know whether I'd be successful with pop music. I wanted to be a drummer and decided to cover all the bases.

MR&M: It sounds to me as if you use your drums, at times, for what I'd call a humble solo instrument. They'll come way out front, make some point and then recede.

PC: The most important thing is for the drums to be doing whatever is right for the song. Things like "Intruder" [from Peter Gabriel's 1980 album], I wrote that part around a sound. It's not like I sit down and just play the drums to the song. I've got to understand what the song is about. In that particular instance, luck was involved. I was just mucking about in the studio and Hugh Padgham and Steve Lillywhite were mucking around with the sound. I started playing a particular part and it all came together at the same time. Peter Gabriel was in the control room and he said, "That's great! Play that for ten minutes and I'll write a song around it," which is what he did.

MR&M: How do you use drum machines?

PC: I use different ones for different purposes. I start off working with the tempo, because I think the speed is the most important thing. Certain tempos are more infectious, more exciting to listen to than others. I think "Rocky Mountain Way" by Joe Walsh, "Sail On, Sailor" by the Beach Boys, and "Hold The Line" by Toto all have very infectious tempos.

Since tempo comes to mind first, I use some drum machines just to work on that. For other things like "In The Air," and "Through These Walls," I use different machines because they're more percussive and hypnotic.

I've got three or four Roland drum machines. They're very good because each drum sounds different. If I were

to do a demo and I wanted a real drum sound, I'd use the Linn or DMX.

MR&M: Do you use drum machines to create the structures of songs?

PC: All the time. That's how I write. When I did *Face Value*, I did all the demos at home on 8-track and then took them to the studio and used them as masters. I had started off by playing the drums first on tape and sort of humming along so I'd know where I was. After I bought drum machines, things changed, of course. I could actually play the piano first.

It's a very useful tool for me, and for Genesis, as well. When we started using them, our music started to space out a bit and get more loose and simple. Without drum machines, Tony would create a more rhythmic part on the keyboard to give the impression of rhythm when he was writing a song, and to keep the impression of rhythm when he was playing it to us. But with a drum machine, he was able to leave much more space. It changed our way of writing drastically.

I use them all the time, to the extent that on this new album, there are four or five songs I don't play drums on at all. I found that when I went to replace it I couldn't be as disciplined as the drum machine was. I think the hypnotic quality of the drum machine is part of the song.

MR&M: How does your solo recording process differ from recording with Genesis?

PC: Dictatorship is the big difference. It's just me doing what I want to do, whereas with the group, it's obviously a democracy, a three-way thing. One bends a little bit to hear what the other person has to say. That's not to say that I don't do that

when I've got other guys in the studio doing my stuff. I mean, I get them in because they can add things, not just do what I want them to.

With this new album, I can back from my honeymoon and went upstairs to my home studio, where I still do the demos. When I start writing a song, that's when the recording starts. I don't write ten to six. I tend to go up there and work until I've got the thing done.

I stayed up there for four or five weeks, writing songs and putting them down on my 8-track. This time I did it with a SMPTE reading clock, which is basically a code machine. I recorded this code onto one track of the tape so that when I took it into the Townhouse, which is where I did the album proper, whatever I recorded at home could be synced up.

When I go to the Townhouse, I've already got my backing tracks. All I've got to do is play drums over the drum tracks, maybe do a couple of extra keyboards if I've run out of tracks at home. Next, I do the vocals. Then I get the bass guitar player in, and I get the horn players in, or whatever.

It's a little bit different from any other way of working. Genesis came close to it when we did our last album. We went in the studio without any music written, and started to write and record at the same time. Things like "Mama" were captured very early before they were over-arranged. Sometimes there's a danger of living with a song for too long, getting bored with it, over-arranging it and then blowing it.

MR&M: With Genesis, are the vocals the last part to go down on tape?

PC: With the last Genesis album we used a drum machine, which

I was just mucking about in the studio and Hugh Padgham and Steve Lillywhite were mucking around with the sound. I started playing a particular part and it all came together at the same time. Peter Gabriel was in the control room and he said, "That's great! Play that for ten minutes and I'll write a song around it," which is what he did.

meant that I could sing while we were writing. You see, if you don't have the sound of a voice, you tend to do things you wouldn't do otherwise. You might think that four times around the chord sequence is enough, whereas when you've got a voice singing it, you might want it to go around eight times. Having a voice there is handy, and so it may not be the last thing to go down. It usually is, though, since the lyrics are the last to be written, but the essential idea of what the voice is doing is there from the word go. On my own stuff I always save one or two tracks for guide vocals and I'll just improvise words.

MR&M: Your drum sound is so distinct that it could be patented. I heard that the 1980 Peter Gabriel album is where you really got it down.

PC: I think Peter's album was the first to have it. Up until that moment a lot of bands were quite content with the L.A. sound for drums. But to be quite fair about it, it was really a combination of the right time, place and people. Peter had given me the impression that he didn't want to use cymbals on that third album, so I was concentrating on using drums without cymbals.

MR&M: How did that feel?

PC: It was a bit strange at first. Peter is a man of principle. Knowing him for about ten years, I knew that at times he could be bloody-minded. I said that some of the things should have cymbals and he said, "No, I don't want any metal on the album at all." So, I had to find something to do with my left hand. We set up a tom-tom or tambourine, depending on the track, and we got by without cymbals.

What it meant was that the sound of the drums could really be fooled around with, because when there are no cymbals you've got a lot of space. So the combination of me, Hugh, Steve, and Pete's music basically brought about this drum sound. We called it the "face-hugger sound," because it's a bit like the movie *Alien* when the thing first jumps out. From that album I went right into *Duke* with Genesis.

We went for a more live recording with a couple of ambience mics, a lot of compression. But you know, I can almost produce that drum sound from my drums live because of the velocity with which I hit them.

MR&M: The bass drum gets you in the gut.

PC: A lot of people have searched



Phil Collins and the Phenix (Earth, Wind & Fire) horn section.

out how to get the sound, but it doesn't sound the same. You can buy the same guitar as Eric Clapton, but you won't sound like him. I'm not being big-headed about my drum sound. What I mean is that it's pointless for anyone to try to get the same sound because everyone is different, and everybody strikes the drum differently. Fortunately, if everybody gets a different sound, music will be varied.

MR&M: You seem to be sensitive to the effects of personality on all aspects of record-making. You were originally dissatisfied with the overall sound of *Face Value* until you found a certain mastering technician, Michael Reese.

PC: I was pleased with the fact that, in the studio, I had gotten an R & B feel on *Face Value*, and I wanted to get the same sound on the record. I spent a couple of depressing weeks going around London trying to get the record cut so it would sound right. The importance of mastering a record really came home to me then, because I heard how it can totally change the sound. It's almost as important as mixing. Eventually I looked at a lot of records by Earth, Wind and Fire and the Jacksons, and saw that the same bloke had mastered them all. I rang him up, got right through to him, and he mastered the album. He's really great.

MR&M: Do you have a conscious approach to producing?

PC: I think my role as a producer is really to be a director. I point the

music in a certain direction and hope that the people will understand what I'm saying. I'm not a technical person. I don't know much about the EQ, for instance, on a desk. I just know when it sounds good to me.

MR&M: You rely on the engineer to twiddle the knobs.

PC: Yeah. I draw a parallel with film. The engineer is like the cameraman, and I'm the director. I'll think up something which might be totally impractical and say to the cameraman, "You make it work."

I feel more comfortable as a musician than as a producer. If a real producer were to come and watch me work, he'd probably say that I wasn't doing anything right. All I have is a good pair of ears.

MR&M: You share an artist's vision and more or less help them achieve it.

PC: The people I've worked with have all been well known, and knew what they were doing. They just wanted to do something different and thought that I'd be the person to do that for them. I suggest ways the thing can be done.

MR&M: What approach did you take with Clapton?

PC: I gave him encouragement as to what songs were better than others, and how certain songs could be done. I wanted very much for him to do something different. People think that his best days have been, and he's singing and playing better than ever now. He still makes your hair go up.

MR&M: You're rocking out more on your new album, *No Jacket Required*.

PC: It's much more uptempo than anything I've done before. It's more dance-oriented. It's a happier album.

MR&M: How much of the playing is yours?

PC: I did all the keyboard apart from two songs which David Frank plays on. The Phenix Horns [from Earth, Wind and Fire] are still there. Bass-wise, it's either David Frank on synthesizer bass or Lee Sklar. Daryl Steurmer is playing guitar. Sting sings back-up on a couple of songs, and Peter Gabriel and Helen Terry [from Culture Club] sing back-up on a song as well. A saxophone player named Gary Barnacle did a couple of things on the album, and I did everything else.

MR&M: Are you interested in making a totally self-sufficient album where you do everything?

PC: Yeah. I try to do that, but I don't play guitar.

MR&M: Well, if Peter Gabriel can get by without cymbals, maybe you could get by without guitar.

PC: Better not let Daryl hear that.

MR&M: What are the assets and liabilities of working at home?

PC: Just being at home, in that environment, is an asset. When things aren't happening, you can just go downstairs and have a half hour break. When you go back, it will be different, and there isn't the feeling of "this is costing me money."

Studios are ridiculous! The one I use, the Townhouse, is one of the most expensive studios in London. I use it because I like it, but when you get the bill at the end of an album it's quite extraordinary to see how much you've spent.

I also believe that the quality of the sound is secondary to the quality and the feel of the music, and that's why those old Motown and Beatles things have so much magic for me. The moments captured on tape are very special, and that's why I use my demos.

Getting the right tempo is very crucial. I write down a tempo on the drum machine and take it in the car, and the machine gets joggled up a bit. When I get to the studio and set it up exactly the same, it just doesn't sound the same. I use the demos because once I've got it right, I keep it.

As far as liabilities go, on the first album, which was done at my old house, Old Croft, you hear the storage

When I play my parts to a real keyboard player, he can't actually do what I do. If someone can't play an instrument, they tend to do different things with it, and whatever I lack technically is made up for by being a bit original.

units going on and off on the keyboard. There are lots of outboard noises, but I never really worry about it. If the fridge goes on or off and there's a click on the tape, it doesn't really bother me too much.

MR&M: What comprises your home studio?

PC: I've got an Allen and Heath Brenell 1-in. 8-track machine. The desk [console] is a Studiomaster. I've got lots of outboard gear which is mainly AMS stuff. I've got a DSX sequencer, and a Roland MSQ, which is a real good sequencer for someone who can't operate the complicated ones. I've got a Linn drum machine and a Movement drum machine, which is the English equivalent. I've got a couple of Yamaha DX-7's, and OBX-a, a couple of Prophets, and a grand piano which my aunt who was a piano teacher gave me. I don't often play drums at home, but I've got a set of Simmons.

MR&M: As a musician, producer and session man, you've worked with enough musical heavies to fill a small wax museum. I wonder how some of these people have affected you. Peter Gabriel comes to mind first.

PC: I love working with him. I love what he does. With his third album, I felt that I'd been driving at 60 mph for six months and then suddenly had gone into overdrive. It opened a lot of new doors for everybody. I think a lot of people owe him a lot for that. Many bands have taken those ideas a few stages further.

MR&M: What about Eno?

PC: Eno? That's the same thing, actually. Genesis was doing *The Lamb Lies Down On Broadway* downstairs at Island when he was doing *Taking Tiger Mountain By Strategy*. Peter was a fan of his and he got him down to put a couple of vocal things through the synthesizer. As payment for that, I was sent upstairs to play on Eno's record.

That's when I met him, and we got on very well.

He later rang up me and Percy Jones [Brand X bassist] and asked us to come down and play. We did three or four days of endless playing. A minute of this, two minutes of that, thirty seconds of this. It became *Another Green World*. Then we did *Before And After Science*, and that was the last I saw of him. I haven't seen him for ages, but I have great respect for him. He loves not being a musician. It gives him the freedom to do whatever he wants. He is one of those interesting guys who doesn't know the rules.

MR&M: What about Fripp?

PC: He's a very funny bloke. There's never any dead air when he's around. He's very single-minded. There's his way and the wrong way. But it's good to have people like that around, to be honest. They stand out on their own—him, Eno, and Pete, as people who know what they want, and whether it's commercial or not is irrelevant. I have great respect for them.

MR&M: Are you concerned with being commercial? Do you consciously craft hits?

PC: No. I just try to write something I like. If a song sounds good after three minutes, I finish it. If everyone else likes it, that's great, but I've got to like it first.

I think a hit song is something you can sing before it's finished.

MR&M: If you could put together a fantasy band whose members could be living or dead, who'd be in it?

PC: It would be an awful band, probably, but I can tell you who I admire the most. Lennon would be there, I'd probably have Tony Williams and Steve Gadd playing drums, McCartney on the bass, Hendrix and Clapton on guitars.

MR&M: And you would sing?

PC: No, I wouldn't have me in it.

some of the big time engineers worked their way up 'on the job.' I also read that a lot of recording schools are just a rip-off. What do you think? Is more school really necessary?

(Signed) Anxious in Anaheim

Dear Anxious;

I'll put it to you this way. If you ever needed brain surgery, would you rather have it done by a specially educated and solidly experienced neurosurgeon, or an eager and green young quack who was learning his craft 'on the job'?

Your letter smacks of impatience and a certain lack of willingness to pay some dues before entering the field of audio engineering. Yes, some of the heavy-weights of our industry climbed the ladder the hard way. (They probably had a lot more time than a month to consider their career choice, too.) Yes, it's true that some 'schools' provide you with nothing more than the most basic of introductions to some of the mechanics of audio engineering. For these reasons and about a hundred more, it only makes sense to find yourself a good four year college program that will enable you to walk away with a real sheepskin in the art of audio recording. Add in the new-found knowledge in the art of music theory, electrical engineering, circuit design, computer skills and applied mathematics you will have soaked up and someone with much more real potential will stare back at you from the mirror in the morning. With twenty-five applicants for every entry level position available in any recording studio in the world, which makes more sense—someone who expects to learn enough to own the joint in the first six months or someone who has the credentials to prove they know their stuff from the word go?

