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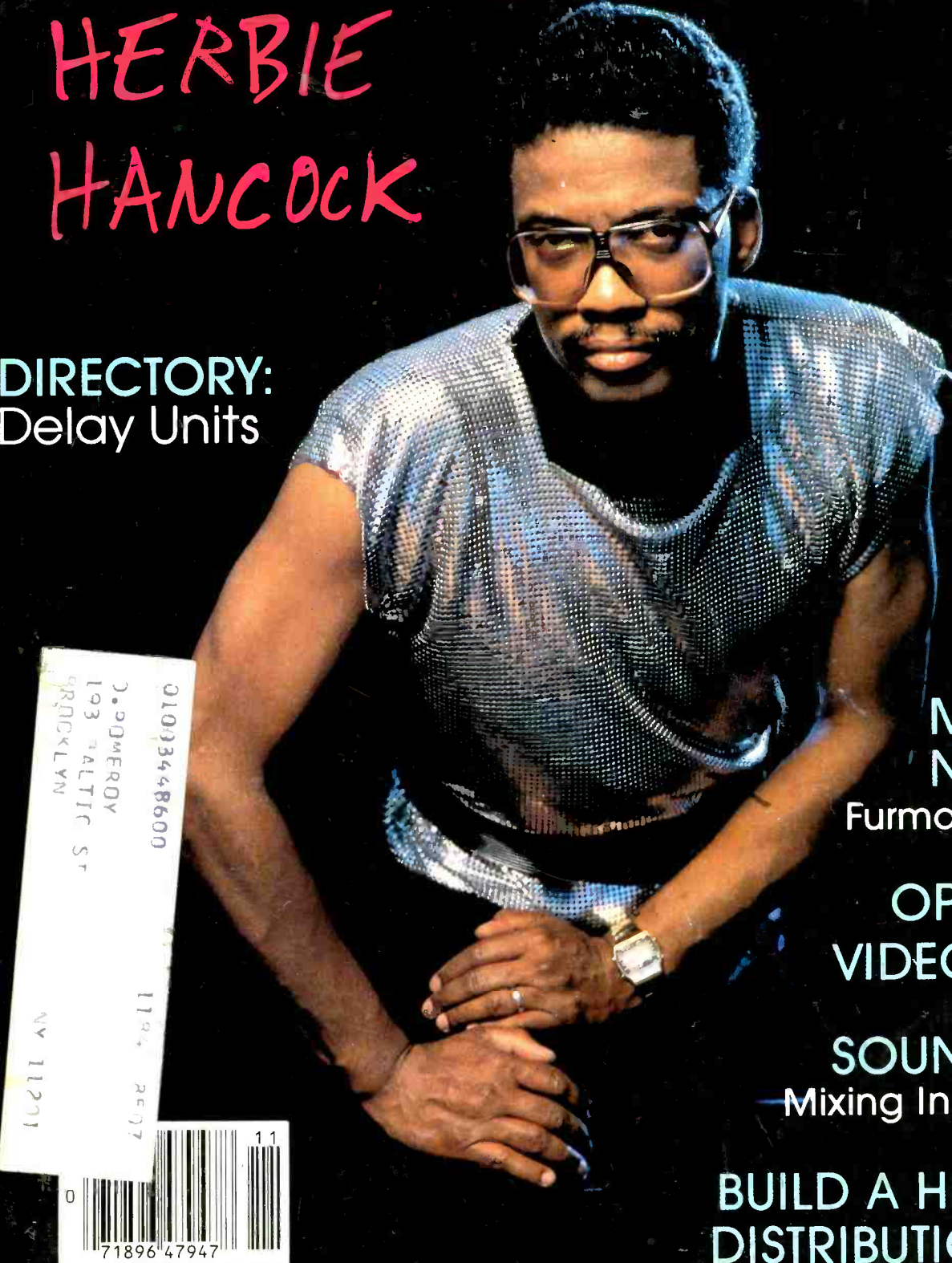
MODERN

RECORDING

& MUSIC

NOVEMBER 1984 VOL. 10 NO. 11 \$2.25

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MODERN RECORDING & MUSIC

FEATURES

- 8 RECORDING TECHNIQUES**
by Bruce Bartlett
Just why do we record, anyway? In this month's edition, Bruce Bartlett answers his own questions with some sharp insights into the reasons we do what we do—and how we can do it better by opening our ears.
- 26 HERBIE HANCOCK**
by Gene Kalbacher
For over two decades Herbie Hancock has been in the vanguard of modern music. From his innovative keyboard work with Miles Davis in the '60s to his pioneering fusion in the '70s and his groundbreaking electronic funk of today, Hancock has never compromised, never stopped growing as a musician. Even in the area of video he has pointed the way for others; his "Rockit" clip swept the 1984 MTV awards. In this in-depth interview, Herbie Hancock discusses, all of the above and the inspiration behind his creative processes.
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by Bill Milkowski
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Absorbing Sound and Costs

I would like to know the most effective and/or least expensive way to build a soundproof room or booth. Also, I've come across the term Sonex on occasion in your magazine. Can you explain what it's used for, as well as where I can purchase it?

—Floyd B. White
Augusta, ME

We received the following reply from C. Nicholas Colleran, president of Alpha Audio.

Most effective and least expensive can often be conflicting terms. Relative expense can vary with your point of view and income status. There also appears to be much confusion as to

the meaning of the words "sound proof."

There are basically two types of sound control materials. These are barriers and absorbers. Sonex, the material you mention, which we distribute, is a sound absorber. Its patented anechoic wedge shape increases the absorption surface 4½ times and yields a 1.00 sound absorption coefficient above 500 Hz. (100% absorption). While the elimination of reflections significantly lowers what is perceived as the sound level in the room, the absorber does little to prevent transmission of sound from one room to the outside or from the outside into the recording room. The actual transmission loss is about 14 db with Sonex.

Sound transmission loss is accomplished by dense, massive materials and decoupling of the barrier walls. The most massive and compact

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new members in the planning process is larger than the number in the picture. Since a lot of our friends have only used one or two models so far, we thought we'd better introduce the family. The next time we may not be able to get them all in one picture.

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material we know of is Acoustilead. This can be applied to an existing wall and increases the thickness by only a fraction of an inch. Not only will the lead seal the acoustic paths for air-borne sound, it will lower the resonant frequency of the wall to reduce transmission through the structure.

Both of these materials may appear expensive, but significantly reduce the labor cost of accomplishing your purpose. If you have a lot of time and little money, you can achieve isolation and high transmission loss by using multiple overlapping layers of sheet rock with the joints well sealed. The inner and outer walls should have separate stud work. The studs should alternate and the gap should be filled with an absorber such as fiberglass.

To the best of our knowledge, there is no economical way to achieve the full effect of Sonex with an alternate material. Good absorption characteristics can be accomplished with fiberglass-lined cavities faced with peg board or other flexible material mounted so that the depth varies from one end of the wall to the other. When using fiberglass, care should be taken that it is covered with an acoustic transparent material which will prevent glass particles from entering the air you breathe. Such a material is available as Sound-tex, a wall covering which has a .20 noise reduction coefficient as well. We introduced this product in July and will be showing it at the New York AES in the fall.

Mic Quality is a Matter of Opinion

In your December 1983 issue, Dave Stewart talks about using two inexpensive Beyer M20s on the first Eurythmics' LP, *Sweet Dreams Are Made Of This*. He discusses getting the sound right from the source to the tape and not using special mics, which he says can create a synthetic sound. Can a cheaper mic really compete with a Neumann U87 or U47, as far as quality goes, on vocals or instruments?

—Bill Jenkins
 Manchester, CT

Well, Bill, that depends on your definition of "quality." If "quality" means "wide-range, flat frequency response and high sensitivity," the expensive Neumanns win. If "quality" means "whatever sounds best," then sometimes inexpensive mics can compete. Here's why:

1. Many inexpensive omnidirectional dynamic mics have very low distortion, and have a frequency response wide and smooth enough for the source being recorded.

2. Some inexpensive microphones have a limited frequency response, but if they are used on a sound source with a limited response (spectrum), there's no loss. A wider-range response just adds noise and leakage.

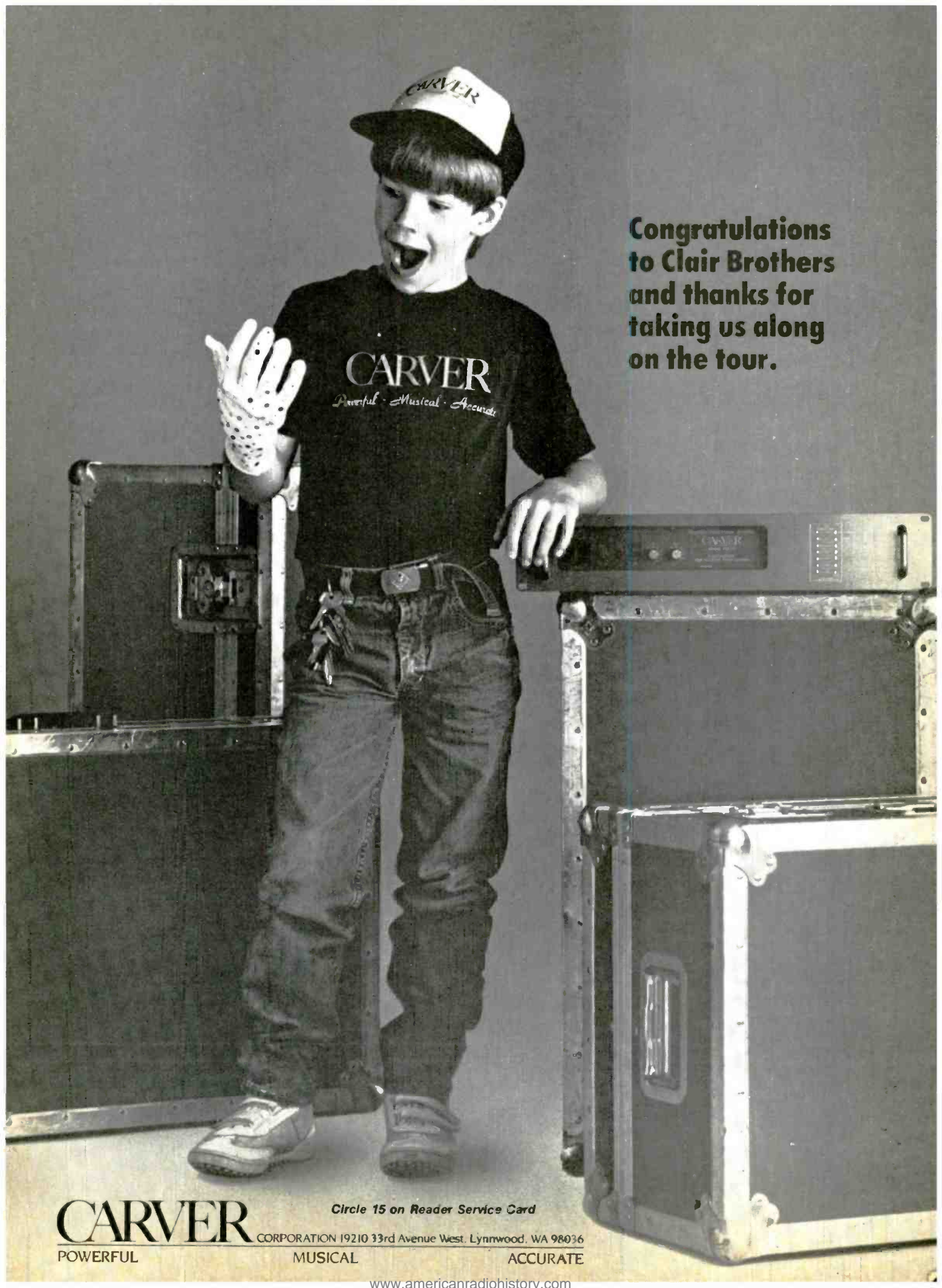
3. Some inexpensive mics have a rough, colored response that just happens to sound right on a particular instrument, when it's mic'ed in a certain way and mixed with other instruments. For example, a mic with a rolled-off low-frequency response might be best for mic'ing an acoustic guitar close to the sound hole, because this placement over-emphasizes the bass.

I've found that if a strange frequency response provides a good sound, there's usually a good scientific (or subjective) reason for it. Wide-range, smooth-response microphones are still necessary for fidelity on most instruments. But as John Woram says, if a cheap mic sounds good to you, that's reason enough to use it.

Some Feedback On Feedback

I found Bruce Bartlett's article "How to Tame Feedback" (*MR&M* June '84) sound and informative for those lacking much experience in stage situations. I've never really had a problem with my main system feeding back, but those monitors can drive you nuts.

There is one part of the article that deals with using an equalizer on a monitor system. It describes turning up your system to the point of feedback and adjusting the offending frequencies. I've



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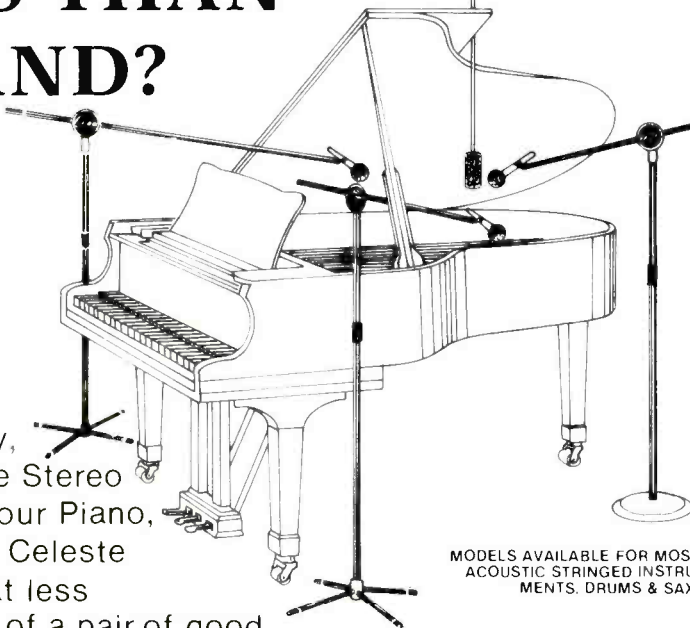
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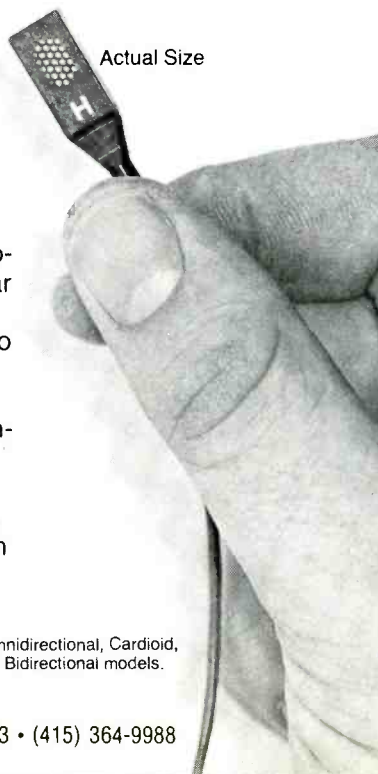
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seen this method outlined in nu-
merous articles and there has
always been one thing that bugged
me. You simply cannot do this in a
club situation, which is where
most folks play. It's been my
experience that when a club opens
the doors, it has customers. You
just can't say to the management:
"Hey, relax. This'll only take a
minute. Squeeeeeeeal!" The cus-
tomers will have a fit. Our band
has been nearly stoned to death
for the slightest little peep during
sound check.

I'm not saying avoid equalizers.
We use them all the time. All I'm
saying is that if you play in clubs
and you're supposed to start at
10:00 and you set up at 7:00 or
8:00, there are going to be people
in there. Don't whip out and buy a
1/6 octave equalizer and think
you're going to take that sucker
down to the Holiday Inn or the
He Ain't Here Tavern and notch-
filter the hell out of that feedback
before you start.

The best advice concerning
monitor feedback was Bruce's.
Find a compromise between no
squealing, volume and EQ. You
can only do what your gear and the
club management will allow. If the
band members still are not satis-
fied, you can upgrade your gear
somewhat or threaten to make
everyone wear headphones on
stage.

If the general public understood
what is involved in setting up a
sound system, it might be more
tolerant of squeals and squawks.
Nobody said life was easy.

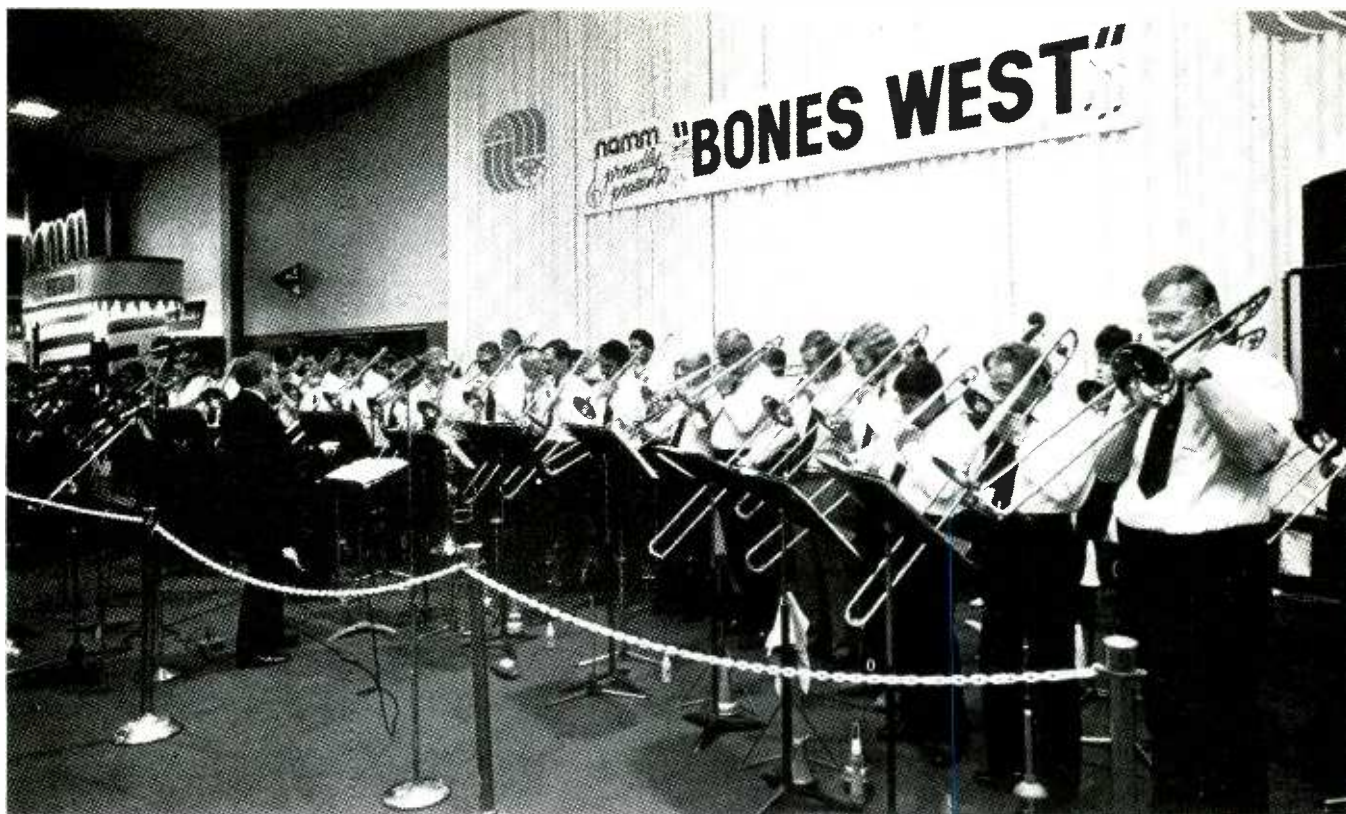
—Dave Weatherwax
Fairfax, IL

*Bruce Bartlett replied to the letter
from Dave Weatherwax.*

Thanks for the "real world" advice,
Dave. About all you can do is get into
the club during off-hours.

What's needed from sound-equip-
ment manufacturers is a device that
detects and corrects feedback as it
occurs. Such a device would have to
differentiate between a feedback
tone and music (say, by long-term
autocorrelation). Then it would
detect the feedback frequency and
insert a notch filter at that frequency.
Unfortunately, this automatic feed-
back notcher would probably exceed
the budget of most club musicians.

If anyone reading has a solution to
this problem, please let us know.



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Recording Techniques

Why Do We Record?

In this series we've focused on techniques for recording music, without paying much attention to the music itself. Occasionally, it's good to remind ourselves that *music* is the main reason why we record!

Music can be exalting, exciting, soothing, sensuous, fulfilling. It's wonderful that recordings can preserve it. As recording engineers, it's to our advantage to better understand what music is all about.

Music starts as an idea or feeling in the mind and heart of its composer. Musical instruments are then used to translate these ideas and feelings into sound waves. Somehow, the emotion contained in the music—the message—is coded in the vibrations of air molecules.

We convert those sound waves to electricity, and store them magnetically. The composer's message manages to survive the trip through the mixing console and tape machines. Then we transfer the signal to disk. Finally, the original sound waves are reproduced in the listening room, and, if the composer and musician

are successful, the original emotion is miraculously reproduced in the listener as well.

Of course, not everyone reacts to a piece of music the same way, so the listener may not perceive the composer's intent. Still, it's amazing that anything as intangible as a thought or feeling can be conveyed by a tiny wiggling groove in vinyl.

Like life, the meaning of music is itself—its moment-to-moment unfolding or happening—rather than a striving for some distant goal. The point of music lies in what it's doing now, in the present. In other words, the meaning of an Am7 chord followed by a FMaj7 chord is the *experience* of Am7 followed by FMaj7.

Increasing Your Involvement In Music

Some say that music is best appreciated with an altered state of mind—being in love, high, or simply relaxed and very attentive. Sometimes, to get into music, you have to relax enough to lay back and listen. You have to feel unhurried, to be

content to sit between your stereo speakers, or wear headphones, and listen with undivided attention—to actively analyze or feel what the musicians are playing.

Music affects us much more when we're already feeling the emotion expressed in the song; for example, hearing "Could This Be Magic" when you're falling in love, hearing "Jessie's Girl" when you're jealous, hearing "Ghostbusters" when you're in a party mood, or hearing a piece by Debussy when you're feeling sensuous.

When you identify strongly with a particular song, that tells you something about yourself and your current mood. And the songs that other people identify with tell you something about them. You can understand individuals better by knowing their favorite music.

Different Ways of Listening

There are so many levels on which to listen to music, so many ways to focus attention. Play one of your favorite records several times while

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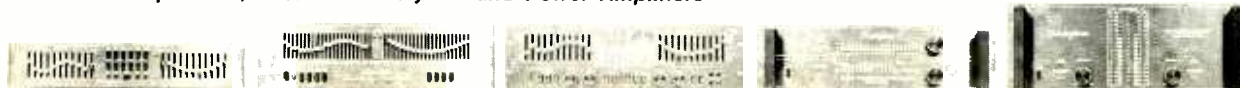
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listening to these different aspects:

1. Overall mood and rhythm
2. Lyrics
3. Vocal technique
4. Bass line
5. Drum fills
6. Sound quality
7. Technical proficiency of musicians
8. Musical arrangement or structure
9. Reaction of one musician to another's playing
10. Surprises vs. predictable patterns and so on...

By carefully listening to a piece of music from several perspectives, you'll get much more out of it than if you just hear it as background music. There's a lot going on in any song that normally goes unnoticed.

I recently played an old record and listened to the lyrics for the first time (I usually just listen to the music). The whole meaning of the song changed.

I'd guess that most people react to music on the basic level of mood and rhythmic motivation. But as recording enthusiasts, we hear much more sonic detail than laymen are aware of, because our occupation demands

sustained critical listening. The same is true of trained musicians focusing on the musical aspects of a performance.

It's all there for anyone to hear, but you must train yourself to hear selectively, to focus attention on a particular level of the multi-dimensional musical event.

For example, instead of just feeling excited while listening to an impressive lead-guitar solo, listen to what the guy is actually playing. You may hear some amazing things.

Here's the secret of really involving yourself in recorded music: Imagine yourself playing it! For example, if you're a bass player, listen to the bass line in a particular record, and imagine that *you're* playing the bass line. You'll hear the part as never before.

There are other, stranger ways to perceive music. It can be fascinating to respond to music *visually*. A lead guitar playing over a musical background can be a figure cavorting on a landscape.

Follow the melody line and see its shape. Hear where it reaches up, strains, relaxes. Hear how one note leads into the next. How does the

musical expression change from moment to moment?

There are times you can almost *touch* music. Some music has a prickly texture (many transients, emphasized high frequencies); other music is soft and gooey (sine-wave synth notes, soaring vocal harmonies); other music is airy and spacious (much reverberation).

All this is meant to show how music is more than just something to dance to, or to make money from, or to fill silence. It's a complex, multi-level phenomenon worth exploring. And recordings make such study possible.

Different Ways of Monitoring

Now let's apply different ways of listening to the recording situation. Let's say you're in the control room working on a pop music mix, and you're aiming for a realistic, natural sound. Listen to the instruments over the monitors and try to make them sound like they're really playing in front of you. That is, instead of trying to make a pleasant mix or a sonically interesting recording, try to control the sound you hear to simulate real instruments—to make them believable.

We're describing a situation similar to that of an artist trying to draw a still-life as realistically as possible. The artist compares the drawing to the real object and notes the *difference* between the two. Then the artist modifies the drawing to reduce the difference. Similarly, when you're striving for a natural sound, compare the recorded instrument with your memory of the real thing. How does it sound different? Turn the appropriate knob on the console that reduces the difference.

Alternatively, when you're mixing, imagine you're creating a *sonic experience* between the monitor speakers, rather than just reproducing instruments. Sometimes you don't want a recording to sound too realistic. If a recording is very accurate, it sounds like musical instruments, rather than just music itself.

This approach contradicts the basic edict of high fidelity: to reproduce the original performance as it sounded in the original environment. But some songs seem to require unreal sounds. That way, we don't connect the sounds we hear with physical instruments, but with the music *behind* the instruments—the composer's dream or vision.



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To illustrate the points just mentioned, I'll describe one of my favorite recordings: *Offramp* by Pat Metheny and Lyle Mays (ECM-1-1216). It was voted Jazz Record of the Year by *Playboy* (1982), and for me, it defines the purpose of music—and recording.

The album was produced to sound like music playing in space, rather than musicians playing in a room.

If you happen to have this record, listen to the song "Are You Going With Me." What is going on here? The lead melody line is in the distance! And unlocalized. That's an unheard-of reversal, putting the lead instrument in the background, off somewhere in space. The music is peaceful yet forward-moving, and includes a synthesized tribute to harmonica-virtuoso Toots Thielmans.

A very affecting tune is "Au Lait." the first section sounds distant and mysterious. The second section transports you to the Seine, with lovely chord changes and solos. The music becomes increasingly hazy and dreamlike, and just drifts off...like meditation, melting snow, or making love.

Now listen to "The Bat Part II." I can't adequately describe the beauty and spaciousness of this piece. The subtle chord changes suggest vast landscapes and sunsets...a forest in winter...the gentleness of a mother's love for her child. One incredible chord slips into another. Finally it ends with a solid "homeland" feeling, a musical "Amen."

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Musicians Notebook

Furman RV-2 Reverb



Although digital reverb is coming down in price, a lot of us still can't afford the \$1000-\$1600 necessary for one of these new wonder boxes. For those on a budget, the answer is the same as it has been for the last few decades: spring reverb. After all, springs are relatively durable, produce an excellent simulation of a large hall, and require minimal electronics. Of course, not all spring reverbs are created equal: some "twang" and "bong" horribly, while others sound quite decent. Furman has taken an approach that "bundles" a limiter and psueo-parametric equalizer in with the springs, thus allowing the user to minimize some of the problems inherent to spring reverb while tailoring the sound for specific applications. But does spring reverb still have a place in today's digimatic world? Read on...

What Is It? The RV-2 is a stereo reverb unit that takes up two standard rack spaces (3.5 inches high). Its retail price of \$525 places it within the financial reach of most small studios. Fortunately, in this case, saving bucks doesn't mean sacrificing sound quality. While the Furman doesn't have the versatility of digital models (which usually have different programs to simulate different types of acoustical environments), the main reverb sound it *does* produce is well-defined

and smooth. In addition, the RV-2's equalization controls, described later, are very effective for customizing the sound.

The Rear Panel. The RV-2 sent for review had a pair of unbalanced, line level ¼-inch phone jack inputs (33K input impedance) and a pair of unbalanced ¼-inch phone jack outputs (47-ohm output impedance). Optionally, the RV-2 can be fitted with balanced XLR connectors (requires installation of "B" option). Each channel also has a footswitch jack that accepts a standard guitar amp-type footswitch; pressing the switch disables or enables the reverb.

The only other control on the rear panel is an on-off switch, which I'm glad to see though some people feel it is redundant. Although I have all my effects powered by a master barrier strip (so in theory I shouldn't need individual on-off switches), there are projects that simply don't require a particular effect so I turn it off. After all, why leave it on if you're not using it? Besides, the turn-on/turn-off transients are not particularly kind to semiconductors, so the fewer times something gets turned on and off, the better.

Front Panel Controls. Going from left to right on the panel, the first control is a stereo/mono switch.

This simply bridges the inputs so that one signal can feed both reverbs, thus turning a mono reverb bus or track into a reverberated stereo sound. The outputs are always in stereo regardless of the switch setting.

The Input Level control is next in line, and here's where the RV-2 starts showing its character. Instead of having an overload indicator to help you set proper operating levels, the RV-2 has an LED that indicates when you're starting to hit the built-in limiter's threshold. Thanks to the limiter, this is one reverb that is quite forgiving of transients and sloppy input control setting; while you can turn up the input loud enough to cause distortion, you have to work at it.

