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SEPT. '79
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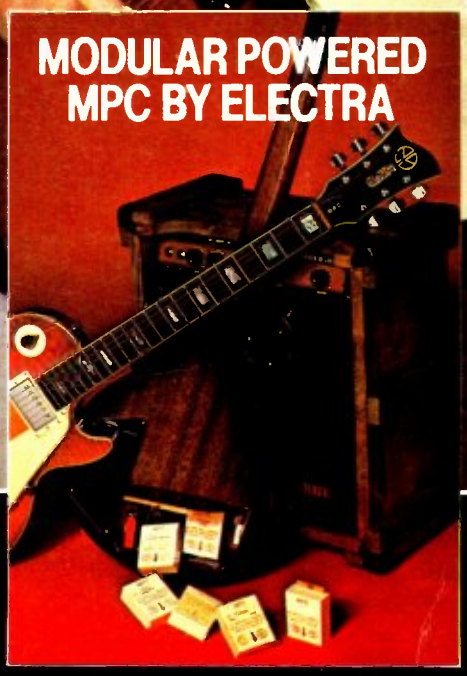

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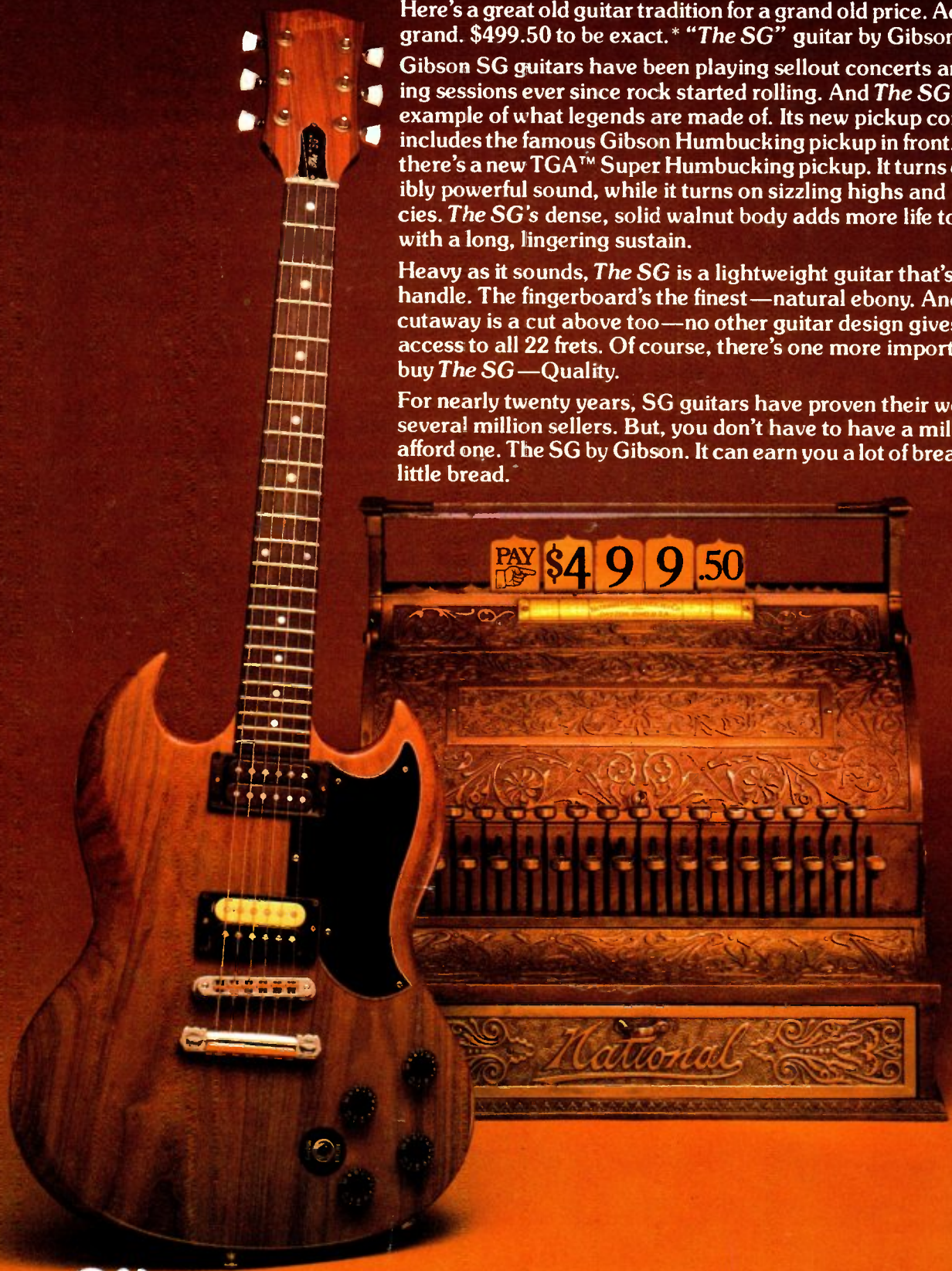

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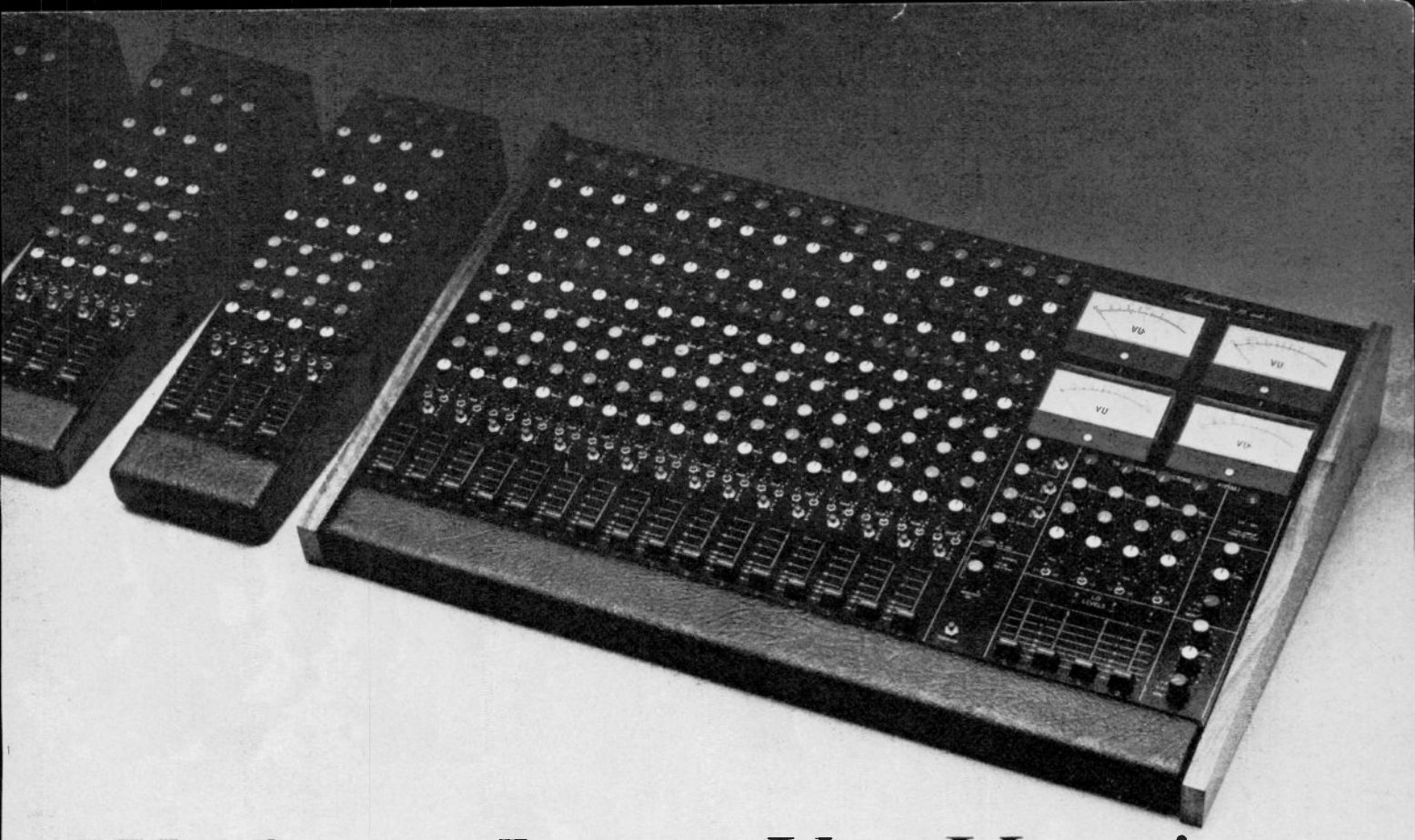

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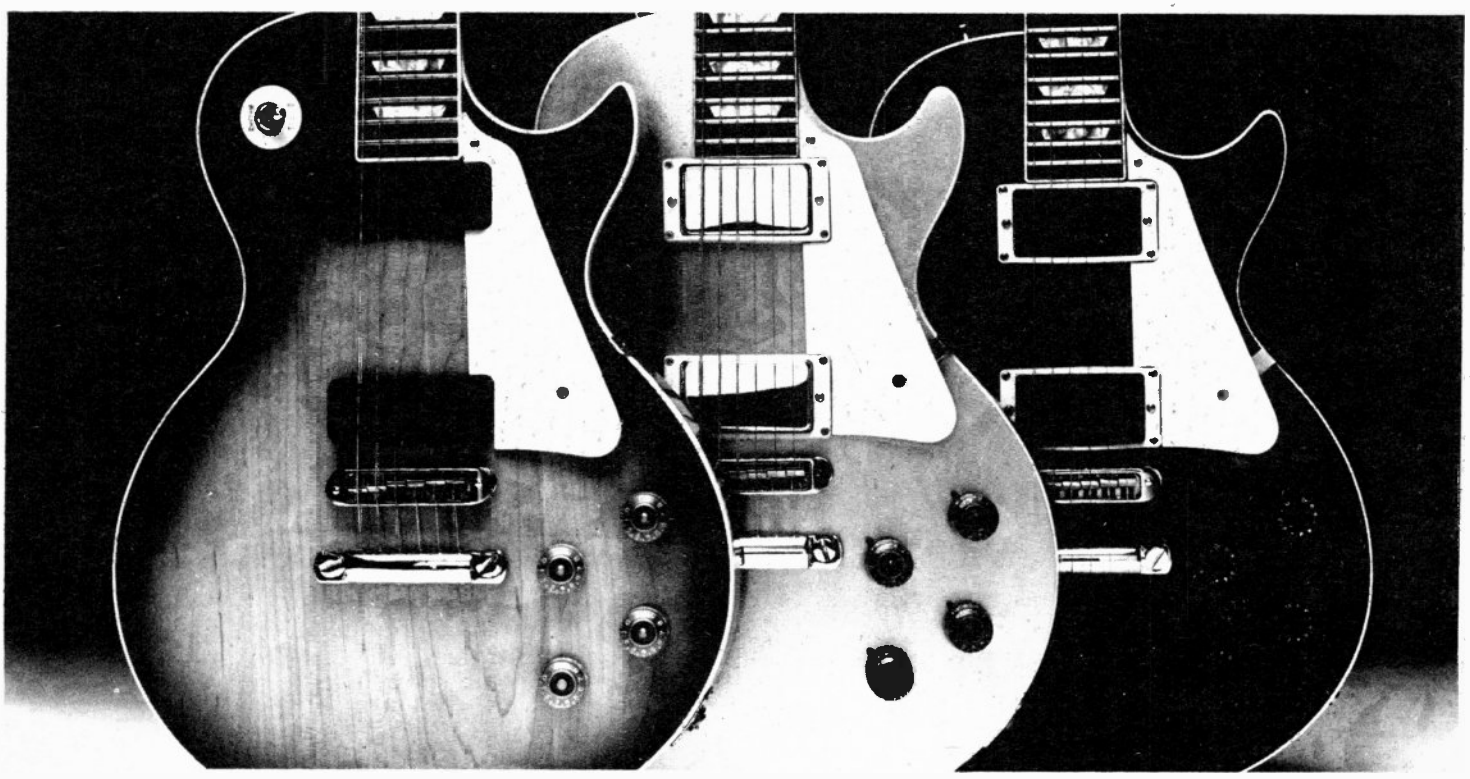


Z PLUS™

More for your "Les"

Z PLUS™ is really the only pickup for your Les Paul. It is unique; from its durable molded exterior, to its very efficient magnet/coil structure. Z PLUS is certainly not just another humbucker. This is a pickup made in a completely new way.

The sound of Z PLUS is its own. A smooth, rich, warm voice that speaks clearly and distinctly with great strength. It can shout the heaviest chords, or whisper the most delicate phrases. Z PLUS responds to your pick and your mind in a most satisfying way.

Our words cannot truly tell you about the sound of the Z PLUS, so we urge you to hear it for yourself.

Anyone familiar with a screwdriver and a soldering iron can install a pair of Z PLUS pickups in his Les Paul. The instructions are simple and complete, including directions for 'coil splitting' using only the tone controls already in your guitar.

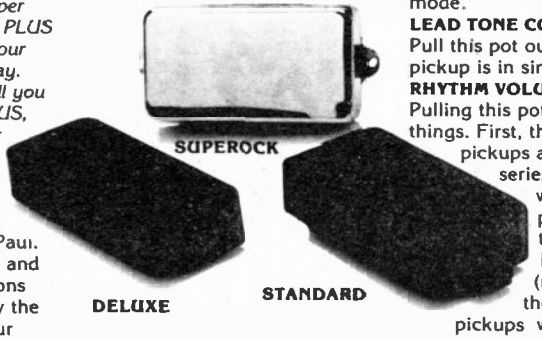
Z PLUS is now available in three styles:

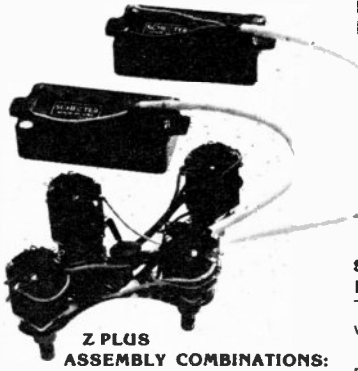
Z PLUS STANDARD— to replace standard size humbuckers.

Z PLUS DELUXE— to replace small humbuckers.

Z PLUS SUPEROCK— for all-out, very high output.

The already famous Z PLUS Assembly offers guitarists 21 complete switched combinations. This is the sensible way to get all the sounds with push-pull convenience. The Z PLUS Assembly features any two Z PLUS pickups and four Allen Bradley Omni switch pots. The Z PLUS Assembly comes fully wired and mounted on a brass grounding plate. Color coded wiring harness allows easy, convenient connections and installs directly into your Les Paul—replacing your old controls and pickups without the problems of drilling holes, mini toggle switches, or batteries.





Z PLUS ASSEMBLY COMBINATIONS:

When all four omni pots are pushed in your Les Paul will function exactly as it did before installation of the Z PLUS Assembly.

Pulling out the following pots will perform these functions:

RHYTHM TONE CONTROL— When this pot is pulled out the rhythm pickup is in single coil mode.

LEAD TONE CONTROL— Pull this pot out and the lead pickup is in single coil mode.

RHYTHM VOLUME CONTROL— Pulling this pot out does three things. First, the two humbucking pickups are connected in series (they are parallel when the pot is pushed in). Second, the selector switch is bypassed (regardless of how the switch is set, both pickups will be on in series). Third, the rhythm pickup volume becomes a master volume control for both pickups.

LEAD VOLUME CONTROL— Pulling out this pot does two things. First, it puts the lead pickup out of phase in relationship to the front pickup. Second, it will select which coil is active in the single coil mode.

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The bridge we have all been waiting for is finally here.

Designed with smooth, rounded contours for comfort and good looks, Schecter's unique "KROS-LOK" design features individual adjustment and locking screws for each saddle. Precision fit with solid brass sustain make "KROS-LOK" a noticeable improvement for your "Les Paul".

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Rockin' Robin Guitar Shop Wins London Trip

On June 8th it was Bart Wittrock's birthday; on June 8th *International Musician and Recording World* made his day by telling him he'd won a free trip to London, England for himself and partner. Needless to say, Bart was a bit stunned.

At the NAMM exhibit in Atlanta, Georgia, we awarded Bart with his ticket only to find out that he was about to be married and would be taking his new wife to London for their honeymoon.

Bart co-owns Rockin' Robin Guitar Shop with Dave Wintz. A guitar player for 10 years, who's been influenced by the great Peter Green, Bart has been in the musical instrument store business for eight years. In that time he has quickly earned a reputation as a dealer in vintage and used guitars – especially old Strats: "I've got a Strat for every year of the 1950s," he explained.

Based in Houston, Texas, Rockin' Robin Guitar Shop was one of the many dealers that chose to support *International Musician and Recording World* in its North American venture. Music stores carrying our first issue were signed up for a drawing with the London trip as a prize. Rockin' Robin was chosen at random and we couldn't be happier that Bart's never been to London before. The IM&RW staff will be able to show him a really good time in the UK.

We want to thank Rockin' Robin Guitar Shop for its support and sincerely hope that Bart Wittrock and wife enjoy their trip to the UK.

Managing Director Richard Desmond presents Bart Wittrock with his prize, and Bart returns the greeting with a presentation of a Pyramid Stetson.

The sound of the Mu-tron Phasor II is the favorite of people like Jeff Baxter, Pat Martino, Lee Ritenour, George Duke, Jan Hammer, Jean-Luc Ponty, and Alphonso Johnson.

The reason? Studio-worthy, low noise specs combined with a deep, rich, sweeping sound make the Phasor II the standard by which all other phasors are measured.

You can hear the difference between a Phasor II and any other phasor. Mu-tron's exclusive photo-mod circuitry is far superior to conventional FET circuits that give you nothing but noise and inherent distortion. The Phasor II contains an expensive custom-made device, called a photo-mod, which works on a sealed optical principle. The result is more than 10 times the dynamic range of conventional phase shifters, plus phasing "notches" that are far deeper and more pronounced.

The controls on the Phasor II are designed to give you dozens of options and total control over your sound in live performance. And it is built to withstand all of the rigors of the road.

See your Mu-tron dealer today for a closer look at the Phasor II. If you can find a better phasor, buy it.

Mu-tron. Hard-working effects for hard-working professionals.

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The Mu-tron Phasor II. The clean sweep of professionals.

For a free copy of Mu-tron's new catalog and the names of Authorized Mu-tron Dealers in your area, write: Mu-tron Inc., 45 Hartwell Avenue, Lexington, Massachusetts 02173.

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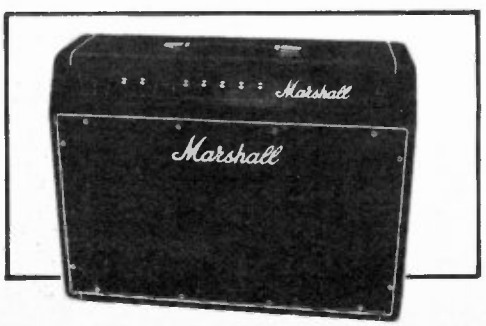


Letters

A Frank enquiry

I read with interest your article in the March 1979 issue of International Musician entitled "A Mother in the Studio." If you consider it part of your publication's purpose to circulate interesting and innovative ideas on the musical scene, perhaps you could be of some help to me.

A serious home recording buff myself, I have some original ideas that I would like to communicate to Frank Zappa, that is, if he could be found in any one place for any length of time. I was most impressed by his well-thought out and disciplined approach to recording and would tremendously like to exchange some thoughts with such an innovator.

Would have have or know where I could obtain a mailing address to Frank Zappa either care of, or preferably, more direct, to avoid loss and delay in a mountain of mail? Any information that you could offer would be most appreciated.

Thank you.

Tom E. Balanyk, DDS,
7186 Roger Crescent,
Niagara Falls, Ont.

Sorry, we don't divulge any addresses or forward any mail. We like to stay friends with the people we know. However, you could send another letter or information for Zappa to Mercury Records, 810 Seventh Ave., New York, NY.

Picking us up

Your May issue was great! The articles on Pat Metheny and Chuck Mangione were really good. It's about time someone did a product review on the new Washburn electric guitars – they certainly deserve a lot more attention than they're getting. However, I feel it was a poor idea for Mr. Delft to review the quality of the pickups by using the Gibson "Pat applied for" pickup as a reference. I'm sure Stephen chose that particular pickup for its popularity (meaning that a large number of guitarists are familiar with it), but the Washburn pickups must be judged on their own merit.

Also, in the next-to-last paragraph of your article on Billy Cobham, where Billy is talking about the various effects that he has used on his drums, the echo unit he was talking about is called the Space Echo, and it is manufactured by Roland, not by Eventide.

Send your comments, criticisms and queries to Letters, International Musician and Recording World, 19th floor, 1500 Broadway, New York, NY 10036.

For anyone that is interested in obtaining more info on it, the model Billy is referring to is the RE-201 (it's a state-of-the-art echo unit). Calling it the "roll-in-space echo" shows a lack of familiarity with common effects equipment. Perhaps a little reading up is in order . . .

Peter A. Gravina
Teaneck, NJ.

Pix mix

Tsk-tsk. A thousand lashes for your boo-boo in the April issue. On page 115 you gave a decent review of the Lenny White *Streamline* album and included his picture. The problem, however, is that the photograph is of ace Ludwig drummer Roy Haynes. Besides, Lenny White plays Gretsch drums and he and Roy Haynes are from totally different schools of drumming.

Lenny White

I realize that some people from the North feel all blacks look alike, so I suggest that you hire either a black or a drummer to differentiate between the two marvellous drummers.

Other than that insignificant mistake your magazine is good. Let me ask: Since I found this mistake, do I get a free year's subscription?

Jack Daniel,
Baytown,
Texas.

Well, what can we say? You're right, it's definitely Roy Haynes in the photograph. However, Lenny White doesn't play Gretsch drums anymore; he's been endorsing Tama drums for some time. Ah, we all make mistakes. As for the prize: let's call it even at one apiece.

Sounding Page

I'd like to compliment you on a very fine magazine. I've bought all three American issues and I'm very impressed. It's just what we musicians always needed. It's good to read about the newest equipment. I'm a guitar player and a big fan of Jimmy Page, and I thought you might be able to answer these questions for me.

1. What kind of guitars did Jimmy Page use on the first Zeppelin LP?
2. What kind of amps does he use now?
3. What kind of effects doe he use now?
4. How many albums did he cut with the Yardbirds and what were their titles?
5. He cut a single around 1965 called "She Just Satisfies", can it be found anywhere? If so, where?
6. How many guitars does he presently own and what are they?

Well, good luck on a tough task. I hope you can help me.

A "tough task" indeed. As you may or may not know, Zeppelin is one of the most "unapproachable" bands in the business – especially when recording – but here goes anyway.

Page used a vintage Les Paul "Standard" ('59) and Telecaster ('56) on the early LPs. He uses Marshall amplification. An Echoplex and Colorsound Effects console. He cut two "official" albums with the Yardbirds – Little Games and Yardbirds Live (the latter was recalled for poor sound). "She Just Satisfies" was released as an English single on the Fontana label (TF 533) and can be found on a bootleg LP entitled Golden Eggs which may be available at your local record outlet if you're real lucky. In answer to your last question, a lot.

CORRECTION

In the S.D. Curlee Story (July, 1979), we incorrectly reported that MTI, a Japanese company, made the Honda guitars. In fact, the guitars are made in Korea exclusively for distribution by International Music Corporation of Fort Worth, Texas.

How can we say that our MXD-5 is the best analog delay for your needs?

Who do you think you are. . . a musician, a PA engineer, a home recordist? What do you play. . . guitar, keyboards, a console? Are you a vocalist? We designed the MXD-5 to be the best value in analog delays for the majority of professional musical applications. The MXD-5's versatility and performance are unequaled in its price range. But whether or not you think it's the best depends on who you are and what you need from a delay device.

What do we mean by 'a majority of professional music applications'?

The MXD-5 is versatile. It will provide echo from the entire gamet of instruments and mics. With the MXD-5 individual channels for high and low level input signals make it possible to achieve a proper interface which is so important for sonic performance. We know that in order for any signal processor to work without distorting new material or adding unwanted noise there must be a correct matching of levels.

Right now you may be working on the road, tomorrow, may be in the studio. The MXD-5 is at home in either situation. A three position switch allows an optimum interface whether going into a musical instrument amplifier, recording console, or a PA mixer.

How much delay is enough?

Once again, the answer to this question depends on who you are. You may never need more than 100 ms. of delay time. The MXD-5 offers from 20 to 200 ms. of delay at an astonishing frequency range. It was developed to provide a wide range of delay times, which are practical, while the quality of the audio signal remains extremely clean. This means a remarkably quiet product with a relatively wide frequency range at all delay settings. We feel that this is a very important factor to consider.

What about, 'how little delay is enough'?

Most other analog delays offer no less than 50 ms. This limits them severely in that they cannot achieve a subtle thickening for instruments or voice. Their delay range starts at a contrived doubling. The MXD-5 can deliver delay from a thick double, to a distinct repeat; in all ranges the performance is superior.

What kinds of things comprise an echo?

In addition to a single time delay, or repeat, there are other factors which effect the way an echo sounds. The intensity of the signal is an important consideration. In many units the volume of the delayed signal is not controllable. With the MXD-5 it can be regulated from a hint to a wallop.

A multi-repeat is achieved by recirculating the delayed signal through the analog circuitry over and over again. In order to get a clean multi-repeat you've got to start with a superior delay circuit. This is what makes the MXD-5 so together.

What qualities exist in natural echo?