I am already working as a chief engineer in a good-sized studio in my area. I make a good living, but I'm not getting rich. I'd like to start my own studio operation, yet I don't want to starve to be on my own either. How much should I realistically expect to make if I own my own studio?

(Signed) Dissatisfied in Detroit

Dear Dissatisfied;

Never underestimate the value of an owner's service. Skilled crafts people (like yourself) are kidding themselves if their self-owned firm's profits are less than they can earn by working for someone else. The United States Small Business Administration recommends that your net profit (after taxes) should be at

least as much as you can earn if you worked at your trade for a weekly pay check. If self-employment is only a wild hair up your chute, stay right where you're at. If you truly realize all the pitfalls and heartbreaks that come part and parcel of owning your own studio, then give it your best shot and our best wishes go with you. Okay?

I've started my own studio in the last few months and I'm happy to report that things are going okay so far. The only thing that I'm paranoid about is bookkeeping. Do I need to hire a bookkeeper or an accountant to keep my records? I don't want the I.R.S. to storm in here one day and arrest me because I screwed up the records necessary for my taxes. Please advise.

(Signed) Bugged about Bookkeeping

Dear Bugged;

This question could take a book to answer. So my advice is to contact the closest office of the S.B.A. and ask for just that! Free booklets and information packets are available on this very subject. Your local I.R.S. office also provides taxpayer assistance to answer any and all of your questions regarding your tax obligations and local/state tax statutes, but will help you fill out your returns as well. This is your government and your tax dollars in action, so be encouraged to make use of it!

Otherwise, the best advice I could offer is that the tax obligations for a sole proprietorship or partnership are much less complicated than those for a corporation. If you keep a thorough and accurate record of all of your sales (cash and charge), all of the monies paid to you (i.e. receivables paid), and all of your accounts payable (bills, utilities, wages and supplies paid for), you're in business. Bookkeeping does not have to be terrifying, nor do you have to shell out a fortune every month for an accountant's services. Ideally to me, an accountant should not be hired until the owner is simply too busy making money to adequately keep track of it. If you're still paranoid come tax-time, there's nothing wrong in hiring an accountant to assist you in the preparation of your yearly personal and business returns. As in all professional services that could be of potential use to your business, the more you learn as a business owner, the less bread you are going to have to pay out to someone else to help you run your company's affairs.

Hi! I really like your magazine. I've been reading it for almost a year now and Rupert sounds like a regular guy to me. I don't have much experience in a studio, but I have run sound for my brother-in-law's band when the regular guy was sick. It was really fun! I've included my resume with this letter which includes all of my experience as an assistant in the Audio/Visual room last year at Marlo Thomas High School. Can Mr. Rupert help me get a job in a studio?

(Signed) Bright-Eyed and Bushy-Tailed

Dear B.E./B.T.'d;
No.

I want to build some really neat-looking racks for my equipment, but I can't find any materials or instructions at my library that were really any help. Could *Modern*

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Recording & Music contact some of the companies that manufacture those great hardwood jobs that the really big studios use and get some free tips and instructions for me? I'd call myself, but I'm kind of afraid because it wouldn't be too proper to ask for information on my specific application and not expect to pay. (I know they wouldn't be cheap.) Besides I don't think I could afford their help anyway.

(Signed) Waiting in Walla Walla

Dear Walla Walla;

MR&M is in kind of a ticklish position here also. We want to be able to offer all of the tips and instructions we possibly can, but we must respect the rights of equipment manufacturers too. Contacting certain manufacturers and asking them for their help in putting together a 'how-to' article so that people will not have to purchase their product, is not the politest thing we could think of to do. Imagine calling up an author of mystery stories, telling them you didn't want to buy their book and then asking them to tell you how the last chapter came out anyway.

I'd suggest that you contact the Public Relations department of any companies whose products interest you, ask for any brochures, specs and information they could provide you and (in the case of custom equipment racks), use them for inspiration in your own designs. All companies we've dealt with are more than happy to assist you (spelled c-u-s-t-o-m-e-r) in all questions regarding application and installation of their products. Telling you how to build them is another story. And that's easy to understand, isn't it?

I just wanted to write and tell you how funny I think James Rupert's writing is. All of his writings are so instructional, while he is so witty in getting his points across. I feel he is truly an inspirational asset to your magazine. If he'd only get a haircut and shave he'd be the perfect audio writer. And what does he have against neckties? He used to look so nice!

(Signed) His Biggest Fan

Dear H.B.F.;

Thanks Mom.

So that's about it! Maybe next time we could feature your letter in an 'all-letters' column. If you have any questions that need answering send them to us here at *Modern Recording & Music* magazine, 1120 Old Country Road, Plainview, L.I., New York 11803. We truly love to get mail, so why not drop us a line?

While you're in the line-dropping mood, don't forget about the *MR&M* Independent Record Release Competition now going on. This is your chance to feature the best work of your studio and your clients in the very pages you're reading at the moment. Check last month's issue for the full details on the contest and get your entries in now. Fame and free ink are waiting right around the corner!

As for me, I'll be busy for the next few weeks. The last kid I told I couldn't get a job just bought up all the stock options in my company and now I'm working for *HIM*. My assignment for the next month is to wash and wax his Caddie everyday. So much for cheap advice.

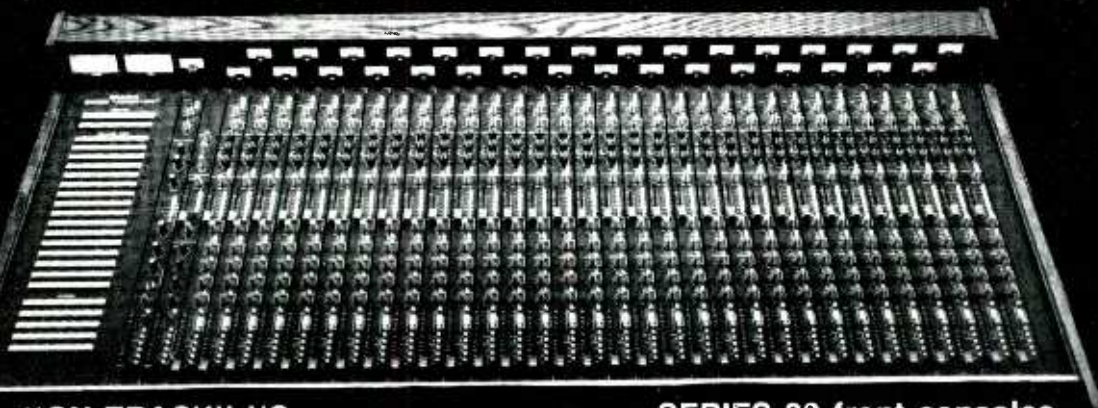
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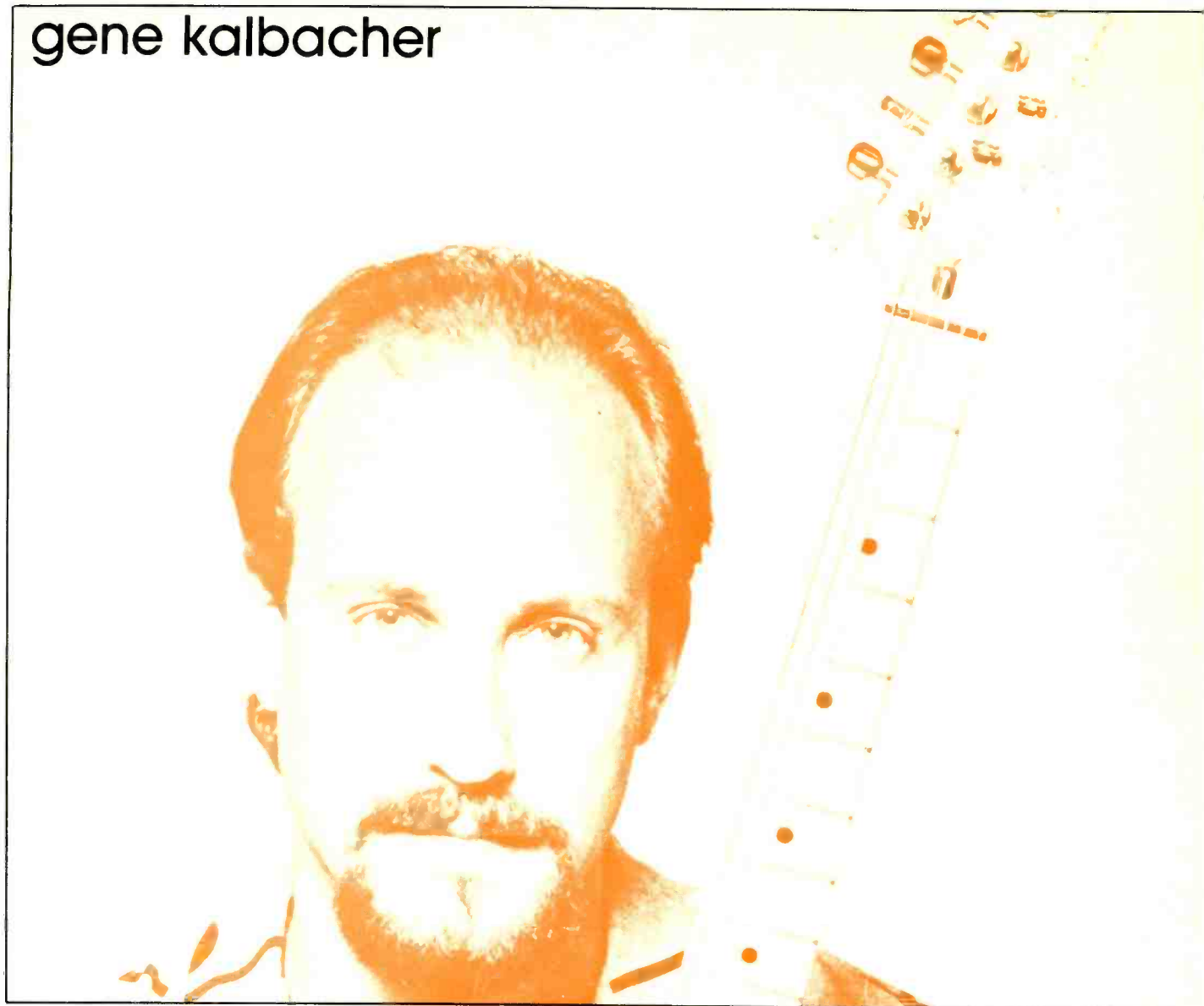
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gene kalbacher



Miles Davis' post-comeback album, "Decoy," has been hailed by fans and critics as his most coherent and fully realized effort of this decade. Part of the credit belongs to John Scofield, the affable, bearded guitarist who is responsible for all three tunes on the disk's second side.

Scofield, 33, a New York City resident by way of Wilton, Connecticut, credits the success of *Decoy* and the trumpeter's 1984-85 live appearances to the cohesion and development of Davis' new band, which now includes keyboardist-synthesist Robert Irving III and reedman Bob Berg. "I think the band just got to be more of a band," Scofield relates.

On his own album for Gramavision, "Electric Outlet," Scofield the leader achieves a band sound without the benefit of a band per se. The guitarist had hoped to corral drummer Steve Jordan, altman David Sanborn, synthesist Peter Levin and trombonist Ray Anderson into the recording studio at the same time (Scofield decided to play the electric bass himself), but scheduling conflicts and the expense of rehearsing a busy, first-call cast proved untenable. "Electric Outlet," marking Scofield's first attempt at multitracking and overdubbing, is his most well-

Guitarist John Scofield

rounded record to date. Besides plugging into a three-pronged socket (jazz, blues and rock), he is charged by his most varied instrumental lineup. A resourceful musician and an emotional technician, Scofield plays what's needed at the moment—lustrous melodies or screaming blues licks, rich chordings or impressionistic trills and colors.

The guitarist, who has recorded as a sideman with Charles Mingus, Jay McShann, Gerry Mulligan/Chet Baker, Billy Cobham/George Duke and many others, has also recorded several albums as a leader, including two raw, visceral trio outings for Enja Records (with Steve Swallow on bass and Adam Nussbaum on drums). "My influences are really starting to congeal now," says the guitarist about his intertwined roots in blues, jazz and rock. Scofield credits Miles Davis, his latest and most prominent

employer, with opening his eyes—and ears—to every musical possibility.

John Scofield spoke with *MR&M* about the making of "Electric Outlet" and his experiences with Miles Davis.

Modern Recording & Music
Steve Swallow, your good friend, trio partner and, of course, one of the best electric bass players in the world, co-produced "Electric Outlet" with you, and on the back cover you credit him for "long hours and commitment beyond the call of duty." Yet, for all that, he doesn't even play on the record!

John Scofield: (Laughs) It's funny. When I put these tunes together, I knew Swallow was going to be involved from the get-go. That was two years ago or something. I put the tunes down on a four-track cassette player where I myself just happened

to play the bass parts, a bunch of guitar parts and a drum machine just as a demo. I wanted to see how the tunes sounded, to use them for compositional purposes. I played it for Swallow, and he said, "Listen, you should play the bass parts because they're essential parts of the tunes." The kind of record we were going for was more of a compositional thing as opposed to a blowing date. So it was actually *his* idea for me to play the bass parts.