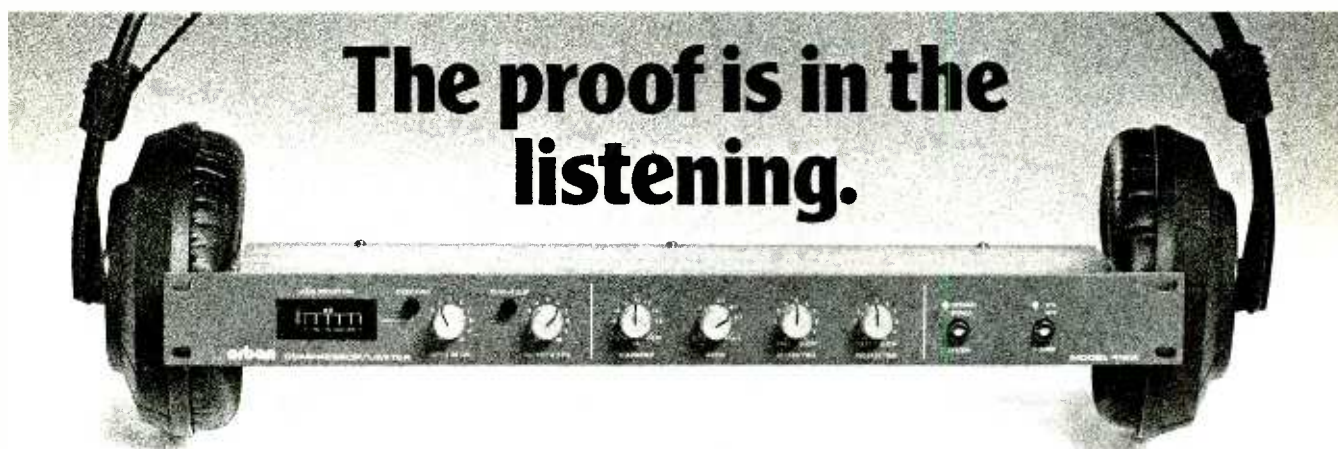
Adding a limiter is particularly important with spring reverb, since this minimizes the "twangs" and "bongs" caused by large transients that flex the reverb transducers into distortion. With most instruments (except drums), I thought that pushing the limiter just a bit brought out the best in the RV-2—I wouldn't push it hard enough to cause distortion, but enough to keep the limiter "exercising."

The next three controls adjust equalization. The first knob selects a midrange frequency from 160 Hz to 1400 Hz, while the second knob controls the amount of boost or cut at the selected frequency (up to ± 18 dB). While you can't adjust the Q, therefore making this section a quasi-parametric rather than true parametric equalizer, the Q seems to be fairly wide and is probably the setting I would choose anyway if there was an adjustable Q control. The final tone control knob is a shelving-type treble control, which provides up to 18 dB of boost or cut at 10 kHz.

The remaining two front panel controls adjust the direct level and the reverb level so that you can set a mix of the dry and reverberated sounds.

Applying the RV-2. I was able to try the RV-2 with several signal sources including electronic drums, voice, guitar, and, courtesy of a prototype Emulator II, strings and piano. As with most spring reverbs, drums brought out the worst in the unit due to "bonging" at the beginning of each beat, although frankly, as soon as you mixed in dry drums, any problems became far less noticeable. All the other instruments sounded very good through the reverb, which has the kind of "warmth" one tends to associate with better spring units. Best of all, the three tone control knobs really allow for tailoring the response to a particular instrument or application. With guitar, for example, cutting the midrange at about 400 Hz and boosting the treble a little bit gives a wide-range reverb that doesn't compete with the main guitar signal. Want a "room" with more absorption? Simple: Just turn down the treble, and cut the midrange a bit at 1400 Hz. Or how about more of a plate sound? Again, no problem; boost the treble, then mix the reverb sound a little further in the background so that the now-bright reverb doesn't become too prominent. Overall, the RV-2 gives a good account of itself in being able to obtain a variety of different timbres.

Now for the big question... I'm sure many of you are thinking, "Is it worth getting a spring reverb, considering that digital reverbs keep coming down in price?" Well, although digital reverb is getting



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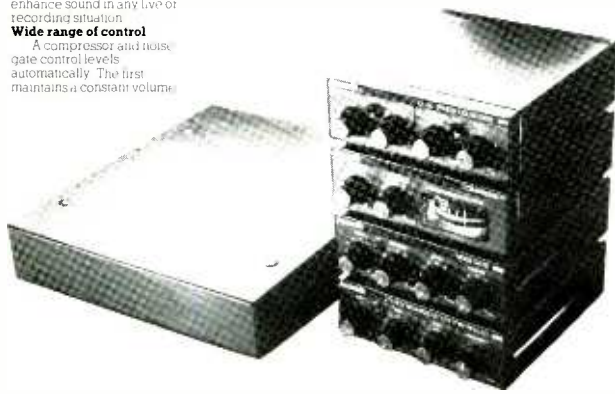
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cheaper, it's probably going to be a while before you see a digital reverb with a \$500 price tag that sounds decent; the technology is just too complex at this point. Eventually I think we will see \$500 digital reverbs, but these will probably be used more for "live" and home recording than for small professional studios. Besides, a lot of engineers feel that if you can notice the reverb, there's too much of it—after all, we're talking ambience here. Therefore, for most traditional audio applications reverb simply isn't that critical, and a good spring reverb will perform just as well for most applications as a digital reverb will (and save you enough to buy quite a few reels of tape).

A conflicting point to consider is that ambience is now being mixed up front and used as an effect (consider the drum work on Peter Gabriel's recent albums). Under these conditions, the sound of the reverb becomes considerably more important.

Interestingly, I had recently received two digital reverbs for review, one of which will be the subject of next month's "Musician's Notebook." As a result, I had a chance to set all three units up side-by-side to do a comparison of the different sounds. Of course, this gets into very subjective territory, but I was struck by certain characteristics. Digital reverb is great because it is so flexible—you can dial up a tight, short delay drum reverb sound one minute, then switch over to a super-languid reverb sound for one note of a guitar solo. Yet the quality of sound for the two technologies is quite different; springs tend to have a warmer, wetter sound, while digital delay is cleaner, brighter, and dryer-sounding. Lower-cost digital delays also have more *periodicity* to their sound—in other words, the reverb is not completely random but somewhat periodic. This becomes noticeable if you mix the reverb fairly high. The RV-2, on the other hand, has a more randomized sound which, to me, sounds quite pleasing, not unlike the difference between the "dry" transistor sound and the "warm" tube sound. Is there a way to get the best of both worlds? Well, actually I did find a way (unfortunately, quite expensive) to get exactly what I wanted...but it would be more appropriate to discuss that subject in next month's review, so we'll follow up then.

Overall Evaluation. I feel the Furman RV-2 is an extremely cost-effective piece of equipment that is well-designed, includes meaningful controls, and offers as good (or better) a reverb sound as anything else I've heard in its price range. The built-in limiting simplifies life considerably, and the EQ really does make a difference; it's not a frill by any means. I would have liked a switch that could place the EQ either pre- or post-reverb, but given the choice of one or the other I think Furman chose correctly to go post-reverb.

New technologies may come along, but they don't make the older technologies sound any different. Well-designed spring units have their own sound; there's something about spring reverb which is unique and cannot be duplicated with other technology. The RV-2 may not be a "trendy" product, but it offers quality and a surprising degree of control. Perhaps more importantly, it is much kinder to checking account balances than the new digital kids on the block. If you're looking for a cost-effective reverberation system, the RV-2 delivers a lot of performance for the price.

Sound Advice

This month, Steve Fisher, a sound person with broad experience in the club sound scene as well as with major concerts, shares his ideas on, among other things, making the transition from club sound to mixing in larger venues. Recently, Steve handled monitors for the John Cougar Mellencamp and Lionel Richie tours. He also talks about PA zoning, EQ techniques, and common mistakes made by developing sound people.

Modern Recording & Music: We heard you've had a hectic schedule lately.

Steve Fisher: Well, Cougar's tour was, I think, 40 shows in 46 days, which is just behind George Thorogood's famous 50 shows in 50 states in 50 days. I did a six-week tour with Richie after that.

MR&M: Who hired you?

SF: With Cougar, I was hired by the band. With Lionel, I was hired by Electrotec, which was the sound company in both cases. Sound people are usually hired by the week, and you generally get an itinerary beforehand.

MR&M: What do you ask when they call to offer a job?

SF: How many weeks will we be out? How many shows in a week? What are the accommodations? How are we going to get around? Then I get into the subject of pay.

MR&M: How did you get into the sound business?

SF: I worked with garage bands in high school and my first year of college. Back then you could be the sound guy if you had two SROs and a Bogen 100-watt amp. This was 1968. I did my first pro gig late in 1971 with Stevie Wonder. I used to do Peter Frampton's monitors in the midwest out of a Dodge Maxivan!

MR&M: Today you still do a lot of club sound. What do you look for when you go into a facility you are unfamiliar with?

SF: The first thing I do is just walk around the room to check out its size and layout. If I'm bringing in my equipment, I want to see how I can best splay it. If I'm using the band's

stuff I want to see how that splays, because clubs are very rarely even rooms as far as being rectangular spaces for the stacks to work into. One stack is often looking into a very different area than the other.

MR&M: Do you ever zone your PA, that is, have a section on a separate send?

SF: No, I don't. If anything, I run

the same stuff but use less components in one area, or run the amp level off a bit. I think zoning creates as many headaches as it solves, especially on a one-night basis. I'm not looking for any complicating variables. If I've got an area that's twice as big on one side, I'll make an adjustment in how much stuff I put up, and even then it's not major. First of all, the differences aren't usually that much. Second, you're looking for

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some sort of even sound wave. I don't like situations where the PA gets away from the stage. When you do that, the stage sound and the PA sound don't blend as well. I think keeping things tight is as important in big venues as in small ones.

MR&M: Don't you run into feedback problems with the PA close to the stage?

SF: Not really. Proper mic selection and proper sensitivity can usually prevent it. Quite often board operators will be banging a limiter and oversensitizing an area. If it was turned down 6 dB it would be in the same place, without feedback.

MR&M: Do you ever equalize using the feedback method, that is, cranking the volume up to where feedback begins and then backing off the feedback frequencies?

SF: Occasionally, but that's not my norm. I use a real time analyzer.

MR&M: Do you ever use tape to tune a system?

SF: No, but I do use it for program material when I walk around a room to check it out. Voice is the best thing for monitors and quite often for the house, too. I don't think I've ever EQ'ed to a tape.

MR&M: What common mistakes

do beginning audio engineers make?

SF: Well, sound people are getting better, there's no doubt about that. Still, the biggest problem is that people often don't know the acoustical or electrical limitations of PAs. They don't know when to stop mixing. It's like the faders are barbed and they can only go in one direction: up! By the end of a set, some people have got the master all the way up, the subs all the way up, the channels all the way up and they're clipping everything in line and wondering why it sounds squished and square. They don't really know how to mix, how to bring something down and place it in the mix. They think, "Well, the guitar is too hot, I'm going to bring up everything else." Another problem can come when people go from clubs to something else. They are used to being 16 feet from the stack which was probably something like two 18s and two horns burning their ears off, and then they get to a big hall and everything is different because you've got to energize so much more air.

MR&M: You mean lots of sound people don't adjust from club situations to bigger halls?

SF: Right. They don't know that six feet away their stuff is still putting

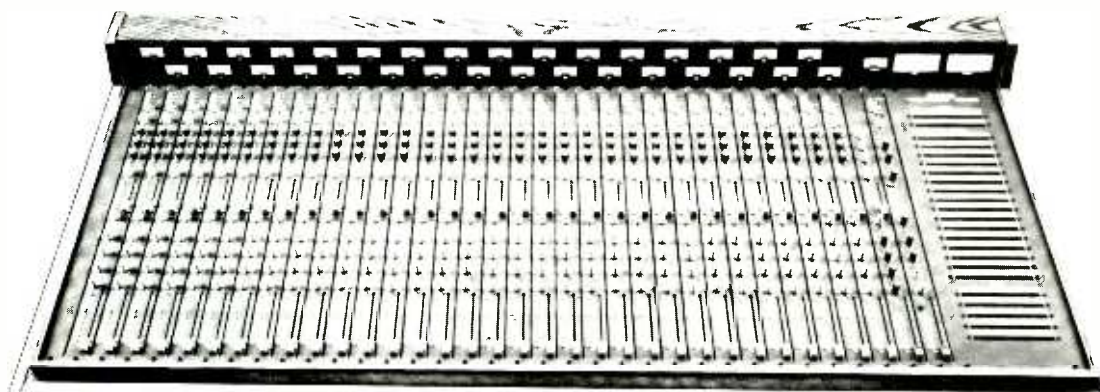
out 116 dB. But they're looking for 116 dB at 80 feet, and it just doesn't happen. They don't know what to do so they start pushing faders, and they blow it. Sometimes they think, "Well, I only paid \$90 for this EQ, it must be that."

MR&M: So they tend to zero in on something rather than look at the whole picture?

SF: I think basically the problem is that a lot of club sound people don't know the importance of the speaker system. Sometimes I go to clubs and see that they're having trouble and often they're looking for its source in the stuff they can grab right around them, like the electronic crossover, the mixer, or the EQ. More often than not it's a lousy speaker system causing problems because the speaker system is most definitely the weakest link in the chain. I don't think very many club sound people know that. Everything is highly sophisticated except transducers, which are mechanical. Maybe a cheap limiter could mess you up. Remember the very first Tapco 10-band graphic? I could make that pass 10 volts and that was a \$200 retail deal. It is hard to make the stuff sound bad because the regular signal level is something

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like two volts, and there's tons of headroom before it clips. Most electronic stuff is that way, but you can have a speaker system that is out of phase, crossover points that are wrong, cabinets that aren't matched, horns that aren't matched.

MR&M: What is the most common problem you experience when working with club acts?

SF: If they're touring, they often don't have a concept of how to do it on a one-night basis. It's usually not the band's fault, it's the sound guy's fault. He's so used to taking six hours on Monday to do a set-up, and they've got this little DI here and that little DI there and it's all jerry-rigged together. They take whatever they have and use it, because economically that's the thing to do. They keep trying things and they come up with this and that which actually does make the band sound good, but they don't realize that when you're opening for a national act, that method just doesn't work. There's no time for it. You had better pre-plan and find out how to get the band up there and set up in no time flat. If you have the output from this pedal and the output from that pedal as opposed to just a mic in front of the amp, you'd better

figure out how to do it with just a mic in front of the amp, in case you have to.

MR&M: How much time are we talking about?

SF: Opening acts should be able to get up and on the stage in 20 minutes, have 20 minutes to set up, and not count on a soundcheck. In the end, keeping your main and monitor requirements simple is going to net you more. I've seen people get a soundcheck and spend five minutes on the snare. Well, their soundcheck is over quickly and they don't even know if they've got any vocal harmonies. Sometimes I say, "Hey, the snare sounds great, how about the rest of the band?" They could have done at least one whole song, but they're not looking at the big picture.

MR&M: Are you seeing more female sound mixers?

SF: Not really, not in clubs. It's too physical. Last ones I saw were with Leon Russell and Roy Clark. You see more women in theatre sound because you can use the house speaker system and only bring in your mixer, mics, EQ, etc., and that's often just from a box on the back of the truck. With rock 'n' roll, pop, soul, whatever, you've usually got a 45-foot semi with

sound gear. With John Cougar Mellencamp I was in the truck loading every other night. We had a four-man crew consisting of me, the house guy, the electrician, and the "fly" guy who gets the PA in the air. Of course the local stagehand's union moves the stuff in the hall, but it's still hard work.

MR&M: What is the latest in club sound effects?

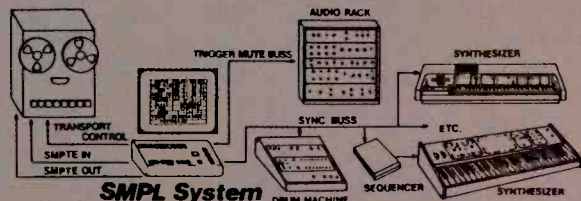
SF: Well, it's obviously digital reverb. They are coming out with units that have anywhere from 8 to 64 different basic sounds that you can effect in small ways for \$1500.

MR&M: Do you have a favorite effect or technique?

SF: I concentrate on vocal harmonies. They can make or break a band. It isn't easy live. I use delay or tape delay or reverb to get a nice studio sound. I use 600-millisecond delay mixed way under, almost subliminal. It seems to do a lot. I have an old Roland 201 Space Echo I've rebuilt that I use a lot. It's not the cleanest, but it's cheap and it works. There's a lot of sound people who grew up on it, and they still like to see it because they think "I go to 2 and set the speed here and regeneration there and I've got the sound."

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Studio Notebook

How To Sell An On-Location Recording

A few days ago, I was delighted to receive the ultimate in reader feedback from Dave Miller of Elkhart, Indiana. As you might remember, Dave was one of the featured winners in our not-soon-to-be-forgotten Design-A-Studio Contest a few months back and had sent me a very nice letter of thanks after the article had been published. Since we have always tried to encourage reader input here at MR&M, I was intrigued by Dave's admission that he's always wanted to try his hand at writing an article for these holy pages. After a modicum of confidence-building and a maximum of stale old jokes on my part, Dave promised to type something up and send it to me.

A few weeks later, my first reaction to the manuscript in my mailbox was that Sears Roebuck had sent my Christmas catalog incredibly early this year. I had expected a few hastily written pages from some well-meaning amateur that I might be able to punch up into a fill-in piece. Instead I found myself reading an extended three-part series on the basics of semi-professional mobile recording. After perusing the first few pages, the smile on my face had turned from amusement to admiration. (Several one-liners I plan to steal shamefacedly from this series in the months to come!)

Consequently we are proud to announce the debut of the Studio Notebook guest artist series, with Dave Miller's welcome advice on how to establish your own studio on wheels. Dave Miller took the time to share his knowledge with all of us, so how about the rest of you? Any other budding Hemmingways lurking in the wings?

As for me, it's adios for a while. Not that I'll be completely absent; you never can tell when the warped pen

of Rupert might strike, even in the middle of a Dave Miller article. For now let's turn the stage over to Dave himself. We'll see you soon.

J.R.

As I hope you know, my background in writing is nil. The only thing I've written was the article in the April issue of MR&M, when I was pleasantly surprised with a first place award in Jim's studio design contest. On yeah, I wrote an article for a four wheel drive magazine about my brother-in-law's handmade \$150,000 tractor, but that's it.

My background in on-location recording is a little more justified. I founded Absolute Recording in Elkhart, Indiana in 1975 (*Why, was it losted? JR*), and I have been recording on-location since that time. I have learned a tremendous amount of information over the years, and sharing this knowledge with you satisfies a goal I have of helping others avoid a few of the hard lessons I had to earn.

In the middle of a self-realization period I went through, I was confused about my career decision. Doing a job I loved while still achieving financial independence was more than I could hope for. How would I do that? To make a long story short: manufacturing was out, because I didn't have enough to make an investment; retail was out, because I didn't want to mess with inventories; service was the obvious route. You simply get paid for the work you perform—pure profit.

Now, I had to combine that with something I liked, something I could be good at. Again, capsulizing, I decided that I would love to record, and felt that I

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Policies first. A line had to be drawn and spelled out concerning the extent of the service for the dollar: no credit to anyone that played music. No offense, you guys, but you know that money that comes to musicians is, at best, erratic. That means that the money coming from musicians (the part that you get) is also irregular. With your end product being subjective and entirely custom, it only makes sense to work on a C.O.D. basis with a deposit up front. It's not like you can take the tapes of a group whose check is no good and sell them to someone else, right? Establish a deposit policy, usually a flat rate that covers about a two hour period. You will find out how to enforce this policy in the section dealing with the preparation of an on-location session.

What if a group cancels an hour before you are supposed to be there? Obviously this is what a deposit is for. Put a cancellation clause on your policy sheet. Usually, there is a refund if the cancellation is prior to a 48-hour period before the session. Stipulate whether set-up and load out is going to be billed at regular rates. Just to cover yourself, you might include a policy that will cover the charges for playback after the session; otherwise you'll never get home before the sun comes up. Then when you let the band listen to playback for 'free' only when you are striking your stage, they think you're a hell of a guy. Mileage rates must be established, or you'll end up recording a gig in Kenosha, Wisconsin for the same amount that you will get for a session in your home town. Although you can't be forced to provide the service in a situation like that, and although Kenosha, Wisconsin was a great city the last time I was there, your policy sheet should leave no room for question, hence, less room for conflict.

Other policy sheet staples could be the provision for free tape storage at the client's risk; no responsibility for loss or damage to property, personal injury, and very importantly, no responsibility for union dues, copyright charges, or royalties for the material recorded. I'm sure there will be other items that need to be spelled out for you and your clients; just remember that the policy sheet stipulates the extent of your services to a client. They should not be designed to scare off potential business.

Just in front of your policy sheet should be your rates. When it came to deciding on the rates for my on-location sessions, I devoted time and thought and utilized scientific formulas in my calculations. I thought about the amount and the value of my equipment, the wear and tear on my car, the figure that I needed to live on, and then, I did the most logical thing—I got a copy of my competitor's rates and made mine lower. Not too much lower; rates that are out of the ordinary (low or high) invite suspicion. Make sure that your rates are structured so that the more you work, the more you'll make. It's a terrible thing to realize that if you work twice as hard, you'll lose twice as much.

My greatest success came in formulating a package rate. With one, simple figure, a potential client knew exactly how much an evening with me would cost him (hey, that sounded a little kinky, didn't it?). Since many musicians and groups have been lured into studios by low rates, then burned by incidental costs, the general reaction is one of reluctance. Costs are expected to be completely spelled out. This is difficult

to do since every project is so subjective and recording times, requirements, and re-takes vary tremendously. Your pitch could end up something like this: "If you want all four sets on two tracks with a cassette master, then it will be 'x.' But if you only want three sets on four tracks with mixdown and 7½" master tapes then we'd be looking at 'Y.' Now, if you only want two songs, there is a minimum of 'Z'."

For me, \$200.00 gets you eight hours, including set-up and load-out, mixdown, and duplication—the client gets any service I provide in any combination he wants for an eight-hour period. Your client can then decide if he wants to pay you for recording time or waiting for the manager to come and unlock the door to the place. To protect yourself, spell out what is included in that package, and what is extra (all tape charges, hourly rate beyond the package rate maximum, etc.). With this package rate, you have established your all-important guidelines, the band knows what the bottom line will be, and you have taken the pressure off the band of working against the clock to change guitar strings.

Another thing that you will run into is the group whose bass player's cousin's secretary's boyfriend has a reel-to-reel recorder, and he is willing to do it for free. Be proud of your products; there is no need to reduce your rates if they are fair. People know that they are going to get what they pay for, especially if it's free. You will lose many jobs because you won't discount your rates. The first time you do, you'll realize that the extra hassle you get from the band that wants more than their money's worth (they would be tickled pink if you broke even), is not worth the sacrifice just to get the job.

This brings up another point—and this is where I get nasty, but it's for your own good. If there is anything that has made me redirect my business from music to industry (more about this in upcoming articles), I could put it in one word—my wife! I didn't really mean that. I mean egos! An example is a local group that was enjoying popularity several years back, playing at a local club. I approached them and made my introductions. Before I could get off the ground with my sales pitch, a couple of the members started trying to impress me with their knowledge. "How many tracks have you got?" "How many of your tapes have been pressed?" "What kind of effects have you got?" "How many different types of noise reduction do you offer?"

My first reaction, although silent, was "Who cares?" I sized them up to be the type of band that likes to play tug-of-war with anyone in the industry. The only way you could impress them was to have accomplished more than they had, which actually wasn't too hard to do. In a tug-of-war, I always give in. When I need to justify my existence is when I don't need the hassles. Being asked for names of past clients and wanting to hear a demo is completely different. What I was dealing with, and what you will deal with at some point, will be out-and-out ridicule. You must realize that many musicians are very frustrated, for various reasons. I don't blame them. I would be frustrated if I were a musician, too. I think that these guys were simply trying to disguise their own insecurities and lack of knowledge in recording. I have always felt that the more someone knows about something, the less he talks about it.



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To make a long story short, these guys had insecurity spelled all over them. Even their business card said "Nashville Recording Artists" on it. They recorded in a 4-track garage studio there. Now, I'm not knocking studio garages: I practically have one. But they could have had a better product than that one (I heard the tape), without nearly the travel or expense, except that their egos wouldn't even allow them to ask or hear some of my work. Believe me, I respect musicians tremendously. It's just that it only takes a couple of the exceptions to leave a sour taste in your mouth. The finest tape I ever made was featured as an FM concert special, and those guys were so professional in their performance and so terrific in their behavior, that I can remember each of their names five years later. They had nothing to prove. But I can't even remember the name of these 'Nashville' guys. What I am saying is don't let the ego trips of select musicians get to you, but do be forewarned that you might encounter an experience much like the one I described. Always give the band a break; they probably have it as tough as you do.

OK, you're ready. You've got the cards, rate sheets, policies, good package rates, and you won't let anyone shove you around. But where do you find prospects? For night clubs, most road bands have rooms in the motel where they are playing. I just call and ask for the room of one of the band members. Get a schedule going by learning how venues book—through what agency, and for what periods of time? If the Ramada books three weeks at a time, catch the band on their second day there, after they've settled. Try to stop in during the day; you can usually find them at the pool. Become their friend by pointing out good restaurants, music stores, shopping malls, etc. If you can, take your mobile and try to get them into it to listen to some stuff you've done. Think of unique ideas that might appeal to them. What about providing high speed duplication the very night you record? They could feasibly pay for your services with the profit from selling tapes that night.

You can even play the ego problem to your advantage. Offer to record the originals for free after the sound check, or tell them to send a copy of their tape to a talent agent you know, or to the record label man you met two years ago. Make your name known to local musicians as well. Again, be forewarned—most local musicians don't do so well financially. If they're not doing so hot then they can figure that you've got to need them a lot more than they need you, so expect them to expect a lot of favors and special treatment. Don't be afraid to give in to some of their more reasonable requests. Who knows, maybe it could turn into some steady business.

If you wish to record church choirs or gospel groups, for example, advertise in the religious section of your local paper. Contact talent agencies and let them know you exist. Leave a stack of calling cards with the minister. Don't rule out radio advertising, perhaps on religious oriented stations, or during religious programming.

Although it only took one wedding tape for me to realize that this was not an area I wished to pursue, others have been known to do very well in this category. It probably didn't help my outlook to be unable to find the church, and then to have 10 minutes to set up. Place flyers with calling cards at all of the wedding

shops in your area. Place a small ad in the wedding tabloids most newspapers publish in the spring. Put your cards at the registers at local stores; that is, the wedding registers. Do the same at the tuxedo rental outlets, perhaps even the bakeries and flower shops.

Concerts are another story. I have never carried out a full concert recording in front of 12,000 fans. I have spent a lot of time investigating the possibilities. To be honest, I felt that my efforts would be better rewarded in other areas, but I'll share with you what I know. If you desire to pursue this avenue, contact the local and regional promoters that bring concerts to your area. In my case, I found that they would stifle your attempts more than assist them. In every instance the promoter had no say in the situation anyhow, but it's only right to let him know of your intentions, even if your intentions are to go over his head.

First, you must secure the number of the artist's management. To do this you must obtain the number of the record label, then call them and ask for "artist relations." This department will then offer the phone number and the name of the agent or manager you must speak with. Contact this person, make your introductions, explain your intentions, and give a brief sales pitch. Most of the time your efforts will end there. Offer to send along a brochure and demo tape that they can keep on file in case "anything comes up in the future." If you do find some interest, they will probably want to know what benefit such a recording would be to the artist. At this point it is wise to have done some preliminary planning with a local station that would agree to air your production if it meets with the approval of the artist's management. If things go so far as to start talking figures and set-up, be prepared for other costs. In a union venue, chances are that you won't even be able to set your own mics. You must pay an additional set fee to the stagehands union for each of the workers. Make sure that the source of these funds (and other union fees) is decided upon. If you get this far, please let me know what happened from there, as this has been the extent of my involvement.

There are countless other areas of on-location productions. I will be covering many of them over the upcoming months, but until then, these are the most common.

Let's recap. You should have done a sufficient amount of homework before you leave your home—rates, policies, business cards, flyers. Decide the direction you wish to pursue, and hit the road. As soon as possible, put together a short demo tape of your better work, and be prepared to rattle off the names of some past clients that your present prospects might relate to. (This is where many of my freebies came in.) Sometimes it is worth discounting or providing a free recording just to have a particular group or artist on your demo, or to be able to say that you have worked with them. Establish your prospects, make your contacts, deliver your pitch, and strike your deal. Make sure to get a deposit up front, then schedule the time, place, and requirements. At this point (and you thought the battle was won), you are ready to proceed to phase two: how to prepare for an on-location recording. Join me next time, and bring your pencils; this is the most important phase of all.

D.M.



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When Herbie Hancock attended Grinnell College, majoring first in electrical engineering and then in music composition, he probably had no idea that one day these seemingly disparate subjects would somehow coalesce into a Grammy Award-winning tune and the biggest-selling 12-inch single in the history of Columbia Records.

That tune was last year's "Rockit," cowritten by the group Material, and besides inspiring an award-winning video directed by Kevin Godley and Lol Creme, it propelled the album *Future Shock* to gold status and provoked intense reactions—positive and negative—from the (seemingly disparate) worlds of jazz and rock-funk. But compositional innovation and controversy are nothing new to the 44-year-old Hancock. *Future Shock*, an ethno/electro-pop breakthrough

(or scam, depending on your viewpoint), can be heard as an outgrowth, owing in part to the composer's love for electronic keyboards, of his work with Miles Davis's fusion bands in the late '60s and early '70s (*On The Corner*, *Get Up With It*) and his own funky escapades beginning with *Headhunters*. And that 1973 album, incidentally, remains Columbia's biggest-selling jazz album ever.

Born in Chicago, Hancock, who took up the piano at age seven, accompanied trumpeter Donald Byrd to New York in 1960 and quickly made his mark. Within two years he not only recorded his first album as a leader, *Takin' Off* for Blue Note, but also joined what was to become Miles Davis's second classic quintet. *Takin' Off*, one of the most accomplished and stunning recording debuts in the annals of jazz, spawned the hit single "Watermelon Man," which has been covered by more than 200 artists. This Horace Silverish tune, along with Joe Zawinul's "Mercy, Mercy, Mercy," exemplified the '60s "soul" or "funky" jazz that reestablished the blues as a vital component of the music. In Davis's band (he would stay five and a half years), Hancock teamed with Wayne Shorter, Ron Carter and Tony Williams, learning firsthand the wisdom and wonders of dynamics and ensemble interplay, sensibilities he incorporated into his various projects spanning the next 20 years.