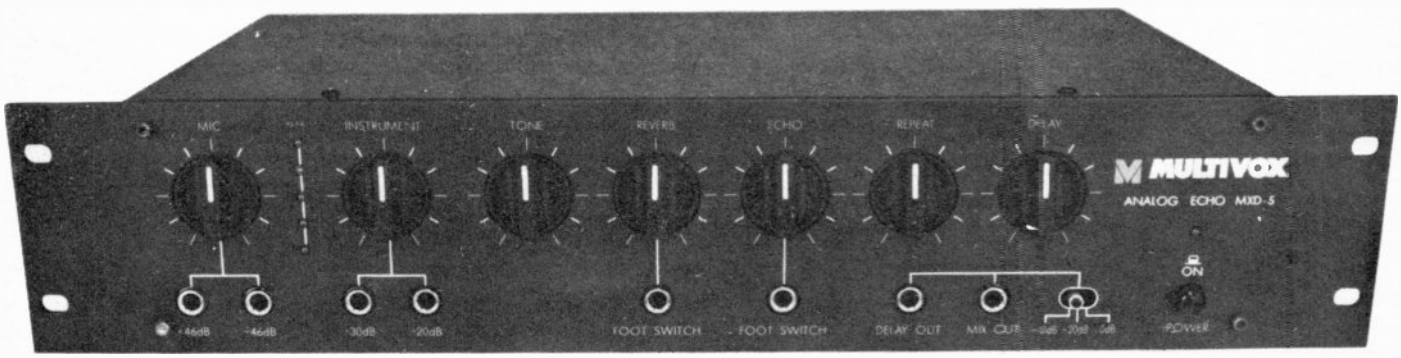
Echoes rarely exist in nature without some degree of reverberation. That's why we built in a high quality spring reverb. The sustain time is variable to a maximum of three seconds. The depth is independently controllable. This reverb feature further separates the MXD-5 from other delay units. The MXD-5 can achieve the illusion of natural spacial relationships.

The EQ of the echo and reverb signals are adjustable so that subtle variations of the effect are attainable without affecting the dry signal.

What makes the MXD-5 better than other competitive units for live performance. . . the road. . . the home studio?

The MXD-5 will work consistently under the most strenuous professional conditions. No matter how good a unit sounds, it would be of little value to you if it lives on a repair bench. The MXD-5 is built with the same mechanical and electronic integrity that you would expect from any professional musical product. It is standard rack mountable and an optional road case is available for the most adverse travel conditions. The MXD-5 was also designed to suit your needs on stage. Instant switching of echo and reverberation has been provided for with remote control which may be foot operated (optional) independently.

The LED overload meter is bright enough to be seen for positive visual monitoring of the input signal. There's access to the delayed signal without the reverb signal for recording or on stage panoramic stereo-like effects.



The bottom line is hearing and using the MXD-5 analog delay. For your needs, today and tomorrow; this delay line should prove to be universally better, in both flexibility and performance, than anything in its class. The **MXD-5. . . $399.50,** suggested retail.

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On Drums:
Chester Thompson

Lately I've been meeting drummers who are concerned about what to practice or how to warm-up before a gig. I will share a few things I like to do, but I suggest talking and shedding with other drummers every now and then because everyone seems to have something different to contribute.

Before a show I like to have about 15 minutes, at least, to get my wrists and feet (especially if I'm playing two bass drums) loosened up. My favourite way to do this is with variations of single-stroke rolls, flams and paradiddles with any combination of them in different meters and tempos.

Special attention is given to eveness, speed and placing accents wherever I want them. Of course, the way to get anything to sound clean is to start slowly and work it up gradually. Once you really understand what you are supposed to be playing, you can work on speed and/or variations. I usually push myself a little before a gig to avoid damage from playing very hard without being properly warmed up. I've thrown my wrists out a little from doing that and it is not fun to be in pain during a gig. The only protection from it is regular practice between gigs.

In actual practicing, I may work on anything. If I'm having a problem with something (like a real tough chart), that's what I work on first. Open and closed rolls should get a lot of attention, I feel, because I don't like sloppy rolls. In a lot of music now, rolls don't seem to be called for as much, which is more reason to practice them. A review of various rudiments doesn't hurt either.

If you have problem areas or just want to improve a specific thing, like your bass drum foot or getting a particular pass around the drums, there are basics you can follow. To play only a part of what you are trying at a time, instead of playing the whole thing, usually helps. If you only add a note at a time it's okay as long as you thoroughly learn what you are doing. Once you've gotten the part you are working on, go on to the next part. Then tie them together.

You can successfully improve any one limb (either hand or foot) by playing simple patterns of eighth and sixteenth notes, with triplets and quintuplets, with the hand or foot and working for eveness while gradually building speed and endurance. I feel it's okay to work to the point of pain, but make sure you immediately back off a little. By pain I don't mean the point of agony.

Before you finish practicing, allow some time for free expression of whatever comes out naturally. As you are able to do more; more will naturally flow through you. After all, that's what it's really about, isn't it.

Chester Thompson currently tours with Genesis and has worked/recorded with Frank Zappa, Weather Report, Curtis Mayfield, George Duke and the Pointer Sisters, to name a few.

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On Bass: Jim Rodford

This month I'd like to talk about an aspect of bass playing and technique that is used for a very basic, fundamental, but extremely important function i.e. tuning up, and also for advanced tonal, and expression concepts. I am referring of course to the executive of harmonics.

The easiest and strongest harmonic is at the twelfth fret position on the G string, and the first fundamental use of this technique is to check the bridge string length adjustment, on all four strings.

The method involves any one of the fingers of the left hand being placed lightly on one of the chosen four strings, directly above the twelfth fret, but not pushing the string all the way down to connect with the fretwire. Pluck the string in the normal way with your right hand, preferably with a hard surface like a plectrum or your nail, and simulaneously and rapidly remove your left hand digit from the string. With a little "touch" practice and perserverance, a harmonic note will be produced, distinguished by its high, clear pure, ringing tone. In this case, the harmonic is the same pitch as the fretted note.

It logically follows then that, if the fretted note and the harmonic at the twelfth fret are not in tune, then the string length adjustment at the bridge must be altered to achieve this state.

This rule applies to all four strings, and unless this is carried out properly the guitar will not play in tune, all the way up the fretboard. Simply, if the fretted note at the twelfth position is say, flat to the harmonic, then the bridge string saddle must be adjusted to move towards the nut, therefore shortening the string length between the bridge and the twelfth position, and sharpening the note. The same applies in reverse of course.

At varying positions on the fretboard, different harmonics to the fretted note can be obtained, predominately fifth intervals and octaves, at the easiest positions i.e. the 3rd, 5th, 7th, 9th and 12th positions.

Firstly tune the G string by matching the pitch of the harmonic at the 12th fret, which is G an octave above the open string, to a tuning fork, or a piano note, or any electric keyboard.

The note to which you are tuning must be straight, and pure, and unaffected by any deviation such as vibrato, or a "Leslie" effect. This is to allow you to hear the "vibrations" that are set up between the two notes, as they "come together" tuning wise. By using the G harmonic and a G on a piano keyboard of the same octave pitch, it's possible, if you are already near to the correct tuning, to slow down the pulse of the vibrations to a point where they appear to come together and stop intervibrating, this means they are closely in tune.

This same method can be applied to the other three strings, but in my opinion, only as a guide, because you are then dependent on whether the instrument you are tuning to, is perfectly in tune with itself.

To finely tune the bass, I prefer to start with the G string, as explained above, the then "vibration tune" the D string to it thus:- Hit the harmonic at the seventh fret postiion on the G string, and the note produced is a

Jim Rodford is a versatile and experienced bass man. His professional career started with the Mike Cotton Sound, and progressed through Argent to Pheonix. He has recently joined the Kinks as their regular bassist.

continued on page 144

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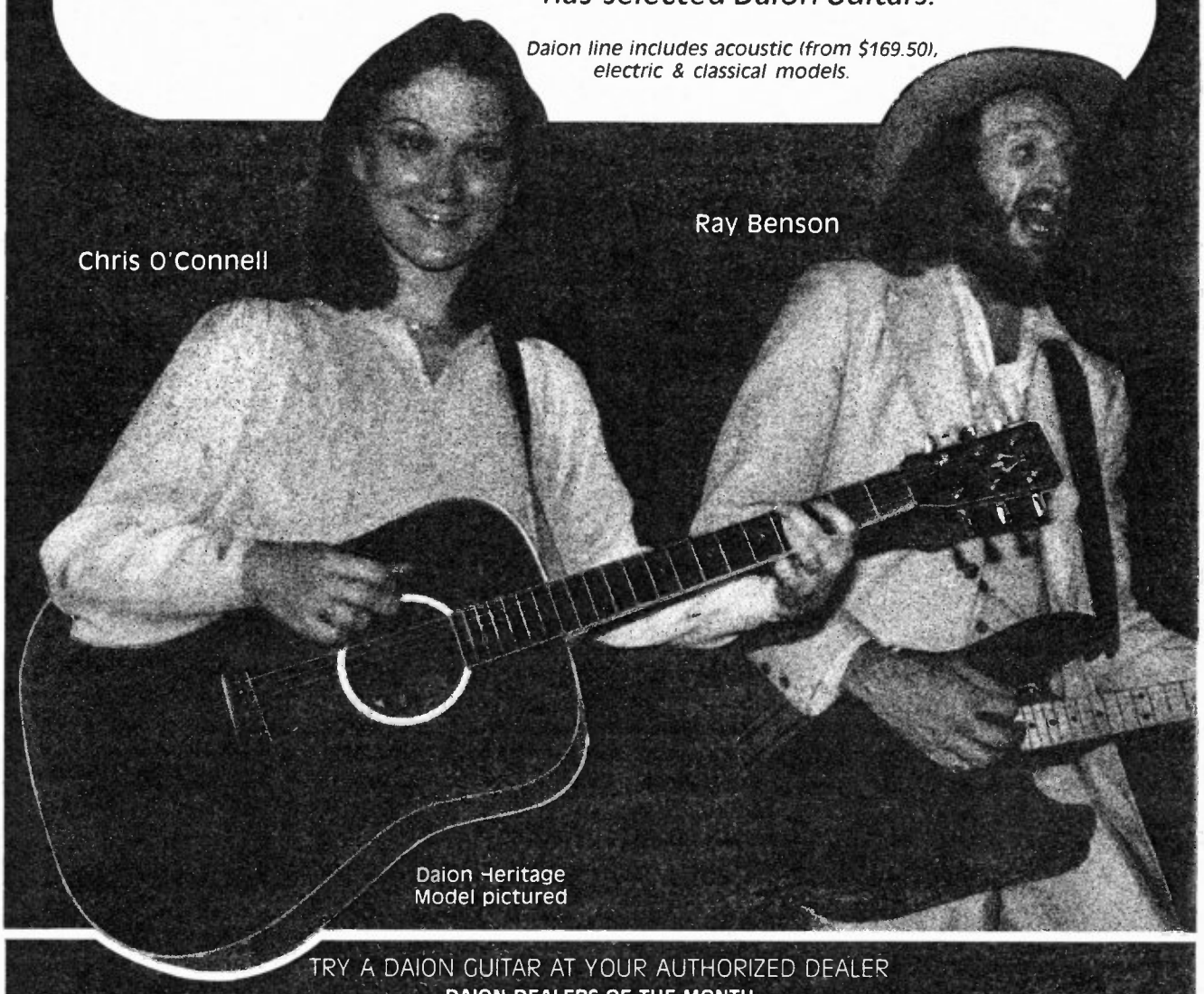

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On Sax and Flute:

Alan Holmes

We dealt with the concept of pressurizing the air column while stopping the reed from vibrating with the tongue in an earlier part of this series which is tracing the physical processes involved in sax playing. We now come to what happens when we remove the tongue which is touching with its tip, the tip of the reed for about a quarter of an inch of the reed's length.

The way in which we start the note and the force of the sound at the very beginning of the note is called the attack, and the degree of explosiveness is determined by the way we remove the tongue. The replacement of the tongue and the degree of force also shapes the end of the note. The tongue is moving only a very short distance and while the note is sounding, it's only about an eighth of an inch away from the reed and so moves through a very small amount in order to move rapidly in fast staccato passages. A note may also be terminated, particularly at the end of a section, by stopping the air supply to it or letting it die away. The use of varying degrees of suddeness in starting and stopping the note gives great variety of expression.

It is very important that the tongue moves without disturbing the embouchure and thus changing the pitch and tone of the note. The lips remain firmly set to control the reed while the tongue operates like a switch, regulating the length of the notes while the air pressure remains constant at all times. The tip of the tongue must also move independently from the back which is controled by the throat and affects the size of the mouth cavity the reed is resonating in.

You can check this by looking in a mirror while saying TA TA TA and making sure that only the tip moves and not the back or the adams apple. The degree of attack may be split into three main syllables:— The very short and percussive 'T' attack which is either 'Tu' or 'Tut' if another note follows rapidly, and is almost a spitting effect. The medium attack 'Du' or 'Dud'. The slight attack 'Lu' or 'Lul', which is a very light touch only.

The start of one note can also be the end of the another and so we get 'Dut' or 'Doot', where a medium attack is followed by a hard attack, or 'Tud' where a hard attack is followed by a medium attack. The phrasing of jazz sax ensemble writing often results in a passage going 'Tu, Du, Du, Dudut. Dudududu Tudut.' The 'T' sound is written as a dot or hat $\hat{\ }$ and the Du by a line $\overset{\frown}{\cdot}$ over the notes and gives the sort of sax section phrasing typical of Count Basie's band and many others too, when used in combination with the slur and tied notes and the sideways push accent

Rapid staccato playing demands complete synchronisa-

continued on page 144

Alan Holmes is a top British session reedman who plays soprano, alto and tenor saxes, flute and alto flute, piccolo, oboe, clarinet and cor anglais. He played on the Beatles' Sgt. Pepper album and for four years he was a member of the Kinks. He now leads his own jazz-rock group.

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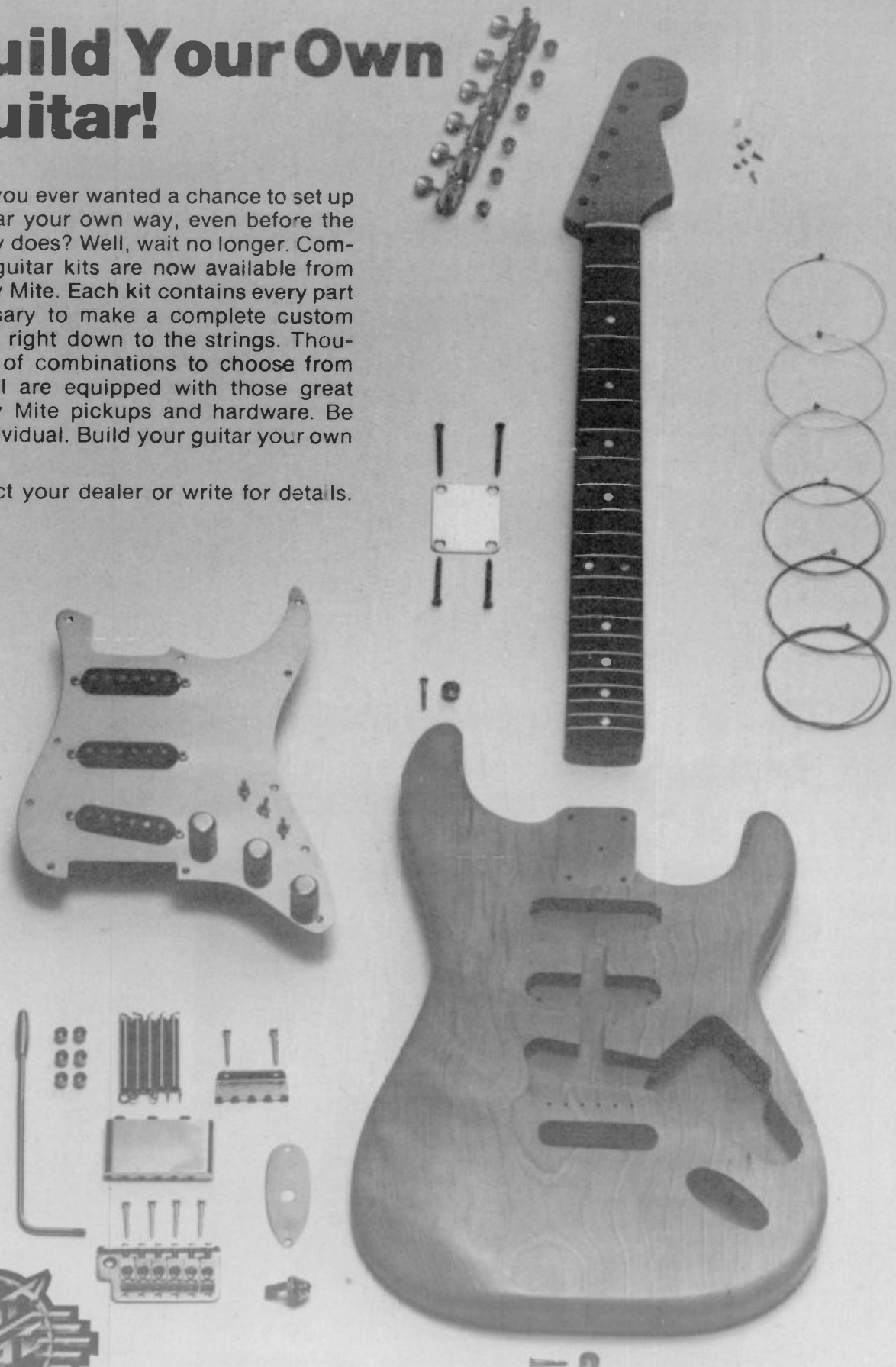

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DAVID GRISMAN'S DAWGOLOGY

by Steve Weitzman

David Grisman is what you'd call a *serious* mandolin player. Not only has he devoted over 18 years of study to the instrument, but he publishes and writes articles for an esoteric magazine called the *Mandolin World News* out of his home town in Northern California.

In one of the more recent issues, Grisman, 34, did a cover interview with Frank Wakefield, one of his major influences and a genuine mandolin pioneer. Although touring and recording have been keeping him busier than ever before, he likes the idea of having his own magazine and doesn't plan on packing it away just yet.

"I'm trying to get 'em to put me on the cover," he laughs. "I don't want to have to throw my weight around." Shouldn't be too difficult to justify because, if Bill Monroe and Frank Wakefield were the seminal players of the instrument, David Grisman is certainly the most innovative mandolin player today.

Grisman's style – crossing bluegrass and jazz with a keen empathy for ethnic music (Greek, Indian, Hebrew, Mexican) as well as traditional classical – has come sharply into focus in the last three years with the release of two albums in particular and a newly formed quintet currently on tour. His all acoustic band (guitar, bass, violin, two mandolins) has been putting on such killer shows on the theater and club circuit, that Grisman's approach has been garnering more and more interest lately.

"People ask me if there's a trend back to acoustic music," he says. "Well, I'm not the guy to ask because I never left."

This isn't the first time David Grisman was thought to be leading the masses to a new musical wonderland. One of his earliest groups, the Even Dozen Jugband, brought some of the same responses. "Elektra thought jugband music was going to be the next big thing," Grisman laughs. "There were a lot of interesting people in that band," he adds, "John Sebastian, Maria D'Amato (Muldaur), Steve Katz, Stefan Grossman. That album is still in print on Everest Records. It's called *Folksongs From the Southern Mountains.* It's the first record I was ever on, in fact."

Grisman was born in New Jersey and spent most of his growing years in Passaic. Although piano was his first instrument, he became infatuated with the folk music of the early '60's. After hearing Ralph Rinzler play mandolin with the Greenbriar Boys, Grisman found the instrument he knew he'd stay with. His first mandolin was a $16 Kay model but he soon traded up. "I bought a mandolin in 1964," he remembers, "a 1924 Lloyd Loar Gibson F-5 for $550. Three months ago, I re-bought the same mandolin – because I'd sold it eight years ago. It just turned up again and I had to pay $5500 for it!"

While still in high school, Grisman periodically hit the road in search of music. "I used to make pilgrimages to Wheeling, West Virginia to play with some hillbillies – Red Allen and the Kentuckians – and I also commuted to the D.C. area to hear real bluegrass. On one trip I went to hear Red Allen and Frank Wakefield. I met those guys and Frank sort of took me under his wing and showed me a lot of stuff."

He learned quick. Grisman joined the New York Ramblers who proceeded to win the prestigious Union Grove Fiddlers' Contest in 1964. He has since led a number of highly acclaimed groups including Old And In The Way which he formed with Jerry Garcia and Vassar Clements, and Muleskinner with the late Clarence White. He has also been a much in-demand session player, having guested on more than 45 albums for artists such as Linda Ronstadt, James Taylor, Bonnie Raitt and others.

Grisman, however, has always had special ideas for his own compositions. "I've been writing mandolin tunes all along," he notes, "and after I got bored with Old And In The Way, I fell in with Richard Greene (Muleskinner's fiddle player) and we put a band together with an insturmental format

and called it the Great American Music Band."

After nine months, Greene joined Loggins & Messina for the big bucks and Grisman "was left with a concept." He found bassist Todd Phillips, pulled Mike Marshall out of a mandolin class he was teaching ("he was my best student"), Marshall brought along violinist Darol Anger, and after playing a tape for guitarist extraordinaire Tony Rice, who said, "I would give my left nut to play this music," the David Grisman Quintet was born in early 1975.

In 1976 they recorded an album for Kaleidescope Records which is the musical roots of the band and includes some outstanding instrumental work and highly original writing. Titled simply, *The David Grisman Band*, they started calling their hybrid form of blue grass/jazz, "Dawg Music," for want of something better. Tony LiPuma, president of Horizon Records which is distributed by A&M, heard Grisman's music and signed him. "They couldn't ignore the fact that I had a band that was selling out the Great American Music Hall in San Francisco and the record had sold 70,000 copies," Grisman states.

Talking about the fusion of styles that can be heard on both the *Kaleidescope* album and *Hot Dawg*, released this year by Horizon, Grisman offers, "There's a lot of improvisation in bluegrass but there are definite guidelines. Bluegrass only allows certain kinds of chords and certain kinds of rhythms. Jazz opens all that up."

With his interest in jazz, it was only fitting that Grisman meet French violinist Stefan Grappelli while they were both working on the soundtrack for the film, "King Of The Gypsies." It also happened to be while Grisman was trying to finish recording *Hot Dawg*. "There were a few tracks I was unsatisfied with and I figured, 'Why not?' Stefan was in town so I asked him."

Grappelli wound up sitting in on one of his own compositions – "Minor Swing," which he had written in the early Fifties with Django Reinhardt. As for the final version on Grisman's album, "It's my own arrangement of it though," he says. Stefan sitting in on his own song had to be amusing, I suggest . . .

"It was," Grisman smiles. "When I first said I wanted to record "Minor Swing" naturally he starts playing his old version of it (laughs) which is in another key and is different. But he dug it. He's a great guy. He'll resist, though. He'll say, 'Ahh, eets eempossible.' But he'll do it. I laid another tune on him which we didn't put on this record and he said, 'Dees ees grass music.' It's funny. He doesn't know how to play in three chords."

David Grisman's playing sometimes is reminiscent of Grappelli's old cohort, guitarist Django Reinhardt, especially the sound Django gets in the upper register on tunes like "How High The Moon," which he recorded in 1947 with Grappelli. Reinhardt's guitar almost sounds like a mandolin on certain tracks.

"It's funny," Grisman agrees. "When I played a couple of gigs in England with Stefan and George Shearing – it was Stefan's 70th anniversary concerts – George Shearing said to me, 'We all miss Django but it's good to hear you play.' I think I have a rhythmic, syncopated way of playing and so did Django. I don't really play his notes or anything."

I wonder what Django would think of David Grisman's band. Grisman is quick. "He'd probably be in it," he laughs. "Or I in his."