MR&M: So when you made the demo, you didn't think you would be playing the bass ultimately.

JS: No, no, I wasn't. I was thinking of doing it with a group. As a matter of fact, I wasn't thinking of doing any sort of overdub-type things. I was thinking of having everybody come in and play, and then maybe putting a little overdubbing on.

MR&M: Had you played much bass previously?

JS: Yeah, I'd always messed around with it. I can play my own music on the bass, but I couldn't play a gig. First of all, my chops would give out after about three minutes....I wrote all the music on the guitar, thinking of the bass parts and all that. The bass is just a guitar an octave lower. It's just like one big guitar part, the bass and the six-string guitar.

MR&M: How did you decide on the rest of the instrumentation on "Electric Outlet?"

JS: I wanted a keyboard-synthesizer in there as a "pad," as they call it, not so much as a solo instrument.

MR&M: In other words, for cushioning.

JS: A cushion, right. You hear that in a lot of pop music today, *Weather Report* and stuff like that. I've been playing with Pete Levin in Gil Evans's band, so he was the natural choice; I think he's one of the best *sound* people in New York. And Sanborn—I've always liked his playing. Ray Anderson—I've been a fan of his for a long time. So it was a chance to get these guys into key slots on this record. The thing that pulls me, Ray, and Sanborn together—even though we are all stylistically different—is that we're all blues oriented to a certain extent.

MR&M: And Steve Jordan's backbeats on this record are very fat and solid. To some extent, although the sonority is different, his drumming on "Electric Outlet" reminds me of Al Foster's drum sound on Miles' "Star People" LP. Foster's drum sound there is transmogrified, if I

can use that word. There's a palpable *crackle*.

JS: That's right. I've definitely been affected by Miles and his whole concept. And I think it's sort of the way funk drumming has been going lately, too. It's not just my record or Miles' records; you can hear it in a lot of stuff on the radio.

MR&M: Yes, but it's nice to hear a backbeat without a byte, if you know what I mean. I like to hear a human being.

JS: Yes, try to keep the human thing in there. That's what Miles says. He doesn't call anything jazz—he hates that word. But he doesn't distinguish between what he's doing now and what he did before, as far as when the bass and drums were playing 4/4 swing time. He thinks in terms of the *swing* of the music, even though it's backbeat music.

MR&M: On your album, John, was it a difficult transition to make your four-track demo recording into a full-fledged studio recording?

JS: It's weird. I went into the 24-track studio and did exactly the same thing again, using the drum machine and overdubbing everything.

MR&M: Then Steve came in?

if you listen really closely, you can hear it on the backbeat or the bass drum figures when they're playing the same thing. There are actually two of them in there, but you can't even tell...I can't even remember where it is and where it isn't.

MR&M: At what point did the guitars come in?

JS: I recorded the guitar stuff before Steve came in. I recorded all the guitars, the bass and the drum machine, so there was a whole little band there. Then I put keyboards over for the cushion, then I put Jordan over. Then the horns came in after the drums.

MR&M: So the drums were essentially recorded *last*, not first. Had you ever worked that way before?

JS: No, I'd never done that before. I'd never done any overdubbing before all the rhythm tracks were down. However, I'm happy with it because it came out sounding like a band anyway. The thing was, I kept it loose enough in the parts, so that say the bass line goes along and he does something hip. Steve would play along with that and he'd respond to it. So it wasn't like they were responding to each other, but it was 50

way of doing it. You can put [drums] down anywhere along the line if you're doing a record...as long as you have some sort of click track or drum machine to play with the stuff beforehand. We just tried to keep it loose all the way through...We improvised slightly as we were playing to try to give it a more spontaneous feel.

MR&M: The reed player Bill Evans, your former colleague in Miles's band, related that Miles considers every member of his bands, past and present, as a sideman, whether it's John Coltrane or Bill Evans. John McLaughlin or John Scofield. On Miles's latest record, *Decoy*, you're all over it. In fact, you co-wrote all of side two, all three tunes. I haven't seen that sort of compositional input, especially from a guitarist, on a Miles record in a very long time. What accounts for that?

JS: One of the reasons is because Miles and Gil Evans really got into this thing of taping solos and then transcribing the solos and using those for the heads. That's what those three tunes are. Gil told me one day that he's been trying to get Miles to do this [with heads] for 20 years...

MR&M: This process strikes me as very organic—building for the future from the past.

JS: Right. Yes, it's a very jazzlike way. If you check out Charlie Parker's written music, and Monk's, to some extent, bebop lines are like solos. That's the way Bird used to play; he just played his licks and wrote 'em out. All those blues, all of those things on "Rhythm" changes—those are like his little solos. And that's what [Miles' music] is. It's a logical extension.

MR&M: So your tunes on "Decoy" came about from improvisations?

JS: Miles tapes everything—gigs, rehearsals, everything—on a cassette or something. And he just finds the parts he likes. It just so happened that he used the stuff from my guitar solos. There's a lot of stuff he's done from his trumpet solos, too, and they're in the can; they're real good. I think the band just got to be more of a band in the last year. It's still completely The Miles Davis Show, and he's the leader, that's for sure.

MR&M: Why, after some 20 years and 30 or more records, didn't Teo Macero produce the last Miles LP?

JS: He and Miles had a falling out. I don't know any more than that because I wasn't there when it happened. Miles doesn't talk to me about that stuff.

At this point, the future is the combination of acoustic and electric instruments. That's Miles' trumpet along with a synthesizer. The electric guitar is sort of a hybrid between an acoustic instrument and an electric instrument, while a digital synthesizer is very electric. It's all electric when it comes down on tape, whether it's generated by a man blowing into an instrument that goes into a microphone, or a digital synthesizer.

JS: Then Steve came in and played over the parts. So he was responding to the already existing bass lines and the solos.

MR&M: The drum machine doesn't remain on the record, does it?

JS: The drum machine is in there a little bit. It's 90 percent real drums. In some tunes it isn't there at all. But

percent responding. It's almost like a whole band playing together when you do it like that.

MR&M: You recorded the drums essentially last, not first, as is often the case. The crack and sizzle of Jordan's backbeats hardly make the drums sound like an afterthought.

JS: This is just sort of a backwards

MR&M: Did Miles appear to have any difficulty in the role of producer without Macero around?

JS: I don't know. If he did, he didn't say that he did. See, when I was there, they were just recording, recording and recording. And then there was this long period where he [Davis] edited all the stuff that was recorded. Hours and hours of stuff went into it. Twenty hours, at least, to make that *one* record.

MR&M: What preparations are made before going into the studio to record with Miles?

JS: It varies. Sometimes we'll have rehearsals, and sometimes we'll learn [the new music] there [in the studio]. When we record stuff we've been playing live, we just go in and hit, just like a gig.

MR&M: How is recording with Miles different from recording with anyone else?

JS: Previously, Miles liked to get something going, then add different ideas to it. You'd play for an hour, and if it shows up on a record, it's usually only five minutes of that. Just play until the groove really gets going. But it's *all* recorded. He'll take excerpts of it that are really hot, which is a great way of doing it.

MR&M: As a teenager in Connecticut, what kind of music did you listen to, John?

JS: I was really a blues fanatic. Ninety percent of the kids in my school didn't like blues and jazz; they were into the Beach Boys and the Four Seasons. I went out of my way to find it, but you could get it if you wanted.

MR&M: At that age, as a budding musician, as a blues fanatic, did you perceive yourself as different from other musicians in your peer group?

JS: Oh, yes. I'll tell you, honestly. I think it was 50 percent love of that sound, blues and jazz, and also there was a certain amount of snob appeal involved. Like, "Nobody else is hip to this kind of music except me." And this sort of put me [apart]. This stuff was hip; that was the hip stuff that people were writing about in New York. I was from this little suburban town, and nobody was into that [kind of music]. But I think, primarily, when I heard this music, I fell in love with it and thought it would be great to be able to play it.

MR&M: Give us a rundown of your live-performance apparatus and the gear you take on the road.

JS: I use Ibanez guitars, mainly an Artists Series AS200 semi-acoustic

I'd never done any overdubbing before all the rhythm tracks were down. However, I'm happy with it because it came out sounding like a band anyway. The thing was, I kept it loose enough in the parts, so that say the bass line goes along and he does something hip. Steve would play along with that and he'd respond to it.

electric guitar, and a Roadstar RS440 solid-body guitar. The first one is sort of based after the Gibson ES335. The second one is based after the Fender Stratocaster. These are Japanese guitars that are imitations of these American guitars. Quite good.

MR&M: And your amps?

JS: I use different amps. When I'm on the road, touring with Miles or my own group, I usually use rental amps; the promoter will rent me an amp. I have this list that I give them. The first choice is Roland Jazz Chorus, and the second choice is either Music Man or Yamaha. I always use two amps because I use a stereo chorus when I play. My effects include Ibanez Stereo Chorus, Ibanez Tube Screamer foot pedal, and two Ibanez HD1000s, which are harmonizers and delays. Then I have a Boss digital delay foot pedal and a Boss Octaver. I use these in various combinations, and sometimes I don't use them at all (laughs). I also use compression in the studio. When I go into the studio, sometimes they'll have a good compressor or a good digital reverb or digital delay. Then I won't use my own stuff. At home, at local gigs or in the studio, I use two Sundown amplifiers.

MR&M: Outside of Miles, which artists today are doing innovative things in the studio?

JS: As far as the studio is concerned—the level of technology with the new synthesizers and the signal-processing things that have come out in the last 10 years—you have to really look to pop music. But that doesn't necessarily mean the *music* is exciting.

MR&M: Which musicians, in particular, have impressed you?

JS: In this genre of jazz, using electric instruments and using "the rhythms of today," quote-unquote, I'd have to say the group Weather Report, Miles Davis and Pat Metheny. But I'm a big bebop fan, too. I think you should use all the [recording] techniques that are there.... There's a lot of stuff I get off on *sonically* as well as musically. With a lot of stuff, if I don't like it musically, then there's no way I'm going to like the recording part. You can have a great-sounding record, but if you don't like the songs, forget it. Everybody's making great-sounding records now.

MR&M: But not everybody is making great *music*.

JS: That's right. I like Prince and I like other stuff, too. Just the general technology of pop music, and the way it's being recorded, excites me nowadays.

MR&M: As a listener, I sometimes wonder, "Where are the *musicians*?" Sometimes it sounds like the same silicon chip, rhythm-track is being passed from studio to studio.

JS: That's exactly what it is. It's the same sound from the drum machine. And that's already gotten boring and old. I don't like drum machines anymore, flat out. I think they're a great tool to perform along with. But the sound of real drums is really a beautiful thing. A great drummer and his touch! A drum machine is a good *tool* for getting a tune down or learning an arrangement. Also, I really prefer the *sound* of drums when they're mic'ed well. When you hear Steve Jordan or Art Blakey or Elvin Jones play the drums, and all the colors they can get out of drums, it just can't be replaced. At the same time, all a drum machine is is a sequencer; you program in a rhythm

and it remembers it. It plays the rhythm back on pre-recorded drums. You can do the same thing with synthesizers, too. I think synthesizers are *great*. There are so many possibilities that I don't see how anybody could not like it and not be excited.

When Mike Stern was playing guitar in Miles' band, I had less to play, because he was the primary guitar player. He was there before I was. So when he left, I had more space to fill up. *Too much*, to the point where we said, "Man, we've got to get a synthesizer player!" I think Bobby [Irving] just knows how to orchestrate the music and fill in the holes. That's what he's great at; he's really subtle. He knows how to do all these colors without getting in Miles' way. I think [the synthesizer] gives the whole band sort of a glow, that beautiful digital synthesizer sound. It's really just running parallel to what's happening everywhere.

MR&M: This synthesizer aura that you speak of is effective because it's not intrusive.

JS: Right, exactly. It's got to be done subtly. At this point, the future is the combination of acoustic and electric instruments. That's Miles' trumpet along with synthesizer. The electric guitar is sort of a hybrid between an acoustic instrument and an electric instrument, while a digital synthesizer is *very* electric. It's *all electric*. It's *all electric* when it comes down on tape, whether it's generated by a man blowing into an instrument that goes into a microphone, or a digital synthesizer. It's all electric in the end. Weather Report is great. They use Wayne's saxophone along with Joe Zawinul's keyboards to make this beautiful blend. The synthesizer is copying the sound of

Selected John Scofield Discography

As A Leader

Electric Outlet (Gramavision GR-8405)
Solar (Palo Alto PA-8031—with co-leader John Abercrombie)
Shinola (Enja 4004)
Rough House (Inner City 3030)
Bar Talk (Arista/Novus 3022)
Who's Who (Arista/Novus 3018)
Live (Inner City 3022)
Out Like A Light (Enja 4038)

With Miles Davis

Decoy (Columbia FC-38891)
Star People (Columbia FC-38657)

With Charles Mingus

Three Or Four Shades Of Blue (Atlantic 1700)

With Larry Coryell

Tributaries (Arista/Novus 3017)

With Gerry Mulligan/Chet Baker

Carnegie Hall Concert, Vol. 1 & 2 (CTI 6054/6055)

With Jay McShann

Last Of The Blue Devils (Atlantic 8800)

With Billy Cobham/George Duke

Live On Tour In Europe (Atlantic 18194)

acoustic instruments but actually starting something new, because you can't ever really re-create it. A synthesized saxophone section sounds different from a saxophone section. You can say, "That's a synthesizer sounding like a sax section." But it's something different, and it creates a whole new sound.

MR&M: Let's return to your "Electric Outlet" album. You mentioned before that your influences are

really starting to congeal and that Miles is largely responsible for that. In what way is Miles responsible?