These projects—several dozen LPs under his own name—have ranged from funkified R&B experiments with the Vocoder to shimmering acoustic-piano duets with fellow Davis alum Chick Corea. With *Headhunters* came Hancock's immersion into the world of synthesizers, a

passion that has intensified with advances in computer technology, yet Hancock has never abandoned acoustic jazz; and this juxtaposition of, again, seemingly disparate genres has confounded many a critic.

The following interview with Hancock, a follower of Nichiren Shoshu Buddhism, was conducted at the mid-Manhattan offices of Columbia Records. The keyboardist had just returned from a tour of Japan with his band and was preparing for a 40-city U.S. tour to promote his second collaboration with Material, *Sound-System*.

Hancock's well-trained ears are no doubt his prized physical attribute, but no sooner had he eyed the album jacket to *Sound-System* than he noticed that, due to a proofreading error, the letters DMX had been transposed to XMD. The discussion begins with an analysis of the composing/recording process by which Hancock received "skeletal" tracks from co-producer Bill Laswell in New York and fleshed them out with chord patterns and melodies at his home studio in West Hollywood.

Modern Recording & Music: You've been quoted to the effect that your previous album, *Future Shock*, was recorded "piece by piece," that Bill Laswell and Michael Beinhorn of Material developed some concepts in New York and then brought "skeletal tapes" to you in L.A., whereupon you worked on them. Did they assist you in L.A.?

Herbie Hancock: Yes. I wasn't there for the basic tracks [done in New York]. I put the melodies on. [The basic tracks] had chords, some rhythm things, some chordal rhythms

or something, and I would put the melodies on. And I would *define* the structure. Take the new record, for example, the song "Karabali." What they brought to me was Daniel Ponce playing the Bata, bells and shekere; Hamid Drake with cymbals, and Bernard Fowler with two vocal parts. That's what was on it when they brought it to me. But no chords.

MR&M: Had Material seen sheet music for the melody or had you discussed it with them before they laid down the basic tracks?

HH: No. It's something Daniel knew, almost some kind of traditional [Cuban] chant. It has no chord structure or anything. You play the drums and sing this melody. What I did was to take that and develop some chord progressions or chord motions that fit that melody and a flavor I felt fit the melody. All the melodic and harmonic stuff, except the vocal melody, I put on.

MR&M: You put it on later, secondarily. Had you worked in this fashion previously?

HH: That's how I usually do things. I start out with chords and then put the melody on afterwards. That's how *Maiden Voyage* was written.

MR&M: You also said in the same quote that the recording process for *Future Shock* had an "improvisatory" flavor. But, to me, and maybe I'm putting the wrong frame of reference on it, improvisation implies a face-to-face, in-person spontaneity.

HH: First of all, according to jazz standards, improvisation is basically done on an individual level. It may be a group, but basically when you think of jazz improvisation, you think of a soloist. That doesn't apply here; that's not how I meant improvisation. What I meant was that in listening to the tracks, as you hear music moment to moment, it sounds, at least to my ears, as though it was put together moment to moment. It was as though I had a whole bunch of things around me, the music would go by, and I would grab this (reaches left) and grab this (reaches right). It sounds like that. Of course, it can't be done like that. But that's what I meant by improvisatory. Sounds spontaneous, is what I mean.

MR&M: Was this piece-by-piece composing and recording approach repeated on the new record, *Sound-System*?

HH: Yes. As on the other record, if there were things I didn't like, I changed them. If there are things I

A lot of the sounds on this record came from moments in records by other artists. On the tune "Metal Beat," near the beginning there's a thing that goes I...I...I. It's the word "I" from some record. Another thing says "won... won... won... wonder." That's from another record.

want to improve. I do it. For example, we got rid of a lot of the bass lines that Bill had put on [the basic tracks]. I changed 'em and made some new bass lines that I played with a synthesizer. For example, the song "People Are Changing," which was written by somebody else [T. Thomas], had his original chords on some kind of organ. Well, there was something lacking in it. The bass line fit the original chords, and that was something Bill played, but I wanted to change the chords. So I worked on changing the chords...and that meant the bass line had to be changed. So I played the bass line with the Yamaha DX7. And the organ sound is also Yamaha DX7. And so is the clarinet sound. And of course there's acoustic piano. So the only thing we kept from the original track was the TR-808 drum machine, wood block and percussion, and the vocals. So it kind of wound up being structurally like "Karabali," in the sense that it was just rhythm and vocals.

MR&M: Many of the tunes on *Sound-System* are co-compositions with Laswell and sometimes another member or two. At what point does the tune become a song? It sounds like the tune develops and grows after you get your hands on it.

HH: The thing is, the original ideas start with Bill. Not the melodic ideas, but the germs, the food... We're both listed as writers. If we'd done it the other way around, if I started with the melodies and chords, and he put all the other stuff on top of it, then I could more easily feel like it was my composition.

MR&M: I had assumed that you had some input into the basic tracks.

HH: Some things we do like that. "Hard Rock," "Karabali," "Metal Beat"—I had no idea what they were going to be. "Junko" was done for Olympic album [*The Official Music Of The XXIIIrd Olympiad Los Angeles 1984* on Columbia].

MR&M: How much did these basic tracks presuppose particular chord sequences and melodies for you, Herbie, and did they provide support structure for you? Or were they open-ended?

HH: (Picks up album jackets) That record [*Future Shock*] was much more skeletal than this one [*Sound-System*]. When Bill brought me these things [*Sound-System*], some of them were so full of stuff, I said, "Jesus, how am I going to put a melody on this?"

MR&M: That's curious. *Future*



Herbie Hancock (left) in the studio with Bernard Fowler, Grandmixer D. St., and (rear) Bill Laswell.

Shock strikes me as the denser album. *Sound-System* has an airiness, an ethereal quality, that I don't hear so much on *Future Shock*. Several of the songs have a chantlike, incantatory quality. Did the basic tracks imply this, or did you, as part of your [Buddhist] philosophy, want to lend that flavor to these tunes?

HH: "Junko," because of the Olympic thing, was done before we did the rest of the album. That was a whole separate thing. It's also on the Olympic record. When we did that, I didn't know that Bill had in mind to use [Foday Musa] Suso and this combination of things [kora, kalimba, dusunguni, guitar] for my record. He'd already been working on it.

MR&M: This was before the design for the album had been worked out?

HH: (Excitedly) Yeah. Bill knew what he wanted to prepare for me, at least conceptually. So "Junko" was the perfect thing because the nature of the Olympics, to me, implies that there should be something international about it. It was coincidental with what Bill was going to suggest for the album... Before we did the album, Bill said to me, "Maybe we should do another tune that was written by someone else, something kind of outside of what we do, like we did [with Curtis Mayfield's "Future Shock"] on *Future Shock*."... "People Are Changing" is a sharp contrast to the rest of the album because of its simplicity. It's kind of normal. At the same time, it's the only thing that actually, verberally, says something about change.

MR&M: How much does your

basic-track approach with Bill differ from the approach you took on previous funk albums with co-producer David Rubinson?

HH: I never worked like this before. I'm always around [with Rubinson] from the very first time anything is put on tape. I'm usually the person that initiates the ideas. David is like the other ear, more or less; he makes suggestions. He might make a suggestion about a percussion thing in a section, for example.

MR&M: Working with Laswell in this manner, there must have been continual surprises for you when you received the tapes of his basic tracks. Surely, in order to do this you must have great respect for him musically and great trust in him. Where does this rapport stem from?

HH: I took a chance, because I didn't know him when I did *Future Shock*. The guy who introduced me to him and Michael [Beinhorn] is a guy who works for me, Tony Meilandt, the associate producer [of *Future Shock*]. He scopes things out and he's the one who found Godley and Creme [for the "Rockit" video]. He's also responsible for me changing my booking agency. Tony played some [of Laswell's] things for me, and that's why I agreed to let Bill try one or two things for *Future Shock*. He wasn't originally assigned to do the whole album.

MR&M: What were the original tunes assigned to him?

HH: The very first one was "Rockit."

MR&M: The big one, the eventual hit. What elements of the tune were on the basic track of "Rockit" he did for you?

HH: (Examines record jacket) The [turntable] scratching, the bass line, the DMX, the Bata drum, the Synare, and that was it. The bass line was there, so there was an implication of chords, but I had to put the melody on. But Bill sort of knew where the melody should go, where in the tune the melody goes, and where it should repeat... So we pieced it together little by little. Not only on this tune but on other tunes, too, some things were kind of improvised; I'd get a sound on an instrument, start to play in a certain section, and they'd keep

use that sound. But it could be the other way around. Sometimes he thinks the idea really works, but the *sound* may need some kind of adjustment. Basically, I'm kind of free to do what I want. We pretty much see eye to eye on things, which is really nice.

MR&M: Were any tunes for either *Future Shock* or *Sound-System* completed but not released?

HH: Things in the can? No.

MR&M: How many "skeletal ideas" and basic tracks of prospective tunes from Laswell failed to materialize?

I walked in the studio and I looked for the acoustic piano, and I didn't see it. I said, "Miles, what do you want me to play?" He pointed to the electric piano and said, "I want you to play that." I was thinking, "That? That toy!" Then I went over, turned it on and played a chord. I said, "Cool, wow!"

the tape running. They'd erase some things and keep some things.

MR&M: Was *Sound-System*, your second album with Material, recorded faster and less expensively than the first one, perhaps owing to greater familiarity with the recording process you followed?

HH: The second one took around the same amount of time, maybe a little less. A couple of weeks. That's hardly anything for me; I'm used to doing something in a month, or more. When I did *Light Me Up*, the album before *Future Shock*, we spent three weeks *mixing* it. That was the most expensive record I ever made. What happens, though, is that Bill does so much homework with the stuff, and is really sure of the direction, that things fall into place pretty quickly.

MR&M: After you receive the basic tracks from Bill, how much input does he have from that point on?

HH: It depends on what's needed from moment to moment. If I'm doing everything, he doesn't have to say anything. I mean, I consult with him... I'll try something and he'll say, "The sound is great. How about if you try it with such and such an idea?" So little by little we'll hone in on how to

HH: None.

MR&M: So everything worked. Turntables are new "instruments" in the recording studio, especially as played by the likes of Grand Mixer D. ST., who appears on both albums. At what stage in the production does he do the scratching and so forth?

HH: They're put on before I hear anything. The thing I want to clarify is that he does more than scratch. A lot of the sounds on this record came from moments in records by other artists. On the tune "Metal Beat," near the beginning there's a thing that goes "I...I...I." It's the word "I" from some record. Another thing says "Won...won...won...wonder." That's from another record.

MR&M: And those sounds, you say, were part of the basic tracks. On a conventional record, wouldn't such sounds be added on later as effects?

HH: This tune ["Metal Beat"] was *full* when I got it. And so was "Sound-System." It had all kinds of stuff on it. To me it sounded thick with sounds and ideas.

MR&M: On the album, D. ST. is credited rather vaguely with "turntables," yet much of his work has an interesting ancillary vocal quality.

HH: He puts records on, you know?

Another thing, at the beginning of "Hard Rock" he goes (drums on table with fingertips) "*ee-yah*." It sounds like a big band playing. Actually, I think it's D. ST. with records, but somehow they used a Kepex to trigger the record or something. One of the things Bill does is work with the idea of one instrument triggering another one. Sometimes the bass triggers something else; and because the bass notes usually have a sharp attack and die down very quickly, he sets a noise gate, Kepex, or something like that such that it opens up, stays open just a short time and then closes up. But when it opens up, it's the sound of some other instrument or the radio or something. It could be anything on the radio, it might be somebody talking. The only time you hear the radio is when Bill plays a note. That's on "Junko." It's actually the bass triggering the radio. He's clever (laughs). I probably shouldn't have mentioned that; that might be giving away his secret.

MR&M: You've said, on a release accompanying *Sound-System*, that "this album has a kind of freedom that allows me to draw from my experience in avant-garde jazz." Which avant-garde experience were you referring to?

HH: The personnel I had from 1970-73—that band was probably the furthest-out band I had. Buster Williams played bass, Billy Hart on drums, Eddie Henderson on trumpet, Julian Priester on trombone, and Bennie Maupin on reeds. We made two records. At that time I didn't have any synthesizers, but I had wah-wah pedals. Echo plates and things attached to my Rhodes piano. Sometimes I'd take the top off and play the inside with mallets. We had a lot of percussion instruments that we played, too, and it was highly improvised. The structures were skeletal and we got to the point (laughs) where we would play introductions to songs that became songs themselves. We'd play an introduction to a tune that could take 30 minutes. "*We haven't even played the melody yet, wait!*" We were just so attuned with each other.... The music was pretty far out, and the empathy and trust were very close between us. When it was good, it was incredible; when it wasn't, it was like noise.

Referring back to the question, the sound of scratching is a *sound*, somewhere between a percussion sound maybe a guitar-rhythm sound, that dead-string kind of

sound—for example, the kind of work Wah Wah Watson used to do on some of my early fusion stuff. Sometimes what D. ST. does live sounds like that. He's got effects on his turntable; he's got a phaser, a delay device, and all kinds of stuff, just like a guitar player would have. It's really exciting. And the fact that he's playing records puts him almost in the category of a guy playing a synthesizer. He can play a whole phrase of a record, then switch to the other turntable and play something from another record. It gives us a bigger library to choose from... I understand that Bill, who buys records all the time, takes a stack of records and gives them to D. And there's all kinds of things. They're not necessarily things D. ST. would pick out himself. But, again, he trusts Bill, too. Bill brings him stuff, and D. finds things to use.

MR&M: That's improvisation in itself, just the records he gives to D. ST. That's the feed.

HH: Right, exactly. It's a whole different approach, but still improvisation... For the song "Metal Beat" we took one word from a very, very popular song. We sampled it, put it in the Fairlight so I could play it on the keyboard, and we used it throughout the song.

MR&M: What song did you take it from?

HH: I'm not gonna tell ya (laughs devilishly). I don't think I could be held liable because there's no way in the world you can tell what the song is. It's too short. But it's a very important part of the song.

MR&M: You used the Dr. Click Rhythm Controller on several tunes, including "Rockit," for *Future Shock*. Yet you apparently didn't use it for the new album. Why?

HH: The Rhythm Controller is used to sync up two different instruments that are being run by a clock. The Dr. Click becomes the master clock. I used it on "Rockit" for the click sound (taps on table). The sound is so short that it's real difficult to play it even, manually. And it needed to be very robotic and very precise... because it was functioning with the drums, which are very robotic and precise. When Bill recorded the DMX, he also recorded the sync-tone of the DMX, and that was on a track of the tape. So we fed a sync-tone into the Dr. Click, then generated another tone from Dr. Click to go into the Emu Emulator (digital keyboard). The keyboard, which has a sequencer in it, allowed me to slow the tempo way

down to the point where I could really play it evenly. (Taps on table) Once I got it real even, I had the Dr. Click take that one pattern and repeat it.

MR&M: The song "Hard Rock," on first audition, sounds related to "Rockit," a sequel of sorts. Was this inadvertent? In fact, the word "Rockit" even appears in the song, does it not?

HH: "Rockin' it." It sounds like [the word] "Rockit." That's what I thought it was. It was on purpose. This material here [on *Sound-System*], generally speaking, the *new* stuff, but not necessarily "Karabali" and "People Are Changing," is so different from anything I've ever heard and so different from *Future Shock*, although you know it grows out of *Future Shock*. It doesn't sound like an entirely different band. It sounds like we dipped our toes in the water here [on *Future Shock*], and here [on *Sound-System*] we dove in. But *Sound-System* is so far ahead of *Future Shock*, we felt that it needed a more familiar bridge so that the people could cross from that album into this one.

MR&M: Then again, some will say, and I'll say it now: "Well, 'Rockit' was such a smash hit, such a big video, and it made so much money. Why not just repeat it again with a twist?"

HH: Well, I know a lot of people say that. We realized that people would think we purposely tried to do a thing just like "Rockit" just to jump on the bandwagon and milk it. But that

wasn't why we did it. That's a very dangerous thing to do. People get tired of things real quickly.

If you're going to take someone a long distance, you have to spend more time to prepare him. That was the idea. But it is different enough [from "Rockit"]. It's got rock guitar in there, which wasn't in "Rockit". That's a whole new combination of things.

MR&M: Let's turn for a moment to your tenure in the '60s with Miles Davis. You were, I believe, the first keyboardist ever to play electric piano on his records.

HH: When I was with his band, live, I always played acoustic piano. On records I played electric sometimes. After I split, when Chick [Corea] got in the band, Miles started using the Rhodes piano live. Miles has been playing keyboards himself. I think I read somewhere where Miles said something complimentary: (imitates the trumpeter's raspy whisper) "After Herbie and Chick, I couldn't find nobody to play keyboards." (Hancock laughs)

MR&M: It is said that Miles one day pointed to the electric piano in the recording studio and said to you, "Play it!" Did this happen during the 1968 "Stuff" session, later released as *Miles In The Sky*, at which Miles also used an electric guitarist [George Benson] for the first time?

HH: Yes. That was the first time I'd ever played electric piano. I walked in the studio and I looked for

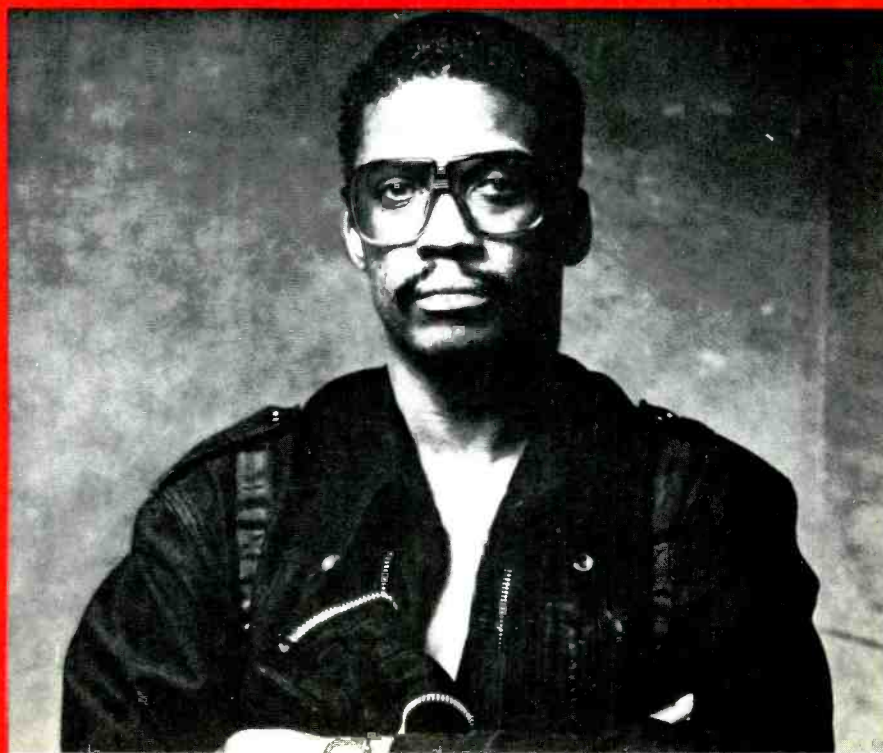


Photo by Geoff Thomas

We realized that people would think we purposely tried to do a thing just like "Rockit" just to jump on the bandwagon and milk it. But that wasn't why we did it. That's a very dangerous thing to do. People get tired of things real quickly.

the acoustic piano, and I didn't see it. I said, "Miles, what do you want me to play?" He pointed to the electric piano and said, "I want you to play that." I was thinking, "That? That toy!" Then I went over, turned it on and played a chord. I said, "Cool, wow!" I was thinking to myself, "It goes to show you. If you listen to somebody else's opinion and accept it, it can lead you up the wrong tree." I liked it from the first chord I hit, but I was so stupid. I had followed somebody else's idea: "Oh, those things are electric; they don't sound like anything." *I hadn't even played one—how could I conclude that?* I played the first chord, and two things killed me: It sounded warm and it had this mellow thing somewhere between a piano and guitar and vibes or something. It's a blending instrument, which the acoustic piano is not; the acoustic piano doesn't blend with anything. But the Rhodes blends with everything. And you can turn it up so you can hear yourself, which you can't do with the acoustic piano. So I loved it right off.

MR&M: Three electric keyboard players—yourself, Chick Corea and Joe Zawinul—are credited on Miles' *In A Silent Way* album. Why three keyboardists? Did you play on different sessions or did Miles conceive of electric keyboards in combination?

HH: He liked us, liked the way we played. Not on every tune, but sometimes there would be three keyboard players.

MR&M: You and the trumpeter Wynton Marsalis, whose debut album you produced, were both precocious youngsters, both classical-music prodigies of sorts. You played Mozart's "D Major Concerto" at age 11 with the Chicago Symphony Orchestra, and he performed "The Brandenburg Concerto No. 2 in F Major" as a teenager. Were you surprised by the success of his

classical album, and do you think the success of the album might make classical music more appealing—and more open—to blacks? After all, the world of classical music has been largely the preserve of white musicians.

HH: I don't know too much about the classical world from a professional level, because I was never in that world since I became a professional. So I don't know what kinds of problems there are, except things I've heard about some racial things. I think Hubert Laws ran into some flak, maybe with the New York Philharmonic or something. As far as Wynton's sound is concerned, what he did sounded so beautiful. It was the finest trumpet work I had heard on a classical record ever. I think it's one of the best things that's ever been recorded. Just like Hubert Laws is probably the world's number one flutist in classical music as well as jazz, I think Wynton is probably the number one classical trumpet player. It just sounded so good and so warm that I wasn't surprised at its success. I think his new reputation as a jazz player, and the fact that he's so young, probably helped his success a great deal, too.

MR&M: In an interview for this magazine, I asked Wynton what it was like to be produced by Herbie Hancock and then by Stanley Crouch [*Fathers & Sons*]. He smiled impishly and answered nonverbally by raising his eyebrows.

HH: (Roars with laughter) I didn't do anything! I feel a producer's job is to make sure the record goes the way the artist wants it to, considering all the factors that (speaks rapidly), half-mumbling) the record company is buying it and all that. And if it's already being done, then you should shut up. I had very little input. I was mostly there—I think it made the record company feel more comfort-

able, because they knew me and they didn't know him that well.

MR&M: How many of the instruments in your home studio, Garage Sale Recording, do you bring out on the road when you tour?

HH: Some of the keyboards we had on the road this time I don't own. D. ST. has an Oberheim OB-X and a Moog-Source. Jeff Bova, the other keyboard player, has an [Oberheim] OB-8 and a Chroma. He also used my Memory Moog Plus. Bernard Fowler has a Yamaha DX-7 he was playing. We had two Fairlights, and one of the Fairlights had two keyboards. So there were three Fairlights with two units on this tour. I also had two Chromas, so there were three Chromas on the stage. There are three DX-7s, two Fairlights, an OB-8, an OB-X, a Mini-Moog, Moog-Source, a Rhodes, and in Japan we had a Yamaha CP-80, which is the grand piano. I just got hold of a Yamaha DX-1, a digital synthesizer that has an acoustic piano sound that I like better than the electric grand.

MR&M: With the explosion of electronic technology, Herbie, and your fascination with sound, can you ever be satisfied that you have enough equipment?

HH: No. The only thing that gets out of hand is when I have to buy the keyboards (laughs). It gets expensive. I start telling these guys, "I've supported you enough—give me a break!" I talk about 'em in interviews, and I'm advertising keyboards all the time.

MR&M: You've had two large crossover successes 10 years apart—*Headhunters*, Columbia's best-selling jazz album ever, and *Future Shock* in 1983. Did your first major crossover experience, and the critical response it engendered, prepare you for the reaction that followed *Future Shock*? Any similarities?

HH: What I feel is similar is the fact that both records are basically instrumental records. And I've done a lot of records since *Headhunters* that were primarily vocals. The first records after *Headhunters* were instrumental, and then the ones after that were all vocals, except the acoustic ones and an album called *Mr. Hands*, which is kind of a compilation of a lot of things. Both of them [*Headhunters* and *Future Shock*] were pretty radical for their time. There wasn't a sound like that (points to the jacket of *Future Shock*) before this, and I don't think there's anything quite like *Future Shock*. I've

never heard a song like "Metal Beat."

MR&M: Art Lange, writing in a recent issue of *downbeat* (Sept. 1984), posits that when a musician becomes an innovator, the critics expect him to innovate all the time. And you certainly come under this category. Yet, Lange contrasts that a stylist, even a virtuoso who may make albums of pretty standards, is allowed to continue along without fear of backlash from the critics. Does his

premise ring true with you?

HH: Yes. I think they expect me to do something different, something innovative. It certainly applies to Miles. Fortunately, I don't really let that bind me. The thing is, many times, in order to get to an innovative place you have to go through certain doors.

MR&M: Take interim steps. Witness Miles's transition steps from one "new direction" to the next, such as

the aforementioned *Miles In The Sky* album, a forerunning fusion LP.

HH: Yes. But actually all of those [mid-'60s Davis] things were innovative. I've done some records that weren't particularly innovative, but I had to go through those records to get to do the ones that *were*. But the critics didn't realize that; they blasted the records and said what they had to say. That's all right. I know what I'm doing.

Selected Herbie Hancock Discography

As a Leader with Material

Sound-System (Columbia FC-39478)

Future Shock (Columbia FC-38814)

As a Leader

Herbie Hancock Quartet (Columbia C2-38275—with Ron Carter, Tony Williams and Wynton Marsalis)

Monster (Columbia JC-36415)

Feels Don't Fail Me Now (Columbia JC-35764)

Sunlight (Columbia JC-34907)

The Best Of (Columbia JC-36309)

Death Wish (Columbia 33169—movie soundtrack)

Corea/Hancock (Polydor PD-2-6328)

Mwandishi (Warner Bros. 1898)

V.S.O.P. (Columbia PG-34688)

The Quintet/V.S.O.P. Live (Columbia C2-34976)

Empyrean Isles (Blue Note 84175)

Maiden Voyage (Blue Note 84195)

Speak Like A Child (Blue Note 84279)

Best Of, Vol. 1 (Blue Note 89907)

Takin' Off (Blue Note 84109)

Inventions And Dimensions (Blue Note 84147)

With Miles Davis

Water Babies (Columbia PC-34396)

Get Up With It (Columbia PG-33236)

On The Corner (Columbia KC-31906)

Live-Evil (Columbia G-30954)

Jack Johnson (Columbia S-30455)

In A Silent Way (Columbia CS-9875)

Filles De Kilimanjaro (Columbia CS-9750)

Miles In The Sky (Columbia CS-9628)

Live At The Plugged Nickel (Columbia C2-38266)

Heard 'Round The World (Columbia)

Nefertiti (Columbia CS-9594)

Sorcerer (Columbia CS-9532)

Miles Smiles (Columbia CS-9401)

ESP (Columbia CS-9150)

Four And More (Columbia CS-9253)

My Funny Valentine (Columbia CS-9106)

Seven Steps To Heaven (Columbia CS-8851)

With George Benson

White Rabbit (CTI 6015)

With Tony Williams

Lifetime (Blue Note 84180)

With Wes Montgomery

California Dreaming (Verve V6-8672)

Kirk Pengilly and Tim Farris with soundman at New York's Beacon Theater.

INXS IN ACTION



If the members of INXS had followed the music trends of the day when they were starting out back in Sydney, they probably would've settled on something along the lines of ska or headbanging music.

"That was about it," says lead guitarist Tim Farriss, one of the founders of the group along with his brothers Andrew and Jon. "The typical Australian pub scene at the time was shirts off, beers being poured over people's heads, everybody completely drunk and screaming for power chords. Nobody was doing funk at all. No young bands were going out into the suburbs and playing a mixture of funk and rock, taking it beyond the Angels and Rose Tattoo. But we were trying to do that.

"After struggling as a cover band, the Farriss Brothers changed their name to INXS and began playing original funk, inspired by the likes of Motown, Chic, and such punk progeny as Television and Talking Heads. Their fresh idea did not exactly go over well right away.

"We met with some resistance, especially on the west coast where we had actually prospered as a cover band. You had to be a jukebox band to exist there and we were tired of playing Steely Dan and Tubes and Roxy Music tunes by night and rehearsing our own stuff by day. So after a year of doing that in Perth we split,

went back to Sydney and made a commitment to playing our own music. And eventually we really helped change a lot about the pub scene because several bands started following our lead and began playing funk."

Today, on the strength of their Stateside debut on Atlantic, 1983's *Shabooh-Shoobah*, and their successful followup LP, *The Swing*, the six members of INXS are making it on their own terms and spearheading an Aussie-funk movement in the process. Last year we opened for the likes of Men At Work, Adam Ant, and the Go-Go's. This year they are headliners in their own right with a hit single, the Nile Rodgers-produced "The Original Sin." And they have a cool video on MTV to boot. America is finally waking up to INXS.

While most rock musicians go through the usual series of garage bands and high school bands and the like before hitting on a combination that clicks, the members of INXS have only experienced this one band.

"This has really been it for all of us," explains Tim. "We got together out of two high schools in Sydney. My two brothers went to school with Michael Hutchence, the lead singer, and I went to school with the other two guys in the band (bassist Garry Gary Beers and guitarist-saxist Kirk Pengilly). I really didn't know Garry at school though. He was in one of my classes but I never really knew him. I probably didn't even know his name back then, but he somehow met up with my brother Andrew and we got together out of that. Kirk and I used to play duets together in high school, just for fun. So this band is really the first serious venture for all of us."

Brother Jon, the group's drummer, was only 15 years old when they formed as the Farriss Brothers. "I remember we had to sneak him into a lot of the places we played," recalls Tim, who at 25 is the oldest member of INXS.

When they got serious about music, they all quit their menial jobs ("I had a job washing cars," recalls Tim) and moved to Perth to enter into a period of intensive rehearsals. "It was really a time for us to learn how to play together on an intimate level and learn how to play our instruments," he says. "We all lived together in this house in Perth where we rehearsed every day of the week. We had this one room that we covered up with mattresses. We just set all our gear up in there and practiced all day,

then played the pubs at night. It was a great way to start. It was a bit like reliving my childhood fantasies of the Monkees, I suppose. And I guess we've been living together ever since, in a sense."

Upon returning to Sydney after their year of woodshedding in Perth, they promptly went broke. "When we were in Perth and playing covers at the gig at night, we were making a good living. As soon as we decided to go back to Sydney and get serious about things and play our own music, we all starved. And we continued to do so right through the making of our first record, which we did in about three weeks for a couple hundred dollars."