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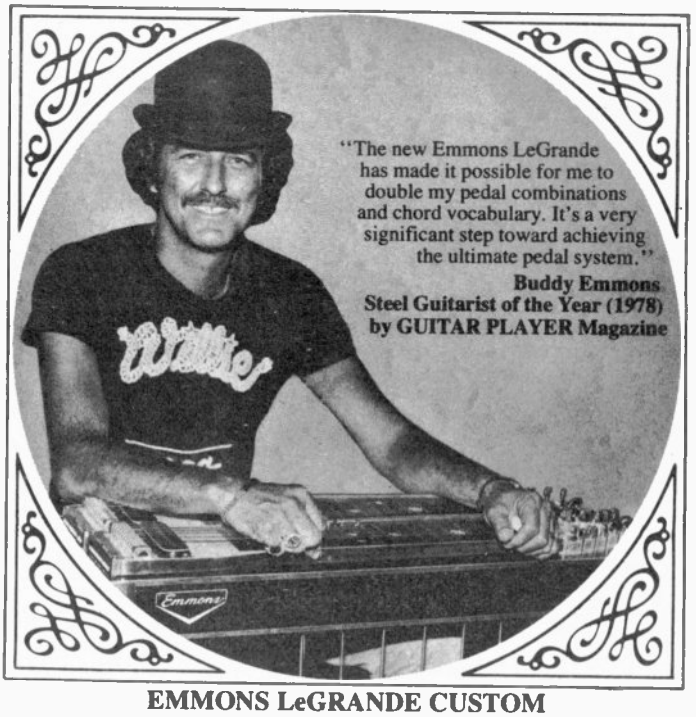

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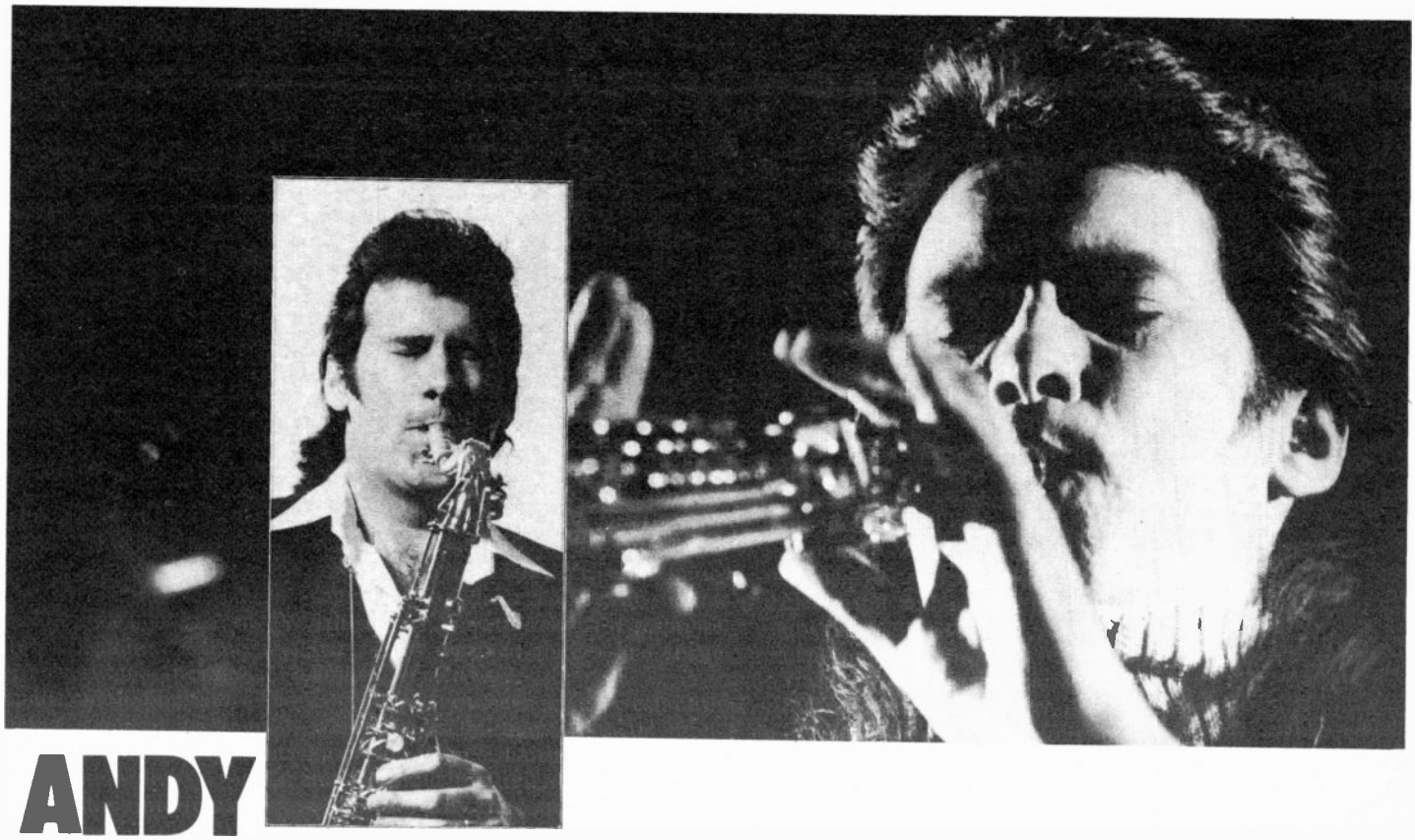

ANDY MACKAY

IN SEARCH OF ANY RIFF

After the break up of Roxy Music, one of the the most innovative bands of the Seventies, much of the spotlight was focused on Bryan Ferry. Yet in terms of sheer work and versatility, it could could be argued that sax player Andy Mackay stole the honors during the period of Roxy's retirement.

BY
DAVID LAWRENSON

The resurgence of the band this year, with a hit album and sell-out European and U.S. tours, served to reinforce this theory. Andy's playing was one of the highlights of Roxy's live performances, which showed that despite the inactivity of the band and his subsequent musical diversification, he could still cut it on stage.

It was in 1975 that Andy released his first solo album, *In Search Of Eddie Riff*, which showed his potential outside the Roxy framework. During the ensuing four years he wrote and produced two albums of music for a British television series called "Rock Follies," the first of which reached number one in the UK charts, and a subsequent single made the Top Ten. In addition he composed the themes for several other British television series.

His musical development continued with the release of his second solo album, *Resolving Contradictions*, toward the end of last year. This proved one of the most interesting releases of the last 12 months because it contains heavy Eastern influences which reflected Andy's visit to China and interest in oriental culture.

Rock music thrives on innovation and experimentation, although few musicians seem to be prepared to really strike out and try something radical – which is what rock is all about. The work of David Bowie immediately springs to mind, his residence in Germany has had considerable influence on his music over the last couple of years, and Andy Mackay's recent album reflects a similar kind of influence.

A country such as China, with such a large population and long history, but which largely remains a mystery to Western eyes, has obvious fascinations. Many rock musicians have expressed interest in performing there as in other largely inaccessible Communist states, but Andy is one of the few who has actually gained first-hand experience.

So what effect would such a visit have on a rock musician making an album? Andy said: "The main influence of the visit to China was that it gave me a kind of focus for a lot of ideas I had anyway. I was intending to do a solo album, and had done a deal with Bronze Records in the UK to do specifically solo albums. I'd gotten the material together and, just by instinct, I'd decided to wait until I went to China. I felt that it probably was going to give me some ideas.

"I was also interested in picking up some new musical ideas purely in terms of sound, instruments, the way they are used, etc. and, as it happened, that's really the way it turned out. Although I would have done an album which would have been similar in some places, the total album, the way that it actually sounds, is a result of the Chinese experience."

Although Andy's visit was not one particularly designed for musicians, he did gain some insight into Chinese music and the people who play it.

"China has always interested me, as I think it would interest everyone, it is such a fascinating, intriguing place," he said. "The trip we were on

was a cultural exchange which wasn't particularly designed for musicians, so I just had to try as best as I could to hear music.

"I did get to hear quite a lot, but I didn't meet many musicians to talk to, which was the only thing that disappointed me. Maybe the musicians, like musicians everywhere, are a little bit on the wrong end of being non-conformist and it would have been a little bit too much. From what I had seen of musicians in the theater bands, I suddenly thought, 'Hey, these guys look pretty much like musicians anywhere'; quite cool, very professional, even the way they dressed. Most people's dress is conformist in China, and I just noticed that musicians I had seen were wearing things like crew-neck sweaters, which would be very hip in Chinese terms. Its great, I hope that musicians all over the world are still the ravers of society."

The music of China is also quite varied, according to Andy. This ranges from the traditional tunes and folk songs through to the revolutionary operas which were performed during the cultural revolution of the Sixties but are now considered out of favor. The amount of Western music which has filtered through to the country is very limited.

"At the moment, the Western music they're into most is classical, Mozart, Beethoven, etc. Rock music is still quite a long way off, they've never heard of the Beatles or Elvis Presley. I played them a few Rossini overtures, Country and Western, Rock & Roll, but by and large they liked Rossini best, they're not quite ready for the rest yet.

"There is a lot of music in China, you hear it all the time in public places where they have loudspeaker systems. They sell records, 45s on rough, crappy plastic and they are so cheap, cheaper than newspapers – LPs are more expensive but freely available.

"Every city has a music shop that sells records and sheet music and an instruments shop at the center. A lot of people play instruments there and I had great fun going out and buying stuff. Huge crowds would gather outside the shops I went into because I used to try the instruments out and they would gather round to see what was happening."

The current popular Chinese music is a mixture of strange orchestral music played on traditional instruments, although they do use French horns, trumpets, oboes and violins and specialize in grandiose arrangements. Andy explained the technical differences between this and Western music: "The thing about Chinese music, in technical terms, from what we do is that it essentially deals with one melodic line and harmonies are not very important.

"If you listen to a Chinese piece, the thing that makes it sound Chinese, apart from a certain amount of ornamentation, is that they double the melody line several octaves. They would probably have a flute on top, Chinese fiddle in the middle and, maybe an octave lower, a cello or viola type thing with only a very light bass line and no harmony as such. They would then punctuate that with percussion, which is not used to keep the beat going all the way. The modern music uses more harmony, but it's still not important. Strong melody lines are the things that come across and that is harder to relate to Western music because we tend to hear things in harmonic terms."

He is anxious to organize another trip to China, which this time, hopefully, will be made up of musicians and people interested in music. He then believes it would be possible to ask to see recording studios, meet musicians, visit music schools and perhaps find out if they have any electronic instruments. Andy would also like to perform there, but he feels that this is something which will take time.

The album, which marries Eastern and Western musical styles, contains several haunting Chinese melodies, which are quite unlike anything you may expect to hear on a rock record, and the whole thing works remarkably well. This is a tribute to the sheer professionalism of Andy Mackay, a musician who is not content to stay in one particular music area, but is prepared to spread his talents.

It is this talent and the constant desire for challenges which led Andy into the world of writing music for television. His first big venture was the Rock Follies series, which met with mixed critical reviews. Any kind of drama concerning rock music is usually viewed with much scepticism by the music business. Rock Follies was treading on even more dangerous ground by being satirical about the whole music business, and the general feeling seemed to be that you either loved it or hated it. However, as televisoin entertainment it proved a winner, as did the music.

Writing for the series involved a whole new way of working which Andy explained: 'It was such a different situation. In Rock Follies , for the first time, I was presented with finished lyrics and then had to write a melody line. I had to work very closely with Howard Shulman, who wrote Rock Follies as well as the lyrics. Instead of trying out ideas with a group, I was given the lyrics and the script and told what was needed. There was also a lot of pastiche, which was obviously something different.

"There was a Musical Director situation, where I was responsible for the music and also for spending a not very large budget on the music – I had to stick within it, which was one of the biggest differences. With a Roxy album, although nobody wants to waste money, we never thought about what they cost. You go into a studio and just go on until you finish it. Then, about a year later, you'd be going through your accounts and say, 'Christ, is that what we spent?' At the time we didn't think about it.

"With Follies, the producer would phone me up and say, 'Look I'm worried about this music, the last session was $ 4 more than we expected!' Although he was very sympathetic, he didn't have any more money, he had that much to do the music with, and you just had to work within it. Obviously it's a drag, but at the same time if you want to do a television program, you work in those limitations.

"The main difference was not in the music, but the fact that I was in a working situation which was much closer to the theater. Things like sitting in a ▶▶

cold rehearsal room at 9 o'clock in the morning with an out-of-tune piano. All those things are very different from the spirit of rock, but it's fun. Musically, I did what I always do. I don't know what tunes I'm going to write next week or tomorrow. I was presented with the challenge of trying to create a musical style for a hypothetical group – The Little Ladies. One of the ways I tried to keep it real was to use the same musicians; they were all session musicians but I used the same ones all the time and actually created a group.

"I also, against the advice of a lot of people, used the girls doing their own singing, I didn't use back-up singers to do their singing for them because I wanted it to sound like they were a real group. A lot of people who attack Rock Follies maybe never considered that particular aspect of it. It was a real group to all intents and purposes. We're now going to do a movie of Rock Follies for next year, and Howard and I are involved in the music."

Working in television helped destroy a few myths and put right a few misconceptions that Andy believes many people have of the media.

"One of the things about television is that you have to live with your mistakes. Everyone gets television wrong, they think it's a lavish area to work in, rock musicians especially say that, but I think they are on the wrong end of the stick. Rock music is the self-indulgent end of the music business, that's where people actually take all the time in the world, which may not be worth the amount of time and money spent on it.

"Television is where you're working against the clock and against the budget. If you want to do it you accept those conditions, I accept them and I think you have got to try and supercede those limitations.

"We used to work on a two-week turnaround for an episode. We'd rehearse it in a rehearsal room for a week and two or three days. Then we'd go into a studio and video-tape it for two days and the music had to be squeezed in somewhere. We'd go in and pre-record the backing tracks at some stage during those two weeks. We were right up against the wall the whole time and I was trying to write songs at the same time. I write some of my best things under that kind of pressure and also let some things go that are maybe my worst things, but that's something I accepted when I took the job on. I think that, out of the 50-odd songs I wrote for Rock Follies, I would say there were three four songs that are the best I've ever written.

His involvement with Rock Follies led directly to other television work, notably composing the theme tunes for television series. Once again, this led Andy into another area of music, requiring a different discipline and bringing with it different problems.

Although a lucrative area to work in, writing music for television seems to be a kind of "closed shop" involving just a few musicians. Andy said, "People in TV, by and large, work very hard and put in very long hours and they spend nearly all of their time in TV studios, offices etc. They don't know many musicians, although a lot of them are rock fans. You'll find the same names do crop up pretty often like Mike Batt, Manfred Mann, Harry Rabinowitz and Lynsey De Paul. They are all good, professional people, and it is a tricky job.

Before I did anything, I read the scripts and spoke to the producers to find out exactly what they wanted and tried to write music to fit in with the programs. That's what I really like and that's how I see my role.

"It's funny because it is a lot shorter than a single, you tend to forget that in television you work to within a few seconds. I mean on one program the opening titles were only 28 seconds an the closing titles were either one minute, 12 seconds or one minute, 40 seconds, depending on whether it was a long or short cast. So we did different versions and it had to be that long, I just played things through on the piano until we got one exactly the right length. A lot of people would see that as a compromise, I suppose that's just a personal decision. I'm proud of trying to do something which fits the situation it is required for."

Although Andy writes much of his material on piano, his early formal musical training enables him to write down his music straight onto manuscript paper. This is particularly useful because many of his ideas for tunes come while he is traveling, so he usually carries a notebook around to jot down ideas.

Coinciding with the completion of his solo album was the Roxy Music reunion. Andy said, "We got together to check out whether it was going to work and it did, so we then extended things to carry on and do an album".

Andy has been working on a new system of ampliflying his instruments and using effects. His basic equipment consists of a Selmer Mark VI sax, Selmer mouthpieces and Rico reeds. The oboes and cor anglais he uses are all French-made. In fact, he used to make his own oboe reeds.

In common with all horn and reed players, Andy has experienced problems with miking up his equipment on stage and using effects. He said, "I'm still disappointed that sax and wind instruments in general haven't been developed with the same enthusiasm as, say, the electric guitar. Even the best players tend to be fairly straight, they play through a mike and don't do much to it.

"Before I go on stage again, I should have a whole new set-up which I've been working on for a long time and it includes a whole lot of pedals and effects. I've been trying to get things built, because no one makes units for sax. They are usually made for guitar and what you have to do is convert them. I'm working on a complete set-up which will include echo unit, pedal board, a studio monitor on stage and a small mixer EQ'd for various signals. Also, I want to start using a radio mike on stage. I hate having to stand by a microphone, while bugs and things always involve huge lumps of wires and I used to keep tripping up and pulling them out."

This constant search for improvement and innovation is a feature of Andy Mackay's work which makes him a truly modern, professional musician. His willingness to explore new musical directions mark him as one of the most versatile and accomplished musicians of the Seventies – with the promise of much more to come.

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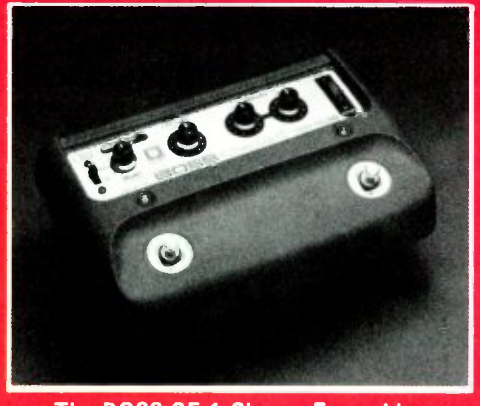

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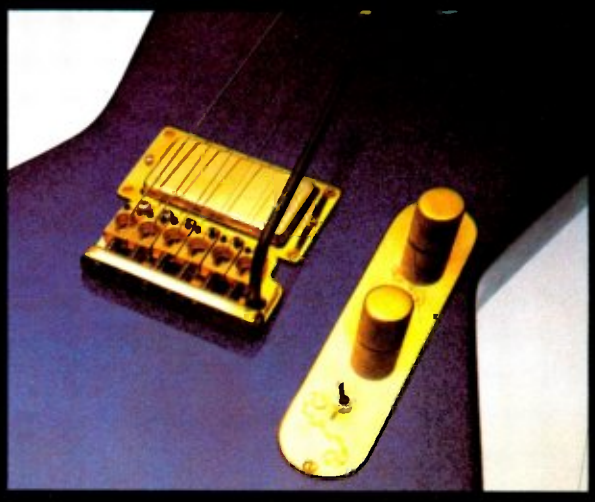

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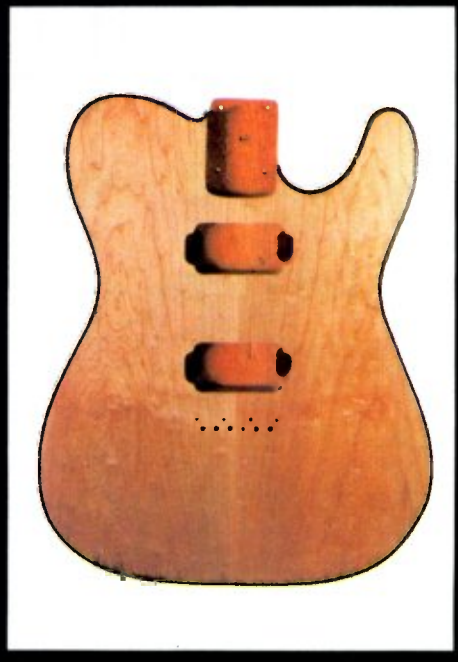

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INPUT CHANNELS The 16 input channels each accept balanced or unbalanced inputs in the range -60dBm to +15dBm. Input impedance is greater than 5k ohms (optimum source impedance is 200 ohms).
The equaliser provides ±16dB at 10kHz, ±16dB at 400Hz to 8kHz (continuously variable), ±16dB at 30Hz to 300Hz, continuously variable.
There are separate level controls for sends to **Foldback** (prefade) and Echo 1 and 2 (postfade). Routing to the 8 output groups is selected via four push button switches, each one selecting left and right sides of the panpot to a pair of outputs. A fifth push button selects that channel **prelude to the PFM bus**. This allows the signal to the channel to be read on meter 8, and to be listened to 'solo' on the monitoring system.

OUTPUTS The eight output groups, as selected from the individual channel routing, represents the eight sends to the eight track tape recorder. Each group has it own fader, followed by a line amp with 10dB gain feeding the line out sockets on the back panel of the desk. The other outputs are the two Echo (effects) sends. The Foldback send (which may be used to drive a power amp or up to 10 pairs of 600 ohm phones directly). And the Monitor (loudspeaker) sends (to drive external power amps or 1 pair of 600 ohm phones).

MONITERING A stereo loudspeaker mix is derived from the eight monitor channels situated directly above the group output faders. Each channel may be selected to monitor either the group line out or the sync/playback return from the tape recorder (the signal presented at the line in sockets at the back panel). The meters follow this selection. A Foldback signal may also be derived from each monitor channel. These facilities allow the loudspeaker mix and the Foldback mix to be derived from either tracks being recorded or tracks already on tape. The loudspeakers may also be selected to be fed from the PFM system for channel checking. In this mode, meter 8 is switched to read the level in the PFM out and from that level in the individual channels.

TRACK STATUS SWITCHES These switches have two positions - (a) Record, in which the desk operates as previously described. (b) Remix, when the playback returns from the 8 track recorder are re-routed through mic channels 1-8. **Outputs** 1 and 2 are converted to remix groups and are sent to the two track (stereo) line outputs on the back panel. A stereo tape recorder may be left connected to these outputs in order to record the final re-mixed stereo program.

AUXILLARY FUNCTIONS 1. Echo Returns. These may be panned across consecutive odd and even numbered pairs of output groups or the monitors. 2. Oscillator. When activated, the oscillator output is sent to all output groups for lining up purposes. The signal is a 1kHz low distortion sinewave. 3. Talkback. A back panel female socket (XLR) is provided to accept a low impedance mic which, along with a volume control and a conveniently placed button, allows the studiobman to talk to Foldback.

LEVELS The 16/8 operates basically, at the studio line level of a +4dBm (about 1.2v). Certain facilities have been included to allow it to operate successfully, at other levels (i.e. 0dBm or 10dBm).

CONNECTIONS Mic inputs are D3F (female XLR) type, wired 1. Earth, 2. In Phase, 3. Out phase. line inputs are mono jack sockets, line outputs are mono jack sockets, echo send and returns are mono jack sockets, foldback sends are stereo jack sockets for direct headphone connection, or D3M (male XLR) wired 1. Earth, 2. Signal for connection to a power amp or headphone distribution system, monitor outputs are via two D3M's wired 1. Earth, 2. Signal for connection to a stereo power amp, and a stereo jack socket for direct monitoring on 600 ohms, by the studiomaster, talkback input is D3F wired 1. Earth, 2. Signal, power input is via a multipin connector and requires a positive and negative supply of 15 volts (each capable of supplying at least 750mA) and an earth connection.

EXTERNAL POWER SUPPLY The power requirements of the mixer are supplied by an external power supply, in order to avoid the possibility of induced hum from an internal transformer. The unit supplied with the 16/8 will produce in excess of 1500mA and twice will support a number of additional input channels.

SPECIFICATIONS Inputs - Maximum gain +60dB, minimum gain 15dB, headroom +20dBm, input impedance greater than 5k ohms, optimum source impedance 200 ohms. Equalisation - Treble ±16dB at 10kHz, mid ±16dB at 400Hz to 8kHz (continuously variable), bass ±16dB at 30 to 300Hz (continuously variable). **Outputs** - Gain after fader +10dB, output impedance less than 10 ohms, minimum impedance 600 ohms (except Foldback - 8 ohms), maximum output level +20dBm. Meters - 0 VU = +4dBm. Line inputs - Preset to level of +4dBm, will accept down to -10dBm. The following applies from a mic output to a line output with eq flat - 1kHz distortion (THD) at +4dBm less than 0.15%, 1kHz THD at +20dBm less than 0.15%, maximum gain through mixer +70dB, maximum input level before clipping +25dB, equivalent input noise (200 ohms input register, 16.7kHz 6dB act filter giving 20kHz effective noise bandwidth) less than -125dBm. Signal to noise ratio, line output faders down 90dB. Line output fader normal, channel faders down 88dB. One mic channel at 40dB gain 64dB, four mic channels at 40dB gain 80dB, sixteen mic channels at 40dB gain 72dB.

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CHEAP TRICK'S RICK NIELSEN

I never wanted to be like anybody else

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"Hello . . . John?"

(Editorial Relief) "Yes!"

"This is Rick Nielsen. Geez, I'm sorry to be calling so late but our schedule is all screwed up today."

"That's OK. I know how it is on the road."

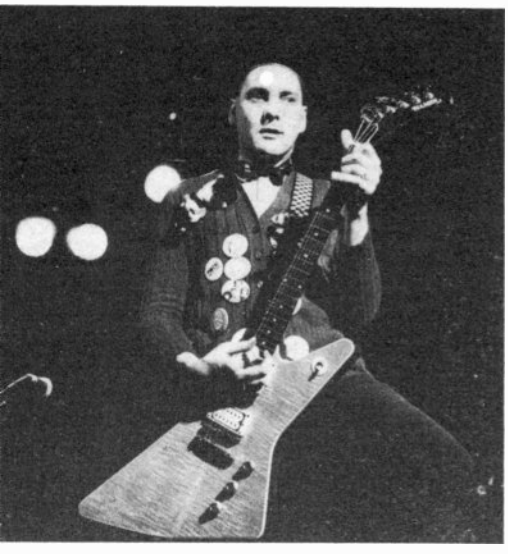
"Swell, but I'll only be able to give ya' 15 minutes. Let's go."

Gulp.

Like other great rock & roll songwriters, Rick Nielsen of Cheap Trick has mastered the art of "the set-up and the kill." Listening to the transcription of our conversation weeks later, I would discover that I was able to stretch the interview out to 45 minutes, largely due to Rick's natural enthusiasm for the subject of rock & roll and electric guitars, and that Nielsen crammed a lot of information into what initially seemed to be a casual telephonic aside. Time and motion. Economy of action. "Practicality." This is what Rick Nielsen and Cheap Trick are about.

Nielsen has a firm grasp of the rock & roll particulars, A keen intelligence that moves as fast as his stuttering guitar; compiling data, sifting through it, eventually tossing out what is bogus or a waste of time. He knows how to concentrate and he knows his audience – whatever the time or place. For *our* conversation, his principal concern was to relate the specifics of his extensive guitar collection (between 83 and 85 instruments as of June '79) and related equipment, knowing that *IM&RW* readers were undoubtedly hungering for this information. And, unlike Stephen Stills, his passionate accumulation of instruments is not just a manifestation of conspicuous consumption in the grand American tradition. He actually locates rare instruments for colleagues like Elliot Easton and Dave Edmunds. In fact, his comments on Edmunds' instrumentation tells us much of his "loose" philosophical approach right off the bat.

"Yeah, I'm helpin' him get a guitar – got one for him right now as a matter of fact. A blond, dot inlay



(ES) 335. He's chicken to take it on the road. I told him he was nuts. We've been around the world twice in a year and a half, and I've never lost a guitar. I've gotten some weather checkin'. That's about the worst thing that's happened. Of course, I've got 'em insured to the hilt. I don't want to lose 'em, but we're realistic. Plus, what's the sense of hoarding guitars? Take 'em out and play 'em. Let people see 'em. At the Calderone (Theater in fabulous Hempstead, Long Island) there were probably five people who know what you know about guitars, but to those five it's *important.* That's why I told Edmunds to get rid of those ugly guitars he way playin'. He looked so great with those 335's and all of a sudden he's got a new Les Paul and I said, 'Come on Dave, get on the stick. Get *rid* of it!"

If you examine the preceding quote, you might notice a tell-tale phrase that reveals another facet of Nielsen's guitar policy, specifically "he looked so great with those 335's." Because he is subjected to so much guitar chat from day to day, Nielsen has cultivated and anti-collector's stance that has nothing to do with extended discussions of wood grain, active electronics or other such dreary guitar palaver. His now famous line from a *Rolling Stone* piece, "I can make any guitar sound crummy," prepared us for this, and he was only to glad to elaborate on the subject.

(Referring to several left-handed vintage Fender Strats he uses onstage) "I use a lefty because I found a girl that likes it. Who cares what it *sounds* like. If the girls like it, GET IT! I'm not tryin' to impress any guitar players. Forget that. Who cares about the dumb equipment unless the girls like it."