JS: Ten years ago, let's say, I would've been scared to play real bluesy stuff or scared to play some country-type stuff, because I would've thought this doesn't go along with my other [jazz] stuff. I realize [now] that they can all work together, and live together, in my own musical world. And I think Miles is responsible for that because he's not afraid to draw upon anything he likes; he doesn't think, "Well, that's not hip," or "That's not what everybody is doing now," or "That's not what these people like." Like everybody my age, I'm a hybrid. With mass media being what it is, if you're 33 years old [his age] and grew up in America, you've been exposed to a lot over the radio, through records and all that. It's not like [bluesman] Muddy Waters, who grew up in this real sectionalized thing with the music of his people. Or Doc Watson. You follow me? It's just not like that anymore. Or Miles Davis. When he grew up in St. Louis, jazz was *it*. So Miles has made it clear to me not to worry about any of that, and to play what you hear.

If you check out Charlie Parker's written music, and Monk's, to some extent, bebop lines are like solos. That's the way Bird used to play; he just played his licks and wrote 'em out. All those blues, all of those things on "Rhythm" changes—those are like his little solos. And that's what (Miles's music) is. It's a logical extension.

bob buontempo

BLUE ÖYSTER CULT

THE BAND IS STILL HERE



Twelve albums and thirteen years after their inception, Blue Oyster Cult is still going strong. One need only witness their recent tour, lasting from last summer to winter, spanning the country and the Atlantic, and including two sold-out nights at New York's Radio City Music Hall!!

Sometimes being type cast as a "Heavy Metal" or "Hard Rock" band, their music in reality spans many styles, remaining contemporary by utilizing the latest state-of-the-art technology (in both instruments and recording techniques), while still remaining true to their roots.

The members of the band are also all loyal home recordists. In fact, *MR&M* caught up with the group for his interview in guitarist/singer/songwriter Donald "Buck Dharma" Roeser's private studio at his lovely home in Connecticut.

Also on hand were bassist Joe Bouchard and drummer Rick Downey. (The other two band members, guitarist/keyboardist Alan Lanier and guitarist Eric Bloom, were not available that day.)

Here's what the band had to say about their music, their recording techniques, home recording studios, and the music scene in general.

Modern Recording & Music: When most people hear the name Blue Oyster Cult, they associate it with heavy metal/hard rock, yet most of your hits like "Don't Fear the Reaper" and "Burning For You" have been in a *poppier* vein, and your last album was very contemporary sounding.

Buck D: Well, the kids know that already. The pop stuff happened to be hits.

Joe B: We're not the monsters that they think.

BD: It's just evolution. If it was our first album that's the way it would sound, but we've always been hard and soft. It just depended on what went, and what was a hit. We can't tell what's going to be a hit. We'd be really happy if some of our raunchier stuff were hits. But it's never worked out that way. I don't think we're any more laid back now than we ever were. I think we're a little edgier than we used to be. There was a wide range of material on our last record; we've done that before. Some of our raunchiest records haven't been our best sellers. The hardest records have never made it. Our last album, "Revolution By Night" was also our first CD.

MR&M: Do you use any other digital recording besides the compact disc?

JB: The only other digital thing we did is that when they mastered the last record they made digital copies which are used to send overseas.

BD: They used the Sony U-Matic ¾-inch format.

JB: Well, right there it's a great advantage, because you'll be able to have your record sound very consistent around the world, and it'll never deteriorate in quality.

BD: For duping and dubbing it's just great, and like I say, if you get a CD off the Sony digital master it sounds just as good as the master tape does. It's actually a verbatim copy of the master tape. It's great.

MR&M: I understand the rest of the album was done real high tech; 48 tracks, synced machines, computerized mix, the whole bit.

BD: Actually, most of it was mixed manually, not much was done by computer. We did some automated mixes but the manual ones came out better. We found that, especially at the mix stage, electrically syncing the two different brands of machines that we used (an Ampex and a Studer) was real hard, because they

BD: Usually we don't use noise reduction. I don't think most records use it.

MR&M: What studio(s) did you use for recording and mixing "Revolution By Night?"

BD: The basics were done at Boogie Hotel and a couple of tunes were redone at the Automat.

Rick D: We also used Kingdom Sound a couple of weeks for overdubs.

BD: The mixes were done at the Automat.

MR&M: When you do the rhythm tracks, do you do room mic'ing for a "live" sound?

BD: We do some room mic'ing, but wind up not using much of it. Most of the ambience on the drums is from the room itself and the close mics, because the room at Boogie Hotel is very live and very good sounding. But we don't use a lot of the far away (Neumann) U87s in the mix. Any additional ambience is usually an Eventide 2016 or a Lexicon 224X.

MR&M: Any use of live chambers or plates on "Revolution By Night?"

BD: No, all echo and ambience was electronic. There was an EMT 140, but I don't think it was used for that.

MR&M: Do you know if any of the studios that you use have a special control room design, LEDE, etc.

BD: I don't think so. I don't think either Boogie, Kingdom or the Automat mix room (studio C) is a trademark design.

MR&M: What kind of boards do they have?

BD: Boogie has the new Neve. Most of our last record was recorded on the Neve. Kingdom has a Trident TSM and the Automat also has a Trident TSM.

MR&M: How about isolation booths? Do you usually use any for drums, guitars or bass or use any direct feeds?

BD: It's mostly direct bass, although we do use mic'ed feeds. The keeper vocals get overdubbed, usually in the same studio room.

RD: All of Buck's stuff on "Revolution" was done in a cement block room. Nothing covering the walls, just cinderblocks.

BD: It was a real live room, but it really wasn't used for that sound. It was all baffled down to sound fairly civilized. Joe and I both use wirelesses. We have Nady diversity systems that are really good. So we all can be in the drum room, but the amps can be elsewhere in the Hotel.

MR&M: Are your vocals cut live at the same time?

We can't tell what's going to be a hit. We'd be really happy if some of our raunchier stuff were hits. But it's never worked out that way. I don't think we're any more laid back now than we ever were. I think we're a little edgier than we used to be.

MR&M: What do you think about CD's; are they going to make it?

BD: They're great. I think they'll do well, but it's going to take a while until the prices come down.

MR&M: How do you feel about digital recording?

BD: I don't know. So far, I think, just to be able to hear it as good as the stereo master in the studio at home is a real boon, ya know. Whether it needs to be tracked on a digital recorder or not, I can't say. As far as rock goes, sometimes it sounds a lot better off the tape machines than it does live so, therefore, why bother. But, I think with the CD, just to have it sound as good as it does in the remix room at home, it's a real benefit.

rewind at different speeds, start up at different speeds, and the relays are at different times. It was a kind of a pain in the ass. I suppose if there were two identical machines, it would work out better.

MR&M: What kind of synchronizer was used?

BD: We used a Q-Lock. But all my experience with running two machines is that it's almost more trouble than it's worth.

MR&M: Do you use noise reduction or do it without at 30 ips?

BD: No, did we ever make a Dolby record? I don't know.

JB: No. On (producer) Martin Birch's records he would use Dolby on everything except drums.

BD: Sometimes.

MR&M: Who did the production on your last record?

BD: Bruce Fairburn. There was a lot of input on the mixing, and we all worked on certain things. Dave Whitman engineered. He was there EVERY day.

MR&M: In all the studios?

BD: He was every place except for Kingdom. For some of the overdubs Ken Kessie, the engineer who worked on my solo album, was there. Whitman also did some engineering at the Automat. Ken did a great job of engineering there, too. But Dave was the primary engineer on the project.

MR&M: How about instruments—guitars, amps, etc...?

BD: Guitar-wise, nothing really radical. I use a Boogie head and a 4x12 cabinet, sometimes with a Crown power amp. For guitar amps we use Boogies, Labs, Rolands, and Hiwatts. Also Flag cabinets with Celestion speakers. My guitars are a Les Paul, a Vulcan, which is my main guitar, and a Phil Kubicki mini guitar.

MR&M: How about your bass set-up, Joe?

JB: I use the Music Man bass, the single pickup model, and a Music Man head through one of those new Boogie 15-inch cabinets. That's my mic'ed amp. The direct box I use is a Countryman.

BD: Allen uses a Lab amp with 4x12 and a Les Paul. But I think mostly everything he does on the record is keyboards. The keyboards are more important than they used to be. And Eric uses a Boogie head with 4x12 cabinet with Celestion speakers and a Strat.

MR&M: Besides Allen on synthesizers, you used Larry Fast on your last record. Did he program, play, or both?

BD: He mainly programmed the synthesizers for the tunes. He didn't really play the parts.

JB: We had Larry for about a day and a half, and he was just using the very basic Memory Moog and some ambiance effects.

BD: I guess Larry's responsible for half of the factory presets for the MemoryMoog. He can really make the thing talk.

RD: For the other keyboards, we used a Prophet 5, an OB8, a Grand Piano, and a Yamaha CP70.

JB: I think that's about the average amount of synthesizers we've used for the last couple of records.

MR&M: Rick, what kind of drums

and set up do you use?

RD: The Ludwig kit that I use has four toms; my mounted toms are 9x10 and 10x14 and my floor toms are 16x16 and 16x18. I used a 6¼ x 14 bronze metal snare. The bass drum for our last record was the studio's. I don't even know what kind it was. All I know is that it was 24x14 and Japanese.

MR&M: Why a bronze metal snare? That's unusual.

RD: Ludwig came out with it a couple of years ago, and it's the best sounding snare that I have. The bronze snare has a better crack; it's just more what I want to hear from a snare, more crack, not real thuddy.

MR&M: What kind of heads on the drums?

RD: I use Ludwig Silver Dot heads on top, except for the 16x18 floor tom which has a Remo Pinstripe. Heavy clear heads are on the bottom of all the drums.

MR&M: So two heads are used on every drum?

RD: Yeah, bottom heads on every drum in the studio. I use wood-tipped, hickory sticks and started with a wood bass drum beater, but ended up with a felt one. Cymbal-wise, I use Zildians all around, and a couple of their new Amir line. They

of the bass drum, and you get confused sometimes. So you use the nice sweet sounding cowbell and play most of the tracks with that.

MR&M: Do you just overdub the Simmons or play them live with the drum set?

RD: The kit and the Simmons are used together at all times. I never use the factory settings in the Simmons because they're pretty middle-of-the-road sounding, and I wanted to go for some more interesting settings. The Simmons gives you the capability of programming three of your own sounds. I use the Simmons in conjunction with my kit. I never played the Simmons just as Simmons. I find it better because you can get a better feel for playing the live kit, and using the Simmons for effects and accents.

MR&M: How about mic'ing—any special mics? For example, tube U47 for vocals or anything special?

BD: Mostly Neumann's U87 or U47 FETs.

MR&M: And what about for guitars?

BD: I'm partial to Beyer 160s.

JB: I think the mic on the bass amp is usually a Sennheiser 421, or an Electro-Voice RE20.

MR&M: Drum mics?

RD: On the toms we use 421s, and

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seem to be a more "pitched" or "tuned" cymbal. They have a very quick decay, and a nice fast crash that you don't have to worry about choking afterwards.

MR&M: You're also using Simmons drums and a Drumulator. Do you play to a click track and overdub to that, or play to the Drumulator?

RD: We started without clicks. On the last album we went through one or two songs without clicks, and then we used Donald's Drumulator and came up with something that was pleasing to listen to in the phones.

BD: The cowbell on the Drumulator was better to use than the click track, because the cowbell could be placed in your headphones easier, and it didn't get lost when you were trying to follow it. The click sometimes sounds like an upper bass note or part

either Sony condensers or 421s on the high-hat and snare. We have U87s for overheads, and I'm not sure what we use on the kick.

BD: I think it's a "Shaver" (Sennheiser, MD421).

MR&M: Do you do the rhythm tracks for all the songs first, and the overdub, or complete one tune at a time?

BD: On our last album we did about a week of rhythm tracks, and several overdubs.

JB: We got all the rhythm tracks in about six days.

RD: Everybody played at once, too. It wasn't just bass and drums first.

MR&M: So, it was pretty much "live" in the studio, with vocal and lead overdubs, as opposed to starting from a click track and layering up from there.

BD: Yeah.

MR&M: I understand that you once rebuilt the song "Shooting Shark" using only the sync track of the Drumulator after it was already completed.

RD: Yeah. The first version of the song was recorded during the initial basic track sessions. Then there was a problem with the vocal, and when Donald was out in San Francisco, he ended up rewriting the song, coming up with different bass and drum parts. So we could change some parts and keep others by using the Drumulator sync track as a constant. The drum part was changed, and a new bass part added—then it worked with the vocal. The whole drum track came from the Drumulator, with Simmons and cymbal overdubs.

MR&M: Who writes your material? Is it an equal contribution?

BD: Pretty much.

JB: We searched for a lot of outside material last time and came up with a few songs that made the record, as well as our own stuff.

RD: We probably gave more leeway to outside stuff than ever before, I guess.

JB: It's a great facility. You can live there.

BD: Boogie's a good environment, just to be there.

JB: It's not located too far from our homes, but it's far enough away so that we aren't distracted by our home life.

BD: It's really good.

RD: Yeah. We can really set our own schedule. We all sort of like a pretty "normal" schedule. We at least try to set a starting hour and an ending hour, and you can do that there. We can all crawl into the studio at about oneish or so and know that we could work until 10, 11, whatever.

MR&M: Not too many hot tubs for distractions?

BD: It's not really a hot tub kind of place.

MR&M: George Geraniums is your live sound man. Does he bring a lot of special equipment or outboard effects to be able to reproduce the sound of your records?

JB: George has been mixing our sound for over ten years. He has a full range of effects to use live.