But in spite of the hard times, they never let go of their vision. "When you are hungry and you're doing something that you really believe in, like playing your own music, doing your own show the way that you want to do it, and you're not making any money at it, then a lot of people would just want to give up. But to us, it just made us try all the harder because we believed so strongly in what we were doing. No one ever considered giving up."

Their 1980 self-titled debut album yielded a Top 20 single in Australia, an energetic tune called "Just Keep Walking." In 1981 their followup album, *Underneath The Colours*, showed a more aggressive side of the band, exemplified by the fiery hit single, "Stay Young." INXS was beginning to make some noise in the land down under.

Shabooh-Shoobah, coupled with an appearance at the US Festival,

helped them get over with the Yanks. The final piece of the puzzle fell into place when they linked up with producer Nile Rodgers, who caught their live show and offered to work with the band. That collaboration bore fruit in "The Original Sin," a dance number that makes a powerful statement about racial equality. That tune, with its echoed refrain of "Dream on white boy/Dream on black girl" (and vice versa) caused a lot of controversy on the few radio stations that have deemed it acceptable to add to their playlists. Nazis, KKK-ers, and other assorted kooks threatened to boycott stations and even resort to violence to get "The Original Sin" removed from rotation. Singer Michael Hutchence seems taken aback by all the fuss.

"Lyrically, it was written quite innocently," he asserts. "I didn't expect people to even take notice. The inspiration for the song came from watching some kids playing while we were waiting outside a club to get in for our sound check. It was a black neighborhood and there was just one white kid playing with all the black kids. And everyone was getting along just fine. Then I thought, every day when those kids wake up, the possibility is that they'll be a little more prejudiced than the day before. Every day another reality is forced on them and eventually they lose their dreams. They're just playing and having fun until somebody tells them that this is wrong, that this is sin."

Besides getting the Nile Rodgers stamp of approval on "The Original Sin," INXS came away with some



Photo by Robin Kaplan

invaluable lessons on Rodgers' recording techniques. "Nile was really inspiring," says Tim. "He records everything direct to the desk so it's as clean as possible. He does everything that way, so just by watching what he does and noting how he EQ'd everything at the mixing desk was very educational for me. I learned a lot from this session with Nile."

In concert, Tim travels with a Fender Telecaster, a Fender Stratocaster, and a Tokai guitar. Guitar counterpart Kirk Pengilly uses a Fender L-series Stratocaster and blows a Selmer Mark VI tenor and alto sax. Brother Andrew Farriss mans an arsenal of keyboards that includes a Yamaha DX-7, a Roland Juno-60 synthesizer, and a Sequential Circuits Prophet-5 synthesizer. He doubles on guitar, favoring an Ibanez Silver series with a Fender neck. Brother Jon plays two Ludwig snare drums, a Pearl bass drum, and

four Rototoms along with Simmons drums and Zildjian cymbals. Bassist Garry Gary Beers, a fretless Steinberger and an Ibanez fretted. He uses D'Addario XL strings on the fretted (and in fact has patented a special E string that D'Addario will manufacture) and Super Wound strings on his fretless. Beers says he prefers the sound of the Steinberger but likes the feel of the bulkier Ibanez bass.

"When I first got into playing I learned how to make fretless basses myself by pulling out the frets and using wood veneer and glue and stuff to fill in the cracks. I had two basses when I started out and I made them both fretless so I had no choice. I guess I was raised on fretless, but eventually I determined that I needed a more percussive attack for some of the songs. I still use the fretless but I'm using it less and less now because the songs are getting

rockier, so I find that I'm using the Ibanez more."

For amplification, brothers Tim and Andrew favor the Roland JC-120 while Kirk prefers a 100-watt Marshall head with a Marshall bottom. Bassist Beers has gone through a series of amps and on this recent tour of America settled on an Ampeg SVT head with a Yamaha preamp. "I've tried them all...BGWs and all the power amps. The Ampeg sounds great for the heavy stuff but for some of the quieter stuff or funky stuff it's a bit too distorted." He adds that he may soon incorporate a Chapman Stick into his burgeoning collection of instruments. He also uses the Roland programmable effects rack that features delay, chorus, and flange. Tim's effects include a Korg SDD3000 digital delay while Kirk prefers an Ibanez digital delay. Andrew works with a DeltaLab Effectron.

Mixing INXS Live

The following conversation took place backstage at the Beacon Theatre in New York the first stop on INXS's recent headlining tour of America. The team of Bobby Daniels on monitors and Colin Ellis on mixing board and PA had previously worked with INXS in Australia before this American tour. They explained that the sound requirements for their Australian shows are much different than these American concerts.

Modern Recording & Music: What does it mean to you to be a headlining act as opposed to opening?

Bobby Daniels: Well, it gives you the full run of the system. As a headliner you have to draw the line between where you help out the opening act as much as you can and where it's going to mess things up for you. But my theory is that the monitors should sound good for everyone, not just the headlining act.

Colin Ellis: The main thing for me is being able to fine-tune the system myself. Everyone has his own preference. Men At Work likes to tune their system flat and we had to open for them last year, so we weren't able to make too many adjustments that would alter their setup. And if you get a system that isn't tuned the way you like it, you have trouble. Especially with these guys (INXS) because the system is too hard on the horns. And it's very hard to go

through each channel and pull out the frequencies of each channel. It's much easier to be able to go to the graphic EQ and just pull out that one frequency that's the trouble. But if you're in a support situation you can't do that. You're not allowed to. You could press the soundman for the headlining act and ask him if you could pull out that frequency, but that's not a good practice.

MR&M: Is the setup for the American tour pared down from what you would normally use back home?

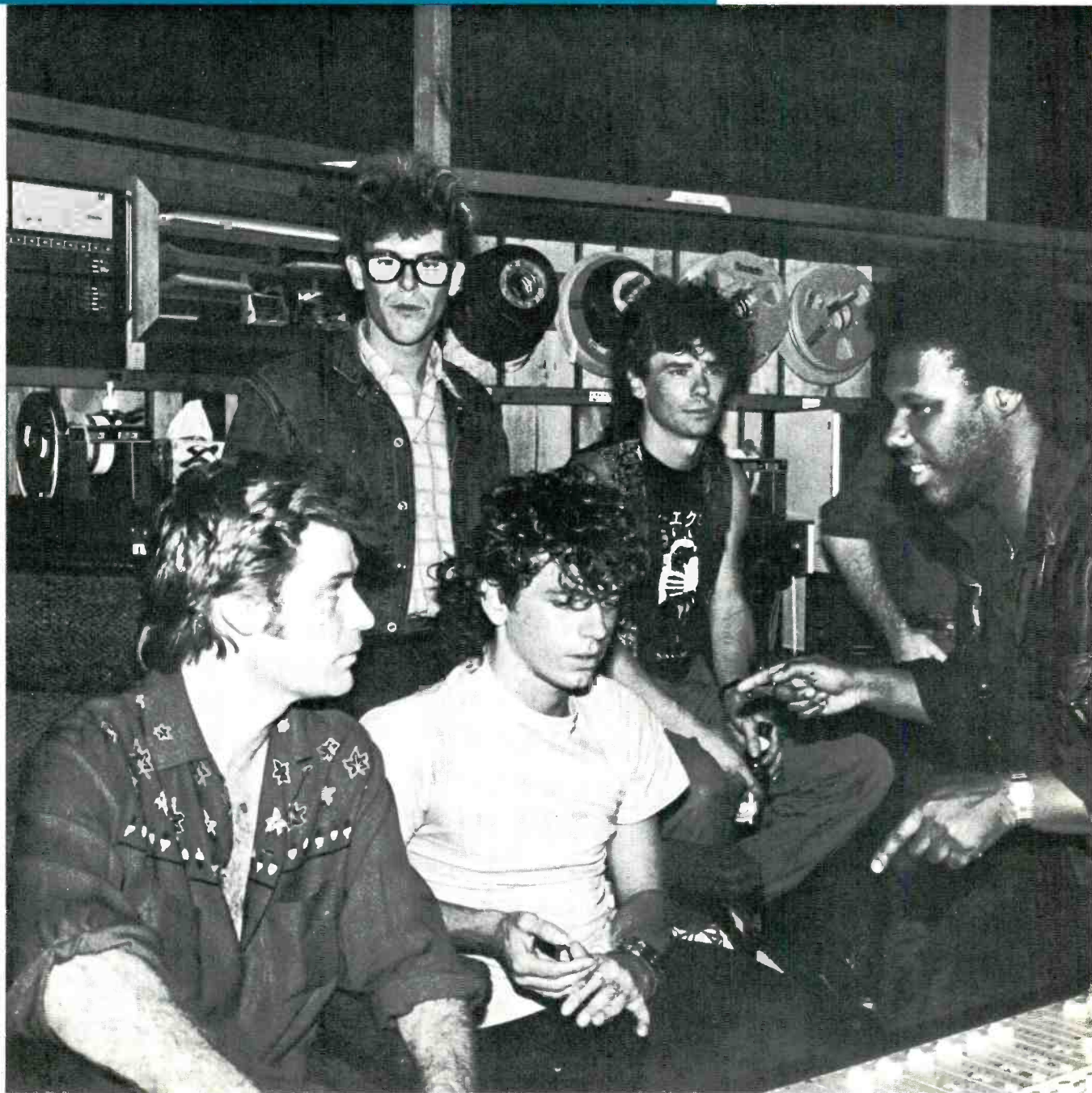
BD: To within reason. When we go into a given place, the monitors vary from nonexistent to poor or fair. So we carry with us a whole monitor system, a drive rack, and a few effects, just basically to upgrade the house systems we encounter from gig to gig. For this tour we're using a Martin Midas system, which we got from Delicate Productions in Cali-

fornia. Supertramp's production company. I had this same desk with Men At Work. It's 34 channels and an extra 10, with a rack of Klark Teknik graphic EQs on each output...the DN-27s. I use eight mixers in this particular setup—two sidefill mixers, three across the front. Now if we go into a small club, which is where we're headed next, then we'll use the sidefills that we've got out front to supplement the existing house system. So, here I've got two drum monitors, but if we played in a small club I'd use only one drum monitor and sacrifice the other one for a sidefill for Colin to work with. But if I lose the sidefills to the house, I still have enough to play around with. It's a good system. Basically, I look after eight sounds up here and Colin looks after two out front—the left and the right. My job is bringing 28 lines down to eight mixes. And sometimes it's up to 32 lines, depending. Like at

I thought we had bad rooms in Australia for acoustics, but it's shocking to see what we have here.

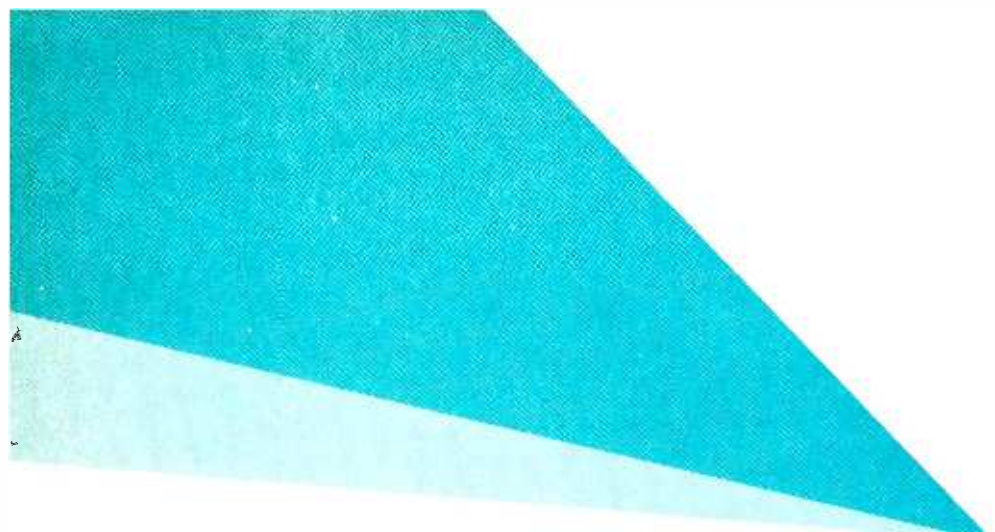
home, we usually have a couple of female singers who join the group on stage.

CE: You see in Australia, INXS is probably one of the biggest bands in the country... at least in the top three. So for those shows back home we use a lot more instruments on stage. It's a much bigger production. They'll use congas, female vocalists, more keyboards, acoustic guitars, and all that. It's a much wider range of dynamics. It's really a totally different show. That's why at home in Australia I'll use 48 channels. I have two 24-channel desks and every one is full.



Members of INXS in the studio with Daryl Hall and Nile Rodgers.

Photo by Robin Kaplan



Whereas, here I'm using 32 channels. So it's a much bigger show back home. In fact, for the last show in Australia I did all the instruments and another guy mixed all the vocalists. It certainly gave me more time to work with individual channels. That's the whole trouble with mixing live...it's there and gone. You can't reach the potential because you simply don't have the time to concentrate so much on each channel and get it right. You're constantly sort of shuffling around, trying to keep it mixed together. Then you have people hovering around by the desk, people asking you questions; you have to keep the crowds back. It gets hard to concentrate.

MR&M: So you must be very busy during the first song?

CE: Oh yeah, the first couple of songs. There's a lot to do. You never know what's gonna happen or how the bodies in the room will affect the acoustics of the room. You can't afford to start off with a quiet mix because the first song has to come out and be very dynamic. So you set it up high then make the necessary adjustments for the room through the first couple of songs. It's no big problem. It's got to be dynamic right from the start and that's where the soundcheck comes in, just to get your gain levels set.

BD: A sound check is just to get basic gain structures together for the first song. It's actually more critical for getting the monitors together than the PA system or the general mix of things.

MR&M: What board are you using for this tour of America?

CE: A Yamaha PM2000, which is good for our purposes. On this tour we're going to be dealing with all different speaker systems at all the different theaters, so I wanted something that would be easy to set

up, and that's the Yamaha PM2000. It's a real easy desk to set up. It has basic gain structures and EQ. You set it up once and leave it. The support band can get onto it and mess up every channel on the desk and you can go back and get it all back perfectly. It's so simple and convenient for touring. I prefer the Soundcraft for its versatility and the fact that it's got better EQ. But the Soundcraft has so many variables to work with, and that can be a problem if the support band gets to messing with it. Then you've got a problem trying to get your gain structures back to where you want them. You really haven't got a lot of choices with the Yamaha since it works in just a few steps.

MR&M: Have you done a lot of trial and error with microphones?

CE: I've used a lot of mics and I always come back to the standard setup of Shure mics for vocals. The SM-58 is not my favorite mic by any means, but it's the only one we can give to Michael that's going to last more than a week. I used to give him Beyer mics but he'd just smash them within a week. They can't handle the abuse of touring. They just fall to pieces as soon as they've been dropped a few times. Electro-Voice mics are good too, but again, they don't hold up like the Shures. Especially the way Michael tends to toss his mics about.

MR&M: Can you detail your equipment?

CE: Well, for this tour we're just going with a desk, an effects rack, and a monitor system, tapping into the house system. But in Australia we use a more modern system. There I use two Soundcraft 400s, giving me a full 48 available channels. Then we have a Klark Teknik 3030 graphic equalizer, DSS crossovers, a Lexicon 224 digital reverb, a Lexicon Prime Time, a Yamaha 1000 digital reverb, an Ibanez stereo delay, five gates on

the tom-toms, compressor on the singing mic and on the bass drum. I usually use Beyer M88 mics on the bass drum and the bass guitar. I've found that they're the best in a live situation. Then I use SM57s on the snare drum and guitars and 41s on the tom-toms. In the studio you'd never use SM57s on the guitars. You'd use anything but. The thing is, in a live situation you really need directional microphones, whereas in the studio you'd use non-directional mics to pick up the room sound, and you can't do that live.

MR&M: Are the larger concert halls you're playing in now difficult to deal with?

CE: Yes, especially in America, where you have to play in basketball stadiums and hockey stadiums. It's terrible. I mean, I thought we had bad rooms in Australia for acoustics, but it's shocking to see what we have here. I've found that the best circumstances for this band is working the 3,000 to 5,000 seat theaters.

MR&M: Is the amount of time you have for a soundcheck sufficient?

CE: Yeah, usually. Some of the best gigs you have are when you don't have a soundcheck at all. Because if you do a really long soundcheck and get everything perfect, you tend to really hang onto what you had in the soundcheck and you're too scared to change it. Then when the band comes out and begins playing and it doesn't sound quite right, you're sitting there going, "But that sounded perfect in the soundcheck!" So you get too intimidated to go away from that. Whereas, if you don't have any soundcheck, you can really get vibed up about it and throw the sound together instinctively so it sounds just right. So you really can't stick that closely to your soundcheck. And also, the band plays totally different during the soundcheck. Often, doing the sound like this, you'll be sitting there wondering what doesn't sound right. You'll be blaming yourself when it's actually the band and what they're putting out. Then all of a sudden, without touching anything, the sound pulls together. The band comes to life and it sounds really great and you haven't touched the desk. All of a sudden it's gone from sounding terrible to sounding good. It's the way the band is playing...their attack on the strings, the way they're hitting it. They just start clicking and everything kind of falls into place.

b.m.

MODERN **RECORDING** & MUSIC

Looks At

Delay Units

The digital delay is one of the most popular signal processors ever introduced—and with good reason. A single digital delay can give such popular effects as flanging, doubling, chorusing, slap-back echo, and standard echo, as well as more esoteric effects such as digital sampling, synchronized echo, and pitch-shifting.

However, with so many delays on the market, how can you select the one that's right for you? Part of the answer depends on your application. Short delay units (up to, say, 300 ms) are extremely cost-effective as they can provide flanging, chorusing, doubling, and moderate length echo effects. On the other hand, longer delay lines (greater than one second) can not only give some very spacey echo effects, but also usually include a *hold* switch for "freezing" sounds in the unit's memory. For those who like to experiment with interesting rhythmic effects and solid-state tape loops, the extra investment in a long delay unit might well be justified.

Also note that different delays have different "sound signatures" and color the sound differently. For example, what sounds best with guitar may not sound best with voice; therefore, try as many delays as possible to find out which one sounds best to you (even units with identical specs can sound remarkably different).

Perhaps what's most exciting about digital delays is that a great many applications, particularly those

involving multiple delay lines, are just waiting to be discovered (after all, digital delays have not been around all that long, and much experimentation remains to be done). If you're interested in getting the absolute most out of a delay line, I recently completed a book describing 69 different digital delay line applications (published by Music Sales and scheduled for imminent introduction). But you can learn a lot on your own simply by experimenting—especially with interfacing the various "jacks on the back" to other equipment in your studio. This is one effect where your satisfaction with the unit will be directly proportional to your creativity in applying it.

Nonetheless, while digital delays are extremely versatile, bear in mind that they can't do everything. It's difficult to get convincing hall reverb effects; you really need a spring, plate, or digital reverb unit to do the job right. Also, with few exceptions, digital delays are not as good as analog delays for wide-range flanging (in fact, this is one of the few applications where analog technology still has an edge). But one thing's for certain: A delay line is one of the most cost-effective and musically useful processors going. Whether you want to thicken up a guitar, subtly alter a voice, add ambience to electronic keyboards, or experiment with outrageous special effects, once you have a good digital delay in your studio you'll wonder how you ever got along without one.

craig anderton

ADA

2FX Digital Multi-Effects produces two effects at once. It has separately grouped controls for flanger, chorus, and digital delay. A patch switching system selects the position of effects in the signal processing chain. A DM-2 footswitch accessory memory bypass function remembers any combination of preset effects. Maximum delay is 1024 ms, bandwidth is 17 kHz. Dimensions-10½ x 1¼ x 19 inches. Weight-6.5 lbs. Price-\$599.95, DM-2 price-\$119.00.

2.56i Digital Delay offers 2560 ms of delay at 16 k Hz bandwidth. Sweep range is 8:1, continuously variable waveform selector allows signal to be modulated by a triangle, sine, or square wave. Other features include modulation rate indicator, phase invert, remote repeat hold and bypass, high cut, and 4-step LED headroom indicator. Dimensions-10½ x 1¼ x 19 inches. Weight-6.5 lbs. Price-\$799.95.

1.28i Digital Delay has same features as 2.56i except 1280 ms of delay. Price-\$699.95.

.64 Digital Delay has same features as 2.56i except 640 ms of delay. Price-\$499.95.

STD-1 Stereo Tapped Delay is a voltage-controlled analog delay with six delay taps, each mixable and assignable to the A or B outputs. Regeneration tap switch selects tap 1, 3, or 6 as the regeneration source. Sweep modulation control superimposes higher frequency sweep pattern over the regular sweep. Effects include multi-voiced chorusing, true stereo generation, and holographic positioning. Dynamic range is 93 dB. Dimensions-10½ x 1¼ x 19 inches. Weight-6.5 lbs. Price-\$799.95.

AKG

BX25E is a true two-channel reverb unit which uses the company's patented torsional transmission line principle. This studio unit is portable and provides for totally separate use and control. Dimensions-18 x 20 x 21 inches. Weight-66 lbs. Price-\$5500.00.

BX25ED is a version of the model above with a two channel digital delay which provides for initial delay as well as first and second echoes. Each echo has independent level and time control for flexibility over the reverberant environment created. Dimensions-18 x 20 x 21 inches. Weight-66 lbs. Price-\$8400.00.

Audio + Design

SCAMP S24 Time Shape Module performs all the tasks currently available from other analog Time Domain Processors in less than 20% of the space. Features include front end limiter, stereo reverb, flanging, ADT, Modulation and frequency controls give a host of effects. Dimensions-8 x 1 x 9 inches. Weight-1.25 lbs. Price-\$750.00.

SCAMP S23 Pan Effects Module is a stereo unit. Inputs can be fed from stereo or two mono sources. The signals are switched to provide varying output configurations. Two LEDs indicate normal or reversed channel status. Other features include threshold of triggering control, rate of delay, speed of pan. Pan only one way or both. Dimensions-8 x 1 x 9 inches. Weight-1.1 lbs. Price-\$465.00.

PAN-SCAN is a rack mount system offering all the features of the S23 Pan Unit plus a beat counter that will trigger the pan pattern to a variety of actual rhythms, and with a variable width of pan control. Dimensions-1 $\frac{1}{4}$ x 19 x 7 $\frac{1}{2}$. Weight-5.5 lbs. Price-\$890.00.

dbx

Model 906 is a flanger that achieves precise control of the flanging effect with a 100:1 frequency sweep. The unit can also be used as doubler manually, by internal sweep generator, or by internal noise source (or external noise source.) The 906 is part of a dbx system which must be used in the F-900 Powered Frame, available separately. Dimensions in the frame are 5 $\frac{1}{4}$ x 19 x 14 inches. Price of the 906-\$750.00. The F900 Frame-\$525.00.

DeltaLab

CompuEFFECTRON is real time effects processor using the latest touch keypad and microprocessor technology. Features include 1.7 seconds of delay with 20 Hz to 20 kHz bandwidth at all delays. Dynamic range is 90 dB and distortion is 0.2%. Flange ratio is 100:1. There are 128 preset user programs including flange, double, chorus, echo, and custom programs. User memory includes 4 sets of 8 programmable sequences to recall presets, externally addressable ability from foot switches, and external sync capabilities. Dimensions-1 $\frac{3}{4}$ x 19 x 10 inches. Weight-12 lbs. Price-\$999.99.

EFFECTRON III has delay time to 1024 ms at a dynamic range of 90 dB and a bandwidth of 17 kHz. Flanging, doubling, and echo are available. The unit is simple to program and the programs have a battery backup. External VCO, bypass, infinite repeat and program selector. Dimensions-1 $\frac{3}{4}$ x 19 x 10 inches. Weight-12 lbs. Price-\$699.00.

EFFECTRON II digital delay has electronic specifications similar to the III above with an 8:1 flange ratio. Simplified push buttons replace the programmability above. Dimensions-same as III above except weight-10 lbs. Price-\$499.99.

EFFECTRON I offers 15 kHz bandwidth with 87 dB dynamic range and simplified push button controls. Otherwise similar to II above. Dimensions as III above except weight-8 lbs. Price-\$329.00.

DOD

R-910 Digital Delay is a full function delay unit with up to 1900 ms. of delay time. Switching is available for flanging, chorusing, doubling, and echo. Sweep rate is 8:1, Bandwidth is 40-15 kHz delay, dynamic range is 87 dB, THD is 0.08%. Dimensions-1 $\frac{3}{8}$ x 19 x 8 inches. Weight 8 lbs. Price-\$499.95.

R-908 digital delay has up to 900 ms. delay. Selector switches are available for easy setting of flanging, chorusing, doubling, and echo. Bandwidth is 40 Hz to 8kHz delay, THD through delay is 0.2%. Dimensions and weight as above. Price-\$399.95.

R-845 is spring-type reverb system with wide range input and output controls, a four-band equalizer, and mix control. Incorporates pre-limiting and mild precompression to reduce boings and twangs from drum tracks, resulting in a smooth, natural sounding reverb. Center frequencies of 200, 500, 1250, and 3100 can be selected with a delay time up to 2.5 seconds. Dimensions-1 $\frac{3}{4}$ x 19 inch rack. Weight-4.8 lbs. Price-\$229.95.

Electro-Harmonix

9870 is a 16 sec digital delay. It is floor-box configured with delay ranging from 8 ms to 16 sec. Features include reverse playback, chorus, flanging, infinite hold, half or double speed playback. There is a built in click track to sync with drum machines. Dimensions-2 x 7 $\frac{1}{4}$ x 6 $\frac{3}{4}$ inches. Weight 4 lbs. Price-\$675.00

7850 Deluxe Memory Manual is an analog delay in floor-box configuration. Maximum delay is 400 ms. Features include input level control, overload LED, chorus, vibrato. Dimensions-2 x 7 $\frac{1}{4}$ x 6 $\frac{3}{4}$ inches. Weight-3 lbs. Price-\$299.00

7811 Memory Manual Stereo/Echo/Chorus is an analog delay in a floor-box configuration. Maximum delay is 250 ms and there is FET switching with status LED, and true stereo chorus. Dimensions-2 x 7 $\frac{1}{4}$ x 6 $\frac{3}{4}$. Weight-3 lbs. Price-\$219.00

Eventide

H910 Harmonizer[®] is a combination pitch change and digital delay. The combined use of the feedback, delay and pitch change controls can create a variety of effects including robot speech, hollow flanging, and reverb. Keyboard control is available. Dimensions-3 $\frac{1}{2}$ x 19 x 9 inches. Weight-11 lbs, Price-\$1500.00.

H949 Harmonizer[®] is a multi-purpose effects unit with pitch change(up one octave, down two), delay, feedback, flanging, repeat, time reversal and random delay. Remote and keyboard are available. Dimensions-3 $\frac{1}{2}$ x 19 x 12 inches. Weight-16 lbs. Price-\$3500.00.

SP2016 Effect Processor/Reverb is a programmable unit that can do effects such as plate reverb, room reverb, delay, comb filter effects, and selective band delay. New effects software can be added to provide more effects. The unit is full stereo. Dimensions-3 $\frac{1}{2}$ x 19 x 12 inches. Weight-18 lbs. Price-\$9495.00.

Fostex

3050 Digital Delay is a single channel unit with 270 ms. of delay. Useful for a broad variety of effects such as doubling, flanging, phasing, slap echo, and vibrato. Features include triple LED input monitoring, delay modulation with depth and speed control, feedback, phase inversion, input/output mixer, and a control voltage input for delay modulation by synthesizer or foot pedals. Dimensions-17 x 7 $\frac{1}{4}$ x 8 $\frac{1}{4}$ inches. Weight 6.75 lbs. Price-\$400.00.

3180 Stereo Reverb is multiple spring unit plus a delay matrix for natural room sound. Features include front panel input jacks, overload LED and built-in limiter to avoid transient boing sounds. Dry/reverb mix controls, footswitch jack, and a special effect on each channel for processing a mono signal into a stereo effect. Dimensions-3 $\frac{1}{2}$ x 17 x 8 $\frac{1}{4}$ inches. Weight-8.25 lbs. Price-\$400.00.

Furman Sound

RV-1 (mono) and RV-2 (stereo) reverb systems combine 16 inch triple-spring reverb tanks, limiter circuitry, and controls for input level, equalization, and "wet" or "dry" output levels. There are also instrument and line-level inputs, an LED that indicates above threshold, and, in the stereo version, a ground-lift switch, and control to generate a stereo output from a mono source. Dimensions-RV-1 1 $\frac{1}{2}$ x 19 x 8; RV-2 3 $\frac{1}{2}$ x 19 x 8. Weight RV-1 5lbs; RV-2 8 lbs. Price- RV-1 \$315.00; RV-2 \$525.00.

HMR Communications

MuMod Stereo Flanger/Vibrato is a pedal effects device which produces flanging and vibrato types of effects. Four effects controls provide a variety of possible sounds with vibrato in/out footswitch providing a quiet switching action. Dimensions-4 x 4 x 2 inches. Weight-0.5 lb. Price-\$79.00.

MuMod Stereo Chorus/Vibrato is as above except chorus effects instead of flanging. Dimensions, weight and price as above.

MuMod Stereo Reverberation is a pedal type reverb with multifeedback. Delay paths up to one second are provided. Adjustment permits from a single echo to multi-echoes to be created. Dimensions-4 x 4 x 2 inches. Weight-0.5 lb. Price-\$89.40.

RTM-105 Reverberation/Delay is a rack-mount unit with flanging, chorusing, reverb long delays, and vibrato effects provided. Front panel controls permit adjustment. A remote footswitch is included for control. Dimensions-1 $\frac{1}{2}$ x 19 x 11 inches. Weight-3 lbs. Price-\$149.80.

Ibanez

DM1100 Digital Delay provides up to 3.6 seconds of delay without reducing unit bandwidth. Infinite hold and sound-on-sound are available. Delay effects include flanging, chorus, doubling, slapback, hard reverb, and echo. There is treble boost/cut and headroom LEDs. Dimensions-1.8 x 19 x 9.2 inches. Weight-6.6 lbs. Price-\$329.00.