This attitude, overstated a bit for effect, reflects the pure rock & roll spirit at the core of Rick Nielsen and Cheap Trick's art. His (and their) best songs "Surrender," "I Want You To Want Me," "Big Eyes," "On Top Of The World," "Southern Girls" – feature hard edges, stripped down rhythms, taut guitar hooks, infectious choruses and wry, even flip, lyrics: all the basics of great rock & roll music. And even when he "misses," – "Auf Wiedersehen," "On The Radio" – the root components are strong enough to make the song passable. The physical chemistry of Nielsen, drummer Bun E. Carlos, lead singer Robin Zander and bassist extraordinaire Tom Petersson may be a miracle of circumstance, but Nielsen's obsession with transcendant rock & roll is anything but accidental. And although he shares writing duties with Peterson on several tunes ("You're All Talk," "How Are You," "Southern Girls") and the band is credited for a few others. Rick is still the fountainhead of material for Cheap Trick. Their newest studio LP, *Dream Police,* is supposedly a little less Nielsen-oriented. I asked him if he was still responsible for most of the new Cheap Trick tunes.

"Yeah, pretty much. But everybody's involved for sure. Which is good. It doesn't make it so ridiculous for me. The band doesn't say 'OK Rick, go to it!' Robin wrote one with me and Tom and I wrote a couple. We all have credits on one of the tunes."

Was the band sticking with the same producer (Epic's Tom Werman) on *Dream Police?*

"Yeah, it's produced by Werman . . . with US. We seem to be getting more of a hand in what's going on. Just because we're spending an extra 20 or 30 minutes on the album. Before, we used to do the album in three weeks. Now, we do the albums in three weeks and 20 minutes."

These guys don't waste much time in the studio. Mainly because it's in their nature to *get on with it,* but also because they are on the road over 200 nights a year. Their brilliant manager, Ken Adamany (and *they*) understands that rock platinum star-time burns hot and brief and that Cheap Trick has to be *out there,* burning up America's concert halls to follow up on and consolidate the dazzling gains of *Live At Budokan,* the album they were "forced" to release which steered them right to the top of the charts. As Tom Peterson pointed out in an interview with Sean Hogben in *IM&RW's* International Edition, hard work does not scare Cheap Trick.

"We like to play, even if at this point we *have* to do it. We won't just sit around, there's no reason for it. We're in a position where we can play a lot and we do it. It's good for us. We used to work 300 nights a year in clubs when we first played together. We kept working like that until our first album was released. We kept playing but the only reason why we didn't play 300 nights anymore was because we had to take time off to record."

This laudable adherence to the work ethic could get real boring with a lot of bands, but Nielsen's puckish sense of humor and stage demeanor (Huntz Hall via Pete Townshend with a thread of Pinky Lee and Ralston Purina running through it) lightens things considerably. First-time Cheap Trick viewers can make the fatal boo-boo of assuming Nielsen's on-stage persona is simply another "pose." If anything, it is an anti-pose.

"I never wanted to be – and I still don't – like anybody else. I conform because I don't want to get thrown out of hotels and restaurants. I do have table manners, I can speak English and I can converse on a couple of different subjects. But at the same time I don't want to be like everyone else. It's not like some big ACT I've got all worked out here. It's just the way I feel. I like to have energy in the way I play, but not every song needs it. I've seen a lot of groups who think they have to jump around in the middle of a song and they'll do it for no reason. Dumb. I use it to emphasize what I'm doin'. And as far as guitar players are concerned – it's an art in a way but at the same time some people try to make out that they're *really, really cool* (his voice slides down an octave), and that sort of gets to me. I think it's funny. Some of the guitar players – although they play real good – well, I just *have* to make fun of 'em. They go into throes of ecstasy using their strobo-tuner. Young kids see that and think, 'Gee, to hit a high E note you have to bend your mouth just like Frampton on the *Creem* poster! So I'm gonna start a guitar school where I just teach facial expressions to help you play better."

"Who cares about the dumb equipment unless the girls like it"

When prodded, Nielsen readily admits to Townshend as a stylistic influence, but he's probably the only one. Rick mentions that, back in his brief sojourn with the latter-day Yardbirds as a fill-in keyboardist, Jimmy Page used to come up to him and say, 'Hey Townshend.' But Nielsen prefers not to linger on the mechanics of guitar playing or songwriting. When asked about the pressure of coming up with somehing fresh within the fairly rigid strictures of hard rock, he virtually shrugs off the question.

"I don't worry about it so much. We are locked into the framework of the guitar/bass/drums/lead vocalist SYNDROME for live stuff, but on records we go by what the tune needs and I don't think there's any limit to what can happen with songs and how you do things. I like power chords, sure, but I also like sweet chords."

And what of this homogenous guitar collection? Due to the constraints of time imposed at the outset, we had to concentrate on the guitars Nielsen takes on the road with him.

"We carry around 30. A lot of Hamer 'Explorers', a 1959 ES-345, a Hamer 8-string mandocello, a lot of Strats – couple of lefties, couple of righties. I have one rosewood Strat but the rest of 'em have maple necks. I have two Les Pauls – a '58 Standard and a '59 Standard on stage and two 60's at home. A '58 (Flying) V. Let's see . . . the Hamers include a checkerboard Explorer type – the very first one made serial = 00000 – a checkerboard V with Explorer head that also has my beautiful face on it. Another Explorer with my face on it that I designed quite a while ago which is just now gettin' out on the road. I design all this stuff for him (Paul Hamer) and he implements them. It's the same thing with Tom and his basses. Tom initially designed 'em and let them go ahead with the designs – 8, 10 and 12-string. Patterned after a semi-acoustic. I've got a brand new Explorer with song titles from all our albums on the back of the neck and a bunch of newsprint on the front. You have to look real close. It's like good reading. One of the headlines says 'Rick Nielsen voted best guitarist' – another line says 'Rick Nielsen voted worst guitarist'. I enjoy the vintage stuff, but when I'm designing something new I try to put my personality into it."

A gentleman named Dave Wilmer takes care of Nielsen's guitars (Buddy Miller takes care of Robin's Rickenbacker guitars and Peterson's Hamer, Fender, Gibson, Rickenbacker, Alembic and Hagstrom basses). I wondered if Wilmer worked for the Hamer company since Rick uses so many of his guitars.

"Not at all. He's got nothing to do with 'em. Hamer gives me some good deals, but not *that* great. If you print that, maybe he'll give me a better deal. I met him in Philadelphia (Rick was working with Nazz) when I was so broke – talk about my guitar collection. I've got over 80 of 'em now but at the time ('72) I only had two guitars. I sold him a '58 Standard for 850 bucks because I was so broke I needed the money. You know what that's about. That brought it down to one – which was the first Les Paul I ever owned, a '55 Gold Top that I bought around '61."

Nielsen uses fairly heavy gauge "regular" Fender strings (.011, .012 E strings, generally) and a copy of the classic Fender medium pick which he propels into the audience in an amazing variety of ways. His "trashed" speaker cabinets look that way for a reason.

"I bought those in 1968 (English Sound City cabinets, no longer available) and that was done by the world's greatest guitar amp technician – my FOOT. Whenever a speaker screwed up, I'd repair it the way it would stop the buzzing. Knock it out. *Ram it!* I have five Marshall heads (with 50 watt switch for smaller venues) and don't use 'em all. My speakers are staggered – some of the sound comes out of on the left, some on the right. I also use six Fender 'Deluxes' (old & new) that we've had re-worked. They put on master volumes, real heavy-duty speakers, six-way tone switches and all kinds of in/out pots. It gets a buzzsaw sound without being unbelievably loud (Ed note. Everything is relative.) which is good for us because our sound mixer will blend the sounds before sending it out rather than having just one sound to work with."

This flood of technical info having been spilled, Nielsen started to get impatient ("Gee, I thought I was finished.") when asked about critical reactions to their albums. He sums up the whole ball of wax in typically rapid yet elliptical fashion.

"I'm not surprised by our success 'cause I always thought it was good. I was doing good stuff 10 years ago. Our first album didn't sell because people thought it was too raw. Then we toned it down (*In Color*), and then *Heaven Tonight* was more like the first one. *Budokan* sounded even more like the first one, and it became the most popular one. It's weird."

J.C. Costa

Drummers Addendum

The distinguished Bun E. Carlos uses old Slingerland "Radio Kings" circa 1952 and has an extensive collection of old drums from that era to match his world-renowned rock 'n' roll record collection.

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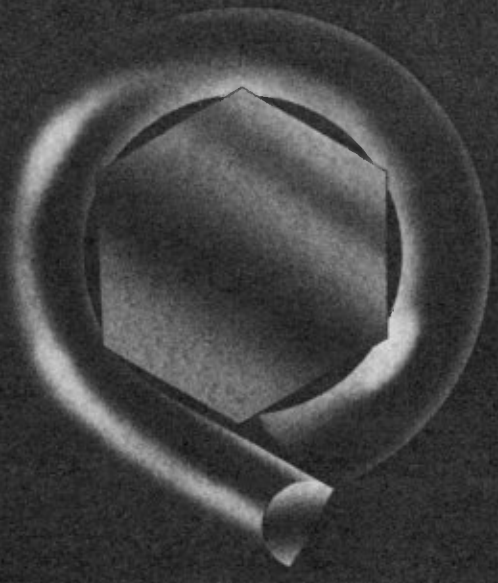

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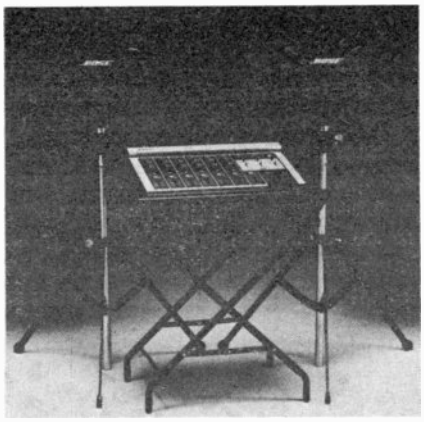

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JEFF BERLIN

"There's nobody in rock who plays like me"

By Bill Stephen

All right. Let's get right to it. After all, the first thing Jeff Berlin said in our telephone conversation was, "There's nobody who plays bass like me." A bit strong considering his lack of recognition, but then it wouldn't be the first time a great musician has gone unnoticed. But when he showed up at the *IM&RW* offices wearing a sheepish grin, he smiled at the obvious first question and said, "I can amend that."

What he really meant was: "There's nobody in 'rock' who plays like me, and there's maybe only one or two in jazz who play the way I do." How can he say that? Simply "because I know what's going on musically. I know what bass players strive for; I know how they think and what they try to do. And I know that the stuff I do is completely my own. Nobody does the thing on the instrument like I do it." Point made.

Oddly enough, it's easy to believe Jeff Berlin because as self-pronouncing as he sounds, he comes across unassuming and confident. He knows he's good and he believes in his ability; an ability that has developed through years of hard work and a type of unpopular "forced" learning that helped him establish what he feels is a distinctiveness among bass players.

Most young bass players probably face similar obstacles as those that Jeff had to either overcome or eventually come to terms with: the bass was not an instrument to solo on and the traditional viewpoint placed it in the rhythm section which implied stiff and definite parameters for the instrument.

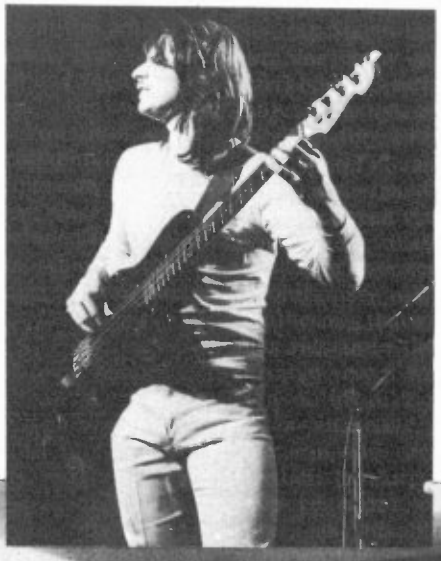
Berlin began his musical career early with a violin before quickly progressing to a double bass which he hauled around the Bar Mitzvah circuit in New York. The small combos he worked with quickly tired of his constant attempts to solo or to do intricate patterns within the framework of each piece. Consequently, none of the bands he worked with kept him on too long. But his ill-fated attempts sparked his interest in soloing and so he decided to switch over to electric bass.

Jeff was looking to solo on his instrument long before it became fashionable. The work of Jack Bruce – who Berlin thinks is the greatest rock bassist – and John Entwistle hadn't fully emerged and it was to be a long while before Stanley Clarke would bring the bass into prominence. But this didn't impede Jeff's desire, primarily because he viewed his instrument differently.

"I felt that if I was a piano player, I'd solo on the piano; or if I was a drummer, on the drums. But I got a bass because I figured I could learn to play it in no time – it's only got four strings."

Berlin was experimenting with his instrument without really knowing what he was trying to achieve because there was nobody really doing it at the time. "It (soloing) wasn't happening," he explained. "I didn't know what jazz was and I didn't have the foggiest notion what improvisation was. But I new Hendrix could do it, and I knew Clapton could, so I figured, although I was a bass player, maybe I could. I wanted to play sizzling feedback electric bass solos – none of the bands I ever played with liked the idea though."

In his first professional gig, a member of the pit orchestra for the



Broadway musical "The Me Nobody Knows," he began to find out what jazz and improvisation were all about from a jazz guitarist with the band. "I had no idea what he was doing. I didn't even know how to play the chords or what the names of them were. So he would sit me down and show me how to do it. After that, I went straight to Berklee where I played nothing but jazz."

Berklee, while proving important in the development of his formal training, became a hindrance to Jeff. Once again he was not content to follow the standard which required him to play classics like "Footprints" in the old "walking" school of bass playing. He lasted a year before ending up in New York playing with Tony Williams and Allan Holdsworth in a group which was to become the new "Lifetime." Jeff, however, thought that it wouldn't work out and decided to bow out before it really got off the ground.

"I didn't want to do a trio," he said. "I wanted a piano player or a fourth instrument. I could see that as good as everybody played, it wasn't going to sound really complete."

His refusal to join the trio, until his recent hook-up with the Bruford Band, set a precedent for most of his career as a wandering musician. "I've had a lot of offers," he explained, "but I never felt I was ready. I also was never under the impression that one band could completely satisfy me musically."

Part of his desire to retain his independence grew out of his ability as a good sideman. He feels that 99 out of 100 times he can walk in and join a band and make it really pop. When he realized he had the "chops" to do this was when he began to feel that he was a really good musician.

Berlin's feelings about music, and his tastes – he listens to operatic tenor arias (as a source of influence) – reveal the development of his technique, execution and outlook. Jeff refers back to his one-of-a-kind bass playing as a method of being totally in "command of the literature. It's being in command of the music as it is presented. This results in an ability to go through changes; I mean chord changes, melodic changes, in a comfortable, musical kind of fashion. The idea is the lyricism of the music."

Part of this lyricism comes from his fingering technique. He prefers to play with his fingers, as opposed to using a plectrum, because of the warm sound this achieves. But he insists that in order to get the fingers moving and fully utilize the instrument, he still takes out the music books and works on different kinds of exercises.

"A lot of guys don't ever get from the low part of their bass to the high part and back down again in a smooth, lyrical fashion. The ability to play ascending and descending lines in a smooth fashion is what I'm talking about when I say nobody does it like me."

Jeff feels that a lot of musicians continue to play the same riffs because it's easy, comfortable and a lot less hassle. "If you want to expand your horizons, just for fun switch your fingers around. Changing the positioning will change your way of thinking."

Jeff would, without a doubt, like to see some of his ideas picked up by rock & roll musicians. It's not that he doesn't like rock, he does. He just seems to take offense at rock & roll being called music. As he puts it: "It ain't. It's powerful and viable because it belongs. But I don't like the sale of three or four guys as musicians when all their doing is turning their instruments up to full volume and hammering out chords that have been hammered out for 20 years.

"The best rock players come from jazz," he explained, "because they are players. But the guys who play rock can't play their instruments. They play the art form. Their hands don't go beyond basic chords and bending the B, G and E strings. And the drummer and bass player, well, their roles are so consigned out that they don't know how to expand or express on their instruments. If you want to be entertained, that's another thing. I've always said that rock music is nothing but theater."

To be fair, Jeff feels that certain rock groups like the Who and Yes display a unique sense of musicianship because of the individual group members. They each have distinctive styles and sounds, and they arrange and compose in a lyrical and musical fashion,

But with the rock & roll debate over, Jeff moves on to discuss his now permanent association with ace drummer Bill Bruford, the newest formation since the breakup of UK (features Bill, Jeff, Dave Steward on keyboards and John Clark on guitar – replacing Allan Holdsworth). He feels solidly locked into the band and unless the music becomes inhibitive, which judging from Bruford's past record is unlikely, Jeff will probably be around for some time. With this move into the band, he has had to change his particular sound in order to cope with a "rock" band's stage presence.

"I've never had the inclination to develop a supposed sound from the equipment. I've always felt that I should get the sound from my hands – let me get the chords and the notes. Usually I just get a B-15 for a duo and go right into it. But now, I've been playing with two Ampeg SVT bottoms and one Ampeg head. The amp is actually very good; and it's pretty versatile. I put the volume at about 12 o'clock, the treble at around between two and three, the mid-range at about between two and three and the bass at about 12:00. It's set up so that I get a lot of mid and I'm trying to get that all important bottom sound now."

Jeff uses what has become almost standard fare for working bass players: Fenders. He owns a "Precision" and a "Jazz" bass and is currently using a black "Jazz" that is "almost" standard. The almost referes to its one customizing feature; a Leo Quahn Badass bass bridge. "It's singularly the best bridge," proclaims Jeff. "This is because of the mere fact of the density and that it won't move a fraction of an inch from position. This allows the strings to vibrate smoothly and without interruption – resulting in a clear and distinct sound."

Currently, Jeff spends a good deal of his time in the studio working on jingles. The money is good and it continues to test and contribute to his versatility. It's primarily through his studio work that Jeff has realized the importance of reading music. "I think it is necessary for anyone who wants to expand his horizons or expand the literature of his instrument. If you read, you're forced to have another outlook, or another point of view, because your reading someone else's melodic conception of the music."

In relation to studio work and other gigging, Jeff notes, "If you don't read, you better make it as a rock & roll star, or as a comparably good jazz star. It just incenses me that people put down reading. I mean there's the standard joke when you ask a guy if he reads: "not enough to hurt my playing.' I understand the point that the more you indulge yourself in other aspects of music the less time you have to indulge in your own concepts. But if your going to indulge in your own work, you better open that up."

As Jeff Berlin puts it: "I'm thoroughly into control in terms of technique; emotional controls or the ability to make the most of the least." This desire to expand his lyrical manner, his depth of musicianship and or music is sure to keep him pushing out form the mainstream.

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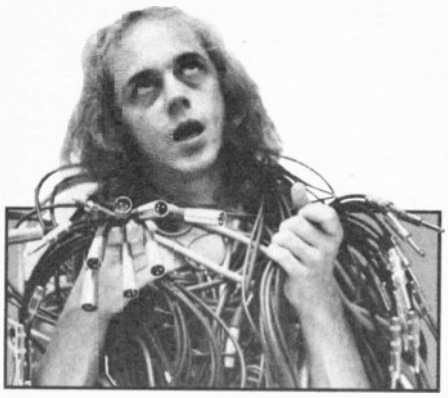

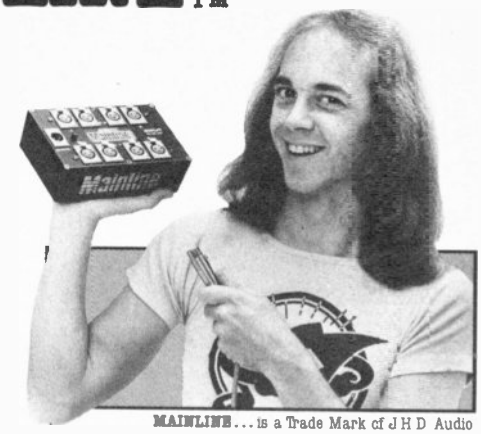

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With the exception of a few select audio dealers and commercial sound contractors, MAINLINE hasn't been available to the public. General distribution is 12 to 18 months away.

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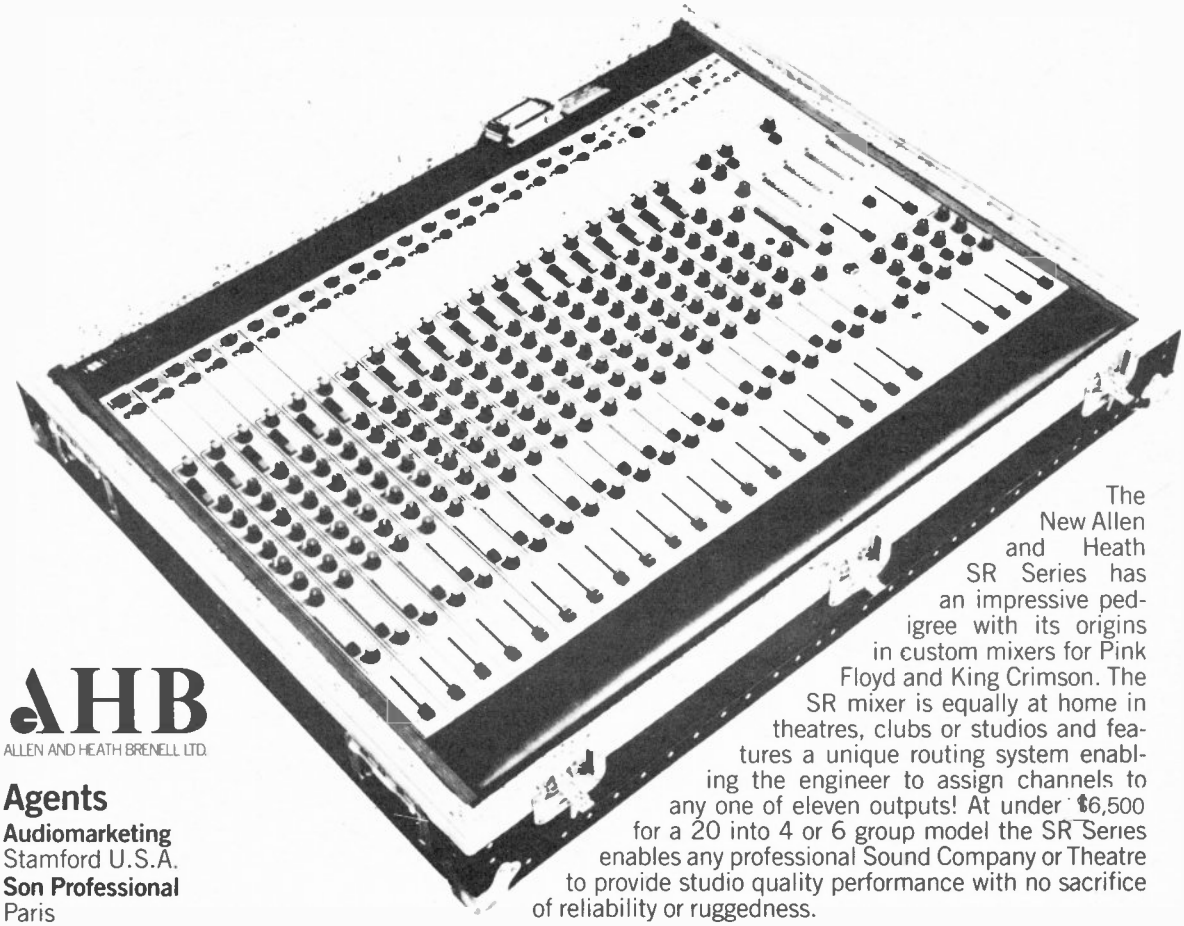

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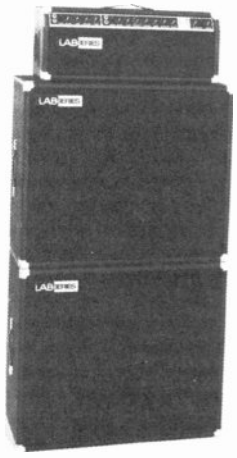

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Guitarcheck

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This addition to the Ovation electric guitar range appears to combine the body shape of the standard Preacher with the on-board electronics of the Breadwinner. It has additional pickup-mode switching, de-luxe gold-plated fittings and an unusual and attractive pattern of abalone decoration in the fingerboard. This is one of many guitars now fitted with "active electronics". Although the electronic circuitry does its intended job very well in this instrument, it does not appear to offer quite as much tonal versatility as some more recently-designed "active electronics" guitars. For example, on the Preacher Deluxe, the player has one tone control knob giving a blend between bass emphasis and treble emphasis, and one switched, on-off midrange filter. Personally, I am perfectly happy with simple electric guitars, but if you want complex filtering arrangements, there were several guitars at the Atlanta N.A.M.M. show with one or more complete 6-band graphics built-in.

The Breadwinner was one of the first widely-available production instruments with built-in electronics. In this field, Ovation now have much competition. If they wish to be in front in this particular "added-features" game, it might be appropriate to invest in a new circuit board and a few more knobs and switches. If, on the other hand, Ovation just want to make good guitars, and to leave the fancy electronics to the amp and pedal manufacturers, I would have some sympathy with that approach. As I see it, there is a continuing demand for complex guitars *and* for more simple, straightforward guitars. From the way consumer electronics is going at the moment, the complex guitars are likely to become out-dated much sooner than the simple ones.

I would prefer to consider the Preacher Deluxe as a conventional guitar with a fairly conventional sort of control system, but augmented and improved by its internal electronics.

One advantage of the electronics fitted to the Preacher Deluxe (and to the Breadwinner) is that, for all practical purposes, there is no interaction between the pickup and your guitar lead or amp. This is not a spectacular feature which is easy to advertise, but you may find it of real value if you are particular about your guitar sound.

There are many factors involved in transferring a "studio" sound to a large stage, and you are not going to solve them all with a few bits of electronics inside your guitar. However, if you can remove even *one* unnecessary variable, it should be that much easier to cope with the others. The circuitry in the Preacher Deluxe (and in the Breadwinner) removes the variable factor of interaction between pickups and guitar leads. It also, incidentally, isolates the pickups from the considerable mis-matching presented by some of the less expensive effects units and pedals.