MR&M: So you can reproduce any sound or effects on your records?

really worried about keeping the sound system going, and keeping the act under the sound company's belt. A lot of bands have that type of situation. Our relationship is really true. It's a really good working situation.

JB: He lets us know if our sound is right on stage; we pretty much work it out together.

RD: George is responsible for the way this band sounds live, and everybody trusts him.

JB: He also does pre-production demos for us. He's responsible for a lot of the ground work for the demos that we make before we go into the studio.

BD: We do pre-production in our home studios like my semi-pro studio here.

MR&M: What do you think about home studios?

BD: Oh, they're great. I've been an amateur recorder since the Teac days, around 1975, all the four track stuff. It really helps, ya know, even for all those people out there who don't have recording contracts. Just to have the four track stuff, even to this day, really helps what we do. It gave me, personally, a lot more insight into the process of recording than I had beforehand, because we made three or four records before the Teac machines were available.

MR&M: So you recommend that new bands get a small recording setup together.

BD: Sure.

JB: As soon as possible.

BD: Jump in and get one.

JB: They're getting less expensive all the time.

BD: I think it's great. You realize firsthand so much more when you actually do home recording beforehand.

MR&M: Do you think that nowadays it's good for a musician to also be a bit of a technician because of the complexity of recording equipment, instruments, and technology?

BD: I think you have to be, sure.

JB: Yeah. New bands have it a lot tougher these days than we did. Our first album was done on an eight track machine. But nowadays you have to have the first record pretty much in the can before the record company signs you.

MR&M: Any closing comments or final statements?

RD: Let's put it this way, we've heard people say, "You guys are still around?"

The band is still here...



New bands have it a lot tougher these days than we did. Our first album was done on an eight track machine. But nowadays you have to have the first record pretty much in the can before the record company signs you.



JB: We're just looking for the best possible material that fit in the BOC vein.

MR&M: Do you like recording better with pre-production rehearsals as opposed to going into the studio and working out the tunes from scratch there?

JB: I think you'll end up with a better record.

BD: I don't think it matters.

JB: (Laughs) How's that for diversity?

RD: I like this (rehearsal) way of doing it. I also like working out at Boogie Hotel. And staying there.

JB: Real close, or even surpass them.

BD: Yeah, you know a lot of our effects get a lot punchier live as compared to the studio versions.

RD: And George also has been around long enough that everybody knows exactly what he hears, and trusts him. It's not the type of situation where a band hires a guy not knowing what type of live mixer this person is, and they go out never really knowing how they're coming across. George doesn't work for a sound company, so his first interest is with the sound of this band. He's not



Producers, audio engineers, and hobbyists often come across situations and problems in everyday recording endeavors which do not lend themselves to easy answers. This column should help straighten out many of the questions that leave recording professionals scratching their heads and performing human sacrifices in the control room. Dr. Knobs brings many weeks of hands-on recording experience to the readers of this publication, since he has spent painstaking hours leafing through *db*, *Modern Recording & Music*, and *Rolling Stone* magazines. He holds a bachelor's degree in Acoustical Sciences and Stuff from Death Valley University, and listens to lots of records that were produced by some of the world's finest studios.

Dear Dr. Knobs,

How can I persuade the owners of the studio where I work to upgrade our analog recording equipment with state-of-the-art digital machines? They don't seem to comprehend that the improvement in audio quality would be worth the investment.

—Mel Z.
East Clintwood, NY

Dear Mel,

Sneak into the bookkeeping office some evening and substitute an abacus for their computerized billing devices. I'm sure they'll appreciate your light-hearted approach and begin to see things your way.

Dear Dr. Knobs,

I just heard a live radio interview program in which singer Lou Gramm of the rock group Foreigner mentioned that he had sung lead on many of the tracks from the band's most recent album *Agent Provocateur* while actually standing in the control room. He felt that it improved his performance to be in the listener's perspective, and he also enjoyed the benefits of being surrounded by his fellow musicians as he sang. I'd like to try this arrangement for an upcoming session in my 24-track facility. Are there any special technical

adjustments or considerations to be applied to such a situation?

—Dick H.
Twiddle, FL

Dear Dick,

This unusual concept is very exciting, and can bring out a thrilling performance. It must be noted, though, that unwanted sounds created by tape deck transports, flipping switches, heat and air conditioning ducts, or people coughing, mumbling, or creaking their chairs could all find their way to the master tape. Therefore, at the time the vocals are recorded, it would be a good idea to relocate the multitrack tape machine and master control console to a remote location. Musicians and technical personnel should also be asked to remain clear of the microphone's pickup pattern. An ideal location for both the equipment and people might be your studio's vocal booth.

Dear Dr. Knobs,

I am the proud owner of a new digital recording facility, but I now find that breathing sounds from singers and players of various wind instruments are often quite audible on final tracks. Is there any reliable method to eliminate these objectionable noises?

—M. F.
Asth, MA

Dear M. F.,

A leading German recording engineer, Dr. Hans Aufderbord, has developed a device which solves this problem. It's called a De-Respirator, and its operation is quite simple: A servo known as a Tracheoconstrictor attaches to the performer's throat, and with a sensing unit similar to a noise gate, a signal from the strangulator control chip automatically and instantly clamps the performer's wind-pipe shut when there is no desirable musical information present. The unit is available in the U.S. through Garotte Industries of Telmi, MO.

Dear Dr. Knobs,

I own and operate a small 16-track studio in the basement of my home. My wife assists by keeping the books, scheduling sessions, and providing refreshments for clients. I have just learned that she has been having

affairs with every musician who comes in. Should I confront her with this situation and insist that she put a stop to it? Her office skills are indispensable, and many clients say that they recommend my studio so highly because of the excellent "snacks" they are served.

—Les C.
Cuckold, CA

Dear Les,

You can short the outputs by making sure no circuits are open and attaching some sort of gate to the main junction box. If you find a bad connection still present, you might prevent undesirable oscillation by shielding the female inputs with a high-resistance pad. Lay down some test tracks, keeping the board fully pinned. If saturation occurs, perhaps a patch inserted will temporarily shunt emissions to another source where there's more resistance. Let me know how it turns out, and send along a few detailed drawings or photographs of your completed installation.

Dear Dr. Knobs,

I am the Production Director at an FM radio station. I am often very envious of the studios featured in magazines like yours, because our production room is far from state-of-the-art. We are equipped with one antiquated full-track mono reel-to-reel deck, a simple four-in/one-out console, and a single cart machine, all of which were installed quite poorly. We also have problems with loud hum from fluorescent lights and sound leaking in through the single-pane windows. Any ideas on how we should go about fixing up the studio?

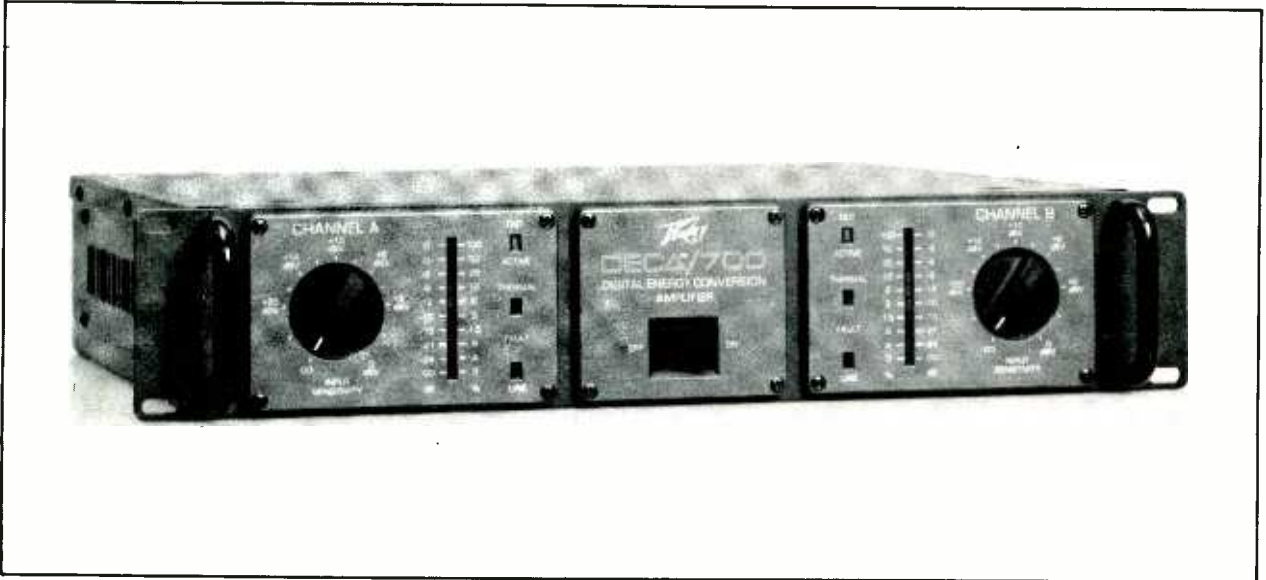
—Serena T.
Daugawn, ME

Dear Serena,

It may come as a comfort to know that radio stations like yours are common, and many times I have heard of prodding owners to upgrade new studios by pouring a couple of pints of gasoline on the poor-quality, offensive equipment, tossing a lit match, and running like hell. Your radio station may then very well find it economical to replace the equipment with more reliable and better-quality production facilities, and to replace you with a more reliable, better-quality production director.

Lab Report

Peavey DECA/700 Power Amplifier



General Information

The letters DECA in the model number designation of this high-powered amplifier from Peavey Electronics Corporation stand for Digital Energy Conversion Amplification. Admittedly quite a mouthful, this DECA technology is but one of the many innovative design features that distinguishes this remarkable amplifier from other run-of-the-mill sound reinforcement amps. In fact, we were so impressed with the sound quality of the amp that we wondered why Peavey has confined its application to sound reinforcement. The amplifier is accurate enough to serve as an audiophile's high-fidelity component, and we suspect that once word gets out about its qualities, it will find its way into better home music systems as well.

As for DECA, as Peavey explains it (deliberately holding back some of the really nitty gritty details for competitive reasons), the technique involves the analog audio input interfacing with a novel digital power supply which delivers signal to the load. While conventional amplifiers utilize basically separate power supplies and amplification circuits, the DECA technique integrates these separate functions into one, thereby eliminating significant complexity and maximizing efficiency. The input analog signal level is processed by digital technology and converted into a digital format for the two quadrant energy pump systems. The steady-state digital conversion rates exceed 25 times that of the full audio spectrum to make

certain that no possible introduction of unwanted frequency components will occur. A highly simplified block diagram of the arrangement is shown in *Fig. 1*.

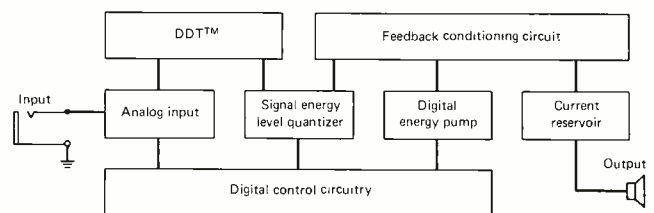


Figure 1. Simplified block diagram of Peavey's DECA/700 amplifier circuitry.

A circuit called a signal energy level quantizer is used to define the signal energy necessary to faithfully reproduce the analog signal both in terms of frequency and amplitude. This signal level quantizer then analyzes the input signal and converts it into the appropriate digital format for processing throughout the high-efficiency digital circuitry. The quantizer then drives the two quadrant energy pumps which are really the heart of the system and are capable of handling tremendous power levels with practically no heat dissipation. The energy pumps transfer quantum energy units into the current reservoir. High efficiency energy recovery semi-conductors and the current reservoir together transfer the energy to the speaker load as required.

The "bottom line" of all this technology is that Peavey

ends up with an amplifier that is around 90% efficient. It dissipates very little power when operating. For example, a conventional class B or class AB 300 watt (rated) amplifier delivering 100 watts would draw about 300 watts of power from its power supply, of which about 150 watts would be dissipated in the form of heat in the output devices. By contrast, an amplifier designed using Peavey's DECA technique, delivering the same amount of power, would draw only a little more than 100 watts from its power supply and only about 10 watts would be dissipated in the form of heat. The high efficiency and low dissipation of the DECA/700 results in an extremely compact and cool running unit that requires no cooling fan.

The Peavey DECA/700 incorporates another important feature; one that is unrelated to the digital circuitry but which will be widely appreciated by most pro users. Peavey calls this circuit their DDT compression system and the initials stand for "Distortion Detection Technique." This circuit senses conditions which indicate increased distortion well in advance of actual clipping and which activate compression to prevent overload.

Control Layout

The front panel of the DECA/700 amplifier is logically divided into three main sections, two of which are identical for Channels A and B. These control sections each have a sensitivity or input level control, a vertical bank of LEDs which are calibrated both in dB and in percent of full rated power, a "DDT Active" indicator which shows when the DDT circuit is actually compressing signals, a "Thermal Fault" indicator which indicates any interruption in operation due to thermal overload on either amplifier, and a "Line Fault" indicator which tells you about any interruption in either channel due to an output line fault such as a short circuit. Fault protection circuitry will automatically restart the amplifier approximately four seconds after the fault has been cleared. The center area of the panel contains a rocker type power ON/OFF switch.