DMD2000 Programmable Digital Delay provides eight programmable presets that may be recalled from either the front panel keyboard or remote switching. Up to 2047 ms. of delay are available at a full 16 kHz bandwidth. A digital display indicates delay time, program selection, and other delay functions. Dimensions-1.8 x 19 x 10.5 inches. Weight-9.6 lbs. Price-\$550.00.

HD1500 Harmonics/Delay with Presets shifts the pitch of any material over one octave up or down with a reduced processing time of 30 ms. and enhanced feedback capabilities. An optional PC40 Preset Controller provides three presettable settings for real-time melodic harmonies. The 1500 is also a full-function digital delay with up to 504 ms. of delay LED readout with level LEDs and full front-panel switching along with multiple input/output configurations are also included. Dimensions-1.8 x 19 x 9.2 inches. Weight-6.6 lbs. Price-\$559.00.

Klark-Teknik

DN780 is a digital reverb/processor that permits accurate and natural reverb simulation. Programs include Hall, Chamber, Plate, and Room with 20 factory-set variations and an effects program for echo, chorus, and sound-on-sound. There are facilities for input or reverb mute, and recall of up to 16 programs in a user determined order. Features include decay adjustable from 0 to 999 milliseconds, dynamic range is 85 dB, and bandwidth is 12kHz. There are 50 user memory locations for program storage. Dimensions-3½ x 19 x 12½ inches. Weight-16 lbs. Price-\$5500.00.

KORG

SDD-1000 Digital Delay has stereo outputs, chorus, doubling, flanging, slapback, short echo, long echo, and infinite hold as standard features and now offers remotely settable delay and hold times. It can be synchronized to drum machines and sequencers and sounds can be sampled and triggered by a foot switch or other trigger. There is a 2 second delay time and a 90 dB dynamic range. Dimensions-1¼ x 19 x 11.9 inches. Weight-8.8 lbs. Price-\$395.00.

SDD-3000 is a programmable digital delay with stereo outputs, infinite hold, remote switching up and down of programs, four-position high and low cut feedback filters, feedback loop and output inversion, triangle, square and LFO waveforms, external and envelope control of VCO, flanging, chorus, doubling, echo. Almost all functions are programmable. Delay is 1023 ms, and bandwidth is 20-17 kHz. Dimensions-1¾ x 19 x 15. Weight-13.2 lbs. Price-\$1495.00.

Lexicon

PCM-60 Digital Reverberator features two reverb programs, room and plate, from which users can tailor reverb characteristics on the basis of size, reverb time, and bass and treble contouring, to produce over a hundred distinct reverb effects. Rotary knobs are used to set input gain, reverb, and output level. A front-panel bypass mode switch with optional footpedal control is included. Dimensions-1¾ x 19 x 11 inches. Weight-9.2 lbs. Price-1495.00.

PCM-41 Digital Delay is an economical 16 kHz processor that provides doubling, chorusing, and related delay effects. Delay time is 800 ms. Dimensions-1¼ x 19 x 11 inches. Weight-5.5 lbs. Price-\$715.00.

PCM-42 has same features and dimensions as the PCM-41 but has a metronome clock function and delay time to 4.8 seconds. Price-\$1000.00.

Model 95 is a digital delay processor with dual output 20 kHz bandwidth and complete on-board mixing. Delay time is up to 7.68 seconds. Dimensions-3½ x 19 x 13½ inches. Weight-10.5 lbs. Price-\$1980.00.

Model 97 is a programmable digital delay processor with dual outputs, 20 kHz delay bandwidth, and 32 storage registers. Cassette storage of user-created effects can be done. Dimensions-5¼ x 19 x 13½. Weight-17 lbs. Price-\$3170.00.

Model 200 Stereo Programmable Digital Reverberator adds reflected energy to dry voices. Features include a size control that can produce ambiances that identify a range of spaces such as a wooden-walled cabin, empty factory, long corridor, etc. Dimensions-5 $\frac{1}{4}$ x 19 x 15 inches. Weight-18 lbs. Price-\$4800.00.

Model 224 XL is a reverb/effects processor unit with 18 reverb/effects programs, and 59 variations of programs controlled by Lexicon Alphanumeric Remote Controller (LARC). Dimensions-5.9 x 9 $\frac{1}{2}$ x 3.2 inches. Weight-19 lbs. Price-\$12,500.00.

LT Sound

Model RCC is Reverb Control Center with a 18 kHz bandwidth in reverb and an 80 dB dynamic range. In addition to its reverb capabilities this is also a mixer permitting two microphones to be mixed with two line inputs. Specifications include THD of 0.05%, full equalization, and low noise mic inputs. Dimensions-2 x 19 x 7 $\frac{1}{2}$ inches. Price-\$595.00.

Model EC-1 is a single-channel echo control center. Delay times of 30 to 500 ms. are possible with bandwidth dependent on the amount of delay. At 3-100 ms. bandwidth is 20 Hz to 15 kHz, while at the maximum 500 ms. bandwidth drops to 20 Hz to 3.5 kHz. Other features include a dynamic range of 90 dB, distortion of 0.5%, full tone and delay controls. The EC-1 can be fitted with the MICROPLATE[®] reverb system of the RCC to become a full feature delay/reverb system. Dimensions-2 x 19 x 7 $\frac{1}{4}$ inches. Price-\$895.00.

TAD-4 designates the Thompson Analog Delay system which can mimic the ambience of many rooms. Delay times are adjustable from 20 to 240 ms. As above, bandwidth is effected by the delay time. In the critical 20-70 ms range, bandwidth is 20 Hz to 12 kHz. This system is comprised by two long delay analog delay lines as well as two reverberation devices(MICROPLATE[®]). Dynamic range is 90 dB. Dimensions-7 $\frac{1}{4}$ x 19 x 2 inches . Price-\$1195.00.

MicMix

Master-Room XL-515. This multi-function reverb system incorporates patented technology and provides the user with the capability of simulating a plate reverb, a live chamber, or a concert hall. Variable decay and other features are included. Dimensions-5 $\frac{1}{2}$ x 19 x 14 inches .Weight-28 lbs. Price-\$3500.00.

Master-Room XL-404. This reverb system duplicates the sound of a plate reverb. It includes variable decay, extensive equalization, plus other features. Dimensions-5 $\frac{1}{2}$ x 19 x 14. Weight-14 lbs. Price-\$1795.00.

Master-Room XL-305. This reverb system synthesizes the sound of a live acoustic chamber. Features include equalization capability, stereo/mono operation, input/output level controls. Decay time is 3 sec. Dimensions-3 $\frac{1}{2}$ x 19 x 12 inches. Weight-16 lbs. Price-\$1295.00.

Master-Room XL-210. This stereo reverb has a three-band equalization, and may be used in mono/stereo. Decay is 2.5 sec. Dimensions-3½ x 19 x 12 inches. Price-\$750.00.

Master-Room XL-121. This is a mono reverb that is essentially one channel of the XL-210, but does include a preamp that permits line or instrument levels. Decay time is 2.5 sec. Dimensions-1½ x 19 x 12 inches. Weight-10 lbs. Price-\$425.00.

Master-Room DC-2. This unit provides the user with the capability of varying the decay time of any reverb device. The incorporated technology permits reduction of decay time on almost any reverb system by about 75%. In addition, a downward expansion circuit reduces any reverb's noise. Dimensions-1½ x 19 x 12 inches. Weight 10 lbs. Price-\$695.00.

Morley

Model ECV is an echo/chorus/vibrato a.c. powered foot pedal. Delay range is 15 to 300 ms., In the delay mode, flanging occurs when the pedal is swept in the presence of a signal. In chorus/vibrato mode, pedal sweeps from one cycle in 20 seconds to 9 cycles per second. Dimensions-4 x 6 x 10½. Weight-4.8 lbs. Price-\$298.95.

SLEV is a slimline echo/volume that operates from battery or a.c. Delay range is 15 to 300 ms. In delay mode, pedal controls repeats, dry to infinity. Volume control pedal when echo switched off. Dimensions-2½ x 6 x 10½. Weight-3.8 lbs. Price-\$249.95.

SLEV-6 is same as SLEV above except delay range is 15 to 600 ms. Price-\$349.95.

AER is an analog echo/reverb with same features as SLEV except for knob control of repeats instead of pedal. No volume control. Dimensions-2½ x 4 x 5½. Weight-2.4 lbs. Price-\$189.95.

AER-6 has same features as AER except delay is 15 to 600 ms. Price-\$279.95.

RBX Lectroverb is an electronic reverb with no springs. Reverb loudness and decay time are fully controllable. Dimensions and Weight as AER model above. Price-\$194.95.

Omni Music Products

Electra EP-150 Analog Delay is an affordable rack mount unit with 300+ ms. of delay. Line and mic input and output padding, 60 Hz to 3 kHz bandwidth, and footswitchable control is standard. Dimensions-1½ x 19 x 6 inches. Weight-3.1 lbs. Price-\$150.00.

Electra EP-200 Analog Delay with Reverb is similar to the EP-150 above with the addition of 3 seconds of reverb from a twin spring system. Both delay and reverb are footswitch-able. Dimensions-1½ x 19 x 9 inches. Weight-5.5 lbs. Price-\$200.00.

Electra 606AD designates an analog delay pedal. Features included rate, repeat, and mix controls, 20-300 ms. delay range. Runs on batteries or a.c. adapter. Padded storage case is included. Dimensions-2½ x 3½ x 5½ inches. Weight-1 lb. Price-\$180.00.

Quad-8

The Quad Eight/Westrex, System 5 Advanced Digital Reverb has a touch-sensitive keypad remote control interfaced (by a standard audio cable) to a rack-mounted mainframe. Bandwidth is 14 kHz, signal-to-noise is 85 dB with a dynamic range of 105 dB, reverb time is adjustable in ten steps from 0.5-0.6 seconds. There are 16 equalization settings for 12 dB adjustment in 1 dB steps, and 4 non-volatile pre-sets. Dimensions-remote: $9\frac{1}{4}$ x 5 x 3; rack unit: $5\frac{1}{4}$ x 19 x 15. Weight-40 lbs. Price-\$5995.00.

Roland

SDE-3000 Programmable Digital Delay has 8 program memory capable of remembering all front panel settings. Frequency response-10 Hz to 17 kHz, dynamic range-100 dB, THD-0.03%, other features-modulation CV invert out, foot control of modulation, hold, delay on/off, playmate. Weight-11 lbs. Price-\$1095.00.

SDE-1000 Programmable Digital Delay has 4 program memory of delay time, delay phase, modulation, feedback settings. Features include 1125 ms delay, frequency response of 10 Hz to 17 kHz, 90 dB dynamic range, THD-0.08% at 1 kHz. Unit has foot control, delay on/off, preset switch, hold, playmate. Weight-11 lbs. Price-\$499.00.

DE-200 BOSS Digital Delay has 1280 ms of delay, frequency response is 10 Hz to 10 kHz in delay mode, THD is 0.25%. Weight-7.7 lbs. Price-\$399.50

DD-2 BOSS Digital Delay is foot-pedal sized, has 800 ms. of delay, 40 Hz to 7 kHz frequency response, footswitchable hold. Weight-0.99 lbs. Price-275.00.

DM-3 is a foot-pedal sized stereo analog delay. It has 300 ms delay. Price-\$189.50.

DM-300 Analog Delay has 600 ms delay, chorus effect, foot control on/off, delay rate. Dimensions-15 x 5 x 8 inches. Weight-8.2 lbs. Price-\$395.00.

SRE-555 Space Echo has tape delay, balanced XLR in and out, 77 dB s/n, 1.8 seconds delay, chorus, echo, sound on sound, reverb footswitchable, single or multiple repeat, bass and treble controls. Weight-34.5 lbs. Price-\$1150.00.

Sony

DRE 2000A Digital Reverberator can be used as a pure delay, echo machine, or full-featured reverb system. Eight master programs, with variations within these programs as well as entirely new parameter combinations are accessible via simple key touches. Complete with non-volatile memories, it can store up to 18 programs for instant one-touch recall. Dimensions- $5\frac{5}{8}$ x $16\frac{7}{8}$ x $17\frac{1}{2}$ inches. Weight-33 lbs, 2 oz. Price-\$11500.00.

Ursa Major

StarGate 323 is a high performance digital reverb, capable of synthesizing a range of acoustic environments from tiny chambers to echoing spaces. Bandwidth is 15kHz, dynamic range is 80 dB. There are 16 choices of pre delay-from 0 to 320 ms and 8 choices of decay time from 0 to 10 sec. Override functions: input mute, reverb clear, dry only. Dimensions- $3\frac{1}{2}$ x 19 x $12\frac{1}{2}$ inches. Weight-16 lbs. Price-\$2500.00.

8X32-MK-II is the new version of the 8X32 digital reverb with 4 additional programs-cask, percussion plate, chamber, and reverse reverb. These programs are in addition to the unit's plate I, plate II, and hall and space programs. Bandwidth is 8 kHz, dynamic range is 80 dB. Dimensions-19 X 3½ x 15 inches. Weight-15 lbs. Price-\$4000 and up.

SPACE STATION SST-282 is a sound processor that adds delay and reverb effects. Bandwidth is 20-20 kHz. There are 16 programs of 8 delay tap times, pre-programmed to 1 ms resolution over a range of 1 to 255 ms. Decay time is 0 to 3.5 sec maximum at 500 Hz decay time. Dimensions-19 x 5½ x 9. Weight 10 lbs. Price-\$2,195.00.

Washburn

WD-700 is a full-bandwidth, full-function digital delay with 640 ms. of delay. Head-room LEDs and an LED for low-frequency oscillation are provided. Multiple inputs in both the front and back of the unit make it convenient for either rack mounting or portable use. Remote switching and hold/repeat are included. Dimensions-1½ x 19 x 9½ inches. Price-\$299.00.

ADA Signal Processors, 2316 Fourth Street, Berkeley, CA 94710
AKG Acoustics, 77 Selleck Street, Stamford, CT 06902
Audio + Design/Calrec Inc., P. O. Box 786, Bremerton, WA 98310
dbx Inc., 71 Chapel Street, Newton, MA 02195
DOD, 5639 South Riley Lane, Salt Lake City, UT 84107
DeltaLab Research, Inc., 19 Alpha Road, Chelmsford, MA 01824
Electro-Harmonix, 27 West 23rd Street, New York, NY 10010
Eventide, Inc., One Alsan Way, Little Ferry, NJ 07643
Fostex Corporation of America, 15431 Blackburn Avenue, Norwalk, CA 90650
Furman Sound, 30 Rich Street, Greenbrae, CA 94904
HMR Communications, Inc. 10 Communications Way, West Newton, PA 15089
Ibanez-Hoshino(USA)Inc.,1716 Winchester Road, Bensalem, PA 19020
Klark-Teknik Electronics, Inc., 262a Eastern Parkway, Farmindale, NY 11735
Korg-Unicord, 89 Frost Street, Westbury, NY 11590
LT Sound, P.O. Box 338, Stone Mountain, GA 30086
Lexicon, Inc., 60 Turner Street, Waltham, MA 02154
Mic Mix, 2995 Ladybird Lane, Dallas, TX 75220
Morley-Division of Tel Ray Electronics Mfg. Co., Inc., 6855 Vineland Ave., North Hollywood, CA 91605
Omni Music Products, 1400 Ferguson Avenue, St. Louis, MO 63133
Orban Associates Inc., 645 Bryant Street, San Francisco, CA 94107
Quad Eight/Westrex, 11929 Vose Street, North Hollywood, CA 91605
RolandCorp US, 7200 Dominion Circle, Los Angeles, CA 90040
Sony Professional Audio Products, Sony Drive, Park Ridge, NJ 07656.
Ursa Major, Inc., Box 18, Belmont, MA 02178
Washburn International, 230 Lexington Drive, Buffalo Grove, IL 60090

Headphone Distribution Systems

Sometimes I wonder why we provide headphones in the studio. Is it so that the musicians can hear, or so they can have something to complain about?

My own experience tells me that the answer is a compromise somewhere between the two. Usually I wait until everything else is set up; then, at the very last minute, I walk out and distribute the headphones to the folks in the studio. This keeps them from interrupting with comments like "I can't hear myself in the 'phones." Comments such as this seem to occur before you even have a chance to switch the console to mic input mode, let alone set up some semblance of a cue mix.

Enough of this. This article is devoted to the ins and outs of headphones, as applied to a recording studio cue system. What sort of phones should you use? How much power do you need? For the technically inclined, there will be a bit of math (so you can tickle your calculators) and some schematics.

What Is Really Needed?

First, the musicians need to hear themselves. The headphone cue system fills the same need that the stage monitors do in live performance. The phones system must deliver faithful reproduction of the program material, with little of its own coloration or distortion, sometimes at ridiculous levels.

Second, the amount of acoustical leakage from the headphones into the

studio needs to be minimized (sometimes it causes problems during overdubbing). Sometimes the acoustical leakage from the studio into the phones must be minimized. At other times the leakage doesn't matter.

Third, the mix presented in the headphone system must be tailored to the needs of the musicians, in their environment. This says that the phones need their own mix(es).

Fourth, the cost of all of this shouldn't break the studio's piggy bank.

Whew! That's a tall order.

What Makes A Good Monitor Headphone?

First, I don't think that there is *one* single type or model that is all things to all people. Typically, two rather different types of headphones will satisfy most needs during a typical recording session. These types are:

1. closed cup or circumaural headphones
2. open cup or supra-aural headphones

The closed cup phones provide a relatively good amount of isolation between the outside world and your ears. They're useful when you are trying to minimize the influence of the sound present in the studio with the mix that is presented to the phones. Some good examples of closed cup phones are the Koss Pro 4 series or the AKG K-340.

The open cup phones are typically lightweight, and provide little or no

isolation from the outside world. They're useful when you want the sound present in the studio to modify the mix presented to the phones. During vocal overdub sessions, they can be a bonus because they allow the singers to hear themselves through the air, as well as via bone conduction. Some good examples of supra-aural headphones are the Sennheiser HD-414 or the Sony MDR-40T.

Beyond the basic design concept of open or closed cup design are the areas of frequency response, distortion, and sensitivity.

It goes without saying that wide frequency response is desirable. Width is a matter of taste, but frequency response from 30 Hz to 15 kHz is a reasonable goal. On the other hand, the frequency response curve should be flat (within economic reason). The reason you want it flat is twofold:

1. Shaped response will alter the mix that you present to the headphones.
2. Peaky response curves cause listening fatigue and may mask some subtle nuance needed for precise cueing.

Low distortion is as desirable as flat frequency response. Like peaked frequency response, distortion causes listening fatigue. Very simply stated, you can't afford listening fatigue on a long overdub session.

Sensitivity is the relationship between the electrical power input and the acoustical output. Don't let a high sensitivity number fool you, though; the picture isn't complete until you consider the impedance (there's that

| Manufacturer | Model | Impedance Ohms | Sensi- tivity ¹ dB | HC6 Max Power ² mW | HC6 Max SPL ³ dB |
|--|---------|-------------------|-------------------------------------|--|--------------------------------------|
| AKG ACOUSTICS | K40 | 200 | 95 | 180 | 118 |
| | K41 | 200 | 95 | 180 | 118 |
| | K120 | 600 | 112 | 70 | 130 |
| | K130 | 600 | 96 | 70 | 114 |
| | K140S | 600 | 97 | 70 | 115 |
| | K141 | 600 | 98 | 70 | 116 |
| | K160 | 600 | 98 | 70 | 116 |
| | K240 | 600 | 102 | 70 | 120 |
| | K241 | 600 | 95 | 70 | 113 |
| | K340 | 400 | 95 | 105 | 115 |
| AUDIO TECHNICA | ATH-1 | 10 | 100 | 440 | 126 |
| | ATH-3 | 10 | 100 | 440 | 126 |
| | ATH-5 | 10 | 100 | 440 | 126 |
| | ATH1 | 10 | 93 | 440 | 119 |
| | ATH2 | 10 | 93 | 440 | 119 |
| BEYER DYNAMIC | DT302 | 600 | 97 | 70 | 115 |
| | DT330 | 40 | 90 | 490 | 117 |
| | DT550 | 600 | 95 | 70 | 113 |
| | DT880 | 600 | 94 | 70 | 112 |
| | DT48 | 200 | 105 | 180 | 128 |
| | DT96 | 200 | 110 | 180 | 133 |
| | DT100 | 200 | 110 | 180 | 133 |
| | DT220 | 600 | 100 | 70 | 118 |
| | DT440 | 600 | 100 | 70 | 118 |
| | DT441 | 600 | 100 | 70 | 118 |
| KOSS | HV1 | 168 | 94 | 210 | 117 |
| | HV1A | 157 | 93 | 220 | 116 |
| | HV1LC | 132.5 | 90 | 260 | 114 |
| | HVX | 85 | 89 | 350 | 114 |
| | HVXLC | 85 | 89 | 350 | 114 |
| | KC180 | 90 | 97 | 335 | 122 |
| | K6A | 100 | 107 | 315 | 132 |
| | K6ALC | 100 | 107 | 315 | 132 |
| | K135 | 98 | 111 | 315 | 136 |
| | K145 | 87 | 101 | 345 | 126 |
| | K0727B | 100 | 112 | 315 | 137 |
| | PRO4AAA | 220 | 97 | 170 | 119 |
| | TECH II | 245 | 97 | 155 | 119 |
| | TECHVFR | 245 | 98 | 155 | 120 |
| | PRO 4X | 120 | 110 | 275 | 134 |
| PICKERING | OA2 | 40 | 100 | 490 | 127 |
| | OA202 | 50 | 100 | 460 | 127 |
| | OA3A | 15 | 92 | 505 | 119 |
| | OA4 | 40 | 105 | 490 | 132 |
| | OA5A | 100 | 114 | 315 | 139 |
| | OA7 | 100 | 114 | 315 | 139 |
| PIONEER | Mas 1s | 100 | 103 | 315 | 128 |
| | MON 10 | 22 | 100 | 530 | 127 |
| | SEL3 | 40 | 101 | 490 | 128 |
| | SEL5 | 40 | 101 | 490 | 128 |
| | SE2 | 150 | 99 | 230 | 123 |
| | SE4 | 250 | 96 | 155 | 118 |
| | SE6 | 150 | 102 | 230 | 126 |
| | SE7 | 150 | 100 | 230 | 124 |
| | SE205 | 10 | 103 | 440 | 129 |
| | SE305 | 8 | 98 | 400 | 124 |
| | SE405 | 8 | 103 | 400 | 129 |
| | SE505 | 8 | 98 | 400 | 124 |
| | SE450 | 22 | 105 | 530 | 132 |
| | SE550 | 22 | 103 | 530 | 130 |
| | SE650 | 22 | 103 | 530 | 130 |
| SE700 | 10 | 100 | 440 | 126 | |
| Manufacturer | Model | Impedance Ohms | Sensi- tivity ¹ dB | HC6 Max Power ² mW | HC6 Max SPL ³ dB |
| SENNHEISER | HD44 | 640 | 94 | 70 | 112 |
| | HD222 | 600 | 94 | 70 | 112 |
| | HD224 | 200 | 94 | 180 | 117 |
| | HD400 | 600 | 90 | 70 | 108 |
| | HD414 | 2000 | 102 | 25 | 116 |
| | HD420 | 600 | 94 | 70 | 112 |
| | HD424 | 2000 | 102 | 25 | 116 |
| | HD430 | 600 | 94 | 70 | 112 |
| SONY | DR2 | 10 | 104 | 440 | 130 |
| | DRM5 | 32 | 106 | 515 | 133 |
| | DRS3 | 14 | 102 | 495 | 129 |
| | DRS4 | 14 | 102 | 495 | 129 |
| | DRS5 | 14 | 102 | 495 | 129 |
| | DRZ5 | 110 | 104 | 295 | 129 |
| | DRZ6 | 110 | 104 | 295 | 129 |
| | DRZ7 | 110 | 104 | 295 | 129 |
| | MDR2 | 32 | 96 | 515 | 123 |
| | MDR3 | 32 | 96 | 515 | 123 |
| | MDR5A | 32 | 98 | 515 | 125 |
| | MDR7 | 55 | 101 | 440 | 127 |
| | MDRE33 | 32 | 95 | 515 | 122 |
| | MDR1T | 32 | 98 | 515 | 125 |
| | MDR4T | 32 | 98 | 515 | 125 |
| MDR50T | 52 | 100 | 450 | 127 | |
| MDR70T | 52 | 100 | 450 | 127 | |
| MDR80T | 52 | 101 | 450 | 128 | |
| STANTON | DYNA 25 | 50 | 100 | 460 | 127 |
| | DYNA 35 | 15 | 102 | 500 | 129 |
| | DYNA 55 | 100 | 114 | 315 | 139 |
| | MWX | 40 | 100 | 490 | 127 |
| | MWXII | 40 | 105 | 490 | 132 |
| SUPEREX | CL1 | 35 | 100 | 505 | 127 |
| | SM700 | 35 | 100 | 505 | 127 |
| | TRL3 | 80 | 92 | 365 | 118 |
| | TRL66 | 80 | 92 | 365 | 118 |
| | TRL77 | 80 | 92 | 365 | 118 |
| | TRL88 | 80 | 92 | 365 | 118 |
| | TRL99 | 35 | 92 | 505 | 118 |
| TEAC | TH101 | 30 | 95 | 520 | 122 |
| | HP50 | 30 | 98 | 520 | 125 |
| TECHNICS | EAHT805 | 125 | 100 | 270 | 124 |
| | EAH810 | 63 | 121 | 415 | 147 |
| | EAH820 | 125 | 128 | 270 | 152 |
| | EAH830 | 125 | 131 | 270 | 155 |
| YAMAHA | YH1 | 150 | 94 | 230 | 118 |
| | YH2 | 150 | 93 | 230 | 117 |
| | YH3 | 150 | 93 | 230 | 117 |
| | YH100 | 150 | 98 | 230 | 122 |
| | YH1000 | 150 | 103 | 230 | 127 |
| NOTES | | | | | |
| 1. Sound pressure level with 1mW of input. | | | | | |
| 2. Typical continuous average (RMS) power. 20-20kHz, THD less than 0.4%. | | | | | |
| 3. Continuous sound pressure level; for peak SPL, add 3 dB. | | | | | |

Figure 1. Headphone impedance and power requirements.

nasty word again!) of the phones and their voltage drive requirements. Likewise, don't let the words "power input" scare you off. Except for electrostatic phones, most headphones require surprisingly little power to make them uncomfortably loud. For the purpose of this discussion, all of the phones listed are *dynamic headphones*.

How Much Power Do You Really Need?

Fortunately, most headphones are really efficient. Ever heard of a Sony Walkman? The Walkman puts out about 12 mW. That's 12 thousandths of a watt. Wait a minute, I thought you needed at least one watt to lift the phones off of your head?

Nope.

The good folks at Rane Corporation provided me with a list that they publish in their "Note 100," an application note dealing with this very

subject: "Understanding Headphone Power Requirements." Since they manufacture a 6-channel headphone amplifier, the HC 6, it's understandable that they would have this sort of information. The list is published in *Figure 1*.

Let's look at the Sennheiser HD414. According to *Figure 1*, the 414s are rated at 102 dB sensitivity, with a rated impedance of 2000 ohms. Knowing these numbers, we can tickle our calculators and see what it will take to send these headphones (and their wearer) into orbit.

First, just what is the sensitivity spec? Very simply, it's the sound pressure level that results when 1 milliwatt of power is applied. How important is the impedance spec? It's the *combination* of the sensitivity spec and the rated impedance that ultimately show how hard a given pair of phones are to drive. Why is that? Because the combination of

sensitivity and impedance tell us how much voltage is required to get a given sound pressure level.

Aha!, you say. Why is the voltage so important, then? Because the maximum voltage that a direct-coupled amplifier can deliver to its load is directly related to its power supply voltage. In this context, direct coupling means that there is no output transformer, which is normal for the majority of solid-state amplifiers.

Suppose that I want 115 dB SPL out of these phones. Let's see what the voltage requirement is, then how it relates to some real world equipment. First, find out how far 115 dB is from the SPL produced with a 1 mW input. Hmmm... 115 minus 102 is 13 dB. Now find out how far 13 dB is above 1 mW. Gotta use the calculator for this one:

change 13 dB to a power ratio:
ratio = antilog (dB/10)
ratio = antilog (13/10)

$$\text{ratio} = 10^{1.3}$$

$$\text{ratio} = 19.95$$

This means that I need 19.95 times more power to get 115 dB SPL out of the phones than I do to get 102 dB out of them (remember 102 dB @ 1 mW input). Thus, if you put 19.95 mW into these phones, they will deliver 115 dB SPL into your ears.

Now convert this to a voltage using Ohm's law:

$$E \text{ (volts)} = \sqrt{P * R}$$

$$E \text{ (volts)} = \sqrt{.0195 * 2000}$$

$$E \text{ (volts)} = 6.24 \text{ volts}$$

This means that 6.24 volts across the phones will deliver 19.95 mW into them. Since the HD414s are rated at 2000 ohms, an amplifier that will drive 600-ohm lines should drive them without trouble. Let's see how many dBm of rated output is needed to get this level.

First, find out how many dBm are represented by 6.24 volts. Since 0 dBm is 0.775 volts across 600 ohms,

$$\text{dBm} = 20 \log E/E \text{ ref}$$

$$= 20 \log 6.24/0.775$$

$$= 20 \log 8.05$$

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

Thus, any amplifier capable of delivering +18.12 dBm will drive these phones to 115 dB SPL. Since the amplifier can do this into 600 ohms, it stands to reason that I should be able to drive three earpieces (one ear only since the 2000 ohms means per ear) from one amplifier. This is roughly equivalent to the output capability of most consoles' built-in headphone amplifiers.

In most studios, it's more common to use an amplifier capable of delivering significant power into an 8-ohm load. That is, an amplifier that was designed to drive *loudspeakers*. Now, let's look at what 8-ohm power rating is required to achieve the same performance. Again, using Ohm's law, we must find the power represented by 6.24 V across an 8-ohm load.

$$P = \frac{E * R}{R}$$

$$= \frac{6.24 * 8}{8}$$

$$= 7.07 \text{ watts}$$

A 7-watt amplifier will do it. Remember that 7 watts is only the required power capability across 8 ohms. Since the actual impedance is 2000 ohms, it's the voltage represented by 7 watts that really counts. Of course, since the amplifier can actually drive an 8-ohm load, we can drive 2000/8 ears' worth of headphones. This works out to 250 ears' worth, or 125 pairs, easily enough to handle a symphony orchestra.