The on-board electronics are powered by two standard 9-volt batteries, accessible through a metal hatch in the back of the guitar body and the circuit is switched on when you plug a lead into the guitar. For a few seconds after plugging in, the volume control makes a swishing sound when turned, and the mid-filter switch (which normally makes a faint click) will produce a snap like a small fire-cracker if operated during this initial period. It appears that the internal voltage levels take a little while to settle after switch-on. This may be a feature of my particular sample. In any case, all controls work smoothly and quietly after about half a minute. It is not a serious problem, although I am surprised that it should appear even in one sample, but it might be sensible not to turn your amp up full until the guitar has been plugged in for a half a minute or so.

The Preacher Deluxe has one small 3-way pickup selector switch which operates in the usual way, except that the "combined" position is at the right-hand end. It has one volume control and one tone control which covers a range from bass emphasis to treble with a "normal" position marked in the center of the dial and a second small switch which operates a mid-range filter.

The volume and tone controls have a smooth feel when turned, and produce evenly graduated changes in sound level and tone. I feel that the volume control on this sample is just too stiff for easy "violining". It may become easier with some use but, on a guitar in this price range, I think it should be right from the beginning.

There are two additional switches on the guitar, which you may not see at first, because they are up against the ends of the pickups. The effect of these switches is small and fairly subtle. Examination of the wiring indicates that they probably arrange the two coils of each pickup in either series or parallel connection. This is a popular and well-advertised feature of various types of high-output, accessory and/or O.E.M. pickups. In the case of a high-output, high-inductance pickup with widely spaced coils, connected directly to the guitar lead, the alternate series/parallel coil connections produce markedly different voicings of the overall sound. However, when the pickup is buffered from the lead, and the coils and pole-pairs are closer together, as in this review instrument, there appears to be rather less difference in sound between the series and parallel connections.

I found the overall sound from this guitar to be slightly heavy in the lower bass and over-bright at the extreme top end. This is, of course, only how the guitar sounds to my ears, with my amp, in my room. I found that I could easily adjust the top end to taste with the treble control on the amp (Peavey Vintage), but I had more trouble with the bass end. Some guitar amps have a fairly severe bass-end roll off and the Preacher may have been designed with this in mind. To get a fair balance from the fingerboard-end pickup, I found it necessary to turn the bass well down on the amp, use the less

bassy pickup mode and, with the strings supplied with this guitar, to adjust the bass side of the pickup further from the strings than the treble side. I experienced no difficulty with the treble pickup, and I found both pickup mode settings equally useful. The overall sound was rather bright, but the treble control on the amp tamed that with no difficulty, leaving the guitar's own tone control available for more general tone adjustments. I did play the Preacher through a different type of amp and although the result was more managable, there was still a generous amount of bass from the fingerboard pickup.

Although the pickups are mounted on the scratchplate and not directly on the body, there was no obvious tendency to uncontrolable feedback, even when the guitar was held close to the amplifier at high gain settings. There was some tendency to feedback at high settings but this was mainly at harmonic frequencies of any undamped strings. The Preacher is a solid-body guitar but seems to have something of the lively character of a good semi-acoustic. A mild tendency towards *controllable* feedback is perfectly normal for this kind of guitar and may be, for some players, a very desirable feature. The more lively sort of solid or "semi" often has a tendency to produce harmonically related "echoes" on adjacent undamped strings. This feature is also noticable on the Preacher, and is probably assisted by the unusual bridge construction, sounding faintly like echoes on a sitar. Our review sample was regrettably not set up as well as it might have been. With the strings supplied, there were quite a few buzzes from various strings in various positions. There does not appear to be anything basically wrong with the instrument: with the action a little lower at the nut and a little higher at the bridge, it worked much better. In particular, the nut was poorly fitted to the guitar and some of the string slots were higher than necessary, even for string-bend enthusiasts. The nut material is some form of molded plastic, but it appears to resist string-wear fairly well.

The fingerboard looks like good quality ebony and it seems to have most of the small pores in the wood filled with some sort of sealer. It has a smooth, clean appearance and is neatly inlaid with large abalone position markers. These are attractively shaped and of good quality, but not particularly well matched. It may be worth laying out a few inlay sets on the bench and shuffling them, to improve the matching of colour and texture. The frets are neatly and accurately fitted and smoothly finished at the ends. The top surfaces have a superficial high polish, but there are plenty of residual deeper scratches and string-bending will be easier after the instrument has had a little playing-in. On this sample the fret-end bevels on the treble side are quite wide, and there is some tendency for the top string to slip over the end of the frets. This may not be present on all samples and it is easy to check before purchase.

The body and neck are made from good quality American mahogany and finished with a clear, hard lacquer, in their natural color. The neck is nicely shaped at the back, but, to my taste, it feels a bit hard-edged where the sides of the neck meet the edges of the fingerboard.

The Preacher has 24 frets on the fingerboard and the bolted-on neck joins the body at the 18th fret. The body is deeply cut away on each side of the neck up to about the 23rd fret, so all 24 frets are accessible. Access to the top frets is a little cramped unless you have fairly small hands. I would be happier with a slightly wider cutaway, at least on the treble side. The bass-side cutaway looks interesting, but the body joint behind it is sufficiently square and bulky that I don't find the cutaway on this side to be of much practical use. A 24-fret guitar with a bolt-on neck is almost bound to involve some compromises, and there is at least reasonable access to all 24 frets on the treble strings, where it is of most use. The back of the neck changes from a rounded to a "square" cross section around frets 16 to 17. I do not think it would present any terrible problems to move this transition point up to the point where the neck meets the body. At the moment, the highest playable part of the neck is completely "square" at the back and I think this makes playing in the highest positions unnecessarily difficult. It *is* quite possible – but it could be easier.

Most of the metal fittings, including the solidly-constructed bridge, are gold-plated. Do not be misled by the plastic cover over the bridge assembly. It seems to be there for the player's comfort. The bridge underneath is made from substantial brass and/or bronze parts and has a solid 3-point mounting to the body. The angle of the bridge assembly, and the height of the hand-rest relative to the strings, can be varied over a limited range by a large nut inside the battery compartment.

On our sample, the B-string machine head has a slightly rough and imprecise movement and is below the standard of the other machines in the instrument.

Stephen Delft

Measurements on Ovation Preacher Deluxe No. 12324

Scale length *628mm*
String spacing at bridge *53mm*
String spacing at nut *35mm*
Fingerboard width at nut *42mm*
Action as supplied *0.4mm* treble/*1.2mm* bass (see text)
Depth of neck at 1st fret *20mm*
Depth of neck at 12th fret *22mm*
Depth of neck at 15th fret *23mm*
Body begins at fret 18 at back of neck
Cutaways begin at fret 22

fact: Shure's new loudspeakers may look compact...but there's plenty of room for all your sound!

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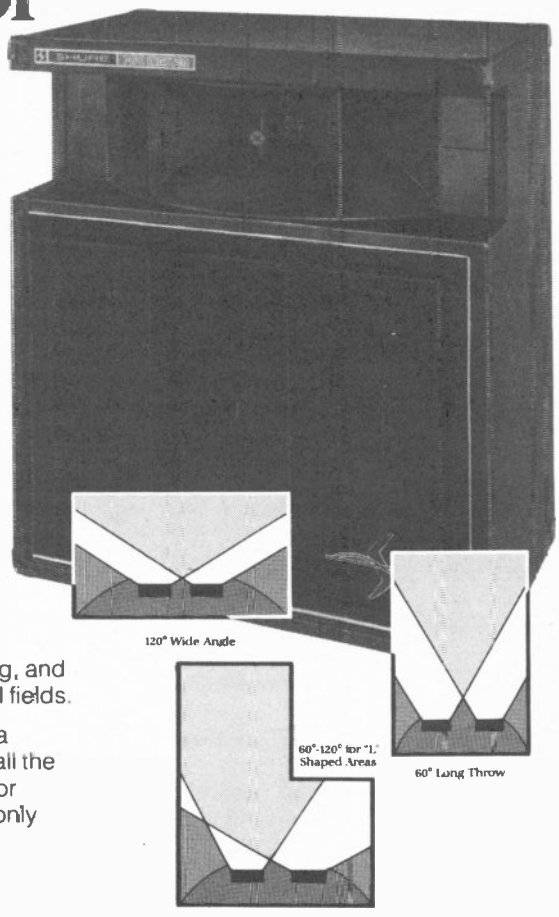
Model 701 Loudspeaker



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- **High power handling—handles up to 150 watts continuous.**

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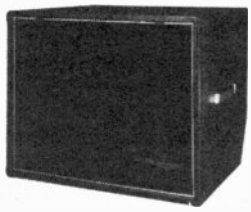
These modular units may be used to construct a custom speaker stack, add high- or low-frequency emphasis to another full-range system, or create custom stage monitor systems. Each speaker is designed to operate with an amplifier capable of delivering up to 150 watts continuous to an 8-ohm load.

Model 708 High-Frequency Speaker

The high-frequency portion of the Model 701, including adjustable dispersion horn. It has a frequency response of 2,000 to 15,000 Hz, an internal crossover filter rolling off at 18 dB per octave below 2,000 Hz.



Model 707 Low-Frequency Speaker

The low-frequency portion of the Model 701, with rubber feet on two surfaces and a diagonally beveled back allowing the speaker to be tilted. It has a frequency response of 50 to 2,600 Hz, an acoustic rolloff above 2,600 Hz.

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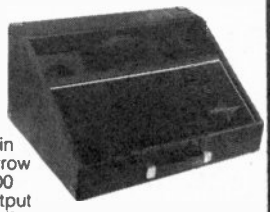
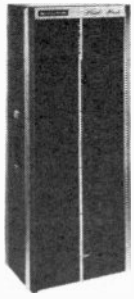


Model 703

Special removable wedges enable the monitor to be used in a wide-angle or narrow pattern. Rated at 100 watts to 8 ohms, output 117 dB SPL at 1.2m (four feet) with 100 watts.

Model 702

A compact two-way system rated at 50 watts to 16 ohms, output 114 dB SPL at 1.2m (four feet) from only 50 watts. Features a built-in volume control.



VOCAL MASTER® Stage Monitor

The VA301-S is a highly directional stage monitor, featuring a built-in volume control. Designed to be used with the Shure VOCAL MASTER Sound System, it is rated at 50 watts to 32 ohms.

Compact Speaker Systems

Three professional speaker systems (SR112B, SR112W, and SR116B) that combine high output capability, high power handling ability and wide frequency response into a compact package. Extraordinarily efficient, they produce 95.5 dB SPL at 1.2m (four feet) with just one watt. And, each is rated at 100 watts to 8 ohms!

SR112B

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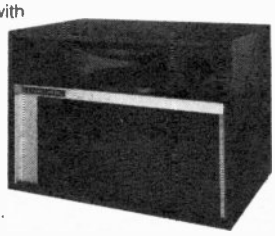
SR112W

Same as SR112B with woodgrain finish, matching many indoor decors.

SR116B

Carrying handle and extra built-in corner protection, built to stand up to the bumps and scrapes of touring.



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Circle 752 on Reader Service Card

"The Resurgence of Baby Amps"

Once upon a time in the halcyon days of rock & roll, the Fender "Champ" stood alone as the only universally accepted amplifier offered in a small/mini configuration. Recent years have demonstrated an increasing need for powerful amplification packaged into compact and lightweight units. In the mid-Seventies, the rock group Chicago sponsored the initial development and marketing of the first Pignose mini-amps while Mike Matthews was hard at work on his "Freedom Amp" (battery powered, so you could be a true cosmic wanderer and play your electric guitar out in the woods while chanting mantras), two significant milestones in what was to eventually become a small or "baby" amp revolution.

Since then, most of the major American amp manufacturers, as well as several smaller firms founded on the ethic of "good things come in small packages" have enthusiastically responded to the burgeoning demand for a greater variety of powerful and *flexible mini amps. When this project was first conceived some months ago – if I'd have only known – out of a mixed sense of curiosity and general ennui at the fact that I couldn't play "crunch" rock & roll guitar in my New York apartment without sending the neighbors reelings into sonic hysteria, I had no idea just* how *enthusiastic companies would be about this informal survey of the latest-and-the-greatest in baby amps. What started out to be a one part article focussing on five representative units is rapidly growing into an ongoing treatise that threatens to stretch out over several issues. So be it. Ideally, this simply means that the consumer has more and more options to choose from at his or her local music retailer.*

Fortunately, for my sanity, I established some hard and fast rules at the outset to avoid the majority of hassles that might arise from evaluating products in such a competitive market. Essentially, this is not *a "comparative" study. Differences in wattage, physical size, price, features and general intent make this impossible. The somewhat arbitrary ceiling of 50 watts (so far only one amp under consideration is a 50 watter) was imposed, with the general parameters falling somewhere between 15 and 30 watts for most of the amps. My insensate prejudice against transistorized amps was quickly tossed out the window because, with the exception of the "Champ" and Hiwatt's "Bulldog Boogie" – ironically, the lowest and highest in wattage respectively – tubes are considered too expensive and impractical for use by virtually all of the small amp builders. Portability was a key if not overriding factor – sometimes the sheer mass of a particular cabinet beefed up the sound enough for me to overlook the possibility of a hernia at the next portage. Finally, more than just a random critical overview, this piece is intended as a straightforward guide of what is currently available and whether or not a specific amp may be right for* your *particular needs. And to those manufacturers who've already bristled at the expression "Baby Amps," I respectfully suggest that a light-hearted catchphrase is certainly no more misleading than bogus techno-jargon like "microtized" or "tube-like." So, without further adieu . . .*

Soundcheck

Peavey "Backstage 30" ($129.50)

From the well-respected Peavey Electronics Corp. of Meridian, Mississippi comes the "Backstage 30" amplifier described as a "professional, compact amp" featuring a 10" heavy-duty speaker housed in an open back cabinet offering up to 18 watts RMS at 5% Total Harmonic Distortion. Like other Peavey units, a major plus of the "Backstage 30" is its rugged dependability – in this case the amp is powered by "extremely heavy duty" push/pull parallel silicon power devices mounted on large heatsinks coupled with four 5 watt emitter resistors, all neatly tucked away in a ¼" wood cabinet covered with black tolex. Like many of the other units under consideration, the "Backstage 30" features two input jacks (one for low gain), a GAIN CONTROL (actually controls the "sensitivity" of the preamp), LOW EQUALIZER (varies the amount of bass response), MID EQUALIZER (to *tailor* mid-range response), HIGH EQUALIZER (varies high end response) and a MASTER GAIN to overdrive the amp for sustain at lower volume levels. The company recommends lowering the "treble" to achieve a smoother "natural distortion characteristic" and boosting the "mid" to obtain a "fatter" distortion sound – something we *all* long for.

The unit is portable, but heavy enough to remind you it's right there by your side, and attractive in the spartan black & white Peavey tradition. The amp performed admirably, scoring very well on the PPP (power per pound) index. Another pleasant feature is the fact that the speaker is actually tilted upward for better sound dispersion. My only minor complaint centers around the MASTER GAIN function – it works fine but the way it breaks up is not quite suited to my personal taste in distortion.

Specifications

Input Impedance: 47.0 K ohms
Input Required for Rated Output: 10.0 mV RMS
Input – 5; Master – 5; EQ flat
Gain: 60.0 dB
Signal-to-noise Ratio: 50.0 dB
Recommended Load: 8.0 Ohms
Power Output: 15 watts RMS @ 1% THD
18 watts RMS @ 5% THD
Equalization Frequencies: Bass – 100 Hz
Mid – 450 Hz
Treble – 10 kHz
Dimensions: (Approximate)
7¼" – 9" deep
16½" wide x 15" high

Circle 840 on Reader Service Card

Crate 1 (St. Louis Music) ($169.95)

This is actually the most "stripped down" version of the Crate series of amplifiers; other units like the Crate IR, the Crate II, the Crate IIRn and II Rs offer extras like reverb, "bright" switches, gain control, frequency analyzers and signal line in/line out for effects. All of the Crates feature rugged ¾" wood cabinets (the roughhewn look) with extra ¾" planks to reinforce the corners. The wood used for the Crate I is called "Ponderosa Pine" and although it undoubtedly makes for a *very* well-protected piece of equipment, what effect this cabinet has on the sound could at best be debatable.

The amp uses a 12" Magnum Projector Speaker with a 20 oz. magnet aluminium dust cap rated up to 40 watts capacity. This is mounted in an aluminium chassis mounted at the top of the cabinet with two lateral wood "members" added for structural support. The cabinet is set onto four generous rubber "feet" or shock pads. Again, the Crate I features two input jacks (left input for high gain), GAIN CONTROL (to set overall gain in preamp section), TREBLE CONTROL (±17dB of boost or cut @ 10,000 Hz), BASS CONTROL (±15dB) of boost or cut @ 60 Hz) and MASTER VOLUME (sets output of power amp section).

The Crate seems to be a very sturdy unit with quite a bit of power in reserve. My one reservation stems unit which, to my ears, tends to make for a "distanced" or slightly disembodied sound that is hard to transcend no matter how much the overall gain is increased. In essence, the amp seems to lack a distinguishable "center" or the kind of presence we've come to expect from units of this kind. But it is LOUD, and it could probably even survive *IM&RW's* penultimate editorial soundcheck – heaving it off the 19th floor of our building onto the pavement – and those two bonuses are enough to make the entire series a popular line in the months to come.

Specifications

Inputs: #1 Hi gain
#2 Lo gain (–6dB)
47K ohms input impedance
Output Impedance: 8 ohms
Output power: 15 watts RMS at 1% THD
18 watts RMS at 5% THD
Overall Dimensions: 17½" wide – 19½" high

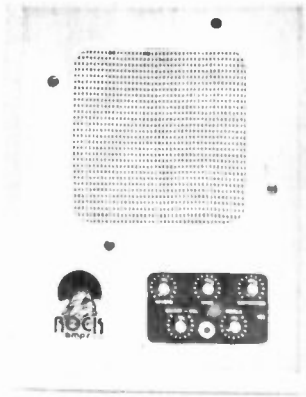
Circle 841 on Reader Service Card

Rock Amplifier "The Deluxe" ($219.00)

Certainly one of the "prettiest" entries, the Rock amp is housed in a classy wood cabinet and, on the surface of it, almost looks like one of those great table radios from the Thirties and Forties. Developed by aerospace engineers, the Rock features a fine-tuned cabinet for maximum performance, a Hammond Spring Reverb (excellent) and a jack for an optional stereo footswitch which independently activates or disengages either the reverb or the distortion function. Controls include TREBLE (27 dB of cut at 6000 Hz), BASS (27 dB of cut at 80 Hz), REVERB, DISTORTION (overdrive function) and a combination ON/OFF VOLUME switch. The "Distortion"

model offers a "Waveform" control to help get that elusive "tube-type" sound as well as a cleaner, transistorized sound.

This amplifier has a gorgeous sound and can really kick ass for a unit this size. The distortion function is excellent, while the reverb, always a problematic aspect of small amps, operates very well. Two minor gripes: The built-in handle (really a wooden lip that projects out in front of the amp) is not too effective – balancing problems – and the tiny ISC input sensitivity control potentiometer (theoretically matches the input of the amp to your pickup) is extraordinarily fragile. The merest touch of a tiny screwdriver caused it to collapse before any adjustment could be made – goodbye distortion circuit! But that could be a singular problem with this unit. Expensive, but seemingly worth the extra bucks.



Specifications:
Output Power: Just clipping 16.5 watts RMS at 8 ohms
20 watts RMS 40 ohms (less than 2% distortion)
Output Power: Peak Power 28 watts RMS at 8 ohms
36 watts RMS at 4 ohms
Signal-to-noise ratio – Better than –68 dB from rated output
Frequency response – Flat bandwidth b .5 dB response 30 Hz to 20,000 Hz
½ power bandwidth
b 1.5 response 14 Hz to 31,000 Hz
Line output impedance – 1000 ohms
Line output level – 1 volt RMS

Circle 842 on Reader Service Card

Barcus-Berry XL-8 ($197.50)

This one was recommended to me "on the sly" by one of 48th street's (NYC's musical instrument mecca) most enlightened dealers, a good sign right off the bat. Described as a "migit-ized" – uh oh, another one of those non-words – amplifier for professional use as a practice amp, studio monitor or for small club work, this sturdy little brute offers up to 15 watts of average program power (it sounds louder!) at 1% THD through an

efficient 8" PM speaker in a reflex enclosure. The control panel features the everpresent ON/OFF switch and pilot light, MASTER VOLUME, TREBLE EQ (cut and boost over 20 dB range at 5 kHz), MID EQ (10 dB at 400 Hz) and BASS EQ (15 dB at 100 Hz). To produce what Barcus-Berry humorously refers to as "that thoroughly deplorable distortion," the XL-8 also comes equipped with an overdrive function for the INPUT stage of the amp, thus creating three separate controls affecting the volume at different stages along the audio chain. This makes for maximum flexibility in terms of volume, timbre and quality of sustain.

The most remarkable thing about the XL-8 is its smooth and plangent tone, a rich response that encompasses the full tonal spectrum of the guitar (or bass) played through it. The units is fairly heavy (23 lb – 10.45 kg) and squat, but the sound more than makes up for it. Looks is not a *major* consideration here (serviceable black), but who cares about looks when your guitar sound is purring through the room with little or no excess noise/hum.

Specifications:
Power Output – 15 watts average into 4 ohms (120V line)
Power band width – 3 dB at 30 Hz and 15 kHz
THD – 1% at full power
"Output" line impedance – 10,000 ohms
Power requirements – 120 VAC, 60 Hz, 30 watts
Dimensions – 15½" wide, 14¼" high, 10" deep
39.37 x 36.83 x 25.40 cm

Circle 843 on Reader Service Card

Pignose 30/60 ($129.50)

The Pignose 30/60 represents a lucid and intelligent evolutionary step over its trend-setting predecessor (the little Pignose mini-amp), offering a solid 30 watts (60 watts Peak – hence the name) through a sturdy 10" speaker housed in the characteristically luxurious cabinet with a simulated pigskin covering back with foam. Controls offered are the standard low and high gain inputs, a separate ON/OFF switch, VOLUME, TREBLE (1.5K peaks at 10K w/ 25 dB boost) MID (1K – 4K w/ 20 dB boost) and BASS (peaks at 500 cycles – 20 dB). One of the real bonuses though, which is also offered on some of the other units, is the separate circuit for effects which greatly alleviates noise problems. Since this amp was primarily intended for the rigorous demands of recording, the inclusion of this circuit makes a lot of sense.

The 30/60 has more than enough punch for most playing situations – short of Madison Square Garden – and my favorite feature is the *superior* MASTER VOLUME function which provides some of the sweetest, "singing" distortion available this side of the much higher-priced (and out of this league) Mesa Boogie amplifier. A

Specifications.
30 watts RMS/60 watts peak with 0.5% THD
Dimensions: 17" x 16" 7/8" x 9"

Final Note:

Amid the blizzard of features and specs, I overlooked the fact that all of these amps offer a "line out" function, allowing the player to use it as a preamp in conjunction with another power amplifier or speakers. Stay tuned for more of the Baby Brutes in the months to come.

J.C. COSTA

Circle 844 on Reader Service Card

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Circle 806 on Reader Service Card

Synthcheck

Oberheim OB-1 $1895

The OB 1 is made by Oberheim Electronics Inc. and is one of the "new breed" of synthesizers which have memories i.e. a particular sound can be stored away, to be recalled instantly at the press of a button. This, to my mind, is the ideal type of synthesizer – fully variable but with a number of preset sounds, each of which can be set up to the player's own taste. (You're not lumbered with somone else's idea of what a trumpet sounds like). Apart from the memory, the synthesizer is fairly conventional, with two VCOs (Voltage Controled Oscillators), two ADSR (attack, Sustain, Release) envelope generators, one VCF (Voltage Controled Filter) and one VCA (Voltage Controled Amplifier).

Voltage Controled Oscillators

The first thing that one notices when tuning the oscillators is that the frequency controls do not change the pitch of the oscillators smoothly. As the control is turned, the pitch changes in a series of "steps," each step being a fraction of a tone. This gives the memory precise voltage levels which can be stored and recalled from the memory section. (All the controls whose positions can be stored in the memory work in this way.) Precise tuning of the oscillators inside these steps is obtained by using the "fine tune" controls.

The oscillators can be tuned over four octaves and this range can be increased by use of the transpose control. The waveforms produced by the oscillators are (1) Pulse waves (the width of the pulse can be varied by the waveform control from a narrow pulse to a 50% square wave) and (2) Sawtooth (again, the shape of the sawtooth can be varied from triangle through to sawtooth).

The pitch of VCO 1 can be modulated by the LFO (Low Frequency Oscillator) to produce vibrato, or the LFO can be switched to modulate the waveform (dynamic pulse) producing a "phasing" effect, similar to that of two oscillators being slightly out of tune. Pitch and waveform modulation of VCO 2 can be either by the LFO or by one of the ADSR generators.

Each oscillator produces a square wave an octave below its fundamental (on Moogs, this is called 'doubling') and this signal and the fundamental produced by the oscillator are fed into the VCF via two three-position switches marked ON, -3dB, OFF. This enables mixing of hte various waveforms (albeit somewhat limited). VCO 1 can be "cross-modulated" by VCO 2 (the output of VCO 2 is fed to the control input of VCO 1). The effect of this is similar to a ring modulator producing gongs and bells.

VCO 2 can be "synched" to VCO 1, for perfect tuning, or when VCO 2 is forced out of tune (either manually or by modulation by the ADSR generator) it produces a scanning of harmonics, which is very useful for guitar-like sounds and other "sweeping" effects.

Voltage Controled Filter

The filter has four variable controls – cut-off frequency fine and coarse, resonance and modulation (modulation can be by the ADSR generator or the LFO) and can be used in two modes, '2-pole' or '4-pole'. The difference is that the 2-pole is harsher than the 4-pole which produces a cleaner, rounder sound. The keyboard control voltage can be fed into the filter so that the filter can be "played" as a third oscillator when the resonance control is at maximum (self-oscillation – producing a sine wave). Noise can be switched into the filter via a three-position switch for wind or surf effects.