Examining the rear panel, we concluded that Peavey had thought of just about every conceivable input and output connection requirement. There are balanced XLR connectors and unbalanced ¼-inch phone jack connectors for the inputs. There are conventional binding posts for the outputs as well as paralleled phone jacks and there are also line-out jacks which make it easy to connect the same signal inputs to several of these power amplifiers at once. A three-prong male receptacle accepts the heavy duty IEC-type power cord supplied separately with the amplifier. There's also a mode switch which allows bridged operation of the amplifier, for an output of approximately 700 watts into a single 8-ohm load. Finally, there are two DDT compression defeat switches. With these switches defeated, the amplifier can deliver even higher power than specified in the published specs, but of course at somewhat higher distortion levels.

Laboratory Measurements

The Peavey amplifier delivered a clean 350 watts of power into 4-ohm loads (that's the load impedance specified by Peavey) for a distortion level of only 0.09%. At that rated impedance, distortion was less than 0.1% even at the frequency extremes of 20 Hz and 20 kHz.

As usual, our VITAL STATISTICS chart at the end of this report shows operation under 8-ohm load conditions as well as additional measurements which we consider to be significant. What we couldn't convey in the chart is the excellent manner in which the DDT circuit prevents severe *square-wave* type clipping, the type of clipping that is often responsible for blown loudspeakers (especially high-frequency drivers). Nor does the chart convey the fact that the transient response of this amplifier was superb. We could detect no evidence of any slew-induced distortion, nor were we able to detect any evidence of TIM (Transient Intermodulation Distortion) using a wide variety of test signals for that purpose. Input sensitivity for rated output measured exactly 1.0 volt, as claimed, so you should have no trouble driving this amp from any console, mixer or, for that matter, from any preamplifier of the domestic variety.

Comments

The DDT circuit is actually audibly even more impressive than the DECA technology, since it makes it almost impossible to drive this amplifier into audible clipping or overload. Don't confuse this DECA circuitry with ordinary so-called Class D or "switching" amplifiers. We have, over the years, tested any number of Class D amps and have usually found that their disadvantages, such as RF radiation and heavy required shielding all but outweighed their efficiency advantages. That was not the case with this Peavey unit. We checked it out for possible interference and radiation into other equipment and even when we were as close as two feet or so from TV or FM receivers, or next to high-gain tape recorder or phono stage preamplifier circuitry we could detect no audible "sputtering" such as that commonly encountered with early Class D amplifiers in the past.

Peavey makes no secret of the fact that the digital circuitry does employ RF frequencies that might, under some circumstances, cause forms of RF induced interference in other equipment. They even have a paragraph on the back of the operating manual which is entitled "Class B Computing Device Information to User." It's the same paragraph found in the owner's manuals of many personal home computers. But whereas we have run into such computers which raise all kinds of hell with TV sets and radios if they are turned on within a few yards of such equipment, the Peavey DECA/700 exhibited no such problems during our listening tests. Yet, an examination of the innards of the amplifier did not disclose the kind of elaborate RF shielding that has been found necessary in more typical Class D switching amplifiers.

If you didn't know that this special kind of digital circuitry was being employed in the DECA/700, you would swear that this amplifier was configured as a Class A device. It has that clarity of sound—especially at low listening levels—that is typical of Class A designs. But no Class A amplifier could ever put out the kind of awesome, clean power delivered by the Peavey DECA/700 and be as compact and as cool-running as this remarkable unit built in Meridian, Mississippi. Hartley Peavey and his people have come up with a winner here. Mr. Peavey and his company have certainly come a long way since he decided to build amplifiers and musical instruments "full time" back in 1965.

PEAVEY DECA/700 POWER AMPLIFIER: Vital Statistics

SPECIFICATIONS	MFR. CLAIM	MR&M MEASURED
Continuous Power for Rated THD, (W) (8 ohms, 1 kHz)	N/A	200
Continuous Power for Rated THD, (W) (4 ohms, 1 kHz)	350	350
FTC Rated Power (20 Hz to 20 kHz) (W)	N/A	N/A
THD at Rated Output, 1 kHz (8 ohms) (%)	N/A	0.1
THD at Rated Output, 1 kHz (4 ohms) (%)	0.1	0.09
THD at Rated Output, 20 Hz (8 ohms) (%)	N/A	0.2
THD at Rated Output, 20 kHz (8 ohms) (%)	N/A	0.3
IM Distortion, Rated Output, SMPTE (%)	N/A	0.2
IM Distortion, Rated Output, CCIF (%)	N/A	0.022
IM Distortion, Rated Output, IHF (%)	N/A	0.06
Frequency Response @ 1 W, Hz-kHz (For -1 dB)	5 to 20K	5 to 26K
S/N Ratio, Re: 1 W, "A" Weighted, IHF (dB)	N/A	76 dB
S/N Ratio Re: Rated Output, "A" Weighted (dB)	95 db	101.5 dB
Dynamic Headroom, IHF (dB)	N/A	1.0 dB
Damping Factor, @ 50 Hz	N/A	50
IHF Input Sensitivity (Volts)	N/A	100 mV
Input Sensitivity Re: Rated Output (Volts)	1.0 Volts	Confirmed
Slew Rate (Volts/Microsecond)	N/A	See text
Power Consumption, Idling (Watts)	N/A	N/A
Power Consumption, Maximum (Watts)	800	780
Dimensions (W" x H" x D")	19 x 3.5 x 13.5	Confirmed
New Weight (Pounds)	30 lbs.	Confirmed
Suggested Retail Price: \$799.50		

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Looks At *Power Amplifiers*



Understanding the Specifications

This month's directory is focused on that all critical component--the power amplifier. The nine specifications in our tables (in addition to the product physical description columns) were chosen to assist in the understanding and value of the equipment. The price would normally vary according to the quality of the circuitry, hence initiating the classic dollar vs. value dilemma.

As with any piece of audio equipment there are always exceptions to the high quality/high price rule. Also, in some cases, sacrifices in certain specs might be made in order for the buyer to attain certain other desired features. In order to be unbiased, all manufacturers of which we are aware are included. (You may note that a manufacturer of which you may be aware is absent. We contacted everyone several times, but if they don't send info, we don't have them in the charts.)

You may also note that some specs asked for are not always included. You can assume that the company individual that filled out our forms may not have had all the specific facts at his disposal. We stress that this is by no means a cover-up by the manufacturer. It may simply indicate that the response was not verified at certain ratings (ie:IM, $\frac{1}{4}$ watt, %.)

The Specifications

In our charts we have separate columns for $\frac{1}{4}$ watt and full rated power in both intermodulation and total harmonic distortion. The $\frac{1}{4}$ watt IM and THD numbers refer to the percentage of distortion while operating at low to moderate listening levels such as would be encountered in small studios with monitors and/or when listening with headphones. Distortion should be very low at these levels, since your ear is most sensitive to non-linearities (dissonance) at such levels. The rated power IM and THD, on the other hand tells you what the amplifier is doing when it is doing all it can; that is, at maximum power such as you would likely only encounter in multi-speaker rigs or at peak musical levels in studios.

Continuous power/channel is all channels of an amplifier with a common power supply driven to just before distortion/clipping--in other words, the maximum undistorted power the amplifier can provide. It's important to know that there is a relationship between amplifier power and rated handling capability of speaker systems. In a home/studio system this is relatively unimportant. Speakers rated at 150 watts could be used with 300 watt amplifiers under these conditions. However, in a multi-speaker system such as is used in large areas (indoor and outdoor) careful matching of amplifier power and speaker load capabilities is required.

High level sensitivity given in volts, is important in that this voltage must come from your console or preamp if you are to be able to drive the amplifier to full power.

Power bandwidth is the frequency range over which a power amplifier produces at least one half of its rated output power. This is most

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critical at bass and high end extremes, where at least half power (-3 dB) is needed.

Frequency response at $\frac{1}{2}$ watt is the specification which describes what the frequency response is when the signal varies in amplitude, generally less than 3 dB. Obviously, the flatter the response (lower dB) the better. This is for the most part one of the most significant specifications when comparing amplifiers. The circuitry involved in producing a "flatter" response takes more sophistication, therefore necessitating a higher price. The benefit of having amplification with a flatter response is more accurate reproduction with amplification and this superior circuitry probably results in better distortion specifications.

The other specs on our chart have to do with physical characteristics such as number of channels, dimension, weight, and, of course, price. Note that virtually all amplifiers fit standard 19-inch racks, so if this is important to you, note it particularly.

In the Features column, we have allowed the manufacturer relatively free rein. Here, they are permitted to tell you what is special about their product, and for the most part, they have tried to do just that, telling you their particular approach to the practical compromises necessary between features and price.

Now, on to the charts.

Model
Number of Channels
Min. Cont. Power/Chan.
Watts at 8 Ohms, All Channels driven
Power Bandwidth, Hz-kHz
IM, %act, %
THD, Full rated power
THD, %act, %
IM, Full rated power
Frequency Response, Hz
Signal to Noise, dB
High Level Sens., V
Dimensions H/W/D, in.
Weight, lbs.
Price, \$.

Model	Number of Channels	Min. Cont. Power/Chan. Watts at 8 Ohms, All Channels driven	Power Bandwidth, Hz-kHz	IM, %act, %	THD, Full rated power	THD, %act, %	IM, Full rated power	Frequency Response, Hz	Signal to Noise, dB	High Level Sens., V	Dimensions H/W/D, in.	Weight, lbs.	Price, \$.	Features
600	2	175	20-20k	0.1	0.1	0.1	0.1	20-20k 0.25	104	1.5	5.25 19.0 13.38	30	625.00	
900	2	300	20-20k	0.1	0.1	0.25	0.1	20-20k .025	104	1.5	5.25 19.0 13.38	40	835.00	
2220	2	50	20-20k	0.1	0.1	0.25	0.1	20-20k 0.25	104	1.5	1.75 19.0 11.0	17	599.00	
5220	2	175	30-10k	0.1	0.1	0.25	0.1	20-20k 0.25	104	1.5	5.25 19.0 14.0	31	739.00	
9220	2	300	20-20k	0.1	0.1	0.25	0.1	20-20k 0.25	105	1.5	5.25 19.0 11.0	39	1099.00	
1200A	2	300	20-20k	0.1	0.1	0.25	0.1	20-20k 0.25	105	1.5	5.25 19.0 16.0	72	1649.00	Slide drawer amplifier modules.
8120	2	125/ 300	20-20k	0.1	0.1	0.25	0.1	-	105	1.5	5.25 19.0 11.0	40	1099.00	Bi-amp, includes crossover.
9120	3	125/ 125/ 300	20-20k	0.1	0.1	0.25	0.1	-	105	1.5	5.25 19.0 11.0	41	1249.00	Tri-amp, includes crossover.
Ashly Audio														
FET-200	2	100	10-100k	0.007	0.004	0.004	0.004	10-50k 0.5	110	1.4	3.5 19.0 16.0	33	769.00	MOSFET output circuitry for extreme reliability and sonic accuracy, fan cooled, meters, balanced inputs, modular construction, mono and bridging switch selectable
FET-500	2	250	10-100k	0.007	0.004	0.004	0.004	10-50k 0.5	110	1.7	5.25 19.0 16.0	62	1095.00	Same features as unit above.

Model
Number of Channels
Watts at 8 Ohms/Chan.
Power Bandwidth, Hz-KHz
IM, %atc, %
THD, full rated power
THD, watt, %
H2, full rated power
H2, frequency response,
Signal to Noise, dB
Dimensions, H/W/D, in.
Weights, lbs.
Price, \$
Features

Model	Number of Channels	Watts at 8 Ohms/Chan.	Power Bandwidth, Hz-KHz	IM, %atc, %	THD, full rated power	THD, watt, %	H2, full rated power	H2, frequency response,	Signal to Noise, dB	Dimensions, H/W/D, in.	Weights, lbs.	Price, \$	Features
2125	1	110	20-20k	0.05	0.1	0.1	1Hz-50k 3	100	0.77	3.5 19.0 12.0	31	619.00	
320	2	100	20-20k	0.05	0.2	0.2	1Hz-50k 3	100	0.7	5.25 19.0 11.75	39	909.00	
620B	2	200	20-20k	0.06	0.25	0.25	1Hz-70k 3	100	0.7	8.75 19.0 11.75	58	1209.00	
250D	2	100	20-20k	0.02	0.1	0.1	1Hz-90k 3	110	1.41	5.25 19.0 11.75	33	839.00	
750C	2	225	20-20k	0.02	0.1	0.1	1Hz-90k 3	106	2.12	7.0 19.0 12.0	57	1339.00	
75	2	25	20-20k	0.03	0.15	0.15	-	-	-	1.75 19.0 11.5	14	409.00	
150	2	50	20-20k	0.02	0.1	0.1	1Hz-90k	109	1.0	1.75 19.0 11.5	17	679.00	
8000	-	225	20-20k	0.05	0.1	0.1	10-100k 3	110	1.23	5.25 19.0 13.0	44	749.00	
Brylston													
2B-LP	2	50	0.5-100k	0.01	0.01	0.01	0.5-50k 0	100	0.75	1.75 19.0 10.0	18	600.00	Also available in balanced version for \$50 more, bridgeable for mono, dual power supplies, gain controls, 60V/usec slew rate, ground lift switch.
3B	2	100	0.5-100k	0.01	0.01	0.01	0.5-50k 0	100	1.0	5.25 19.0 9.0	35	975.00	Available balanced for \$1075, other features as above.
4B	2	200	0.5-100k	0.01	0.01	0.01	0.5-50k 0	100	1.25	5.25 19.0 13.5	50	1500.00	Available balanced for \$1600, other features as above.