In this instance, matched im-

pedances are not too important. As a matter of fact, it's the impedance *mismatch* that keeps the amplifier from destroying the headphones (not to mention your ears). The part that is really important is whether or not the amplifier can deliver enough voltage into the headphones' input impedance. This is what determines how much power is delivered to the phones. It's the voltage that counts. This is true for most headphones, especially in a recording studio distribution system. In a nutshell, the headphones should bridge the output of the headphone amplifier.

Now, a final contradiction. As you look over the List, one thing that you will note is that very few headphones actually are rated at 8 ohms impedance (or for that matter, anything even close). If you do a little calculation, you will see that the voltage required for ear-splitting levels is less than 1 volt.

Consider: Even our hypothetical 7-watt amplifier can deliver about 7.5 volts into an 8-ohm load. Translating that into SPL, say for the Pioneer SE405 phones, means 7 watts is 38.5 dB above 1 milliwatt; the SE405s are 103 dB/1mW, so 7 watts is 103 plus 38.5. Let's see; that's 141.5 dB at the ears... *OUCH!*

At this point, you can see that it doesn't take much voltage to make a pair of 8-ohm phones *very* uncomfortable. This is precisely why the Japanese tape recorders of several years ago always seemed to have inadequate headphone jacks. They were designed to work with 8-ohm phones. Thus, the voltage available wasn't very high, which meant that anything other than 8-ohm phones wouldn't work very well at all. On the other hand, if your phones aren't 8 ohms, you can hang quite a few of them across the output of a small amplifier.

Conversely, if you use very high impedance phones, like the Sennheisers, you will need a fair amount of voltage swing. This translates to a medium-sized 8-ohm power rating. You can work it out for yourself using the formulas presented earlier, or you can take my word for it that you'll need something between 20 and 30 watts.

How Much Level Is Really Needed?

This is a sticky subject, at the least. Obviously personal preference is important here, but let's at least look at what constitutes *loud*. Bear in

mind that this is very subjective.

| | |
|--------|--|
| 50 dB | background music |
| 60 dB | normal speech |
| 70 dB | kids at play |
| 80 dB | average factory or home stereo at average settings |
| 90 dB | loud home stereo |
| 100 dB | quiet live band |
| 105 dB | <i>very</i> loud home stereo, or average live band |
| 110 dB | live band, threshold of discomfort |
| 115 dB | loud live band |
| 120 dB | pain for some people (usually women) |
| 130 dB | pain for others (usually men), jet taking off |
| 140 dB | irreparable hearing damage |
| 150 dB | fuel injected dragster @ 10 feet |

For most uses, 120 dB *peak* level capability will suffice. If you really feel you need more level than that, it might be wise to use phones with better isolation from the outside world, since in most cases, the extra level is just an attempt to overcome leakage.

If you are tempted to shoot for the moon and get a phones system that is capable of deafening level, just to make sure that you can hear *everything*, consider the following: A cue system that is too loud tends to drown out that part of our hearing that is contributed by bone conduction. For many singers, that is a necessary part of the pitch-determining process. (Bone conduction is sound transmitted via the bones that make up the skull, directly to the inner ear.)

Many times, the problem with a headphone mix is not the mix itself, just the volume. Many folks, when presented with a monitoring problem, ask for the instrument or person that they can't hear. In headphone mixing, it's probably more important to evaluate what you can hear too well. I call this "reverse mixing." Listen for the sound that's hiding the sound the players are asking for; that's the one to turn down. Reverse mixing really helps to prevent the climbing mix (or you better have infinite headroom) syndrome.

How To Do It

Now that you can see just how much power is really required, let's look at a real-world application that might apply to you. The situation is a small 1/2-inch 8-track recording studio. The console is flexible enough to give us several extra buses that can (and

will) be used for cue (headphone) sends. Our minimum requirements are three independent mono sends convertible into one stereo send and one mono send, with a possibility of using a pair of small speakers for cueing.

First, let's discuss equipment. As you saw previously, it doesn't take much to drive a pair of phones into the pain zone. For maximum flexibility, I've chosen the Rane Corporation HC 6 to drive the bulk of the phones. The HC 6 is a six-channel stereo headphone amplifier that can operate in stereo or mono. In mono mode, each stereo headphone is driven by two amplifiers with their inputs paralleled. The HC 6 has a tricky input scheme which gives it a lot more flexibility than you might imagine. First, there is a pair of jacks which are the master stereo input. These jacks drive the 12 amplifiers in two groups of six (left and right). Each pair of amplifiers has a volume control and two three-conductor output jacks. In addition, there is an overall stereo master control. Secondly, there are six mono input jacks which give you direct access to the input of any of the six stereo amplifiers. When you use these jacks, that particular amplifier is disconnected from the master stereo inputs.

The HC 6 is especially useful here because its six independent channels allow each set of phones to have its own volume control. Many headphone problems are caused by one person's phones being too soft; then when their phones are loud enough, someone else's phones are too loud. This problem is quite common when all the headphones share the same amplifier. Likewise, when someone asks you to pull another headphone mix out of your hat, the extra channels and flexibility built into the HC 6 make you glad that you got it.

Since the HC 6 is a six-channel unit, we can overlook its relatively high output impedance (although it will drive an 8-ohm load, it's best in the 10- to 150-ohm range). Even though you can't hang 100 pairs of ears on one channel, you have totally independent control over 6 channels. In a small studio, that's a bonus.

Next, we'll use the Symmetrix A-220 amplifier to run small speakers, high impedance phones, large numbers of phones, or phones for a volume freak. As an added bonus, some simple switching allows the same amplifier to be used to drive the ubiquitous Auratones during

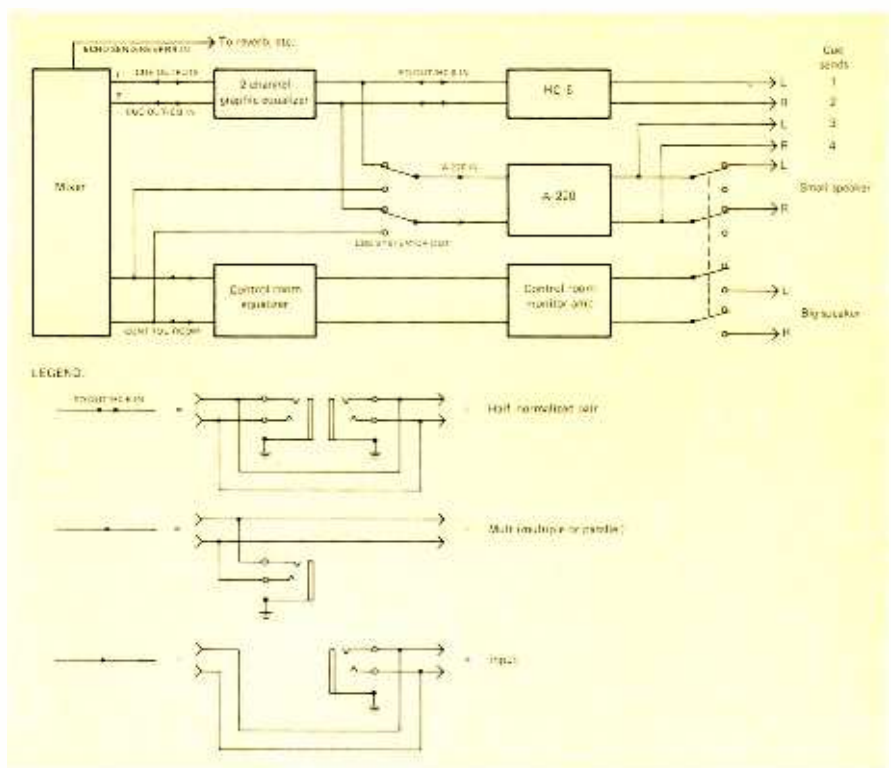


Figure 2. A headphone distribution system (see text).

mixdown. This same headphone amplifier can be used on larger sessions (yes, I know I said that this is a *small* studio) to drive many sets of phones. The A-220 is a moderate power output amplifier (20W) with sufficient output voltage capability (12.6V) to make a pair of Sennheiser 414s very uncomfortable. Additionally, it can drive an 8-ohm load, so it is quite comfortable driving loudspeaker loads instead of headphones. Additionally, the 8-ohm drive capability means that it can drive loads of phones (many more than our hypothetical studio probably has room for).

You should have some sort of equalization available, even if it is only a set of bass and treble controls. An octave-band graphic equalizer offers the best compromise between operating convenience and degree of control. If you have only one equalizer, arrange it so that it may be patched in where needed. This way it can be used for something totally unrelated to the cue system, if necessary.

The console has only two cue sends available so we'll fudge by saying that the third cue send can be had by re-patching one of the phones amplifiers to one of the echo (effects) sends, and by making switching available to allow the control-room monitor mix to also be used.

When you need three mono sends,

patch the A-220 input channels to the two cue sends and punch the stereo/mono switch on the HC 6. Patch the left or right input to the HC 6 to the loose echo send (which becomes the third mono send). You could also get tricky and leave the HC 6's stereo inputs patched where they were, then reach behind the HC 6 and direct-access any of the six amplifiers to the loose echo send. Then part of the HC 6 runs in stereo, and the direct-access channel runs in mono. Tricky, huh?

You will probably want to mount the HC 6 in the studio for maximum convenience because of its individual volume controls. As long as the *source impedance* from your board is low (say... below 1000 ohms), any reasonable amount of cable (100 feet, for example) will not degrade performance. This is a far better solution than putting L-pads on the headphone jacks (which load the amplifier down).

The Wiring

Figure 2 shows the way things are connected. Patch bay connections are shown here because this allows maximum flexibility and is a sensible approach when you are trying to trouble-shoot your cue system under fire. If a patch bay isn't allowed in your budget, just bypass it for now.

Both the HC 6 and the A-220 have balanced inputs. It's worth the

trouble to run everything balanced, whether it is or not. The extra trouble is well worth it when you try interconnecting various sorts of unknown equipment together. What do you do with the other input lead? Tie it to ground at the other end (at the equipment that drives the line). If you use three-conductor jacks, plugging a two-conductor plug in automatically does this. The best plan is to use three conductor jacks and wire for everything, balanced or unbalanced. For any equipment that isn't balanced, connect the ring contact of the jack to the ground connection of the remote equipment. If it ever gets replaced with something that is balanced, the wiring is right there.

Notice that the amplifiers are half-normalled to the various sends. A half-normal uses a switching jack only on the receive side of the jack pair. This means that a plug inserted into the send-jack mults (parallels) the signal that is present there, without disturbing the existing path. Since this is a bridging (non-impedance matched) system, no impedance problems rear their ugly heads.

The switches shown in *Figure 2* allow the A-220 to be switched between the two cue sends or the two control-room outputs of the console. This way, it is a flip of the switch to send the control room monitor mix into the phones. Aside from allowing quick monitoring of something going on in the control room, it's really handy for throwing a hasty mix onto the cue system for a last minute overdub.

The other switch shown in *Figure 2* switches the control room monitors

off while switching the Auratones on (and vice-versa). The phones are shown, as always, being connected, so it's a good idea to unplug them in the studio during mixdown, or to install another switch to allow them to be shut off from the control room.

Figure 3 shows the details of the headphone distribution boxes. These boxes contain switching to convert individual headphone jacks from stereo to mono. In mono mode, you can select either of the two input channels. Use these boxes only when driving headphones with the A-220 or some other power amplifier that is capable of driving loudspeakers.

The individual jack connections are isolated with 47-ohm resistors. This provides a measure of isolation to protect the amplifier's output stage when a plug is pulled out while the amplifier is delivering signal. The resistors prevent the two amplifier channels from being shorted together when a plug is inserted or removed from a jack. This helps prevent your power amplifier from dying. If you must use 8-ohm phones (note, their *real* impedance), make the resistors twice as big, or 100 ohms.

Notice that all headphones are wired in parallel. Since all the phones used are of much higher impedance than the amplifier's minimum load impedance, a parallel connection is the best method of interconnecting all of the various headphones.

The individual distribution boxes can all be tied in parallel. If you put both a male and female connector on them, it's easy to "loop through" or interconnect several boxes by simply

plugging into one, and coming out of it into another. My own preference for connectors is the three-pin XLR microphone connector.

Some people are afraid of using XLR connectors for things other than microphones, saying that some Nimmo (thanks, Mork) will plug a microphone into them and zorch it. Phooey! If you use a male connector for the output of the amplifier, you have to try very hard (i.e., find/get an adapter) to make a male microphone plug mate with a male amplifier connector. Furthermore, microphone cables are very handy (and available) extension cables. Finally, if you are a studio owner, you might even want to use XLR connectors on the headphones themselves, making them a hassle to use if pilfered.

When it's all said and done, we've ended up with four headphone sends. If you can find enough sources on your console, they can all be independent mixes. As it stands, you can even have two stereo mixes (one created by the two cue sends, the other by using the control room monitor mix). If you use the mono inputs behind the HC 6, then you could have six mono sends and one stereo send, or eight mono sends with two of them powerful enough to run a truckload of phones.

Summing It All Up

First, remember that even though most (95 percent-plus) headphones on the market are suitable for amplifiers capable of driving 8-ohm loads, their real impedance is *not* 8 ohms. What the manufacturer is really indicating is the voltage drive requirements of the headphones.

Next, lower impedance phones require less drive voltage than high impedance phones of the same sensitivity for the same SPL. This translates to a lower 8-ohm power rating requirement for the amplifier.

Finally, if you use phone jacks (guitar jacks) for headphones, you should put a low value resistor in series with each hot lead of the phones to protect the amplifier from shorts when the plug is inserted or removed.

Simple yes?

For more information, contact:

Symetrix
109 Bell St.
Seattle, WA 98121
Rane Corp.
6510-D 216th SW
Mountlake Terrace, WA 98043

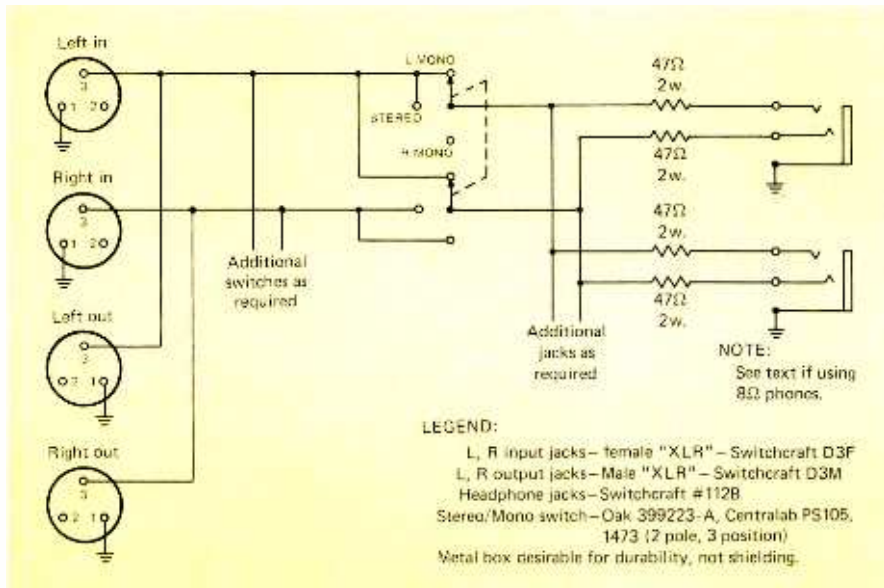


Figure 3. Headphone junction box

Lab Report

Fostex B-16 16-Track Recorder/Reproducer



General Description: The Fostex B-16 is, first and foremost, a remarkable engineering achievement. Being able to lay down 16 independent tracks on half-inch tape is no small feat, and that's what the B-16 lets you do—easily and effectively. For multitrack live recording dates in the field, or even for small-studio work, the B-16 may well be the answer to a recording engineer's dream. With it, no more sub-mixes are needed; you can do a full 16-track live recording where formerly you had to settle for 8 tracks.

To be sure, cramming 16 tracks on half-inch tape means that each track is about as wide as the narrow tracks you find on a home cassette deck. You'd think, therefore, that such important parameters as frequency response, signal-to-noise ratio, headroom, and distortion would suffer. Not so, thanks to such innovations as Dolby C, a superb, proven half-inch tape transport, an unusually precise head configuration and excellent record/playback electronics. Many of the features demanded of a professional recorder are there, including punch-in recording. The one thing that is *not* there is tape monitoring, since the record head is also the reproduce head. With the excellent LED meters available for each channel, however, you probably won't miss the third head in actual production work. With the B-16 calibrated for fixed input and output levels (there are no front panel level controls—only calibration controls for initial adjustment), you will, of course, need a 16-in/out console of some kind to go with the B-16. A remote control (Fostex Model 8090) can be interfaced with the B-16 via a remote control jack on the rear panel.

The 16-channel LED Bar Graph meter on the front panel of the B-16 can be lifted out and installed at a remote location such as a mixing console or video switcher. An optional meter mounting kit is available for that purpose.

Control Layout: The reel holders of the B-16 are equipped with permanent NAB hub adapters. The pinch roller, head assembly, and other elements in the simple tape threading path are fairly conventional, and there is a tape sensor which is activated to put the transport in the stop mode if tape breaks or at end-of-tape. A head shield gate in front of the head assembly can be manually raised or lowered.

The lower right section of the front panel contains a dual concentric pitch control knob. The outer knob is used for large amounts of pitch change, the inner knob for trimming pitch to exact requirements. A pitch control switch nearby is used to bypass the pitch control when precise 15 ips speed is desired. A five-digit counter display nearby shows hour, minute, and seconds of tape travel. For tape positions below the zero point, a minus sign (-) is displayed in front of the hour numeral. A reset button for the counter is located adjacent to it. Transport touch-buttons include PLAY, FAST FORWARD, FAST REWIND, STOP, RECORD and ZERO RETURN. Touching this last-named pushbutton will cause the transport to rewind tape to precisely the zero point on the counter.

Sixteen small pushbuttons spread across much of the width of the front panel are positioned above the 16 bar-graph LED meters. These pushbuttons determine whether recording can begin on a given track. If the tape is not in motion, depressing a specific track button places that track in the RECORD READY mode, and the LED above that track's meter will flash on and off. If only the main RECORD button (near the transport control buttons) is depressed, the dB meter indications and signals from the output jack will change from "tape out" to "input monitor" for those channels whose record track buttons are depressed, and if the INPUT MONITOR switch is set to Individual, the Input Monitor LED will begin to flash. This mode is cancelled by again

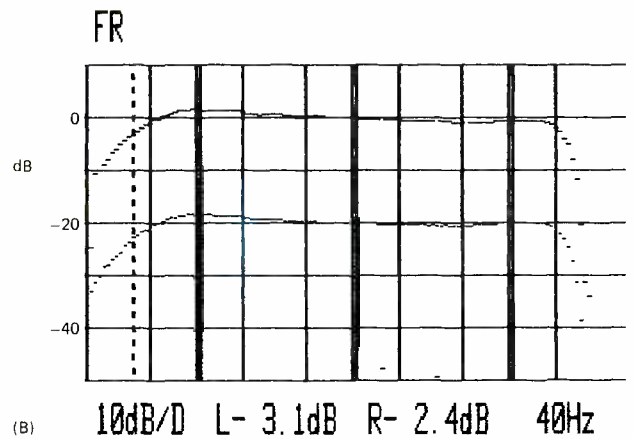
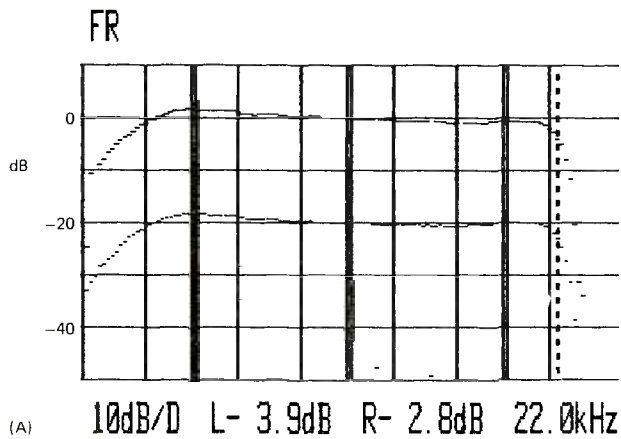


Figure 1. Frequency response, record/play, without Dolby noise reduction. Cursor shows high frequency cutoff (A) and bass cutoff (B).

depressing the record button. If the record and play buttons are depressed together, recording begins, the Record Track LED stops flashing and remains lit continuously, and the Record LED turns on.

If the tape is rolling in the PLAY mode, depressing a record track button readies the track for recording. If the tape is rolling in the record-ready mode, the record LED near the record button will flash and subsequent depression of a record track button will immediately cause that track to enter the record mode. It is this procedure which is used for punch-in recording of any of the 16 available tracks. An input monitor selector switch, if set to the ALL position, will cause all channels to read input monitor levels and a green LED nearby will be lit. If the switch is set to INDIVIDUAL, individual channels can monitor input signals. A cue lever located beneath the head block assembly, if pushed forward towards the head, makes the tape lifters retract, allowing tape cueing during FAST FORWARD or REWIND modes.

The rear panel contains the required input and output jacks for each channel, the remote control connector jack, a remote punch-in/punch-out jack that

accepts a Fostex Model 8050 footswitch, a meter jack (for use when the meter assembly is remotely located), and the noise reduction switch. In the INT position of this switch, the built-in Dolby C circuitry is active. When the switch is set to EXTERNAL, the Dolby C system is bypassed and an external noise reduction system can be patched into the system.

While the control layout as described may seem a bit complicated at first, we found that if we followed the instructions step-by-step, the full versatility of the B-16 was easily accessed. After a few minutes of working with the machine, we were quickly and efficiently performing such standard functions as ordinary multitrack recording, overdubbing, punch-in/punch-out recording onto given tracks, and, of course, playback. While we did not work with an associated console during our bench tests, it was clear that the addition of a 16-track console would in no way make use of the machine any more difficult or complex.

Test Results: Results of our laboratory measurements are summarized in the VITAL STATISTICS

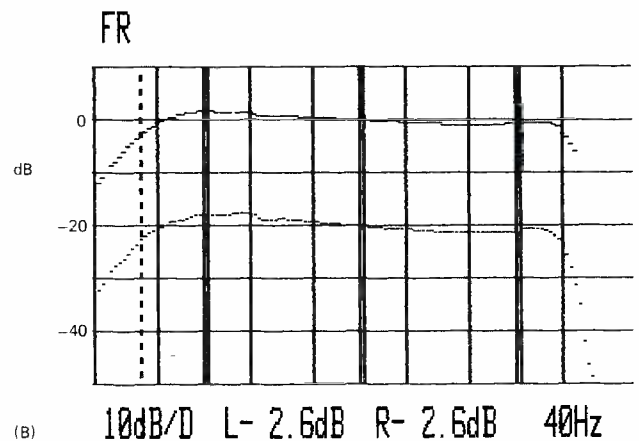
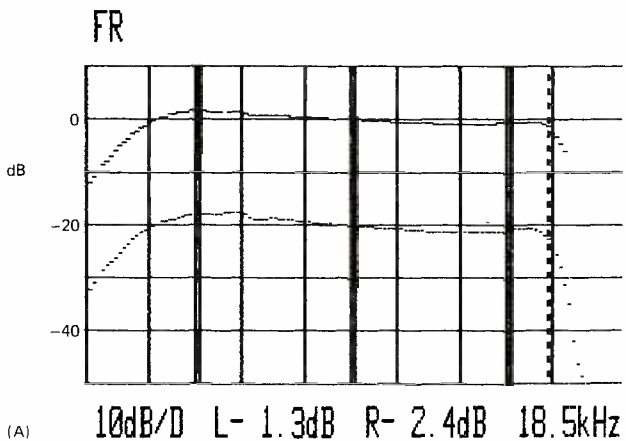


Figure 2. Frequency response, record/play, with Dolby noise reduction. Cursor is set to show high frequency cutoff (A) and bass cutoff point (B).

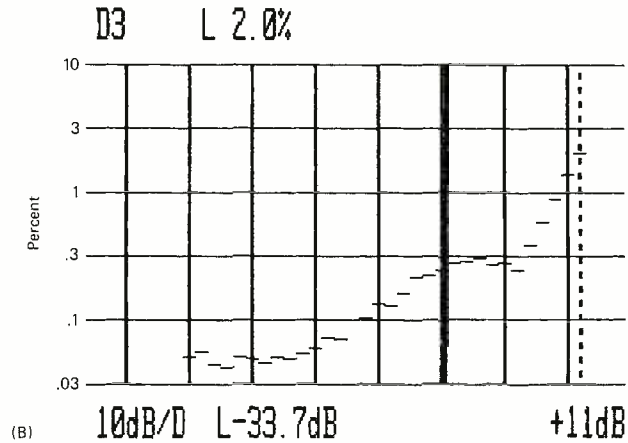
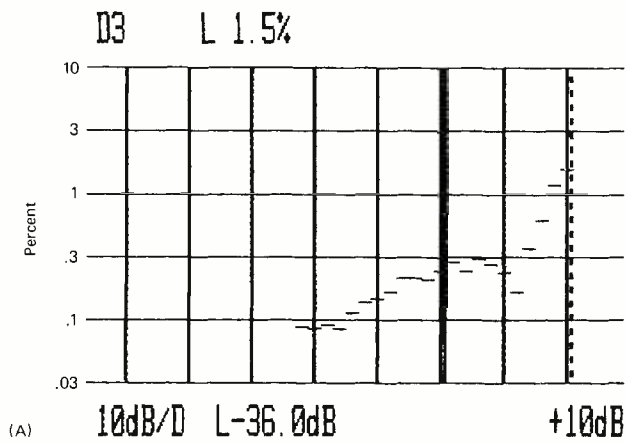


Figure 3. Third-order distortion, record/play, vs. record level, with Dolby (A) and without Dolby (B).

chart found at the end of this report. In order to be fair and yet thorough, we elected to use a pair of adjacent tracks for tests involving crosstalk between channels. By the same token, we felt that it would be unfair to measure such parameters as frequency response and signal-to-noise using the outermost tracks, and so for those measurements we selected a pair of tracks near the center of the half-inch wide tape. We later discovered that had we used the outer tracks, results would have been essentially the same; quite an achievement when you are trying to accommodate 16 tracks on half-inch tape!

RECORD/PLAY frequency response, without Dolby C turned on, was flat (within 3 dB) from 40 Hz to 22.0 kHz at a -20 dB record level (relative to 320 nWb/m, or 0 dB on the LED metering system). Figure 1 shows the graphic results obtained at 0 dB record level (upper curve) and at -20 dB (lower curve) over the range of 20 Hz to 40 kHz. Figures 1A and 1B are identical, except that the dotted line "cursor" has been moved to the high-frequency cut-off point in Figure 1A, while in Figure 1B it has been positioned to the low-frequency -3 dB point (or, as close to that attenuation as possible); in this case 40 Hz. The double vertical lines in all of

these frequency graphs represent (reading from left to right) frequencies of 100 Hz, 1 kHz and 10 kHz. Vertical scale in this and other figures of this type is 10 dB per division.

A second set of frequency response measurements was made with the Dolby C circuitry turned on. Results are shown in Figure 2. This time, response extended to slightly above 18.5 kHz and to slightly below 40 Hz at the bass end. Results were still better than the minimum specified by Fostex. Again, the dotted line "cursor" in Figures 2A and 2B has been positioned to show the closest frequencies to the -3 dB roll-off points at the bass and treble ends of the sweep.

Figure 3 shows a plot of third-order harmonic distortion as a function of recording input levels. Results shown in Figure 3A are with Dolby C active; while those in Figure 3B are for the Dolby-Off condition. The double vertical line represents 0 dB reference level, while each division horizontally represents an increase (or decrease) of 5 dB with respect to that level. Our test equipment generally starts plotting at around +10 or +11 dB above the reference level and, as you can see from the results, even at those recording levels, distortion had not

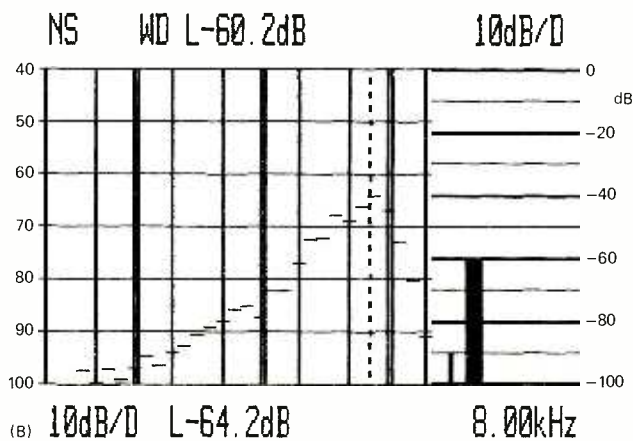
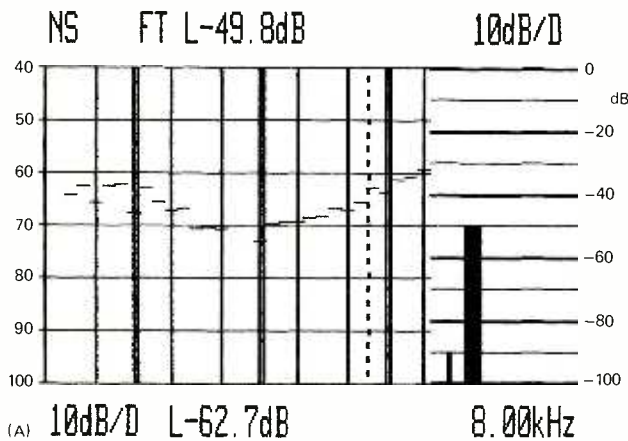


Figure 4. Signal-to-noise analysis, without Dolby, measured without weighting curve (A) and with CCIR/ARM weighting (B).