Envelope Generator and Voltage Controled Amplifier

Two envelope generators of the ADSR type are supplied VCF – VCF envelope (also used for modulation of VCOs) and VCA envelope. Attack, decay and release times are variable from zero to about eight seconds. The release time of both envelopes can be switched to zero (giving instant cut-off once a note is released) by a switch at the left hand side of the keyboard marked "Env Reset." The VCA envelope can be by-passed so that the synthesizer produces a constant time.

Programing

All of the controls and functions that I have mentioned can be stored in one of the eight "memories." Loading the memory couldn't be simpler. Press the Manual button (all the programing buttons are of the non-mechanical "touch" type, and are accompanied by LED indicators to show which function has been selected), set up whatever sound you want with the front panel controls, press the "Write" button until the LED flashes and select one of the eight memory slots by pressing its appropriate button. That sound is then stored away until recalled by pressing the button again.

Manual Controls

There are a few controls on the left hand side of the keyboard that cannot be stored in the memory – another good idea as it gives a certain amount of flexibility to the preset sounds – these are LFO speed and Delay (delayed vibrato, etc.), LFO Shape (sine, square and sample and hold), Portamento, Envelope re-set, Transpose, VCF frequency and bend controls. Pitch bending is achieved by a calibrated lever, pull toward you to bend up – push away to bend down. It returns to center in the "hands off" situation and can be switched to control VCO 1 and 2 or VCO 2 only. The spread can be switched to bend a tone or octave at maximum, or it can be used to feed the LFO and noise to the oscillators (I would prefer it to be Bend Up in one direction and add Vibrato in th other direction).

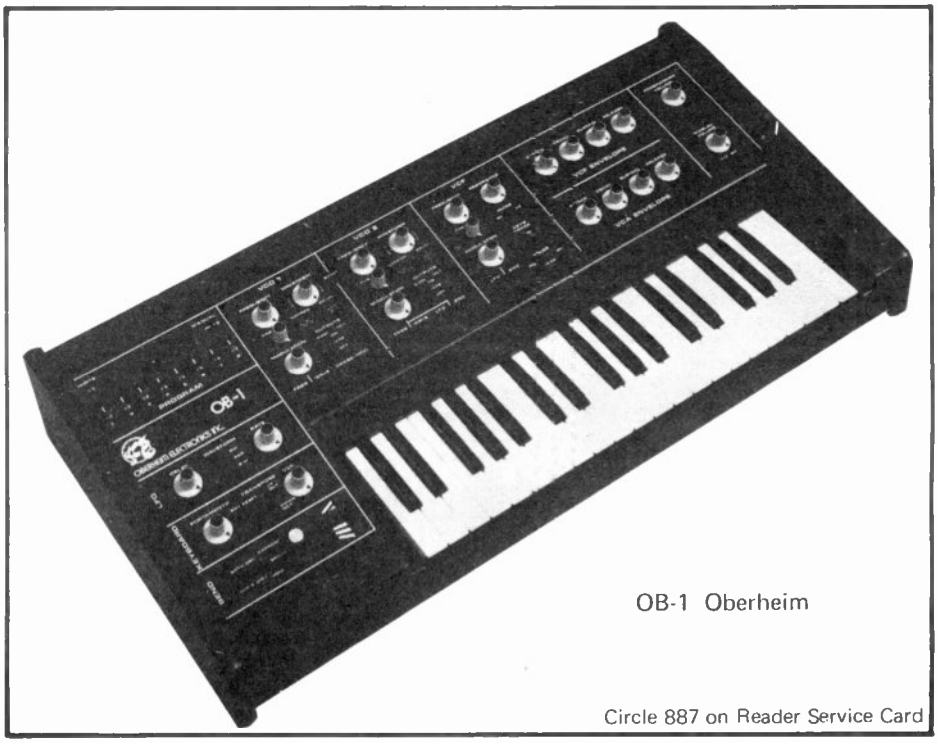
Layout

The synthesizer has a three-octave (C to C) keyboard and the layout is great with all the controls one would need to get at quickly on the left hand side, apart from the output volume which, for some reason, is on the right hand side – a bit awkward to adjust while playing right-handed. The all-metal chassis is black with veneered end-panels and white lettering. On the back panel are all the normal interface connections you would expect to find enabling hook-ups with sequencers and other units.

Conclusion

Obviously, the big "plus" for this machine is its programable memory, enabling you to obtain the sounds of your choice quickly and easily from one machine. It does all that you would expect from a single voice, lead-line synthesizer and is not much more expensive than one without the memory.

Dave Simmons



OB-1 Oberheim

Drumcheck

Yamaha 9122WD $1395

Yamaha drums manufactured by the giant Nippon Gakki Corporation in Hamamatsu, Japan came to America originally in 1962, sold reasonably well for a year or two and then disappeared (or at least weren't selling in any great volume). Two years (or so) ago they decided to regroup, run down production of their other drum lines and bring out a completely new and top quality set with many thoughtful innovations.

Their brief for the new set was a product which would easily take the rigorous playing of modern drummers (let's face it, rigorous is an understatement) and yet still satisfy the guy who wants immediate response at low volume. In other words, cover the whole sound and playing style spectrum.

So, the YD9000 series has evolved from hundreds of prototype drums, all different in material and construction. The final result uses a process with a special lamination for strength and also for tonal depth. When first introduced the drum had extra length, double ended casings which would of course help to strengthen the drum. *Their* idea was that the extra length would stop the nut-box (casing) from lifting off the drum under pressure from the tension screws – a smaller single nut-box has some tendency to do this. However, this full length (top head to bottom head) nut-box with its *three* shell fixing screws (one in the center) does over brace the shell and arguably kills some of its breath and ring. Mind you, some informed sources claim that even ordinary single nut-boxes spaced opposite each other have an adverse effect on the clarity of the drum. So, the shell stress factor afforded by the extra long nut-boxes may be the reason why America does not go for them and instead prefers its Yamahas with the more conventional single ended type.

The shells are formed from birch (seven ply thickness for the bass drums and five ply for everything else) around an air bag. The idea being to keep the cylindrical shape as true as possible and thus make the sound emanating from it equally as true as possible. The laminations are joined at an acute angle instead of at right-angles to the bearing edge and at three different places to equal out the surface distortion which might attempt to buckle the shell out of its true shape, or at least give it a weak point where it could possibly crack.

Incidentally, the 7000 system which is the cheaper brother is built from birch and maranti and is said to give a much heavier, deeper sound than the sharper attack of the 9000 – it's an interesting alternative and, of course, since both the systems are modular, one could use a set combination of the two different materials for an interesting effect.

Each of the prototypes were evaluated by drummers and then, if necessary, changed. The list of evaluators is very interesting in that some of the guys involved are known Yamaha endorsees yet some of them aren't. Anyway, these guys in the know are all notable (to say the least) West Coast players.

So, the set I was looking at was a five drum 'Rock' type outfit called YD9122WD.

Bass Drum

The set has a 22x14 bass drum with laminated wooden hoops, 16 timpani-type tension screws and four ordinary square headed drum-key operated tension screws filled where the drum touches the floor which I find more convenient since they leave more room for the pedal to fit the hoop. In addition the bass drum has cast claws. I used the drum single-headed with a blanket inside and it sounded satisfyingly big. There was no boom at all – just a solid thud.

Yamaha spurs are really neat with a cast plate with two indentations in it bolted to the shell. Into these 'V'-shaped indentations is fixed the actual spur unit. One slot, parallel to the ground, puts the playing position at roughly 60 degrees to the bass drum hoop, the other puts it parallel to the nut-boxes for packing away. The whole spur is adjustable in length on a telescopic tube with a large knurled lock nut. The whole spur unit is locked to the shell via a capstan type nut with three arms which seemed a bit fiddly to me. I would have preferred a wing bolt.

Tom Toms

The tom tom sizes supplied with YD9122 WD are pretty standard sizes. 12x8, 13x9 and 16x16 all with square-headed tension screws. Twelve for the smallest and 16 for the largest. All the toms had a deep rich sound but I experimented by tuning them up a turn or two and discovered a much brighter, cleaner, sometimes more modern sound. So, as the company had planned, the drums do seem to cover the whole sound spectrum. The floor tom tom has three wide-spreading legs with optional rubber or spiked feet activated by rotating the rubber tip a quarter turn and pushing down. The bass drum spurs too have this feature. The tom legs have a straight flute at their ends for grip where they go into their retainer block. This unfussy cast block has the usual eye-ring bolt inside it and a cast wing-nut on the outside. (Evidently, there are only *two* different bolts and *one* nut for the majority of the set which makes emergency cannibalisation a lot easier.) All toms have triple flange hoops (although a cast hoop is available for the snare drum as an option). All drums, too, have either large washers behind the fittings or substantial plates to take away the *direct* strain inside the shells. Mounted tom toms are fitted with cast receiver plates with hexagonal holes and plastic sleeves inside. These are bolted to the shell to locate the tom tom holder. More of this later.

Snare Drum

The 14x6½ inch metal shell SD055MB snare drum was, at first, a little disconcerting, since with its full length nut-boxes it looked a soupcon ungainly. However, it sounded modern

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and a little brighter than I had heard it before. Nowadays the Japanese company fit Remo's Ambassador heads but when I last played a set it was fitted with Yamaha's 'own-brand' heads made from Melanex. (Remo uses the vastly superior Mylar film from Dupont). The Remo heads are fitted to all drums from Yamaha – at least as far as America is concerned.

The side drums have 10 tension screws per head and the metal shell has an inverse flange at roughly 45 degrees, a slight snare bend and a triple indentation in its side to strengthen the shell and take away any tendency to buckle.

SD055MB's snare mechanism is of the 'super sensitive' type with a parallel action adjustable at both ends with a solid on/off cam action and an extremely substantial pressed steel protecting cage around both ends of the twin, independently-pivoted 10 strand snares. (The result is a 20 strand snare). The shell itself is light of approximately 32 gauge material but all the extra hardware on it makes it a heavy-duty drum indeed.

The Yamaha catalog offers external dampers for all the drums since they don't have any internally fitted. These are part plastic and part metal and clip to the drum rim with a clamp and substantial wing bolt. There's an extension piece which stretches out over the head and is tapped at the very end to take the damper itself. This is made from some sort of foam rubber and is "squashy", cone-shaped and joined at its widest end to the thread. There is a knurled thumb screw at the opposite end to the tip of the cone to adjust the dampers while playing the tom toms since I rarely use any, but the snare was greatly improved by one of them. As I have said before external dampers do not kill the sound on impact – on the contrary, as the head returns to rest they get rid of the unwanted overtones caused by reverberation.

The tension screws used on the tom toms are unique in that their threaded portions are split top to bottom and a piece of plastic slightly wider than the screw's diameter is inserted. This serves to bind and lock the tension screw in its insert thus making tensioning more certain and the screw less likely to unlock itself. For some inexplicable reason these locking tension screws didn't used to be fitted to the snare drum. This seemed something of an oversight since after all this drum takes the most hammering and is therefore more prone to detuning during play.

Stands/Accessories

The snare drum stand is really weighty which for my money is a really good thing. It has a shallow, tripod-based stand from pressed steel and a bottom section of less than 12 inches high which I think makes it the lowest around. The snare drum retainer is the old favorite "basket-type" like the "Atlas" with a large locking-nut but with huge rubber bumper sleeves to keep the drum secure. The playing angle adjustment works via a ball and socket, with in this instance the ball being made from some "space-age" form of metal/plastic with the ball mounted with a piece of hexagonal steel protruding sideways from it to take the basket mechanism. Incidentally, the basket can be moved sideways slightly from the true center two or three inches which might prove beneficial. The ball itself is arrested by a wing bolt which pushes it against and through a cage with small teeth on its inside. This successfully and, as far as I know, uniquely, stops any movement at all. The height adjustment on the snare stand, hi-hat, cymbal or concert tom stand is through a large wing bolt tapped into a cast boss (fixed to the top of the tube) which has a diametrically split plastic core inside it. Against this nylon core where the wing bolt would touch it is a small strip of spring steel which locates into an indentation in it and locks the whole thing solid. You can (I've seen it done) swing on the stands after having put just an ordinary amount of tension on these screws.

Yamaha's 901 hi-hat has a two piece footplate with a slot for a top stop, a cast frame, with two adjustable sprung spurs, centre-pull action and a thick nylon linkage, tripod base, the usual aforementioned height control, a large height remembering jubilee type clip and large outside spring adjustments. The tubing is all thicker than usual so is more stable with a plastic adjustable and angle lockable bottom cymbal seat with specially thin felt and a top cymbal clutch which ingeniously assembles from the bottom nut which has a threaded tube as part of it. To this there are added felt, washers and a top cylindrical boss, which screws on to this with a large wing bolt through. This attaches the whole unit to the rod. The beauty of it is you will never end up with an inoperable hi-hat if the bottom nut has fallen off. The pedal furthermore was smooth, easy to play and substantial enough to take lots of aggression.

The 901 bass drum foot-pedal has an identical two-piece cast footplate identical to the hi-hat's. It's a single post unit which locks to the hoop with a cam action. This pedal too has a pair of sharp spurs and the footplate can be adjusted on its metal rod frame to put the player's toe further underneath the cam pivot if necessary.

The beater height is adjustable as is the pedal's cam and pivot bar height. This is an unusual plastic cam which has serrations in it which receive a corresponding piece of nylon with "mirror-image" indentations which is the pull. So the whole thing works like a bicycle on its cog, or more specifically since it'sover half an inch wide – a caterpillar or tank track. The single expansion spring is, of course, adjustable as is the throw of the beater on its splined ratchet. The beater too is adjustable to left or right of bass drum dead-center and the ball bearing action has a "play" resisting nylon movement. The pedal seemed quite smooth and playable to me but I would have needed it for more than a couple of hours to ascertain whether I liked it or not. Yamaha's cymbal

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stands are elephantine with double tripod legs, very large diameter tubes with their usual height arrest and a very long tilter. The purpose being to allow the drummer licence to play his cymbals vertically if he so desires without the stand interfering. This tilter itself is cast and anodized and the angle is held in a large splined ratchet. There's a pair of thick felts, a large metal washer with a rubber one below it and a large wing nut. Of course, there's a boom attachment available which has what I consider to be a short boom extension on it – I'm not sure whether it would be long enough to allow for playing over the top of a large multi tom set up. However, the actual boom part does fit into the top of the middle section of the stand should you no longer need to use a boom stand.

A bass drum mounted double tom tom holder with the facility to mount *three* drums, comes with all the 900 series sets. It works through a receiver plate mounted on the bass drum sensibly close to the front so the mounted drums can be close together yet a comfortable distance away.

A tube with an indentation along its length locates into this plate/holder and a large wing bolt goes through the holder into the groove. This effectively stops the drums from revolving *around* the bass drum. To the top of this tube is joined a cast triangle of metal with holes at each corner. These all have Yamaha's split nylon inserts and wing bolts to activate them. Into these go the actual holders which consist first of a tube with indentations at the top of which is fixed a ball made from plastic/metal in a cage from which protrudes a piece of hexagonal steel. This goes into the receiver plate fixed to each tom tom. A large wing bolt locks this ball as it does on the snare stand and the angle arrest works very well indeed. The tom tom holder too has cast jubilee type hose clips (or Memory Stopper as Yamaha call it), one on the main down tube and one on each of the ball and socket (or perhaps I should say Ball and Cage) arms.

Appearance

The look, and indeed image, of the drums is extremely professional and two standard colors for each series are available. Real wood (designated WD) which I saw or chrome for the 9000 series and teak or jet black for the 7000. There are of course other more normal colors available to order.

Yamaha have updated their old and, I thought, terrible plastic badges to much more acceptable ones. They're very tasteful in silver with black silk screen print. Moreover they have arranged to fit two (one upside down) diametrically opposite each other to any double-headed tom tom to make it work better when mounted a different way from that intended, i.e. a 9x13 on the left which was actually meant to be positioned at number two on the drummer's right.

As I said earlier Yamaha do make concert toms in the normal octave from six to 16 inches in diameter. They are available only in the birch/maranti shell composition of the 7000 series which has the slightly deeper sound. They have single nut-boxes and a regular triple flange hoop. These lugs do not have a spring inside them but instead something called a 'lug-o-ring' with a nut and washer behind and inside the casing. Because of the nut-box's tapered shape in profile the size and shape of the washer make it impossible for it to slip and so the tension is always constant. All these single-headed drums are mounted on very well and thoughtfully constructed stands. All have the cymbal stand's tripod bottom and on the set I saw the smallest four (6, 8, 10 and 12) were mounted on the normal bass drum type holders of the 7000 series. These are ball and clamp units which are small enough to allow the drums to get close together for easy multi-tom playing yet they adjust enough to enable the player to set them just as he wants them. The 15 and 16 inch drums had the regular spade-type fittings with a shaped block between them.

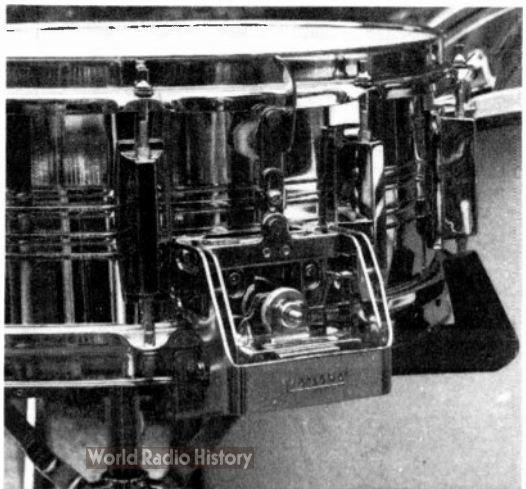
Yamaha now make pedal toms in 14x14 and 16x16 floor standing drums. These are normal shells but without top nut boxes and instead cam cranks which pull rods down from the inside via eight holes in the shell. The eight rods are attached to tension screws at their head end and centrally inside to a bar which is hinge fixed to one side and protrudes from the shell opposite it. The bar is then attached to a pedal. So, you move the pedal, which moves the bar which moves the rods and 'Presto Chango' the pitch goes up. The foot pedal can furthermore be adjusted to a position to left or right of the centre pull for more comfortable foot positioning (or left or right handed players).

Conclusion

We've waited at least three years for the new Yamahas and now they're here I'm sure many thoughtful players will consider the wait worthwhile. They are definitely not cheap (in anybody's currency) being the most expensive of the Japanese manufacturers but obviously the amount of re-thinking, new tooling up and just standing still is reflected in this price.

Bob Henrit

Kit courtesy of C. Foote Music



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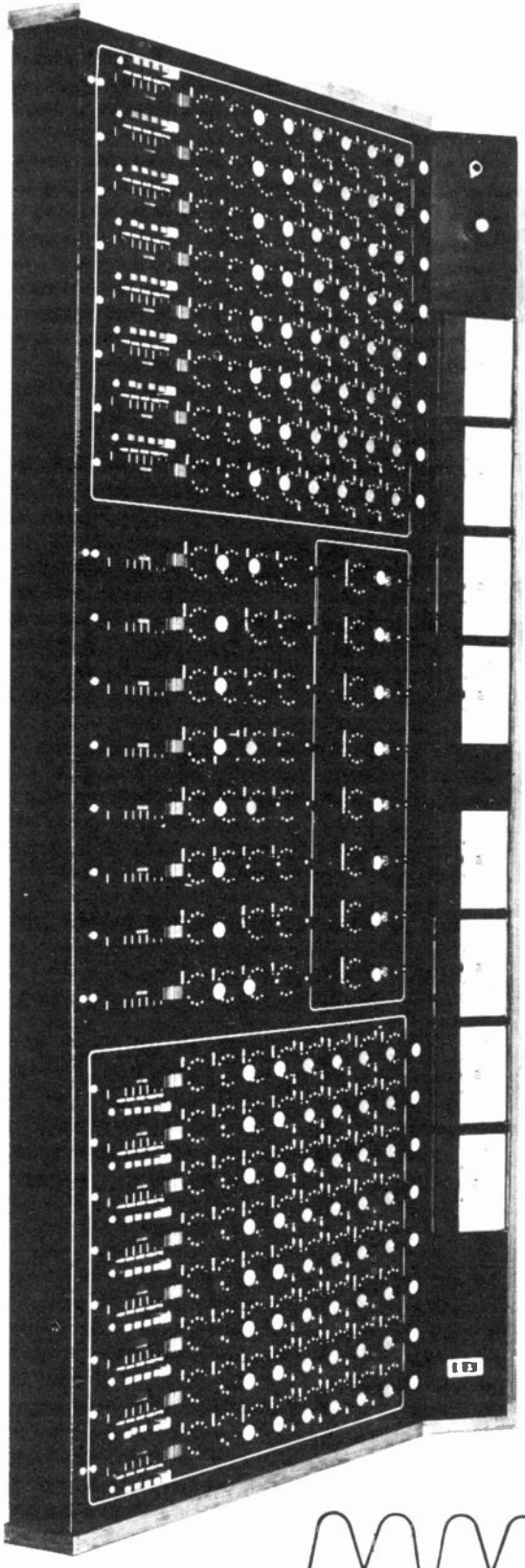

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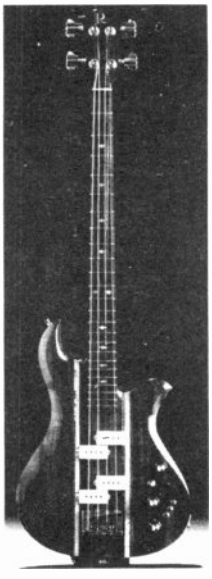

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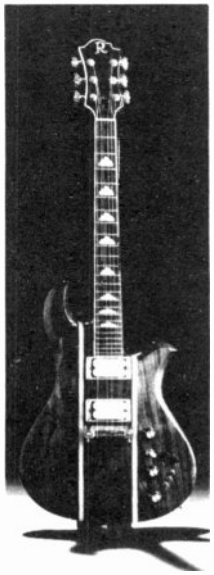

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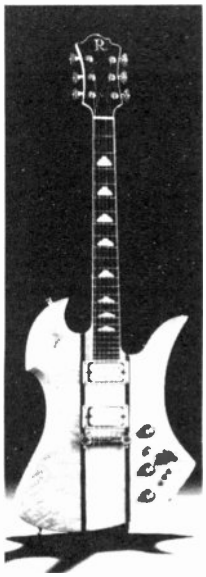

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X 120 Electra MPC Leslie West Model guitar $550 (without modules)

The MPC Electra guitar range from St. Louis Music Supply Co. is a collection of electric guitars and basses which accept interchangeable electronic effects modules. Any two modules from a range of about 12 units can be fitted into any of the MPC series guitars or basses and may be controlled by additional knobs and switches on the instrument's front panel. The basic idea seems to be that some players would like the convenience and easy control of built-in effects units, but no one guitar could possibly contain all of them and still be playable and/or affordable. If there must be a selection of two or three effects, then who should make the selection? Electra seem to have decided that the guitarist should be the one to make the selection, and they have also given him/her the option of having second thoughts later on, without involving too much expense.

There are several different models of MPC guitars and basses. Beyond the initial decision of which basic instrument you want, all sound effect options remain open either at the time of purchasing the instrument or at any later time. You don't need a technician to change the effects modules, you just open a door in the back of the guitar and plug them in. The modules are in neat plastic cases. They do not need individual batteries as they are each powered by the single battery fitted in the guitar body. If you want to have *all* the effects in the series, it would be quite possible to carry the whole set around with you like a box of tape cartridges. (Those little cases which hold 10 or 12 cassettes or cartridges would be just right for the job – incidentally, they are also handy for carrying a complete set of Marine Band harps.) In the interests of upholding our tradition of thoroughness and integrity, I have spent one entire afternoon trying out 14 different effects units and combinations of units with various amp and guitar settings. Here are a few examples.

1. Phaser More like a Small Stone than a Phase 90. Mild effect with 'color' switch in Off position. Much more definite effect with 'color' switch On, giving a deep phase sweep with some resonance effects. Speed controled by knob at guitar front. No other adjustments. Fast end of speed range sounds a bit excessive, like head in a goldfish bowl.

2. Dynamic fuzz I don't much like this one. Very harsh and edgy sort of fuzz, which I never did like. Too much obvious distortion if a lower string sustains on while you play something on a higher string. Deliberately playing more than one string sounds similar but (to me) worse. I hope I have missed the point of this one because if I haven't, it is something of a lemon. It also hisses.

6. Filter follower (a) Trigger mode Some volume loss if guitar master volume is set beyond 7. With the treble on full, this one has a nasty tendency to hit you between the eyes.

11. Frognose Great. Works as an amp overdriver, as a headphone amp, or will drive a spare speaker cab directly. (No amp needed). Works astonishingly well in all three capacities.

Comb. No.6 **Fuzzalizer** (Fuzz plus envelope-follower filter). The kiddies are going to love this one! A real ear cracker. I can't take this sound for long without lumps of Kleenex in my ears. Approximately a combination of hard wiry fuzz and an auto triggered wah effect.

Comb. No.8 **Basement Blues** (Tank tone plus treble/bass equalizer). Set up as described in the handbook, I find it too flat and muddy. Better with knob controlling Tank Tone set to 2½ and treble/bass knob set to 2¼.

12. Compressor (a) Normal mode Operates well enough and is not difficult to set up. Most compressors tend to 'breathe' a bit when fed from more than one string at a time. In a relatively simple unit such as this one (and most or all others sold for electric guitar use), choice of 'climb back' parameters is critical to inconspicuous functioning of compressor. This seems a usable and well thought out compromise.

I have already covered the use of this instrument with the MPC modules; it does a perfectly adequate job of driving the modules. So what is it like as a guitar? The straight guitar sound seems rather short of highs to my way of thinking, and the quality and range of available sounds is improved by the addition of either the overdrive or frognose modules. The literature supplied with the guitar suggests that the pickups are wound with more turns than average humbuckers and it may be that some of the plug-in modules provide buffering between the pickup and the loading effect of the controlsand the guitar lead. As this instrument is *intended* to be used with the modules in various combinations, and the frognose seems to be a general purpose small amp which is not intended to introduce distortion or special effects, I intend to review the guitar with this module in place. It is still possible to switch the effect in or out, leaving just the straight guitar sound.