Model
Number of Channels
Min Cont. Power/Chan.
watts at 8 ohms, All Channels Driven
Power Bandwidth, Hz-kHz
IM, %watt, %
THD, Full rated power
THD, Full rated power
THD, Full rated power, %
Hz, Frequency Response,
Signal to Noise, dB
High Level Sens., V
Dimensions, H/W/D, in.
Weight, lbs.
Price, \$
Features

Model	Number of Channels	Min Cont. Power/Chan. watts at 8 ohms, All Channels Driven	Power Bandwidth, Hz-kHz	IM, %watt, %	THD, Full rated power	THD, Full rated power, %	THD, Full rated power, %	Hz, Frequency Response,	Signal to Noise, dB	High Level Sens., V	Dimensions, H/W/D, in.	Weight, lbs.	Price, \$	Features
Crest 4000/01	2	325	20-20k	0.001	0.01	0.003	0.006	1-50k 0.1	106	1.06	5.25 19.0 13.0	58	1879.00	Has LED bargraph meters.
3000/01	2	240	20-20k	0.001	0.01	0.003	0.006	1-50k 0.1	106	1.06	5.5 19.0 11.5	46	1399.00	As above.
2501A	2	200	20-20k	0.001	0.01	0.004	0.01	20-20k 0.2	96	1.0	3.5 19.0 13.0	38	1199.00	Can deliver 1100W mono into 4 ohms.
2001A	2	125	20-20k	0.001	0.01	0.004	0.01	20-20k 0.2	96	0.79	3.5 19.0 13.0	32	999.00	Can deliver 340W per channel into 2 ohms.
1501A	2	80	20-20k	0.001	0.01	0.004	0.01	1-50k 0.1	95	0.63	1.75 19.0 10.5	19	799.00	Can provide 150W per channel into 4 ohms.
Powerline 400	2	290	20-20k	0.001	0.01	0.01	0.05	20-20k 0.2	100	1.0	3.5 19.0 13.0	38	1079.00	
Crown														
PS-200	2	90	1-20k	0.05	0.05	0.001	0.001	DC-20k 0.1	112	1.3	5.25 19.0 10.13	25	769.00	Mono/stereo switch, distortion and signal presence indicators, low frequency protection, output protection, adjustable turn-on delay, massive heat sinks.
PS-400	2	165	1-20k	0.05	0.05	0.001	0.001	DC-20k 0.1	110	1.76	7.0 19.0 10.13	55	1179.00	Same as PS-200 above.
Delta- Omega 2000	1	730	DC-45k	0.05	0.05	0.05	0.05	DC-45k 0.1	120	1.76	8.75 19.0 16.5	92	2995.00	Compensates for load impedance to improve transient response, mono/dynamic range indicator, signal presence indicator, 70-volt option.
Micro- Tech 1000	2	280	20-20k	0.05	0.05	-	0.1	20-20k 0.1	105	0.775	3.5 19.0 16.0	38	995.00	Reversible air flow, 1000W mono mode, protection circuitry, mono/stereo ground bridge circuit.
D-75	2	40	20-20k	0.05	0.05	0.001	0.001	20-20k 0.1	110	0.812	1.75 19.0 9.0	10	499.00	Fully protected against shorts, mismatches, open loads.

Model
Number of channels
Watts at 8 Ohms, All
Power Bandwidth, Hz-KHz
IM, %watt, %
THD, full rated power
THD, full rated power
THD, %watt, %
Signal to Noise, dB
High Level Sens., V
Dimensions, H/W/D, in.
Weight, lbs.
Price, \$
Features

Model	Number of channels	Watts at 8 Ohms, All	Power Bandwidth, Hz-KHz	IM, %watt, %	THD, full rated power	THD, %watt, %	THD, full rated power	THD, full rated power	Signal to Noise, dB	High Level Sens., V	Dimensions, H/W/D, in.	Weight, lbs.	Price, \$	Features
D-150A	2	80	1-20k	0.05	0.001	0.001	DC-20k	0.1	110	1.19	5.25 19.0 8.75	24	729.00	Has distortion indicator, otherwise the same as D-75 above.
DC-300A	2	155	1-20k	0.05	0.001	0.001	DC-20k	0.1	110	1.75	7.0 19.0 9.75	45	1149.00	Same as D-15A above.
PSA2	2	220	1-20k	0.01	0.002	0.002	20-20k	0.1	110	2.1	7.0 19.0 14.75	57	1699.00	2-speed fan, tone generator, compressor, load protection, power supply protection, mono/stereo switch, distortion indicator, filters, xlr input option.
Fostex														
A300	2	100	20-20k	-	0.05	-	10-50k	0.25	97	0.8	3.5 19.0 15.0	28	699.00	Ultra fast rise time, full load protection, input attenuators with xlr and phone inputs.
A600	2	200	20-20k	-	0.05	-	10-50k	0.25	95	0.8	5.25 19.0 15.0	36	995.00	Same features as above.
GLI/ISS														
SA2060	2	60	20-20k	-	0.05	-	-	-	-	1.3	3.5 19.0	15	299.00	Speaker selector switch and level controls on front panel.
SA2100	2	100	20-20k	-	0.05	-	-	-	1.0	1.0	3.5 19.0 11.38	16	429.00	Level controls and peak indicators on front panel, mono/stereo switch on rear.
SA2175	2	175	-	-	-	-	-	-	-	-	-	-	699.00	
SA2600	2	300	-	-	-	-	-	-	-	-	-	-	1195.00	
David Hafler														
P500	2	255	20-20k	0.007	0.007	0.025	8-85k	3	95	1.55	7.75 19.0 14.0	53	950.00	Also available as a kit-\$800.00, mono switchable, 3 speed fan, level controls, phone and xlr jacks, balanced input, clip and signal presence lights.
P225	2	115	20-20k	0.005	0.005	0.02	2-160k	3	100	1.55	5.5 19.0 11.75	32	510.00	Also available as a kit-\$435.00, mono switchable, level controls, phone jack inputs.
P505	2	255	20-20k	0.007	0.007	0.025	2-110k	3	100	2.3	7.25 19.0	50	825.00	Also available as a kit-\$725.00, mono switchable, level controls, phone jack inputs.

Model	Number of Channels	Min. Cont. Power/Chan. watts at 8 ohms All channels driven	IM, %watts, Hz-KHz	IM, %watts, %	THD, %full rated power	THD, %watts, %	THD, %full rated power	Hz. Frequency Response, -dB	Signal to Noise, dB	Right Level Sens., V	Dimensions, H/W/D, in.	Weight, lbs.	Price, \$	Features
Rane														
19A6	6	100	20-20k	0.1	0.1	0.2	0.2	5-80k +0,-3	90	0.775	5.25 19.0 11.5	44	1299.00	15 dB limiter for each of six channels, auto bridging for each pair, 900 watt total capacity.
Roland														
SRA-1200	2	60	-	-	-	0.05	0.05	10-40k +0,-1	110	-	4.09 18.9 14.8	22	550.00	170W into 8 ohms mono bridged, balanced XLR or unbalanced phone jacks, send output jacks, unbalanced input of +4 dBm or -10 dBm.
SRA-2400	2	120	-	-	-	0.01	0.01	10-60k +0,-1	110	-	4.09 18.9 17.5	33	895.00	340W into 8 ohms mono bridged, balanced XLR or unbalanced phone jacks, send output jacks, protection circuits for ASO-DC voltage-overheating.
SRA-4800	2	240	-	-	-	0.01	0.01	10-60k +0,-1	110	-	5.79 18.9 18.0	53	1795.00	800W into 8 ohms mono bridged, 2 speed fan, bar level meters, balanced XLR or unbalanced phone input jacks.
St Louis Music														
RMA-1000	2	85	10-50k	0.05	0.05	0.02	0.2	10-50k +0,-3	100	1.0	3.5 19.0 14.5	38	599.00	150W into 8 ohms and 22W into 2 ohms, bridgeable 440W into 4 ohms, balanced xlr and phone jacks, built in limiter, protection circuitry.
RMA250	2	75	10-50k	0.1	0.1	0.05	0.1	10-50k +0,-3	100	0.775	3.5 19.0 13.5	21	399.00	125W into 4 ohms and bridged 250W at 8 ohms, 5-way binding posts, protection circuitry, built in limiter.

Model
Number of Channels
Min. Cont. Power/Gain
Power Bandwidth, Hz-KHz
IM, %cart, %
IM, full rated power
THD, %cart, %
THD, full rated power
Res. Frequency Response,
Hz, %cart, +/- dB
Signal to Noise, dB
Dimensions, H/W/D, in.
Weight, lbs.
Price, \$
Features

Model	Number of Channels	Min. Cont. Power/Gain	Power Bandwidth, Hz-KHz	IM, %cart, %	IM, full rated power	THD, %cart, %	THD, full rated power	Res. Frequency Response, Hz, %cart, +/- dB	Signal to Noise, dB	Dimensions, H/W/D, in.	Weight, lbs.	Price, \$	Features
Soundcraftsmen													
PCR-800	2	205	20-20k	0.05	0.05	0.05	0.05	105	1.5	4.87 8.5 12.0	22	449.00	275W at 2 ohms, 600W at 8 ohms bridged, 2-speed fan, true clipping indicators for each channel.
PR1800	2	375	20-20k	0.05	0.05	0.05	0.05	105	1.22	5.25 19.0 17.0	60	1199.00	Power MOSFET design, 600W at 4 ohms, 750 at 2 ohms, and 1500W at 4 ohms bridged, dual relay DC protection, compressor/limiter circuit, 2 speed fan, XLR/phone input.
RA7501	2	250	20-20k	0.05	0.05	0.09	0.09	110	1.2	7.0 19.0 15.0	55	899.00	750W at 8 ohms bridged, Class H signal tracking power supply, no current limiting, overload protection, level controls, true clipping indicators, bal/unbal inputs.
RA650	2	250	20-20k	0.05	0.05	0.09	0.09	110	1.2	7.0 19.0 15.0	53	799.00	Same as RA7501 but no level controls or balanced inputs.
RA7502	2	250	20-20k	0.05	0.05	0.09	0.09	110	1.2	7.0 19.0 15.0	55	999.00	Same as RA7501 plus 0-500W metering for each channel. Also available as model RA7503 with 100 LED bargraph spectrum display of output priced at \$1199.00.
RA5502	2	125	20-20k	0.05	0.05	0.05	0.05	105	0.95	5.25 19.0 15.0	30	649.00	Power MOSFET circuitry, 190W at 4 ohms, level controls, LED power meters, true clipping indicators. Model RA5501 same but no level controls or meters-\$549.00.
SUNN													
SA-20	2	300	20-20k	0.05	0.05	0.05	0.05	108	1.0	5.25 19.0 12.0	36	649.00	600W bridged for mono. Also available as model SA 21 with balanced inputs and fluorescent display priced at \$699.00.
SPL 6800	2	600	20-20k	0.05	0.05	0.05	0.05	105	1.0	7.0 19.0 19.75	67	1299.00	1200W bridged for mono, limiters, digitally controlled, balanced inputs.
UREI													
6150	2	100	20-20k	0.05	0.05	0.1	0.2	100	1.1	1.75 19.0 14.0	22	746.00	Bridging, active diff. balanced inputs, full comp. circuits.
6250	2	175	20-20k	0.05	0.05	0.1	0.2	100	1.1	3.5 19.0 14.0	36	896.00	As above.

Model
Number of Channels
Min. Cont. Power/Chan.
Watts at 8 ohms All channels driven
IM, %watt, %
IM, Full rated power
THD, %
THD, Full rated power
THD, Full rated power
Hz, Frequency response,
Signal to Noise, dB
Dimensions, H/W/D, in.
Weight, lbs.
Price, \$
Features

6300	2	310	20-20k	0.05	0.05	0.1	0.2	20-20k +0,-1	100	1.1	5.25 19.0 14.0	52	1346.00	As above, has fan cooling.
6500	2	360	20-20k	0.05	0.05	0.1	0.2	20-20k +0,-1	100	1.1	7.0 19.0 16.0	84	2396.00	As 6300 above, dual mono amplifiers, plug in modules.
Yamaha														
PC1002	2	100	10-100k	0.01	0.01	-	0.01	10-50k +0,-1	105	0.775	5.5 19.0 13.25	34	780.00	Balanced XLR, unbalanced phone inputs, bridgeable, input attenuators, multiple protection circuits, 300W mono at 8 ohms.
PC2002	2	240	10-100k	0.01	0.01	-	0.003	10-50k +0,-1	110	0.775	7.0 19.0 16.25	44	1250.00	Same as above but 700W mono bridged at 8 ohms, also available as model PC20002M with 2 illuminated peak meters at \$1350.00
PC5002M	2	500	10-100k	0.01	0.002	-	0.003	10-50k +0,-1	110	1.73	10.38 19.0 19.0	134	3550.00	Dual mono amps, thermal and power protection, input attenuators, 1500W mono into 8 ohms, balanced/unbalanced inputs, 2 illuminated peak meters.
P2050	2	45	20-50k	0.03	-	0.01	0.02	20-50k +0,-1	110	0.775	3.5 19.0 12.63	16	425.00	Input attenuators, thermal protection circuits, XLR and phone jack inputs, stereo/mono configuration.
P2100	2	85	20-50k	0.03	-	0.01	0.02	20-50k +0,-1	110	0.775	5.25 19.0 12.63	31	695.00	Same as model P2050 above.
P2200	2	200	20-50k	0.01	-	0.005	0.01	20-50k +0,-1	110	1.25	7.0 19.0 14.5	44	1195.00	2 peak meters, XLR and phone input bal/unbal, input attenuators, thermal protection circuits, stereo/mono outputs. Also available as P2201 no meters-\$1095.00.