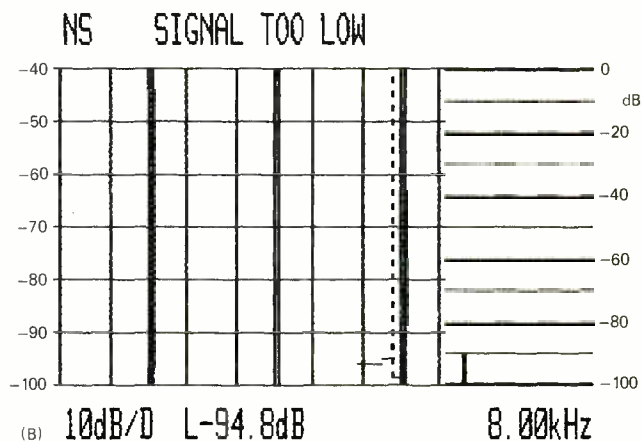
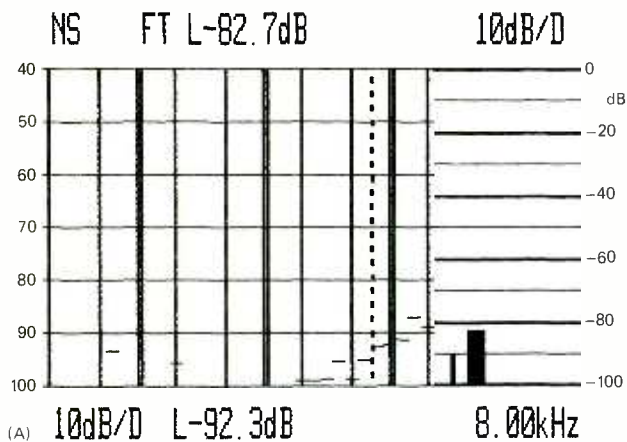


Figure 5. Signal-to-noise analysis measured with Dolby C, unweighted (A). When weighting curve

(CCIR/ARM) was added, noise was too low for test instrument to read.

reached the 3 percent maximum which we use as a reference for maximum permissible recording levels. We estimated, therefore, that headroom would be about +12 dB, with or without Dolby on, and separate measurements using an ordinary distortion analyzer confirmed that estimate. At nominal 0 dB recording level, third-order distortion measured only 0.24 percent with Dolby C and 0.25 percent without Dolby. These results are far better than the 1 percent claimed by Fostex. The tape used, incidentally, was Ampex, a reel of which was supplied with our test sample.

better than we would have ever suspected. Effective dynamic range, using the built in Dolby C, is so high, in fact, that it would not be unreasonable to use this deck as a mastering system for a recording that was ultimately intended for transfer to Compact Disc format!

Several analyses of signal-to-noise were made, both with and without Dolby noise reduction turned on. As shown in Figure 4, S/N without Dolby and without a weighting curve measured 49.8 dB. Adding a CCIR/ARM weighting system, this figure improved to 60.2 dB. For the results shown in Figure 5, Dolby C noise reduction was activated. This time, the unweighted S/N measured a very high 82.7 dB. When we added CCIR/ARM weighting, the message seen above the graph of Figure 5B tells the story; the noise level was simply too low for our test equipment to measure! In short, the signal-to-noise ratio obtainable with Dolby C added to these very narrow tracks is a lot

Wow-and-flutter was also analyzed using our Sound Technology 1500A Audio Analyzer, and, as displayed in Figure 6, the WRMS value of wow and flutter measured only 0.044 percent, while the peak wow component, at 10 Hz, measured 0.045 percent. Again, the sample did much better than the minimum specification published by Fostex. Channel separation, plotted in Figure 7, was particularly good at the high frequency end of the spectrum, where we would have expected it to fall off. As shown in the diagram, separation at 1.0 kHz measured 51.2 dB; a bit short of the 55 dB claimed, but remember that we measured separation between adjacent tracks. That is a "worst case" condition, and separation between more widely separated tracks is much higher; as high as 60 dB, in fact. What did surprise us somewhat was the rapid decrease in separation at the extreme low-frequency end of the audio spectrum. At 100 Hz, for example,

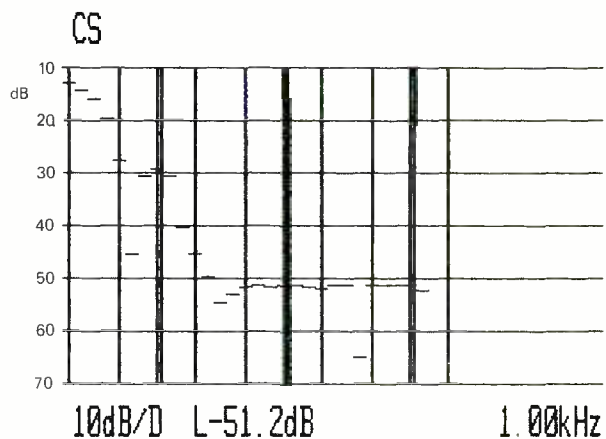
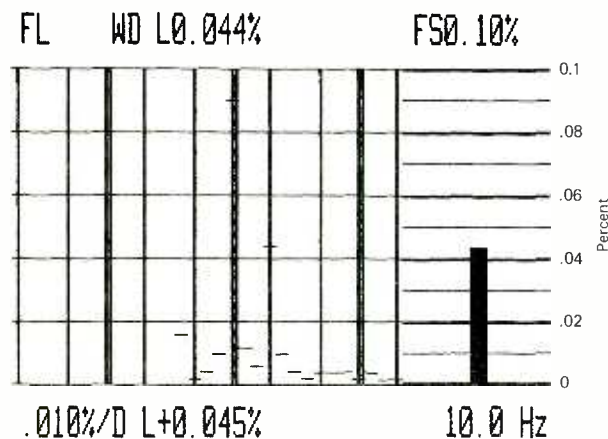


Figure 6. Wow-and-flutter analysis of Fostex B-16.

Figure 7. Channel separation vs. frequency of Fostex B-16; Dolby C is off.

separation between the two adjacent channels we tested had decreased to just over 30 dB. Happily, that will not affect stereo imaging to any significant degree, since as everyone knows, ultra low frequency components are essentially non-directional during reproduction. Of course, this also means that if you want to put an isolation track onto tape, it would be best to leave the adjacent track or tracks blank.

Note also that our measurements were made only with Dolby C off. Thus, the measured 51.2 dB at 1 kHz would be improved by 19.6 dB, handily exceeding Fostex's 55 dB Dolby-On spec.

Comments: Our first impression of this remarkable tape deck remains unaltered after bench testing. The B-16 is, we would think, exactly what many professional music groups are looking for. It is also what many small recording studios who have to do remotes and are limited in terms of space inside their vans or trucks have probably had right at the top of their "wish lists." Tape motion during fast winds was very smooth and quieter than on most professional decks we tested of late. If you use the ZERO RETURN REWIND mode, the system quickly finds the 0:00:0 point unerringly. Sometimes that means a slight overshoot, but that's followed by a quick return to the correct point. Though the owner's manual doesn't mention it, we soon discovered that if you press ZERO RETURN and follow that up with a press of the PLAY button, the system "remembers" your instructions and goes right into the play mode after the zero point has been reached. Punch-in recording resulted in absolutely no audible "glitches" during playback, and overdubbing or "sync" recording was easily and perfectly accomplished from any track to any other track or tracks by the versatile track touch buttons used in combination with the monitor switch and record buttons.

Of course, tape monitoring would have been nice,

but we suspect that having to come up with two perfectly aligned 16-track heads (one for record, the other for playback) and nearly double the amount of electronic amplification circuitry (not to mention a double Dolby C requirement) would, undoubtedly have added considerably to the cost of what is now an extremely reasonably priced machine.

(Editor's note: the Fostex B-16DM does have a full 16-track playback head and 16 additional channels of Dolby C for full monitoring capability, and including remote control and other features. The price is \$9,600.)

Even if you have been accustomed to being able to tape monitor every track in a multitrack machine, the ability to monitor previously recorded tracks while dubbing tracks that are currently being recorded offsets the disadvantage of full tape monitoring facilities. And, as we said at the outset, those 16 LED bar-graph meters remove a lot of the doubts otherwise associated with this type of non-monitoring recording. Fostex obviously has studied and fully understands the needs of its potential customers—the music industry and the small recording studio owners—and has come up with a product that seems to fill their requirements perfectly.

B-16 options include a full remote control with all transport functions at \$450; an auto locator with all the features of the remote control plus a 9-position key pad permitting the recorder to be looped between any two positions at \$1,200; dual 8-channel interfaces convert the -10 dB, high impedance unbalanced lines to +4 dBm, 600 ohm balanced lines with XLR-type connectors, the set being \$1,190. As a special feature, Fostex has available a half-inch 8-track playback head that can be mounted in front of the 16-track head stack, using the recorder's reproduce electronics. This permits half-inch 8-track formatted tapes to be played on the B-16; the price is \$1,000. This must be requested at the time of ordering your B-16.

FOSTEX MODEL B-16 TAPE RECORDER: Vital Statistics

| SPECIFICATION: | MANUFACTURER'S CLAIM | | MR&M MEASURED |
|----------------------------|----------------------|-------------|--|
| Tape Speed | 15 ips* | | Confirmed |
| Reel Size | 10 1/2 inch | 10 1/2 inch | Confirmed |
| Number of Tracks | 16 | | Confirmed |
| Number of Channels | 16 | | Confirmed |
| Frequency Response (3 dB) | 40 Hz to 18 kHz | | 40 Hz-18.5 kHz, 40 Hz-22 kHz, no Dolby |
| Input Level | -10 dBV (0.3V) | | Confirmed |
| Output Level | -10 dBV (0.3V) | | Confirmed |
| Operating Level, 0 dB | 320 nWb/m | | Confirmed |
| S/N/ re 3% THD (w/Dolby C) | | | |
| Unweighted | 60 dB | | 82.7 dB (CCIR/ARM) |
| Weighted | 80 dB | | See Text |
| THD at 0 dB (1 kHz) | 1.0% | | 0.25% (3rd HD) |
| Level for 3% THD | +10 dB | | +12 dB |
| Wow-and-Flutter | 0.06% | | 0.044% |
| Crosstalk (1 kHz—No Dolby) | 44 dB | | 51.2 dB |
| Crosstalk (1 kHz—Dolby on) | 55 dB | | See Text |
| Erasure (1 kHz) | 70 dB | | 72 dB |
| Power Requirements | 170 W | | Confirmed |
| Dimensions (W x H x D, in) | 17 1/2 x 17 x 9 1/4 | | Confirmed |
| Weight | 67 lbs. | | Confirmed |
| Price: \$6,800.00 | | | |

*Fixed and variable speed modes available. In variable mode, ±15%

Practical Music Video Production

Part 3: Video Camera Operation

For music video you'll need to know how to operate cameras in two different kinds of shooting situations. Outside the studio you'll be working as a self-contained production unit, running a handheld camera directly into a portable VTR. In the studio you'll be part of a production crew, running one of the big studio cameras out on the sound-stage floor.

In either case, there are a few basic principles you'll need to know in order to get good pictures. We'll run through them briefly, then show you how to operate the studio cameras. Next time, we'll cover portable-remote operations. By the time we're finished you'll be able to jump behind any video camera and quickly feel right at home.

The Camera Controls

In spite of their internal complexity, video cameras are surprisingly easy to operate. The camera head has a "zoom" lens in front, a body in the middle (housing the video pickup tube and related electronics), and a viewfinder in back. The viewfinder is actually a miniature TV screen; you simply point the camera at your subject and adjust the controls until the picture on the viewfinder screen is in focus and framed up the way you want it. Your camera controls actually make adjustments to the lens. One adjusts the amount of light getting through, the second adjusts the focus, and the third controls the zoom.

The Zoom Control

You've probably heard of telephoto lenses, wide-angle lenses, and so forth. A telephoto lens brings distant

subjects up close, like a telescope, while a wide-angle lens does just the opposite—it makes the subject appear farther away and allows you to get more area into the picture. A *zoom lens* is variable; it lets you go back and forth from telephoto to wide-angle (or anywhere in between) by simply pushing a button or turning a crank. It looks as if you're moving toward or away from the subject, but the camera remains stationary. The only thing moving is a small element inside the lens itself.

The f-Stop Setting

In addition to the zoom control, the lens can be adjusted to allow more or less light into the camera. This is called the aperture, or "f-stop" setting. The *larger* the f-stop number, the *smaller* the lens opening—thus a setting of f8 allows less light into the camera than a setting of f4. (I know this seems backwards, but it's some kind of mathematical voodoo involving light ratios.) If you were shooting in bright sunlight you'd select a higher f-stop number (smaller lens opening) to keep from overloading the pickup tube. If you moved from there into a dimly-lit building, you'd need to select a lower f-stop number (larger lens opening) to allow more light in.

Focus and Depth-of-Field

You can tell from the viewfinder if the picture is in focus or not, but there's one complication you'll need to be aware of. It's called "depth-of-field," and it's determined by your zoom and f-stop settings. Depth-of-field is the range of area in which objects will appear in sharp focus. As your depth-of-field diminishes, ob-

jects in the foreground may be sharp, but the background will be out of focus. If you focus on a more distant subject, the foreground will be fuzzy. As depth-of-field increases, the "in focus" area becomes greater, so focusing becomes less critical. Both close-up and distant objects will appear in sharp focus at the same time.

There isn't any "correct" or ideal depth-of-field. Think of it instead as an artistic tool which you can use to your advantage. There are times when you'll want to emphasize a subject by having it in focus against a soft, fuzzed-out background, and there are other times when you'll want both the subject and the background to be in equally sharp focus.

Depth-of-field diminishes as the lens opening gets larger, and increases as the lens opening gets smaller. Thus at f2 the depth-of-field may shrink to a critical few inches, while at f16 everything from a few feet in front of you to the horizon may be in sharp focus.

Depth-of-field also diminishes as you zoom in toward telephoto, and increases as you zoom back toward wide-angle. In practical operation this means that you should always focus a zoom lens at the maximum telephoto setting. If you focus on an object while you're in wide-angle position (where the focus is less critical), it may appear to be sharp and clear, only to go out of focus as you zoom in on it. If you pre-set the focus in maximum telephoto position, then return to the zoom setting you want for the start of the shot, you can zoom in or out all you want and the subject will remain sharp throughout the entire zoom range.

Studio Camera Operation

Large studio cameras are mounted on camera dollies or tripods with wheels, so they can be rolled around easily on the smooth studio floor. The mounting head can swivel from side to side or tilt up and down, allowing you to point the camera in any direction. There will be a "panning handle" (or two, like handlebars) sticking back toward you so you can aim the camera and hold it steady. The focus and zoom controls are often located on or near these panning handles. A handgrip attached to the handle may rotate like a motorcycle throttle to focus the lens manually via a cable mechanism, or there may be a servo-controlled, motorized focus you operate with your thumb. To zoom in and out, there will either be a manual crank mounted on one of the panning handles, or a servo-control for motorized zoom. Studio camera f-stop settings are remotely controlled by the video engineer, who works closely with the lighting director to maintain a desirable balance between light level and aperture settings. (Out on location you won't have this luxury, so you'll have to be much more aware of light levels and your f-stops.)

In a multi-camera studio shoot your camera will be "on" all the time (in the sense that it's continually sending its picture back to the control room), but it will only be "on the air" or recorded on tape when it's punched up on the switcher. The director will be in touch with you via the headset. He'll tell you what shots to get and call out switching cues in advance so you'll know when you're about to go on and off the air. In addition, each camera has a red "tally light" that goes on whenever it's punched up on the switcher. You (and the talent you're shooting) can use the tally light to tell exactly when your camera is "hot."

Shot Descriptions

In order to function efficiently as a cameraman, you'll need to know the names of a few common shots. They're used in shooting scripts, where you'll be expected to understand them, and directors will use them in headset commands to describe the shots they want you to get.

A *long shot* or *wide shot* is a shot from some distance away—perhaps a wide-angle shot of the entire stage from the back of the hall. (This is sometimes called a "cover" shot.) A *close-up*, of course, is just the oppo-

site—a head-and-shoulders shot of just one performer, for example. An *extreme close-up* carries this one step further, really zeroing in on a tight shot of a singer's face or a soloist's hands. A *medium* shot is somewhere between a long shot and a close-up—close enough to show the action in some detail, but back far enough so you can see it in the context of what's going on. A medium shot of a guitarist might show him from the knees up, for example, so you can catch his facial expressions and his body motions at the same time.

Other shot descriptions designate how much of the performer's body we see in the frame. That medium shot of the guitarist could also be called a *knee* shot; a *waist* shot would show him from the waist up. A head-and-shoulders shot is sometimes called a *bust* shot, and a close-up might be called a *head* shot.

A *two-shot* is a shot with two people in the frame; an *over-the-shoulder* shot is a shot of two people taken from behind one of them (as if you were peering over his shoulder at the other person.)

Camera Movements

In the early days of motion-pictures, directors just locked the camera down and ran the actors around in front of it. You got one continuous wide-angle shot, like watching a play from the audience. It was several years before they figured out that you could move the camera around, too. It hasn't stopped moving since.

A moving camera shot grabs more visual interest than a stationary shot. (Check out a slick TV commercial sometime—the camera almost never stops moving.) There's a lot of camera motion in music video, too. All the moves have specific names; they're used very precisely in scripting, and the director will use them over the headset to describe any moves he wants you to make.

A *pan* is the rotation of the camera left or right with the tripod head. It's analogous to turning your head left or right. The director's command is "pan left" or "pan right." A *tilt* is the rocking of the camera backward or forward with the tripod head, like nodding your head up or down. The command is "tilt up" or "tilt down."

Pedestal up or down refers to the raising or lowering of the whole camera head in elevation, using a crank or pneumatic system on the tripod. (Your head won't do this

unless you have a neck like E.T.) Sometimes the term *crane* up or down is used to mean the same thing, though technically this refers to raising or lowering the camera by means of a camera crane.

Zoom you already know. The command is "zoom in" or "zoom out." Remember, the camera itself doesn't move; the zoom is accomplished by activating a mechanism in the lens.

A shot where the camera actually does move toward or away from the subject is called a *dolly* shot. If the command is "dolly in," you roll the tripod forward on its wheels, camera and all; if the command is "dolly out" or "dolly back," you pull it back away from the subject. It might seem like moving the camera forward or backward would look the same on the screen as simply zooming the lens in and out. This is not the case. The visual effect of dollying is much more dynamic, due to changes in spatial perspective between objects as the camera moves in relation to them.

Technically, dollying refers only to forward or backward movement; rolling the camera sideways is called *trucking*. You "dolly" in or out, but you "truck" left or right. In practice these terms are often used interchangeably to denote any directional camera movement. You might truck around an object, for example, or dolly across a set. Walking with a handheld camera is called "trucking," even though the only camera support is the cameraman himself.

A sharp cameraman can quickly frame up shots that capture the action, but he also has an innate sense of aesthetics and picture composition. There are "close-ups of the (yawn) guitar player," and there are "close-ups of the (wow! *Look* at that!) guitar player." The difference is that little instinctive edge—a knack for sensing what is about to happen and being right there with the perfect camera angle when it does. This takes experience and a practiced eye, but don't underestimate yourself. You have one huge advantage in music video camera work—your musical and recording experience. You've learned what music is supposed to sound like, but you've also learned what it *looks* like. Without even realizing it, you've been training your eyes as well as your ears.

Next month we'll strap on a portable VTR, put a camera on your shoulder, and show you how to get the most out of remote shoots at gigs and rehearsals.



1/4 Notes

MAKING TRACKS

At New York's Unique Recording: **Diana Ross** was in remixing her single "Touch By Touch" for RCA Records. Producer **Malcolm McLaren** has been recording and mixing for his *Madame Butterfly* LP on the Charisma label. **Fred Schneider** of the **B-52's** was in mixing a single for his solo LP on Warner Brothers Records. **John Cale** recently mixed his release for ZE Records with Jay Burnett at the board. Jeff Neiblum and Kennan Keating assisted. **David Johansen** was in cutting tracks and mixing his next release for Jem Records. And **Ossibisa** was in mixing their 12" version of "Wooly Bully" for Other End Records. Roland Ogarrow produced the project with Chris Lord Alge at the board and help from Roey Shanier... **Sting** selected IRS artists **Torch Song** to produce his first solo album, slated for release in early '85... **Kool & The Gang** were at Compass Point Studios in the Bahamas working on their followup LP to their current De-Lite album *In The Heart*... At Miami's Criteria Recording: Producer **George Clinton** was in mixing for Westbound artist, Erasmus Hall, and Nine Records artist Jimmy Giles. Joel Martin co-produced the Erasmus Hall project with Richard Achor at the board and Stan Lambert assisting. A final mix of **Dion's** greatest hits album for World Records was recently completed. Eric Schilling co-produced and engineered the project. Jim Sessody assisted. **Thomas Dolby** was also in with George Clinton laying down synthesizer tracks on Clinton's latest funk album. Richard Achor and Stan Lambert were at the board... **Maze** has been laying tracks for their new LP on the Capitol label at RMJ Recording in Michigan. **Frankie Beverly** produced the album and John Jaszcz was at the board with help from Sparky Lawson... **James Cotton** has been at Streeterville Studios in Chicago continuing work on his blues/funk LP. Bruce Iglauer co-produced the project with engineer Justin Niebank at the controls... San Francisco's **Red 7** are due for their debut album in January on MCA Records. The LP was recorded in England with **Genesis' Mike Rutherford** producing... At Lion Share in Los Angeles: **George Duke** has been doing production work on **France Joli's** next Epic album. Tommy Vicari was at the board with Stephen Schmitt assisting. **Dolly Parton** and **Kenny Rogers** have been mixing their RCA Christmas LP. **David Foster** is co-producing the project along with Rogers. Humberto Gatica engineered with help from Larry Fergusson... **The Motels** have been laying tracks at Conway Recording with Richie Zito producing. Mick Guzauaski was at the board with Jeff Stebbins assisting... **Cyndi Lauper** has been in mixing a live LP at The Automatt in San Francisco. Lennie Petze produced the recording with Ed Thacker engineering... **Bill Payne**, **James Taylor**, and **Lee Sklar** have been laying down tracks at San Francisco's Different Fur Recording for a new film soundtrack. Martin Rosen is producing and Howard Johnston is engineering with help from Kim Foscatto...

ON THE ROAD

Julio Iglesias has embarked on the second leg of his world tour. To date, the itinerary for the tour includes such locations as Germany, Austria, Belgium, South Africa and Australia... For the first time, ex-**Weavers Pete Seeger** and **Ronnie Gilbert** joined **Arlo Guthrie** and **Holly Near** in a three city concert tour... "Rock in Rio," a 10 day music festival, will take place in Rio de Janeiro from January 11-20, 1985. Artists to perform include **the Go-Go's**, **Men At Work**, **George Benson**, **James Taylor**, **Yes**, **Nina Hagen**, **Al Jarreau** and several others... **Barry Manilow** is currently in the midst of his one-year world tour in support of his new album, *2:00 A.M.—Paradise Cafe*. The tour features special engagements at London's Wembley Arena, Los Angeles' Universal Amphitheatre and New York's Radio City Music Hall...

MISCELLANY

Steve Hackett claims to be the first artist to have an album recorded ambisonically. Ambisonics is a system of "surround sound" intended to create the effect of a live performance so accurately that the listener actually feels as though he is in the studio. The album, *Till We Have Faces*, was recorded in Brazil...



ROBERT GÖRL: *Night Full of Tension*. [Produced by Mike Hedges and Robert Görl; engineer unknown; recorded at Jacob's Studio, Surrey, England.] Elektra 9 60367-1.

Performance: **An artistic effort**
Recording: **Quite sophisticated**

This is Robert Görl's first experience with digital recording and due to some smart twisting of the knobs, *Night Full Of Tension* is virtually without clicks, as the tracks were adjusted to eliminate them. Armed with a Synclavier computer and a 32-track machine, the 28-year-old German pumps out stimulating, thought-provoking and even erotic dance and pop tunes, probably influenced by the band Kraftwerk.

His first solo effort after recording three albums with the band Deutsche Amerikanische Freundschaft (or D.A.F.), Görl proves he can stand on his own, using the synthesizer as his main instrument. The bass line is the most important part of Görl's music as he starts from there and then uses a click track to add the drums. Onward, he overdubs the electronic guitars, basses and other synthetic accoutrements. Finally comes his Bowie-like vocals.

Most impressive is the clarity among the tracks and the distinct separation between the right and left channels of the speakers. "I Love Me," a self-enveloping narcissistic song, bounces various synthesizer parts between the speakers, making this song a great test for one's stereo separation. This special effect enhances Görl's intention of perking up the listener and making the synthesizer the main instrument with an actual melody instead of it being an eerie bed of sound.

Seven of the eight tracks are sung in English. The one exception is "Gewinnen Wir Die Beste Der Frauen," based on a 13th century folk poem about a miller who falls in love



with a woman. It is also exceptional from the rest of the outs in that it is slower-moving than the rest of the technopop here, and Görl's vocals are mixed in the forefront of the song, leaving the brooding melody in the distance, making the piece more romantic.

Lending her talents on two tracks is Annie Lennox of Eurythmics fame. When she sings, her presence is obvious and an obvious aid to the marketing of this record. But, Görl doesn't exploit Lennox and she doesn't overshadow him on the duet, "Darling Don't Leave Me." It could

have been that she just stopped by the studio and Görl asked her for some soulful singing, or maybe it was planned. Who knows? But on "Charlie Cat," a whimsical offbeat tune, the stage belongs to Lennox as Görl sticks strictly to the keyboards; a wise choice as she sings it much better than he might have, showing that Görl has the smarts to know when to lay back and adhere to what he knows best.

Görl reproduces many natural sounds on the synthesizer. "Playtime" was originally intended to be recorded with a conga program, but

Görl changed his mind and went with a marimba instead; the percussion does sound realistic. During his days with D.A.F., Görl was more minimalist and stark. Since he's embellished his style, he's become more orchestral and full-bodied, which is a fine way for a classically trained artist to be.

martin basch

RUBEN BLADES Y SEIS DEL SOLAR:

Buscando America. [Produced by Ruben Blades; engineered by David Rodriguez; recorded at Eurosound Studios, New York.] Elektra 60352-1.

Performance: **Muy caliente y profunda**

Recording: **Impeccable**

There's a lot more here than meets the ear. Yes, the songs are quite tuneful and certainly danceable in the tradition of salsa music, but dig beneath the clave grooves and you'll find profound, provocative tales of political realism that hit home with chilling impact once the bilingual text is digested.

An alumnus of the Ray Barretto and Willie Colon bands, Blades is drawing on the musical influences of his mentors but injecting a kind of humane political passion into the lyrics that has hitherto been unheard of in salsa circles. His gripping short stories chronicle the lives of real people and express their anguish, hopes, happiness and pain. He is to the Latin-American city dweller what Bruce Springsteen is to young Jerseyites and middle class Midwesterners, a poet laureate of the people.

In his ebullient tenor, Blades sings of murdered priests and pregnant teenagers, political policemen and neighborhood adulterers. His "El Padre Antonio y el Mongaguillo Andres" (Father Antonio And The Altar Boy Andres) is based on the murder of Salvadoran Bishop Oscar Arnulfo Romero. "Despsaparitions" ("Disappearances") is about the mysterious disappearances of citizens in a police state like Chile. The title cut is an urgent plea for justice in this land ("You have been kidnapped, America; you have been gagged, and it is up to us to free you... I'm calling for America but it can't answer me. Those afraid of truth have made her disappear.").

"Decisiones" ("Decisions"), which begins with a tongue-in-cheek doo-wop riff, shows Blades' penchant for insightful humor. In this chronicle of barrio dwellers he sings of the young boy who nervously awaits the menstrual period of his girlfriend, of the swaggering drunk who runs a red light, of the macho man who submits to a shameless affair. Each, in the end, pays for the decisions made.

Perhaps the most chilling of all is "CDBD," which chronicles a mundane day in the life of a man who turns out to be a secret police agent whose job it is to make political arrests. You relate to this man and his everyday life until, in the end, you learn of his job. The ironic twist is a touch of brilliance by Blades the writer.

These thoughtful cinematic pieces are buoyed by uplifting harmonies, memorable melodies and infectious rhythms. In this major American label debut, Ruben Blades has succeeded in making you think while you dance.

bill milkowski

ROBERT WYATT: 1982-1984. [Producer unlisted; engineered by John Fryer; recorded at Riverside and Blackwing Studios, London, England.] Rough Trade RTSP 25.

Performance: **Eerie and haunting**
Recording: **Complex yet clear**

There are recordings that capture a reviewer's fancy for reasons that defy purely logical analysis. Take this album by British progressive rocker Robert Wyatt. Wyatt's voice is remarkably thin, nasal, reedy, flatly one-dimensional. Yet some quality in his singing kept bringing me back to this album, and only a dozen plays began to clarify his appeal. There is a thinly disguised declaration of psychological pain and vulnerability implicit in every song he renders here. Only after making peace with this singular characteristic in his singing did I discover that Wyatt is a paraplegic. Wyatt and his record company don't disclose that fact; they wisely let this high quality and highly moody pop music speak for itself.

If Wyatt's voice is quite individual in the world of pop music, equally unique are the songs he chooses to cover on this album. Most of the songs chosen are political with a charm-

ingly unfashionable slant toward leftist politics. The album opens with Elvis Costello's "Shipbuilding," which Wyatt transforms into a gently cynical lament for the working class. The record's two apolitical covers are Thelonious Monk's "Round Midnight" and Eubie Blake's "Memories Of You." Wyatt's dirge-like vocals transform both these jazz songs into bluesy requiems. Side one closes—bizarre as this might seem—with a Wyatt original praising Castro's rule of Cuba. Whatever one's political opinions of Castro and company, Wyatt's vocal is a triumph of will and purpose over all obstacles. His voice rings with authentic passion as he sings "Everyone needs to feel at home/Nobody wins who fights alone."

The gem of side two is a keenly sung version of Peter Gabriel's "Biko," a song about the famous black South African leader. Wyatt's voice rises out of densely packed layers of synthesized chords with an eerie blend of sweetness and accusation. It is noteworthy that all of the songs covered here are arranged so sparsely and simply. A synthesizer, bass and various forms of drums/percussion provide skeletal backing; no attempt is made to compensate for the smallness (by rock arena standards) of Wyatt's voice.

Two politically inspired poems sung in their original Spanish complete the side which closes with an annoyingly cute and cryptic children's song with an apocalyptic overtone.

The production is first-rate throughout, highlighted by thoughtful little touches like the echo at the opening of "Memories Of You." Also, Wyatt's voice is profiled *just* prominently enough in the mix, no easy task for a voice that could be so easily overwhelmed by synthesizer.