This review guitar differs slightly from the standard MPC Electra models. It was designed with the co-operation of Leslie West, and retains the strong influence of Les Paul Juniors. The body shape has been changed around the neck end to give a large diagonal cutaway on both sides of the fingerboard. At the back of the neck, there is almost no heel, and the neck is easily playable almost up to the point where it enters the body. As the back of the cutaways are bevelled away around the neck joint, there is good access right to the top of the 22 fret fingerboard.

Although most of the Electra range are fitted with 5-way pickup mode selector switches, this model is fitted with the standard form of 3-way selector. The remainder of the controls on the guitar consist of master volume, Master tone, two effects in/out switches and two

rotary effects controls. As supplied to us for review, the pickup selector switch, the master tone control and one of the effects switches were not securely fastened, and could be turned in their mounting holes. A nice letter which arrived with this guitar describes the body and neck as being made from mahogany. I am not entirely sure about this. Mahogany would not be my first guess, but the wood used for the body has an attractive appearance and the workmanship is generally good.

The bridge assembly is mounted on a brass block inserted in the front of the guitar. This is intended to improve the sustain properties. I can't say how much effect the brass block has, but the overall sustain performance of the guitar is quite satisfactory, in spite of the additional holes cut in the body to take the effects modules. The best sustain is probably on the G and D strings, on my sample. The bridge is one of the several 'copies' based on the Gibson tunamatic but it has been fitted with brass string saddles in place of the usual die-cast bits generally found on such bridges. The brass saddles are not particularly well finished, but they should last a lot longer than the die-cast ones, without crumbling under the strings. The tailpiece is the conventional 'copy' stop-tailpiece bar, fitted in the usual way with two screwed pillars and threaded inserts in the body.

The pickups on this Japanese-made guitar look remarkably similar to some of the better known American made units. They appear to be fitted with powerful Indox magnets and all the polepieces can be individually adjusted with a hexagon key. In addition, the entire pickup can be raised, lowered or tilted in the usual way. I would guess that these pickups are well suited to driving on-board effects units but possibly a little over-wound for general guitar use. They produce a nice mellow sound but it is difficult to get anything else out of them without using some sort of buffer stage. They may have been designed to suit the more complex pickup selection circuitry fitted to other MPC Electra guitars.

The fingerboard is Indian rosewood with neat black plastic binding around the end and edges. The fingerboard has a gentle camber, as preferred by many players, and is reasonably straight from end to end. On our sample there is a slight tendency toward an S-shaped neck which may need some attention.

The frets are fairly wide, well rounded and smoothly finished. String-bending works well from new, with no obvious scratches.

At the other end of the fingerboard there is a nicely finished brass nut and a set of very smooth and solid-looking machine heads. Except for a slight adjustment of button 'stiffness", it is difficult to fault the machine heads. On the nut the second string is higher than necessary and the first and fourth strings are almost too low. Brass nuts are not easy to adjust finely, but I think this could have been done better. Other samples may be better.

The body and neck are finished with what appears to be a high-gloss lacquer in a pleasant orange to dark red-brown sunburst. I can find no faults at all in the finishing. It is a very glossy finish, and some people now prefer a less glossy effect, but it is still a very tidy finishing job.

I believe that this guitar or its prototype was designed to suit Leslie West, who likes Les Paul Juniors. I also like these guitars, and I too would have a (small) collection of them if I could afford it. I know that some old Gibsons of various models have necks which would be considered quite thick by present standards. Even the thicker ones I find comfortable to play.

Although this neck looks a perfectly reasonable shape, somehow I do not find it particularly comfortable, and it does not feel like any "Junior" *I* have come across. Of course it does not *have* to be like a Junior neck, and in any case, what does not suit my hands may be perfect for someone else. If it were not lacquered, I would be very tempted to take a millimeter off in a couple of places. However, tastes differ.

I have a suspicion I have seen some other guitars from the same maker, in the past, and if I am correct, the necks tend to vary a bit in shape (if not in overall dimensions). You really should go and try the guitar for yourself and see whether it suits you. Whether it suits me is much less important.

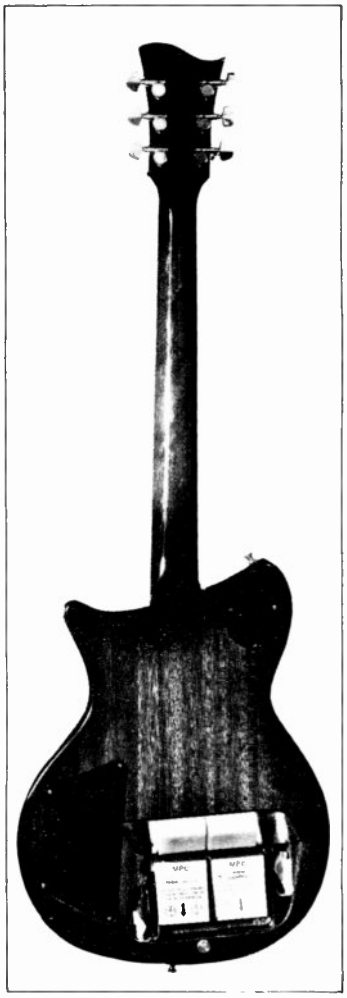
As I noted in the introduction, the overall 'straight' sound of this guitar is pleasant but not particularly variable. It is also a very mellow sond with little top. With the addition of a Frognose (or Overdrive) module, the guitar seems to come to life. The sound is brighter, richer and the whole instrument *seems* more responsive. With the initial brighter sound, the master tone control has a wider operating range, from "acoustic with new strings" to almost as mellow as the 'straight through' sound. The sustain is fairly good in all positions with no obvious dead spots. The sustain on the bass strings does not tend to dominate the treble strings but with the strings supplied, the instrument has a slightly flabby feel.

Conclusion

I believe this guitar is priced at around $525. Our sample had a very nice feel to the frets but I would prefer a slightly different shape to the back of the neck and is possible also a slightly straighter fingerboard. For around $500 our sample represents reasonable, but not outstanding, value, if considered just as a guitar. However, obviously some part of that cost is involved in the fittings and circuitry for the modules and the guitar should probably be considered as part of a complete system. Some modules I liked, some I didn't care for, some I hated. Other people may show the same reactions, but not necessarily to the same units – which is a good reason for providing a wide choice of effects units. **Stephen Delft**

Measurements on MPC Electra guitar

Scale length *626mm*
String spacing at bridge *51mm*
String spacing at nut *35mm*
Fingerboard width at nut *44mm*
Action as supplied *1.2mm* treble/*1.5mm* bass
Depth of neck at 1st fret *22mm*
Depth of neck at 12th fret *26mm*
Depth of neck at 15th fret *27mm*
22 frets on neck
Cutaway begins at fret 19/20 on treble side

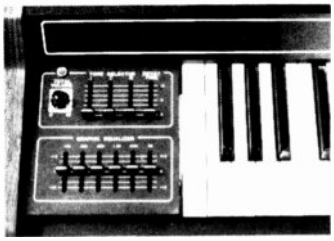


Roland MP600 Electric Piano $1195

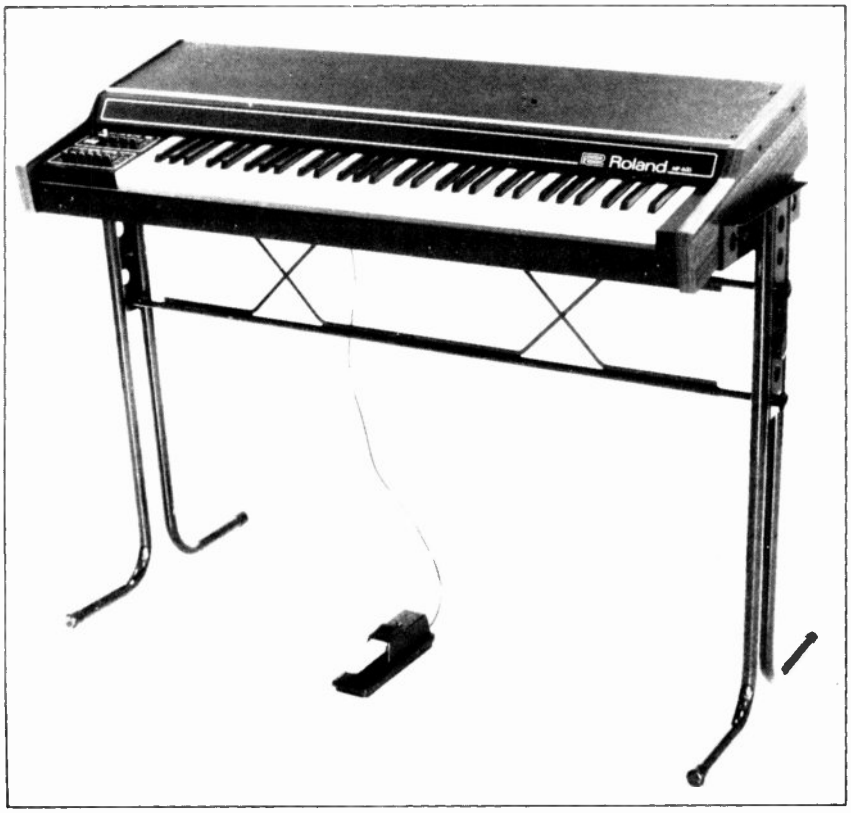
The Roland MP600 is a compact electric piano, well finished as you might expect from these makers and pleasing to look at, i.e. no garish colors. It is easy to lift and has a convenient flat top for putting other hardware on, or even for writing reviews on.

This review sample came with its own stand, which is a very sturdy contraption and difficult to push over unless you are really trying. There was also a flight case which was light but gave the impression of long - term fragility. I wouldn't be too worried about the stand, as I see this instrument as part of a stack resting on the organ or some other piece of hardware. Having said that, if you are looking for a competitively priced electric piano to form the basis of a keyboard set-up, you should certainly try one of these out.

The keyboard has a compass of five octaves and a minor third running from F (two octaves and a sixth below middle C) up to G (two octaves and a fifth above it). To the left of the keyboard is a volume control and tone selectors in the form of sliders I for "mellow piano," II for "bright piano" and III for "clavichord." To the right of these is another slider for decay time. When set on '0' the effect is similar to the mute on a clavinet. When set on '4' or '5', the result is similar to conventional piano decay. N.B. Don't confuse the term "decay" with release the note will only sound as long as you depress it.



Tony Hymas is a keyboard player with a wealth of experience in rock, jazz and classical music. He has played in groups ranging from the Jack Bruce Band to the London Symphony Orchestra, and is in great demand for session work.



Sustain is taken care of by a foot pedal (cable connected to the rear) which you can place where you like. In passing, I would like to mention that it is a well-made foot pedal giving the impression that it won't start squeaking or falling to bits at inopportune moments.

Below the tone selectors is a six-band graphic equalizer (100,300,600Hz, 1.2, 2.5 and 5kHz) with ± variation of 12dB. All these controls are within easy reach of your left hand. At the back of the instrument is the on/off switch, a stereo headphone jack, the output jack with a switch for high or low output, the foot pedal jack and a tuning knob which, when set at center, gives you A440 but when rotated produces a variation of nearly a quarter-tone each way. It's a shame that this is not within easier reach because you could use it for good effect and I don't just mean keeping in tune with the rest of the band.

What is it like to play? Well, the keyboard feels great, though I would dispute the maker's claim that it is exactly like playing a "traditional piano," It's a bit lighter than that, guys. I suppose that no amount of weighting can compensate for the absence of a piano action. Never mind the keys depress just as far and you can really dig into it if you want, make it sing (traditional piano virtues these) and play as staccato or legato as you like. In other words, it is touch-sensitive and feels chunky and solid under the fingers.

How does it sound? Starting with all the controls flat and with just Tone Selector I ("mellow piano") faded in, you get a sound that to my ears is a bit bland. Start messing around with the EQ and things immediately get more interesting. Plug in a flanger and a volume pedal and you'll get some nice string effects. The volume pedal is essential because there is no slow attack facility. Anyway, it's a piano not a synthesizer and the only pianos I can think of offhand which have the slow attack are those that have had beer poured over them.

Selector II is, as you might expect, a brighter version of I and the same remarks apply. Selector III has a very thin quality and is best used in combination with the other two. Of course, you can mix the three selectors together as you wish. One that I really liked was with I half in, II all the way in and III out altogether. With some judicious phasing and some lightly-struck high chords you can get those harmonic chords that guitarists (bless them) so like to lay on us. If you want a sound reminiscent of a clavinet easy! Reinstate number III, boost the low-mid EQ and add some I and II. OK, it doesn't sound *exactly* like a clavinet, but it's a good sound with a personality of its own.

And that about sums it up. There are a lot of keyboards around that, no matter what you do to them, will always remain faceless wonders. This one has a bit of character by experimenting, there are plenty of interesting textures to be found far more than I could go into in the space of one review. It's easy to come to terms with and I enjoyed the limited amount of time I had with it.

Both as a basic instrument or as an ancillary in a larger set-up, it is well worth a good hard look and, bearing in mind that you can shop around, it seems to me to be good value.

Tony Hymas

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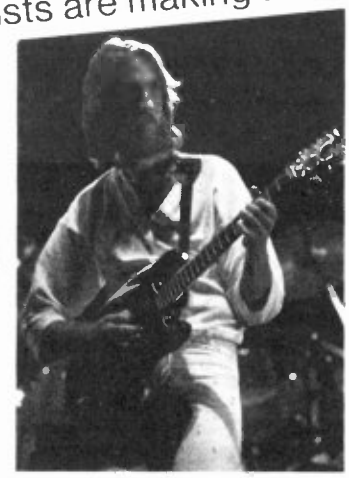

Michael Rutherford - Genesis

Steve Buslowe - Meat Loaf

Dave Hope - Kansas

Ray Moulton, Randy Jackson, Charles Singelton - Billy Cobham Group

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Skip Mitchell, Don Breland - The Oak Ridge Boys

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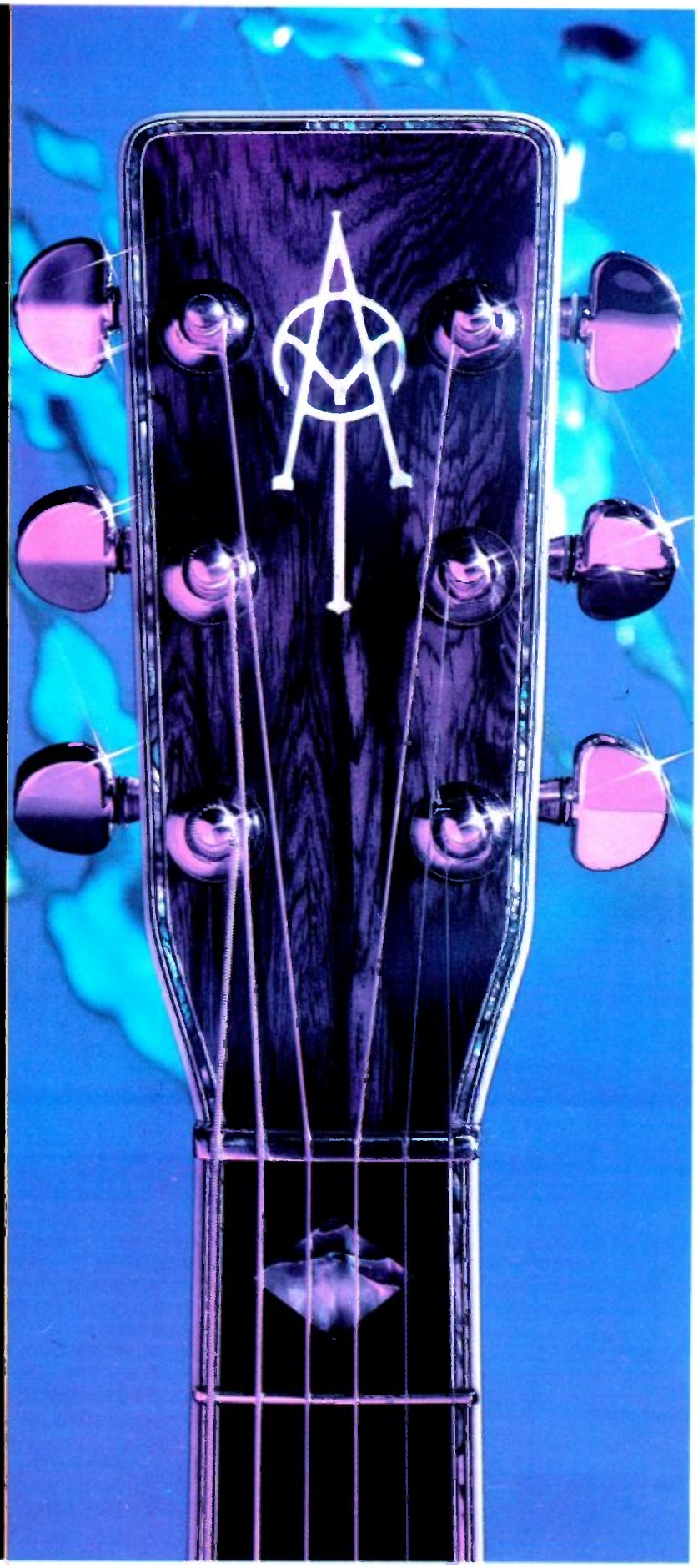

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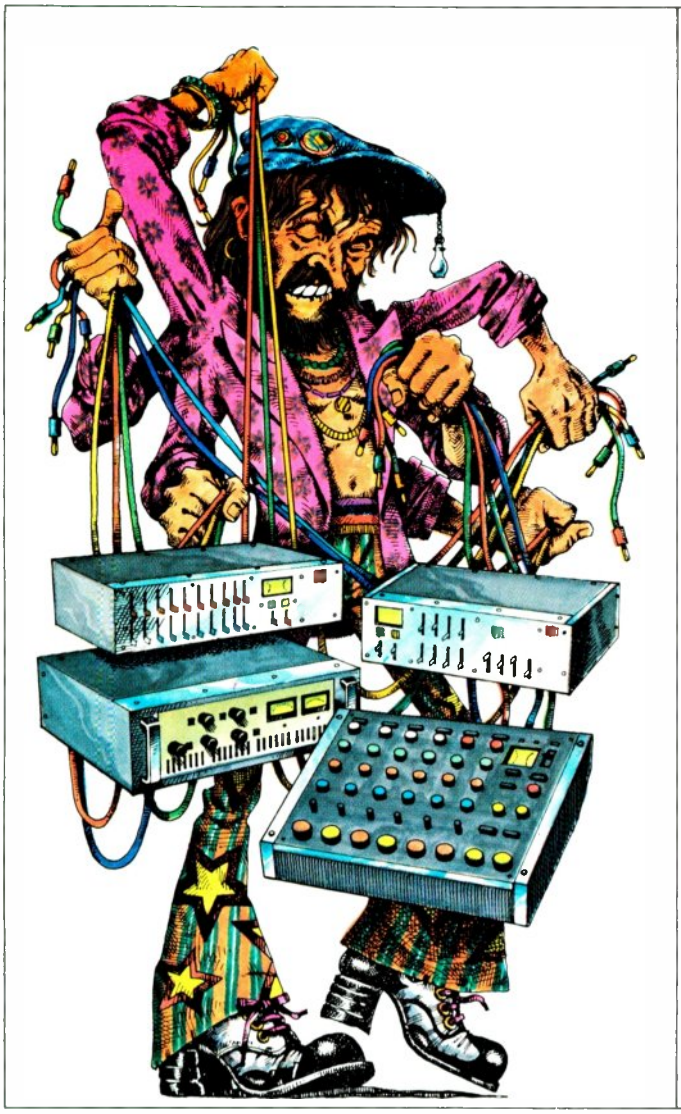

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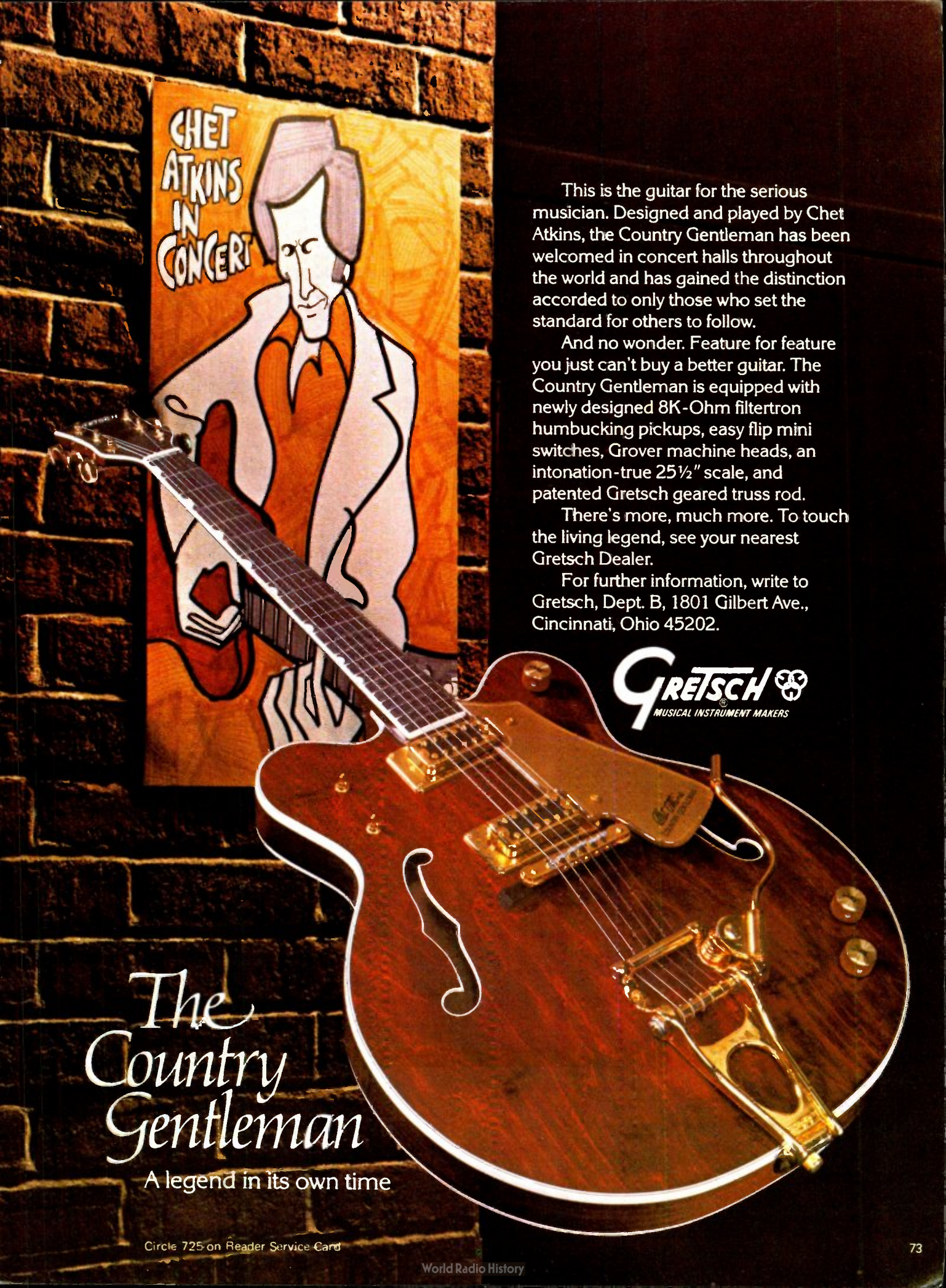

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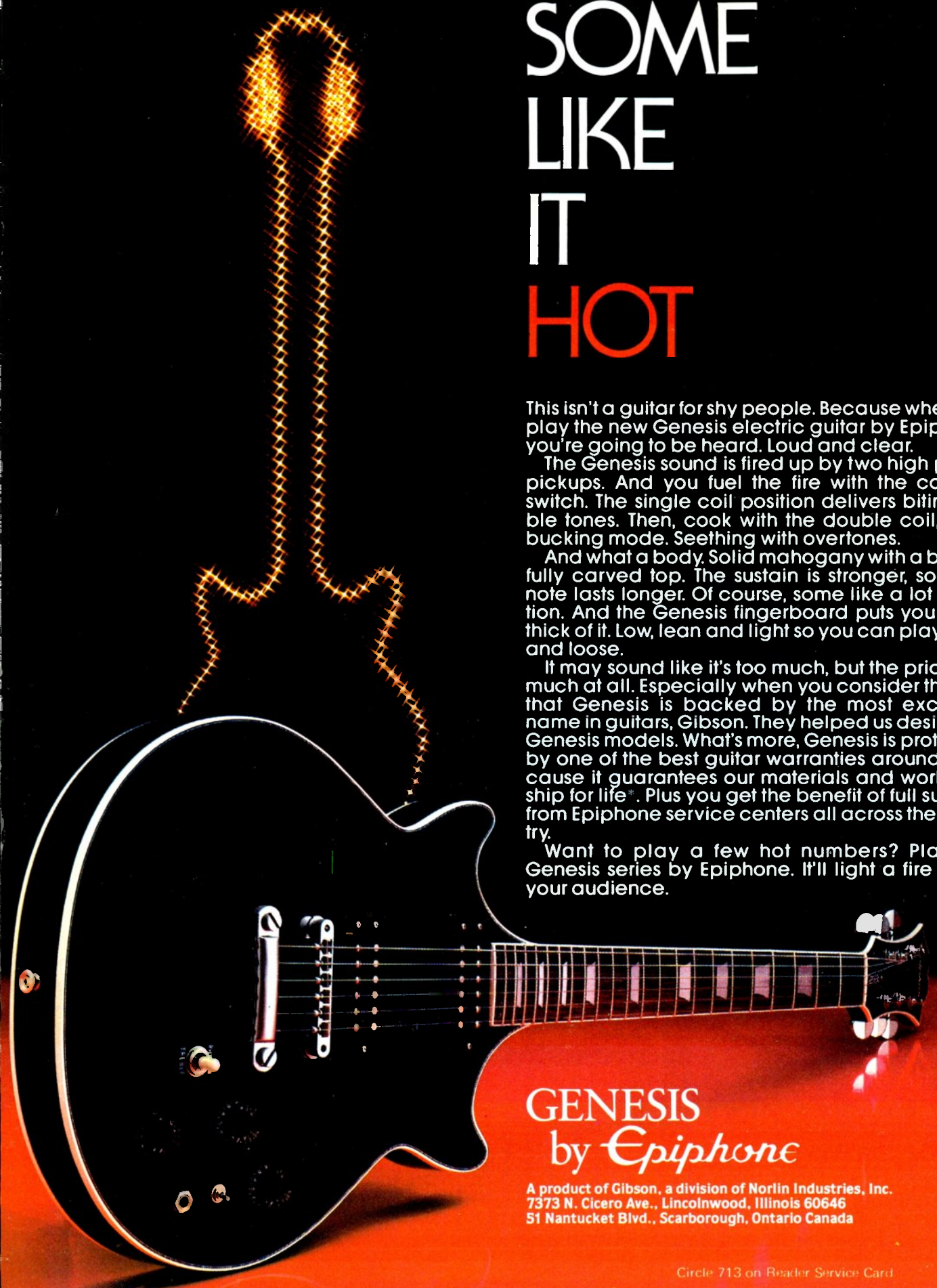