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Readale, Ontario,
Canada M9V376

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P.O.Box 1237
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Carvin Mfg. Corp.
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Escondido, CA 92025

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Hawthorne, NJ 07506

Crown International
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Elkhart, IN 46517

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Norwlk, CA 90650

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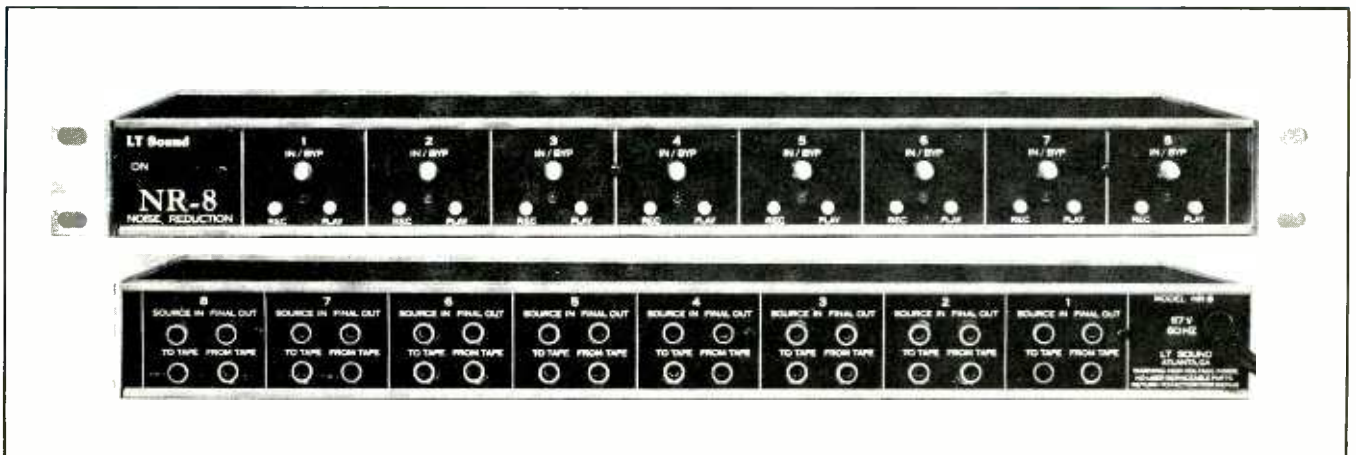
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Musicians Notebook

LT Sound NR-8 Noise Reduction Unit



You've probably seen the ads from LT Sound offering factory direct prices on rack-mount recording studio equipment (compressors, reverb, parametric equalizers, and so on). Anticipating that most people might be reluctant to send off their bucks to some company whose equipment you won't find in a store, LT Sound offers a demo record, 15 day satisfaction guaranteed "trial," two year warranty, and a toll-free 800 number. Still, as someone who had never had any experience with LT Sound equipment prior to this interview, I was curious whether they could back up their claims of better performance at lower prices with appropriate hardware. Did they? Read on for the answer...

What is it? The NR-8 is an eight-channel noise reduction unit that fits in a single-space, rack-mount package. Although it costs less than eight channels of dbx (the NR-8 lists for \$795.00), it gives approximately the same main specs—up to 30 dB of noise reduction coupled with 10 dB of extra headroom. And although this unit is not licensed by *dbx*, it nonetheless claims

the ability to decode *dbx*-encoded tapes. If this all sounds too good to be true, don't be too cynical; the NR-8 does what it claims to do, thanks to a low-cost telecommunications IC which is conceptually very close to being "*dbx* on a chip."

The story behind low-cost companding. Low-cost companding noise reduction first became practical several years ago with the introduction of the NE570, a compander IC introduced by Signetics. This part consists of two variable gain cells (VCAs), two rectifier sections, and two op amps. These are usually hooked up so that one VCA, op amp, and rectifier make up a compressor; the other VCA, op amp, and rectifier make up an expander. The NE570, while not exactly state-of-the-art with respect to noise and distortion specs, does its job quite well and has found its way into flangers, delay lines, and other devices that need low-cost noise reduction (after all, it would be silly to add an expensive *dbx* noise reduction unit to a \$50 stomp box).

More recently, Signetics introduced an improved

version of the NE570, the NE572. This newer part eliminates the internal op amps, which never did have particularly good slew rate or noise characteristics. (In fact, for more critical applications people almost always used external op amps with the NE570, so I guess Signetics took the hint when it came time to do an update.) In addition, the NE572 gain cell has better specs and a more sophisticated rectifier than the NE570.

The NR-8 uses eight individual NE572s (one per channel) with associated support circuitry. Because each IC can be configured as a compressor and expander, the NR-8 offers simultaneous encode and decode for each channel; therefore, if you monitor signals coming off the tape, you will not be solely monitoring the encoded signal but the encoded and subsequently decoded signal. This lets you know whether the encoded signal is recording on tape properly, as well as what it sounds like after decoding. As a bonus, since the compressor and expander are made from the same chip, tracking between the two sections is excellent; in theory, any error that might show up in one stage would be canceled out by an equal-but-opposite error in the other stage.

Interestingly, the compression and expansion curves used by Signetics are the same as for *dbx*—2:1 compression and 1:2 expansion. However, it's important to remember that *dbx* also boosts treble on encode (pre-emphasis) and cuts treble on decode (de-emphasis). The reason for this is that with straight compression, while noise will be virtually non-existent if you're not passing any signal through the system, the noise *will* appear whenever a signal appears (this is very much like modulation noise effects with tape). This problem is called "pumping" or "breathing," and pre-emphasis/de-emphasis helps reduce the apparent hiss level. When you add compansion and pre/de-emphasis together, you end up with a pretty quiet signal.

Mechanical details. The support circuitry for the NE572 is all good quality-stuff—TL074 quad op amps and NE5532 dual op amps. The resistors are 5% tolerance, and tight tolerance capacitors are used at several points in the circuit to aid in proper channel matching. The circuit board is single-sided, but well laid-out and with generous ground traces. The NR-8 is not exactly built like a tank, but it is cleverly constructed so as to allow for a good compromise between sturdiness and low cost. There was one small problem: The transformer had a bit of a buzz—perhaps the laminations needed some more attention during the manufacturing process.

Using the NR-8. The unit is simple to operate. There are 32 phono jacks on the back; each channel includes four jacks, unambiguously labelled as SOURCE IN, TO TAPE, FROM TAPE, and FINAL OUT. These hook up between the console outputs to the tape deck and the returns from the tape deck to the console. A single switch (plus associated status LED) for each channel determines whether the noise reduction is in (with both the encoded signal going on to tape and the decoded signal coming from tape), or out (noise reduction bypassed). There are also two trims for adjusting the system record and playback levels, and these should be tweaked for optimum results. Proper

trimming allows the NR-8 to be electrically compatible with +4 dBm as well as -10 dBV studios, although you have no choice of connectors other than the RCA phono types.

At this point you might wonder why, if these telecommunications ICs are so hot, isn't everyone using them instead of *dbx*? Well, there are some differences. First of all, the *dbx* VCA offers better specs than the VCA in the NE572. Second, *dbx* uses a different kind of signal level detection circuit which exhibits a logarithmic response rather than the straight averaging response used by the NE572. With a product such as the NR-8, which seems designed with the smaller studio in mind, chances are the noise reduction will not be the limiting factor in your overall clarity of sound—in other words, you'd probably make a far more substantial difference in sound quality by upgrading the mixer or tape recorder rather than the type of noise reduction. I don't think anyone would dispute that *dbx* is a more precision kind of device than noise reduction based around industrial-grade companders; however, whether this extra degree of precision is worth the additional expenditure is something that *can* be debated. My personal opinion is that for most applications, the NR-8 would probably be all the noise reduction you would need. Granted, it doesn't have some niceties (like a three conductor AC plug) but its functionality cannot be faulted.

There's not much else you can say about a noise reduction unit... they all do color the sound somewhat, and the NR-8 is no exception. But I feel that the benefits of noise reduction usually outweigh the disadvantages, and that certainly includes the NR-8. If you can't afford eight channels of *dbx*, LT Sound's version of noise reduction represents a COST-EFFECTIVE alternative.

Postscript. In addition to trying the NR-8 with tape, I ran a few other experiments. While most of them didn't pan out, I did find some less obvious but still useful noise reduction applications.

With spring reverb, compressing the signal going into the reverb and expanding the signal on the way out can shorten the reverb decay time as well as quiet down any residual noise. The de-emphasis does reduce brightness somewhat, but spring reverbs are not all that bright to begin with anyway so the difference is not particularly noticeable—and having a choice of two different spring sounds can be useful.

Another experiment involved splitting a drum signal, sending one line through the expander section before going into a mixer, sending the other line directly to the mixer, and mixing the expanded sound in the background. The expanded sound is more muffled and percussive than the straight signal, which adds a feeling of "power" and "bottom." For best results though, remember to mix the expanded signal in sparingly. (For an even heavier effect, run the modified drum signal through two expanders connected in series.)

Finally, if you're desperate for a compressor for guitar or bass the NR-8 can be pressed into service. Pass the instrument through a preamp and feed the preamp output into the compressor, then take the output from the compressor and pass it through a tone control to remove some of the highs and restore a more natural sound.

The Market Place

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ELECTRO-VOICE MICROPHONE



Electro-Voice's new cardioid condenser microphone, Model 1772 has been designed for problem sound reinforcement systems where reflection and speaker placement demand superior gain-before-feedback. The model 1772, maximizes gain-before-feedback through a smooth, peak-free frequency response, a fine-tuned cardioid pick-up pattern which reduces room reverberation and rejects unwanted background noise, and an innovative transducer positioning for exceptional sensitivity. The mic is designed for use with a variety of close-talking applications,

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SHURE HEAD-WORN MICROPHONE/MONITOR

Shure Brothers' new Model 512 is a headset that combines a miniature dynamic microphone with a comfortable, open air headphone in an economical package. The head-worn microphone/monitor combination offers hands-free convenience and consistent microphone placement for musical performances where freedom of movement is essential. The 512 is also suitable for sports and news announcing, communication systems, and special events remote broadcasting. This mic was designed for close mic'ing with a frequency response of (50-15,000 Hz) and is specially tailored for the vocal spectrum. The microphone's cardioid (unidirectional) polar pattern isolates the user's voice by minimizing background sounds. The 512's microphone performance parameters are tightly controlled, resulting in consistent response and output, while the headphone response of (100 to 10,000 Hz) is intended to enhance voice intelligibility. The headband easily adapts to any head size or hairstyle, and the microphone boom length and cartridge position are also fully adjustable. The 512's light weight reduces user fatigue even when worn for long periods of time. The headphone's convenient left ear only design allows the user to hear sounds outside his monitor/cue without un-



comfortable headband positioning in order to leave one ear open. The 512 is made of durable stainless steel and thermoplastic with soft foam earpads. There are two 2.1m (7 ft.) attached cables: one 2-conductor shielded with black 3-pin XLR connector (microphone) and one single-conductor shielded with 2-circuit phone plug (receiver). A foam windscreen/pop

filter is supplied to help minimize unwanted noise when the mic is used outdoors in windy locations, or when the user has a tendency toward explosive "p," "s," or "t" sounds. An easy-fastening cable clip secures the cable to clothing, keeping it out of the way and diminishing cable noise. User net price is \$117.

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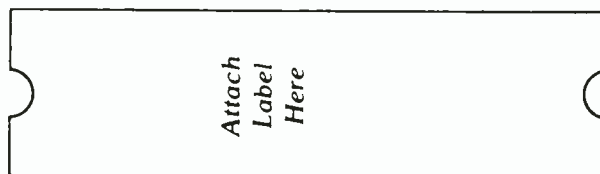
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- servo control over reel rocking in edit mode
- spot erase capability
- coarse and fine pitch controls with blinking LED for ON status
- optional full function remote control and auto locator

Increase your audio production capability while decreasing your costs. You'll not only save on your initial investment, but operating costs as well — both tape and maintenance.

Right now, the B-16 is the smart move in 16-track hardware. Let your Fostex Professional Multitrack Dealer^o prove it. For real.

- * Suggested retail
- + Dolby is a registered trademark of Dolby Labs, Inc.
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I N S T A N T



digital delay feature programmability setting to the next in other digital delay manufacturers. Roland has elected to give you a programmability of the Roland Digital Delays: echo to full-dimensional flanging to there... just push a button (or a footswitch). What's more, Roland has provided program higher resolution and more delay time per dollar on the market. The features speak for themselves:

Both Units: Four convenient footswitches: Delay switch between Memory Channels), Playmate (to time), and Hold. Precision control of Delay Settings: to 10 mSec in 1 mSec steps. Wide Frequency Response-Digital Companding and Pulse Code Modulation (16 bit A/D converter) increase frequency response, to effective dynamic range of 100 dB with only .03% THD.

SDE-1000: Four channels of microprocessor-based memory, 1.125 Sec. of Delay and LED readouts for Delay time for \$499.00.

SDE-3000: Eight channels of memory, 1 mS to 4.5 Sec. of LED readouts for Delay Time, Feedback Level, Output Level, Modulation Rate, and Modulation Depth—all for \$1099.00.

Instant Delay. Once you've experienced it, you won't be able to settle for less.

Roland Roland Corp US, 7200 Dominion Circle, LA, CA 90040.

With most digital delays, the more features you add, the more time it takes to set-up good sounds. Why let any product slow you down? The new digital delays from Roland give you every you could ask for, and also provide to allow you to go from one delay an instant. You see, where the facturers give you a lot of knobs, lot of convenience. The pro- lets you go from crystalline lavish chorus and on from when you're onstage). mability while offering lar than any product on

On/Off, Preset (to remotely set delay adjustable from 1 sponse/Low (equivalent to a give an effec-

1 mSec to

Delay, Mod-

D E L A Y

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