Pop vocalists usually succeed in the music business on the basis of their power and drive. Delicacy and vulnerability have never been highly valued among male singers. Robert Wyatt, in his own quiet way, just might change all that. So I pray.

norman weinstein

VIOLENT FEMMES: Hallowed Ground. [Produced by Mark Van Hecke; engineered by John Tanner and Warren Bruleigh; recorded at Secret Sound Studio, New York.] Slash 1-25004.

Performance: **Idiosyncratic and dreary**

Recording: **Stark and snappy**

Their Slash debut was upbeat and irresistible. This followup is bleak and nasty. Singer-songwriter Gordon Gano must've grown tired of all those comparisons to Jonathan Richman. Where he was ebullient and engaging on the last album, he's angry and unlikeable here, singing about murder, suicide, revenge and other personal conflicts. Gano is exorcising some dark demons on this one, which may be good for his psyche, but he may be alienating some of his fans in the process.

Everything seems to be played in minor keys and Gano's nasal whine cuts through dreadful dirges like "I Hear The Rain" and "Never Tell" with annoying impact. In "Country Death Song" he drones on about a farmer throwing his lovely daughters down a well, then taking his own life by hanging himself out in the barn. Fun stuff. In "Never Tell" he warns, "I will find you out and I will cut you up." Friendly chap.

"Hallowed Ground" is another confessional drone. "Sweet Misery Blues" has more life to it but is weighted down by Gano's mournful whine. Lighten up, lad. "Black Girls" is Gano in heat doing his Mick Jagger little red rooster strut-and-preen. Silly and pretentious. "It's Gonna Rain" is a sing-song sing-along that sounds like an outtake from their more upbeat debut album.

Gano and company—bassist Brian Ritchie and percussionist Victor De Lorenzo—are on the cutting edge of something, but just what it is, I'm not sure. Country punk? Existential folk? Nihilistic blues? Confessional white gospel? You tell me.

The three-piece is flushed out here by a four-piece horn section called, appropriately, the Horns of Dilemma, an autoharp and a banjo on one tune and a piano on another. The stripped-down format of the first album was more appealing. So were the sentiments. Gano, the son of a preacher man (really!), had better work out some of his personal conflicts before the next album. Otherwise, you're likely to get more tales of dread and hopelessness from this Lou Reed progeny. The kid's talented alright, but as funny as a crutch on this one.

bill milkowski

YELLOWMAN: *King Yellowman*. [Produced by Jimmy Wynter, Material; no recording locations listed; mastered at Masterdisk, New York City, by Howie Weinberg.] Columbia FC-3901.

Performance: **Exuberant, bubbly fun**
Recording: **Excellent**

Ho-humophilia is one thing you wouldn't succumb to while listening to *King Yellowman*, the first for the reggae star on a major U.S. label, Columbia. He just wouldn't allow it. When he isn't throwing out some gut wrenching punchline or bragging—oh so comically—of how popular he is with girls ("Any woman Yello want, im ah feh get"), he's voicing in deep Jamaican patois, verses seasoned with classic Yellowman wit ("God mek bees/bees mek 'oney/God mek man/man mek money/But Satan mek woman feh come rob man money/ Man smart/But de woman smarta," for example).

Yellowman, whose real name is Winston Foster, is a 26-year-old toaster—or Jamaican rapper—whose skin, literally yellow, is covered with scales and boils; he is toothpick thin, sees the world through gold-tinted eyeglasses, and has atop his head starchy, corn colored naps, which he sometimes covers with one of a rainbow assortment of derby hats. Though he may not be your idea of a sex symbol, throngs of woman flock to his shows, and scream and swoon affirmatively when he, as in "I'm Getting Married," one of his first hits, asks—in his usual irresistibly sing-song style, "Do you think I'm sexy?"

Five years ago, Yellowman was an unknown club D.J. who rendered atop dub plates (rhythm tracks of popular reggae songs) raps of humor, satire, nonsense, whatever. His popularity, like a mushroom cloud, quickly widened, and soon, because of his reputation as a crowd pleaser, he was making records. Between 1981 and now there has been over 20 Yellowman albums. Some of them, probably bootlegged, are of *extremely* poor quality. This new one though, is excellently captured.

King Yellowman is pure reggae music energy food with a side order (two songs) of urban-American funk thrown in by way of Material, the group/non-group responsible for last year's hip shaking, record breaking sizzler, "Rockit," by Herbie Hancock. Eight of the 10 songs on the album feature Jamaica's tightest, most

evocative rhythm section this side of Black Uhuru's Sly Dunbar and Robbie Shakespeare. A clean, heavy bass with a case throbs and weaves tunefully, locking together with the kick drum like a two-piece jigsaw puzzle. Veneering it are sharp, skeletal arrangements sporting so many echo effects and dropping in and out of instruments that they defy anyone to accuse them of monotony.

The DMX drum computer and an array of whirling, buzzing synthesizers, meanwhile, play a dominant role in the two songs—"Strong Me Strong" and "Disco Reggae"—produced by Material. Above the newly acquired electrosnap is Bill Laswell's surging, ever-present bass, muscular staccato horns compliments of Chops, and the percussive augmentation of Daniel Ponce, who is a rhythm shaker, not a noise maker. These songs obviously added to increase Yellowman's audience to include Americans—are totally different than anything he's yet done, musically. Still, his feel for the right notes and his impeccable phrasing give them the familiar Yellowman sparkle. Like glistening, sweaty bodies on a crowded dance floor, they burn with unmitigated energy.

Comparing the music of other reggae superstars—like Peter Tosh, Steel Pulse, and the late Bob Marley—to Yellowman's, you'll find his doesn't say too much politically. While theirs deal with the headier subjects of, say, world hunger, his bubbles, boils, and churns with innately Yellowman fun. And that, come to think of it, is saying a lot.

havelock nelson

SADAO WATANABE: *Rendezvous*. [Produced by Ralph MacDonald, co-produced by William Eaton and William Salter; engineered by Kendall Brown; recorded at Rosebud Recording Studio, New York; strings recorded at Clinton Recording Studio, New York, engineered by Ed Rak.] Elektra 60371-1.

Performance: **Easy going jazz**
Recording: **Crisp**

As Japan's premier contemporary jazz musician, alto saxophonist Sadao Watanabe likes to record in New York because he prefers the rhythmic qualities of the city's stellar jazz/funk sessionists, who also en-

hance his marketability in his native land. After recording a few albums with producer Dave Grusin, Watanabe switched to Ralph MacDonald for 1983's *Fill Up The Night*, which contained mostly Watanabe's own compositions. But for the follow-up *Rendezvous*, MacDonald and his co-producer William Salter penned four songs, co-producer William Eaton wrote one song, and Watanabe only recorded three of his compositions.

Rendezvous's surprise is the addition of singer Roberta Flack for two love songs; Grady Tate crooned on "Fill Up The Night With Music" on *Fill Up The Night*. The ballad "If I'm Still Around Tomorrow" employs tender strings for atmosphere while Flack sings like a feather, softly over a subdued arrangement. The more upbeat "Here's To Love" finds Watanabe's alto sax especially lyrical while the strings have more impact. Interestingly, MacDonald only uses strings on the two vocal tracks.

For the most part, MacDonald's compositions are R&B based while Watanabe's compositions are jazz centered with his saxophone the key instrument. On all tracks, MacDonald uses a simple, clean approach with all instruments clearly delineated. The plain melody of the title track overrides a mild rhythm laid down by drummer Steve Gadd and bassist Marcus Miller. "Fire Fly" employs a dreamy melody with Eric Gale's crisp guitar leading the way, while "Maraval" features MacDonald's percussion without overwhelming the tune's mood.

Watanabe's three compositions are brighter with "I'm Yours" sounding like it could be in a motion picture soundtrack, perhaps a *Pink Panther* film. And "Cool Breeze" exudes a bright-eyed aura.

MacDonald produces *Rendezvous* like he would a Grover Washington, Jr. session, but Washington has a broader range as a reedman. Too much of *Rendezvous*, especially MacDonald's compositions, seem understated and not too far removed from Muzak.

bob grossweiner

STEVE KHAN: *Casa Loco*. [Produced by Steve Khan and Doug Epstein; engineered by Doug Epstein; recorded at Mediasound, New York.] Antilles AN-1020.

Performance: **Progressive, accessible, excellent**

Recording: **Perfect mix**

He came up through the ranks of studio guitarists, with chops on chops for the effort. But what Steve Khan also has going for him is artistic ambition. Creative drive is pushing—or pulling as the case may be—Steve Khan into some exciting areas.

An immediate indicator that *Casa Loco* goes beyond the norm is the personnel with which Khan is working these days. Bassist Anthony Jackson is solidly established in the New York session hierarchy as a strong, versatile player. Steve Jordan on drums brings a touch of the jazz avant garde to the album, and a textural complexity that justifies some of hook-laden melodies.

Completing the foursome is a man from whom both the rock and jazz worlds need to see and hear more, percussionist Manolo Badrena, who first captivated American audiences as part of the "Birdland" era Weather Report.



What we have here is a cross between the Police, Weather Report and the Ventures (Khan's version of "Penetration" is as catchy—but deeper—than anything from the days of pre-surf twang). The other five compositions are group-written ("Uncle Roy" is by Khan alone) and very cohesive. The rhythm section, to which Khan contributes more than adequately, really cooks. The music is progressive but also immediately accessible.

Badrena's lead vocals have always been exciting, vibrating with Latin passion, and full of earthiness. There is a pan-cultural folk feel to cuts like "Some Sharks." At the same time,

however, there is a remarkable vocal similarity to Sting, especially in the use of non-verbal sounds, a device utilized frequently by the Police. On the other hand, the Police were profoundly influenced by the Afro-Cuban sounds that pervade the Caribbean from where Badrena hails. Is this a case of the chicken or the egg?

Whatever, Steve Khan has come up with an excellent album in *Casa Loco*. Electric guitars and bass have been engineered to feed off of Manolo's amazing percussive flair and Jordan's subtle fire. There is a warmth to the mix, whether on rockers such as "The Breakaway" or the more stretched out, solo-oriented "Uncle Roy."

But the album's simmering quality cannot be attributed solely to the quality production. Khan has super skills in the studio, but he's also got something to say—and his new music is saying it.

robert henschen

DONNA SUMMER: *Cats Without Claws*. [Produced by Michael Omartian, engineered by John Guess; recorded at Lion Shore Studios, Los Angeles; United Western Studios, Hollywood; and Rhema Studio, Los Angeles.] Geffen GHS 24040.

Performance: **Eclectic**
Recording: **Stirring**

From Eurodisco to a heavenly production like "Flashdance," Donna Summer has covered all bases of contemporary dance/disco music. She rebounded nicely in 1983 with the Michael Omartian-produced *She Works Hard For The Money* after a surprising failure the year before with the Quincy Jones produced *Donna Summer*, perhaps Q's only recent misfire. But whereas *She Works Hard For The Money* was basically a one-song album (the stirring title track), *Cats Without Claws* is a more realized album as every track stands out and sounds different.

"It's Not The Way," a song about love going sour, finds Omartian tripling a 12-voice background to give the song a fuller impact. On "I'm Free," which has a calypso-like underbelly, the backing vocals use echo for greater enhancement. When Omartian does not opt for backing vocals, Summer's voice seemingly



Long-lined Lyrical Guitars: Emily Remler and Jim Hall

flies at will, especially in the high range during “Suzanna” and in “Oh Billy Please,” where one has to stop for a second and wonder if it’s Cyndi Lauper or not. Throughout *Claws*, Summer turns in a sterling voice performance as the arrangements and instruments fully accentuate her vocal presence, whereas during her earlier recordings with Giorgio Moroder producing, Summer often had to find her own range and place within the overly synthesized production.

Omartian also makes good use of brass textures and Michael Landau’s brief guitar solos, especially on “Supernatural Love,” which features sonically emotive drums and synthesizers.

The album’s first single was “There Goes My Baby,” a cover of the Drifters’ 1959 chestnut, but with a dramatically different arrangement that starts out almost inanimately before branching out into discofied rhythms.

Most of *Cats Without Claws* deals with the attempt to regain lost love and lost lovers. The title track is the only thematically varied tune, as it deals with streets, gangs, and drugs; Summer both narrates the verses and sings along on the chorus.

Cats Without Claws is the type of album that could spawn numerous singles simply because Omartian took extra care in song selection. Included is Reba Rambo and Donnie McGuire’s pure gospel ballad “Forgive Me,” which facilitates Summer’s religious convictions, arrangements and production so that the album does not clone itself like many of her previous albums did.

bob grossweiner

Emily Remler not only came up fast, but she keeps growing fast. Her newest set, *Transitions* (Concord), reveals, first of all, a further self-assurance that indicates she no longer has to concentrate on notes. Just music. This time, moreover, she is without a piano, so she has to create the harmonic changes for the accompaniments—hers and everyone else’s. In sum, Emily here is all of a swinging, multi-colored piece.

Furthermore, she is more challenged on this album than on her previous sessions. There’s a lyrically assertive horn, trumpeter John D’Earth, whose own intensity brings out more of Emily’s. The bassist is Eddie Gomez, a musician of even more penetrating intensity who, moreover, is in such command of his instrument that he sometimes plays it as if it were as supple as a guitar. So, Emily has to keep up with Gomez, and she shows she can. On drums is Bob Moses the composer, who orchestrates the rhythms as if he were scoring them. A formidable group.

There are three Remler originals, along with pieces by Duke Ellington, Sam Jones, and Keith Jarrett. And Emily is also growing as a writer, as shown by “Searchin.” The engineering is of Concord quality—clear, bright but not metallic, and balanced by a *listening* engineer.

Next time, it might be intriguing for Concord to pair Emily Remler with—if Norman Granz will lend him—Milt Jackson. That will really put her in the post-post-graduate league.

Two of the shyest jazz musicians off the stand are guitarist Jim Hall and bassist Ron Carter. When they play, however, their authority

is palpable. And when they play together—as has been the case from time to time in recent years—the result is a quality of jazz chamber music that will make their records as a duo endure as long as music is listened to.

One such album is *Ron Carter and Jim Hall/Live At Village West* (Concord), recorded in the Greenwich Village club in November 1982. The improvising is seamless, sometimes sounding as if the same person were playing both guitar and bass—so intently does each listen to and anticipate the other. Also, since both Hall and Carter have such warmth in their sound and such supple ways of swinging, there is the feeling of dance music throughout. In the days of the Savoy Ballroom, there were plenty of dancers who could fold their bodies into this kind of music, and maybe some still can. This is a set dance troupes ought to listen to.

Most of the tunes are standards, both popular and jazz, but everything takes on fresh and deeper lines of meaning—and pleasure—in these conversations. *Blue Monk*, for instance, illuminates a dimension of the onliest Thelonious that has not often been suggested before—a poignancy in the seriousness of his entertaining. The quality of sound is beyond caviar—a truly balanced conversation.

EMILY REMLER: *Transitions*. [Carl Jefferson, producer; Ed Trabanco, engineer.] Concord Jazz CJ-236.

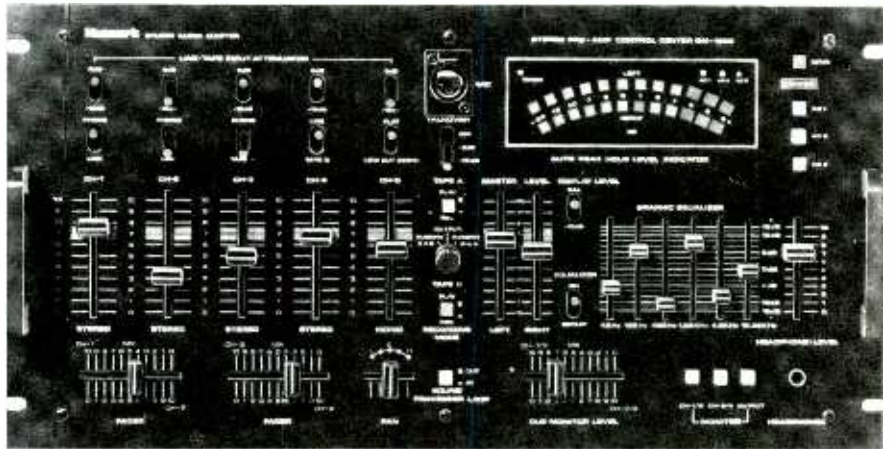
RON CARTER AND JIM HALL: *Live At Village West*. [Jim Hall, producer; Jim Anderson, engineer.] Concord CJ-245.

The Market Place

what's new in sound and music

NUMARK MIXER/ PREAMPLIFIER

The Professional Products Division of Numark has introduced the DM1900 mixer/preamplifier with equalizer. The DM1900 has four stereo phones and two stereo tape recorders, plus a balanced/unbalanced input that will accept a microphone with either a phone plug or XLR connector. The mic input has a professional panpot control for exact and creative positioning. A fast-acting, 12-segment, multi-colored peak-reading LED output meter is provided to ensure optimum output without overload. The DM1900 has a built-in low-noise preamplifier and a selectable variable output to provide the proper output to drive the most powerful amplifiers. Slide controls are provided for adjusting the volume of each input, for controlling the output volume of each stereo channel, and for adjusting each of the equal-



izer's six frequency bands. The fading and cueing volume controls are professional-quality four-gang slide controls with feather-touch action, ultra-fast response, and infinite adjustment sensitivity. The fading and cueing controls automatically adjust the gain levels of the

channels being mixed so that volume does not vary during the mixing process. They can be set to mix either Channels 1 and 2 or Channels 3 and 4 (phono/line inputs).

Circle 1 on Reader Service Card

DOD DIGITAL MULTI-EFFECTS

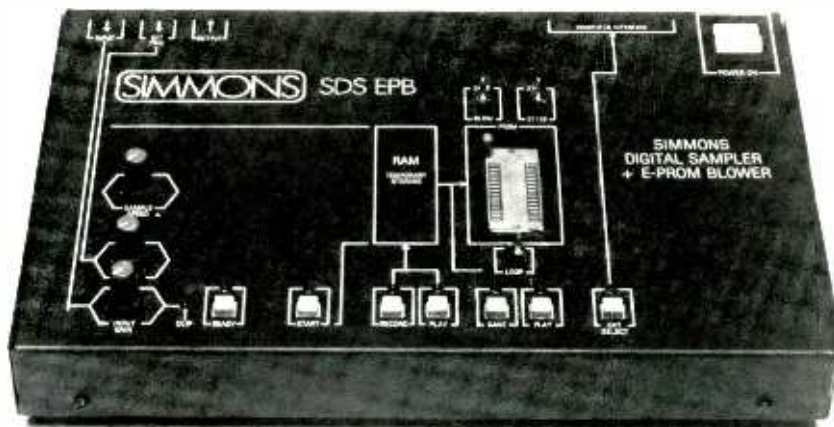
DOD's R-944 Chain Reaction features four independent effects: Compressor/Distortion, Flanger/Chorus, Digital Delay, and Parametric Equalizer. A harmonic enhancement circuit is provided on the output, as well. Other effects may be inserted into the chain through rear panel jacks for increased flexibility. A foot pedal unit (which connects to the R-944 through a standard stereo cord) is included. It features, in addition to On/Off switches for the individual effects, a Bypass switch that takes out all effects at once, and a Repeat Hold switch for the digital delay. The suggested list price for the unit is \$699.95 (USA).



Circle 2 on Reader Service Card

SIMMONS DIGITAL SAMPLER/MEMORY PROGRAMMING UNIT

The new Simmons Digital Sampler/E-Prom Blower (SDS EPB) is designed for use with the SDS7 digital drum kit or SDS1 digital pad. The unit allows its user to program his or her own memory chips from virtually any acoustic or electric sound source. A drummer, for example, will now be able to digitally store the sound of his own acoustic set on a handful of memory chips. A percussionist can carry a trunk-full of percussion effects in a briefcase. The EPB can also be used to store the real sound of other musical instruments, the human voice, and a wide variety of natural sound effects that can be loaded into the SDS1 pad or SDS7 voice module and triggered by Simmons pads or SDS6 sequencer. The SDS EPB greatly expands the range of sounds available, as well as the creative options of its users. To store a sound, the user selects the correct blank memory chip; 8K for shorter sounds, 16K for longer ones. Then the sound is "sampled" via a



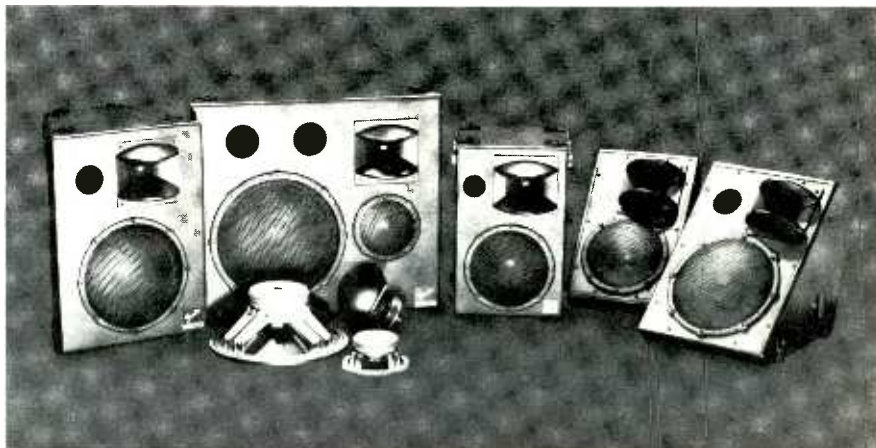
microphone or line source and held in RAM storage to allow audio inspection of the sample. Once the proper sample is produced, the E-PROM (erasable programmable read only memory) chip is inserted and the information is transferred to it. The programmed chip can then be put into the SDS7 or SDS1 where it will

be fully adjustable for all functions. In addition, by exposing a programmed chip to ultraviolet light for 30 minutes, its memory can be erased and the chip reprogrammed.

Circle 6 on Reader Service Card

FENDER PRO SPEAKERS

Fender's new 2800 Series of professional loudspeaker systems consists of five models: three systems for general use, plus two models configured as on-stage floor monitors. All use high-power cone drivers with special constant-directivity high frequency horns and 18 dB/octave crossover networks to achieve smooth, wide-range response and high output capability. Leading the line is the model 2821, a three-way design including 18-inch woofer and 8-inch midrange drivers. With a 200-watt continuous music power rating (and 100 dB/watt/meter sensitivity), it is recommended for high-level indoor and outdoor applications. Like the smaller 2841 two-way system (with 15-inch woofer), it features an extremely rigid trapezoidal "wedge" enclosure that stacks efficiently into splayed arrays with any desired horizontal coverage angle. The 150-watt model 2851 is suited for smaller indoor installations with its 12-inch woofer and constant-directivity 90 ×



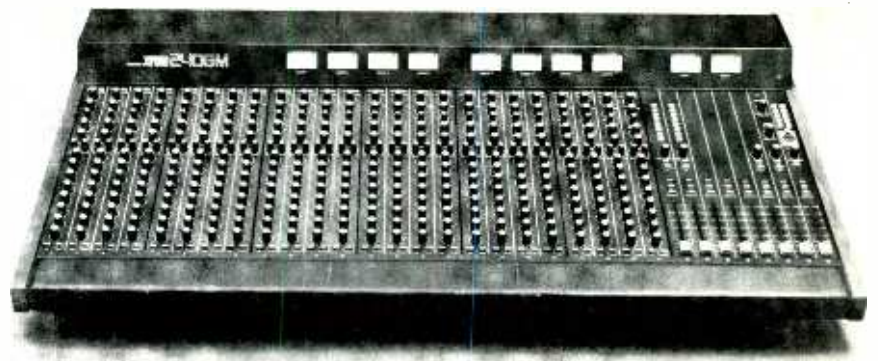
40-degree horn. Both it and the 2841 are also available in stage monitor versions (numbered 2842 and 2822), housed in asymmetrical enclosures which furnish a choice of two different tiltback angles. The new line uses tuned enclosures with computer-designed Thiele-Small alignment to get extra-low-frequency efficiency and power capacity. Constant-directivity horns achieve a controlled

pattern throughout the effective bandwidth of the high frequency system, and 1-inch pure titanium diaphragms give response all the way to 20 kHz with extreme ruggedness.

Circle 7 on Reader Service Card

NEW YAMAHA MONITOR CONSOLES

The latest additions to the new Yamaha MC Series of mixing consoles include the MC1608M and MC2408M monitor mixing consoles, designed with a specific purpose in mind—flexible and efficient on-stage monitoring for performing musicians. The MC monitor consoles are completely compatible with all professional equipment, since all primary inputs and outputs are balanced lines with XLR connectors. The MC1608M has 16 input channels and the MC2408M has 24 input channels. Other than this, the consoles have the same basic features, with 10 meters, eight master outputs, as well as two auxiliary sends and two fully assignable auxiliary returns. The MC1608M and MC2408M are modular in construction, with blocks of four input channels for easy service when necessary. Each input channel features a pad switch and gain control with peak LED, phase reversal switch, three-band equalization with sweep midrange, two post-EQ and pre-fader auxiliary sends, eight rotary master send controls, Channel On/Off and Cue switches with input channel cue priority (explained later). All knobs are color-coded between input and output sections to aid identification in low light situations and make the visual signal flow easy to follow. The Master section includes a 100mm fader, On/Off and Cue switches, and high



pass filter for each of the eight master outputs. The two auxiliary returns, with Cue and On/Off switches, are assignable to any or all of the master outputs. The front panel also includes a headphone cue section and assignable talkback section, each with a level control. The low profile meter panel shows output levels for masters 1-8 and auxiliary 1 and 2. One of the unique features of the MC monitor consoles is *input channel cue priority*. When an input channel Cue switch is pressed, the previous master cue is cancelled. While using a monitor console, the engineer will normally monitor one of the eight master outputs. If, for example, a feedback problem arises, the engineer can press one or more input channel cue switches, and the console automatically replaces what was previously being monitored with the

new channel's program. The back panel has low-impedance, electronically-balanced XLR and high impedance 1/4-inch inputs and channel insert in/out connectors for each input channel. Each module of four channels has a +48 phantom power On/Off switch. Each of the eight master outputs has an insert in/out jack, submixer input, and an electronically balanced XLR master output connector. 1/4-inch jacks are provided auxiliary 1 and auxiliary 2 in/out, and auxiliary submixer inputs. Despite this wealth of features, the MC monitor mixing consoles and the other MC consoles are surprisingly slim and light. The price of the MC1608M is \$2895 and the MC2408M is \$3995.

Circle 3 on Reader Service Card

OVATION ON-BOARD EQUALIZATION FOR ACOUSTIC GUITAR



Ovation Instruments' new Operational Amplifier (OP-24) active equalization system allows the player a far wider range of on-board tonal control than previously available from acoustic/electric guitars. The three band graphic equalizer allows the player to actually boost or cut 12 dB from centering frequencies carefully chosen to compliment the range of the guitar.

Circle 5 on Reader Service Card

NEW SOUND KIT FOR OBERHEIM DX DRUM MACHINE

Oberheim Electronics' second series of alternate drum sounds for the DX Digital Drum Machine, comprised of user-changeable EPROMs, contains three Congas, three Timbales, Cowbells, Tambourine/Rimshot, a Ride Cymbal, and a dynamic new Fat Snare. Like the Electronic Sound Kit, the new kit retails at \$249.00, and will replace all of the existing voices within the DX, yet allows the user to mix and match the voices once the kit is purchased. The DX Sound

Kits have been designed to maximize the DX's existing voice-related hardware so that the results are consistent with the high quality of the original sounds.

Also available is a complete set of nine Zero Insertion Force ROM Sockets to facilitate chip removal and help prevent damage to the chips and the DX. The socket set retails for \$90.00.

Circle 4 on Reader Service Card

E-MU DIGITAL SAMPLING KEYBOARD

E-mu Systems' new Emulator II digital sampling keyboard allows you to digitally record any sound and to play it back polyphonically from its keyboard (like its predecessor). It uses a new data encoding technique that results in increased frequency response with a marked decrease in digital distortion. The Emulator II comes standard with a full 17 seconds of sampling time and up to a full megabyte of disk storage. Its five-octave velocity sensing keyboard with programmable dynamic sensitivity allows the musician to exercise expressive control over a wide range of sonic parameters. The inclusion of filters, VCAs, envelope generators, and independent delayed LFOs for each of its eight channels allows extensive modifications of any sampled sound. The Emulator II's keyboard algorithms provide a variety of new voice assignment techniques. Any number of voices (limited only by available memory) may be assigned to the keyboard at one time. Each voice may have its own independent keyboard range or may stack with or overlap other assigned voices. Two voices assigned to the same range can sound together, or keyboard velocity can be used to



control the balance of a crossfade between them. Voices can be digitally combined to create new voices, and a unique "digital splicing" function allows the attack portion of one sound to be spliced to the sustain and/or decay portion of another. The Emulator II's advanced track-oriented sequencer includes extensive editing and overdubbing capabilities as well as programmable rhythm correction. Combined with the Emulator's ability to assign a different preset to each of its eight channels, it provides a complete music orchestration and production facility in a single portable package. The Emulator II's advanced interface capabilities have been

designed both for future system expansion and for compatibility with other electronic instruments. An RS-232 interface provides for enhanced computer access and control; MIDI allows communication with other synthesizers, and, possibly most important, a built-in SMPTE reader/generator conforms to the synchronization standard of the professional recording, film, and video industries. Suggested list price of the Emulator II is \$7,995. An optional second disk drive is \$650.00.

Circle 8 on Reader Service Card

THE ZETA SYSTEMS PROGRAMMABLE 8 IN/2 OUT AUDIO MIXER

The Zeta Programmable Mixer is a full feature 8 in/2 out mixing board with three-band EQ, Monitor Send, Effects Send, Pan, Level, Aux In, and Effects Return, all fully programmable. The audio path uses extremely low-noise, low-distortion circuitry with fewer op amps in the chain than a conventional mixer uses. Full MIDI compatibility insures communication with other programmable devices and keyboards. The programmer may save 99 front panel control settings, and memory contents can be edited, copied to other program locations, or dumped to cassette. Fade time control provides smooth linear slewing from one program to another. This allows slow fade-outs, panning sound from speaker to speaker, and smooth changes in EQ or effects. An entire front panel can be faded to any other setting with



fade times from 0 to 15 seconds. Tape synchronization function allows program changes to be placed on tape for fully automated mixdown of master to stereo. Foot control of both pro-

gram number and master volume makes it ideal for stage use. The list price for the mixer is \$2995.

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