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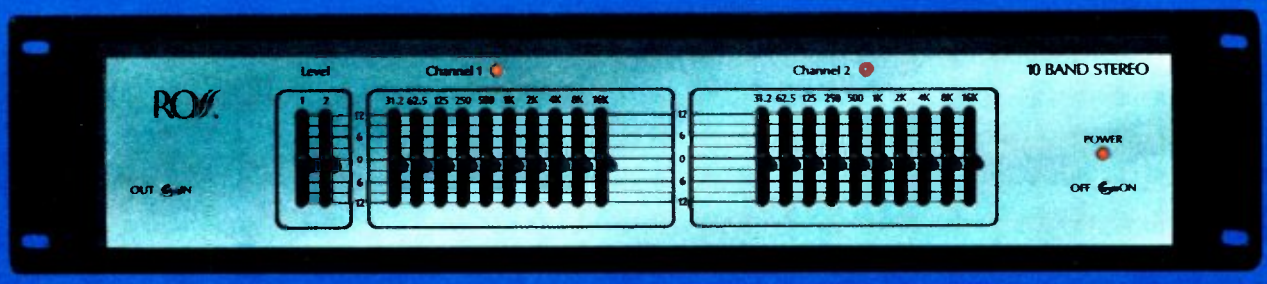

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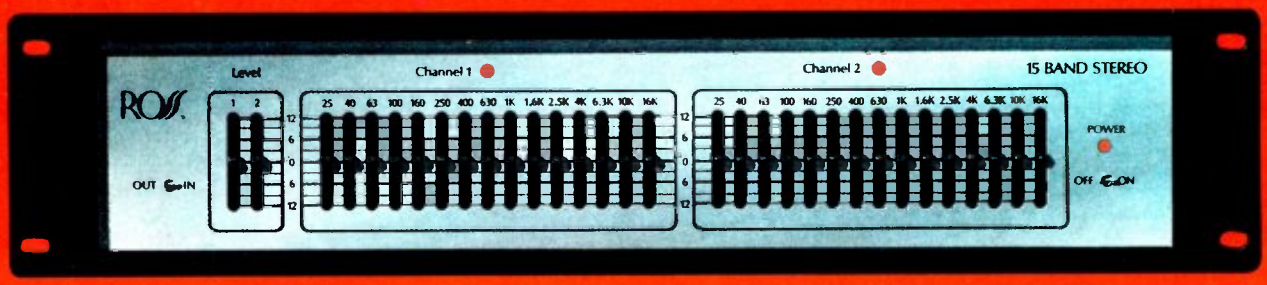

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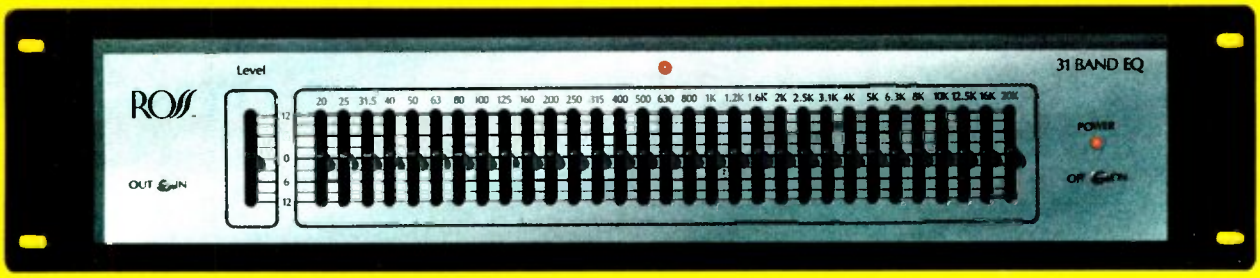

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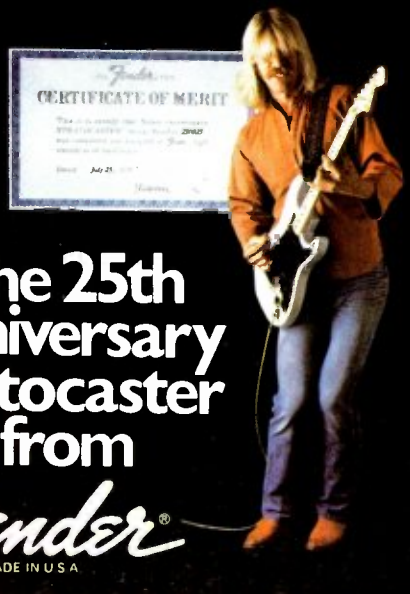

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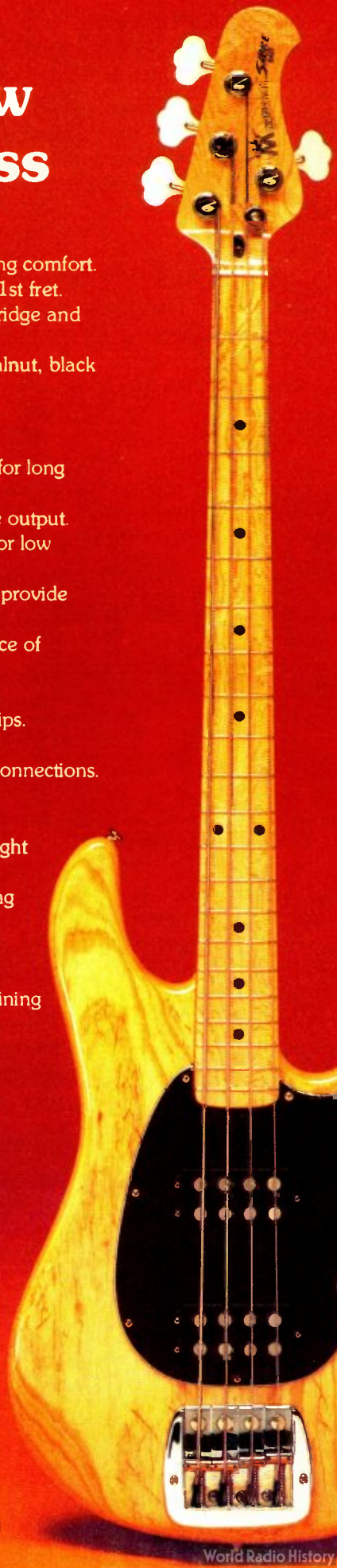

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WEST/MARRIOTT
The Queens—Cockney Connection

and never mind coming back from a 'has been,' they 'never was.' "

"I know," explained West, "that I've started this group with Steven and no matter what happens I can hold my head high with respect for what we've done together."

Expostulating on travelling the "comeback" road of rock & roll Marriot interjects with "It depends what kind of respect you want to come out of the situation with. If people are willing to give you an ear out of respect for you, then that's okay. After all, we're doing what we did in the past but now it has a little more class and it sounds a little better.

"I suppose since we've got older, not so much hair and our bellies are bigger we've developed a maturer attitude. I don't really think that it's any different from what we played in the Sixties, quite honestly. The difference is that now I know how to play it."

Marriott does most of the writing for the band. As he explains, "I'm carrying that weight right now. But I think that's only because it was my role in the other two bands."

"Steve does come up with most of the ideas," West explains, "but then I come up with things after the fact – other ideas."

Marriott agrees explaining that "half the part of writing good songs is the arranging. If youve got thinking people in the band then they contribute to the arrangements and suggest various ideas. In that respect, then everybody writes.

One of the reasons that Marriott gave for the maturing of their music and their development of style was the vast improvement of equipment over the past few years. Always a guitar collector with some of the best in Les Pauls, Gretsch and Fender, he was recently turned on to another instrument, the MPC guitar.

"I'm not a very good guitar player," contends Marriott, "but I like to think that I'm an effective player. I've never really liked effects. The pedals get in the way and they're awkward. But with these new guitars, besides being well made, it gives me a chance to experiment without having to deal with the pedals."

Marriott is making reference to the modular design of the MPC guitar which has different effects available to plug in in modular form inside the guitar. West, who at one stage was never without his Les Paul Juniors, has also turned to an MPC guitar for similar reasons. "I found that I was getting bored. I was limited in what I could do with the guitar. The MPC's really turned me on because I only have two knobs to deal with but I have 12 extra effects I can use because of the modular design. They give me that extra little kick that I need."

Out in Modeto, California, The Firm is putting the tracks down for an album which is nearly half done. Marriott has deserted the English life-style of London Town for the wooded quiet of Boulder Creek, just outside of San Francisco, and West, whose New York style and demeanour seemingly should disallow him from living anywhere else, has taken to the beach town of Santa Cruz, also in California.

The quiet, wooded setting, hardly seems to fit with the intenseness of their earlier accomplishments and careers, yet you can be sure that when the time comes for them to get out and rock on stage, the lazy atmosphere of Santa Cruz will soon disappear.

It will be interesting to see how this "Queens-Cockney connection" works. They say rock and roll is a universal language, so it is up to the West Marriott combination to prove it. Whatever happens you can be sure that the music will be raw and rocking, just like the places they both spring from.

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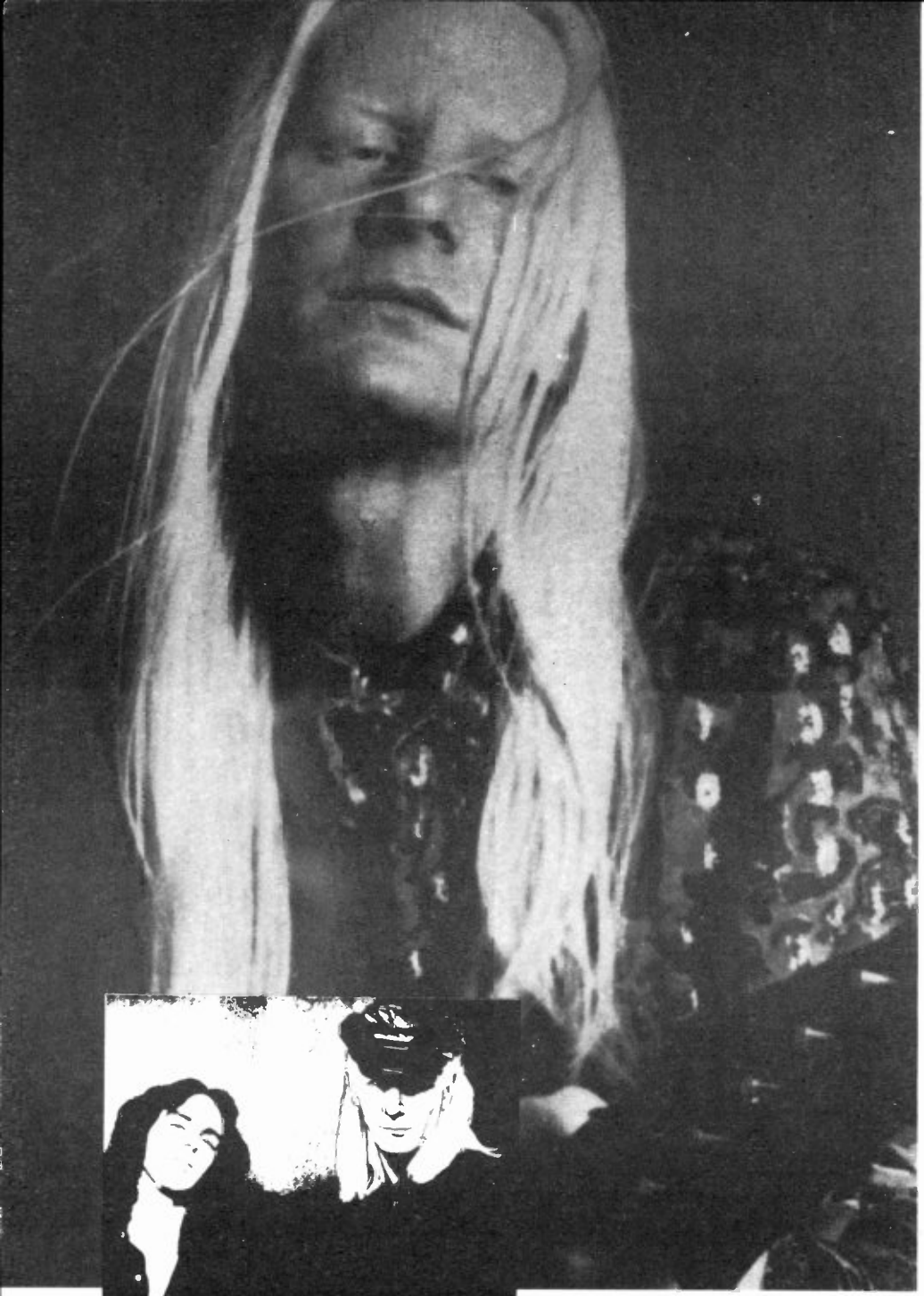

Bobby Torello, Johnny W.

Johnny Winter recently returned from a European tour, his first since 1974, where he gave his audiences what they wanted – a mixture of energetic rock & roll and some exquisite blues. In some ways he's very similar to Britain's Rory Gallagher, in that his first love is the blues and he's stuck to his roots throughout his career – there is no compromise to Johnny Winter.

WINTER'S TALE

EAMONN PERCIVAL

For his European tour, Johnny kept his band tight using Bobby Torello on drums and Job Paris on bass. Paris, in fact, led his own blues band in New York before teaming up with Link Wray and Robert Gordon just prior to teaming up with Johnny. He also sings and doubles on harmonica and is described by Winter as "just great".

"The great thing about this guy," enthuses Winter, "is he plays excellent bass, he loves both blues and rock & roll and he plays harp on a rack at the same time. I wanted a harp player and a bass player and I've really got two for the price of one. We also swap around and he'll play guitar and I'll play bass, it's nice to have that variety. With a trio, you've got to work hard to make it interesting and with this band, it's so much easier. We've got so much freedom with the three of us. The guys are such good musicians that they'll pick up anything real quick, so we do a lot of improvising and jamming."

Although Johnny has a passion for blues, his early influences were varied. Not least important of these was his father.

"Daddy liked a lot of jazz and big band music. The popular music of his time. He played sax and banjo and listened to people like Artie Shaw, Benny Goodman, Tommy Dorsey and that kind of stuff. That was the first music that Edgar and I heard when we were growing up. It wasn't that we suddenly decided to take music lessons and learn how to play things, it was just like walking and talking. Mommy and Daddy were always singing and playing something, we never thought of doing anything else. I was into all types of music. Like country music. There was no way you weren't into country in Beaumont. You couldn't get away from it. If you turned on the radio, you'd hear country, if you went to a club, you'd hear country. There was nowhere you could work in Texas if you didn't play country, apart from the black clubs."

The black clubs, in fact, were Johnny's own "school of music." He would play the white clubs to earn a living and play the black clubs for the joy of being able to play blues.

"Beaumont, was a really strange place for music. It's about 40 minutes west of Lousiana. It's right down there in the south so you'd get a lot of Cajun music, Creole stuff. There were a lot of local bands that played the South Lousiana music. And we'd also have that New Orleans sound coming down which again was totally different. Then we'd have the straight hillbilly country plus the popular rock & roll

and all the jazz stuff that Edgar would be playing. It was a case of which one of us could turn his record player up the loudest. I'd be playing Muddy Waters on mine and he'd be playing John Coltrane!"

After his brief flirtation with the ukulele, Johnny "messed around" with an old, warped classical guitar that belonged to his great grandmother. After six months of struggling with it, his persistence and determination won the day and his father bought him a Gibson 125.

"I really wanted to play the ukulele," Johnny laughed, "but Daddy kept telling me the only people who played it were Arthur Godfrey and Ukulele Ike and he didn't see much future in it"!

Johnny admits to having been somewhat of a slow learner with regard to blues guitar techniques, especially on his finger vibrato.

"When I first started, there wasn't anybody to watch. I was too young to get into the clubs and the only people that I could see playing were the guitar teachers in the music stores and they were mostly hillbilly players. The guy who sold me my first guitar was a great player and he showed me Chet Atkins and Merle Travers stuff, which was what I wanted to play initially. That's also the reason I started using a thumbpick. And, of course, all those people used the big gigantic strings and I didn't know any better. When I first heard blues, I was trying to bend these real heavy strings and I couldn't figure out how they did it. Then, when I got my first Strat with the tremolo bar, I thought 'Wow, that's how they do it' but it still didn't sound right. I was also trying to play blues on the Strat with a *wound* third, my first string was probably a 0.16!

"We had this local radio station called KJET and there was a DJ, Clarence Garlow, who was also a musician and he took time out to show me things. He'd take me to the black clubs and make sure nothing happened to me. He told me about putting a second string in place of a third and a first in place of a second and all that. I figured out the bending and everything but still the vibrato didn't sound right. There weren't many people around using vibrato. T-Bone Walker was typical of the Texas blues players and he didn't use vibrato.

"What really made me want to use vibrato was Otis Rush, because he had the most beautiful vibrato and I was sure he was using the tremolo bar! So, I got real good at using the bar, and a lot of people used to use it. It wasn't any kind of disgrace, it was just another accessory. But now, getting a good vibrato with the damn thing is a lot harder to me than using my fingers. I can't do it now. I used to be able to use the tremolo arm and get just as nice or even nicer vibrato, because I'd go down *and* up instead of just up. So it really was better, but when it became fashionable and cool to be a good guitar player, it depended a lot on you finger vibrato – and I thought it was really stupid but I was determined to learn it if that's what I had to do to be considered a good guitar player. I just took the fuckin' vibrato arm off my guitar and started from scratch. It didn't take nearly as long as I thought it would. That was in '67 or '69. Up until then, I was still using the tremolo arm."

Since he started playing, Johnny had been through many makes and models of guitar. But in 1970, he settled on Gibson Firebirds. Since then, he's used nothing else. While his strings are fairly light (0.9 to 0.42), he favors quite a high action.

"I like real high action on my guitars, not just for slide either. I always played with a fairly high action before I started playing slide. It's because when I've tried lower actions, I can never get my fingers under the string enough for bending. When I bend the third string, for instance, I always push it up toward me. Some people push down for bends but I can't do that. With my action, I push under the other strings.

"I've messed around trying to bend the opposite way but it just doesn't feel anywhere close to normal, for me. It felt horribly awkward. Some people say that guys who play like that have a better or different vibrato. Maybe it's easier if you started from scratch playing like that".

Johnny recently switched to Music Man amps, after having used Fenders., Ampegs and Marshalls. He also officially endorses them.

"It's the first thing I've ever endorsed – guitars, amps, strings or anything - Muddy's guitarist turned me onto them. I'd been using Fenders and stuff and I'd wanted to try the Music Man amps out because I figured if Leo made the originals, they would probably be better. Bob Margoulen had one with two 10" speakers that sounded great. He could use it anywhere, indoors, outdoors, anywhere, and it *screamed*. I bought a couple and just two months ago, Leo found out I was using them and offered me an endorsement deal. Up until then, I'd used Fenders early on and then, during the days of *Johnny Winter And*, we were playing larger places with usually rotten PA systems so I was using a combination of Marshall and Ampeg. The Marshall had the real distorted sound and the Ampeg was a lot cleaner so it was a nice combination for using that power on stage. As soon as I realized that PA sets were good enough to not need that many amps on stage, I stopped. I use a Music Man 4x10 in the studio. It seems the one with two 12s is a little bit louder – I usually use it for rock & roll because it has more of a midrange sound. The 4x10 has more bass and treble and less midrange, but it's a nice piercing treble so I usually use that for blues. I use them both on stage. I keep them both on and, if I'm not getting enough volume, I'll plug into the 2x12 but I usually start off with the 4x10."

Johnny doesn't sit down and practice these days, unless it's for a tour – although it used to be an obsession with him.

"I used to just sit there and play and play every second when I wasn't doing something else that I had to do. Everybody was into sports back home and because of my eyesight, I had to forget sports. I could never have been great at it. The only thing I could do was fight and bowl and I still have time to do both of those! Playing guitar was the whole thing. Now, I really don't practice as such. If I hear something that I don't know how to do then I'll get my guitar and try and figure it out. Or if I've been doing studio work and haven't been gigging to keep up my playing, then I'll go in before a tour and practice with the band. It's just like doing exercises. Even if I take off for a couple of months and haven't touched my guitar, after a couple of weeks of four hours a day. I'm pretty soon back to where I left off. I don't like to have to do that.

"What I really like is when I've played something that's surprised *me*. I love to do that. We usually make cassettes of all our gigs and it usually happens when we're listening back to them. I'll sit there and hear something and say 'God, did I play that? Listen, man, nobody's that good.' I'll just be amazed at myself. When I'm onstage though, I don't have time to sit there and think how cool I am. It's more like worrying about a mistake I made a couple of bars back. If I don't have some wine or something before I go on stage to tense down, I'll do that, I'll make a mistake. I'll play bad because, if I do something I don't like, I won't be able to get my mind off that and go on and play better. I'll be thinking to myself '*Why* did you do that? That was *stupid*.' And when I'm thinking about that, I'll be doing more stupid mistakes that I don't like and pretty soon I'll get to where I *hate* what I'm doing."=

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Albums

The Cars
Nick Lowe

The Cars

The Cars

Candy-O (Elektra)

A bit more "experimental" than their dazzling debut LP (*The Cars*) which accomplished the singularly rare feat of boosting the Boston-based group to the top of the charts *and* the annual cirtics polls, *Candy – O* will undoubtedly win them some new friends while alienating some of the fans who loved them for their brevity and focus. After all, any band that starts out the first side of their debut album with three consecutive powerhouses like "Best Friend's Girl", "All That I Needed" and "Let The Good Times Roll" are already facing follow-up difficulties under the best of circumstances. But *Candy – O* is much too complex a work to submit itself to such a superficial judgment.

Like the second side of *The Cars*, this album demands repeated listenings before allowing you to penetrate its dense, surface instrumental textures. Greg Hawke's brilliant synthesizer (the best in rock & roll and, besides Zawinul, the only guy worth listening to) playing takes a more dominant role as the fountainhead of Cars materials, lead singer and guitarist Ric Ocasek, pulls back a bit from more conventional rock & roll song structures into extended pastiches or "mood pieces" Ocasek's angular lyrics become even more cryptic and abstract on *Candy – O*, barely hinting at the contemporary scenarios dramatized through the naked, metallic instrumentation provided by Hawkes, bassist Benjamin Orr, drummer David Robinson and Massapequa New York's own guitar virtuoso Elliot Easton (if you *really* want to hear what rock & roll guitar *should* sound like, listen and learn from Easton, one of the most tasteful and *musical* guitarists in the U.S.).

Some of the songs growing on me faster than others – which might mean potential hit or multiple play AOR material – include the stunning opener "Let's Go" with its catchy "I like the nightlife baby" refrain and growling synthesizer counterpoint, "It's All I can Do" (another million dollar chorus); "Got A Lot On My Head", "Double Life" and the moody title track, "Candy – O". Every passing day or listening brings added nuances to the ear as these brilliantly quirky (in the Boston – the city, not the group – tradition) and meticulous craftsmen ply the trade they were obviously born to. Not as dazzling as the first, but a nonetheless brilliant follow-up album for one of America's most promising bands.

J.C. Costa

Produced by Roy Thomas Baker, engineered by Geoff Workman

Nick Lowe

Labour of Lust (Columbia)

In a recent *CREEM* profile, Nick Lowe described *Labour of Lust,* his second solo American LP, as a "guitar album". This could be slightly misleading for those fans conditioned to construe that term as signifying 20 minute guitar solos drowning in bathos and distortion. What Lowe probably meant was that, like other pop-rockers from the past (Hollies, Buffalo Springfield) he has mixed the acoustic and electric rhythm guitar tracks big and "hot" to match the high-profile position his bass guitar holds in the overall mix, Dave Edmunds' lead guitar playing is certainly a factor on tracks like Mickey Jupp's "Switchboard Susan" and Lowe's "Born Fighter" and "Love So Fine", but it by no means dominates the general proceedings.

Unlike *Pure Pop For Now People*, this album does not sound like a haphazard collection of singles and incidental tracks culled from Lowe's already extensive British discography. There is a certain "standardization" or recorded sound to *Labour* that implies more a coherent overall approach to these particular sessions. But Lowe still has a knack for creating oddball little pop ditties that bear a multitude of reference points from rock classics of the past (Tom Verlaine once dismissed Lowe as sounding like he'd "listened to every rock & roll record that had ever been made") without actually coalescing into a "hit record" per se. Some people find this trademark Nick Lowe characteristic a bit ennervating, I find it adds a measure of charm and vulnerability to his work, setting him apart from some of his "clenched-teeth" colleagues who insist on droning on about their particular brand of misanthropy or misogyny – whichever applies.

Standout tracks include the afore-mentioned "Switchboard Susan", "Cruel To Be Kind" (co-written with Ian Gomm), "American Squirm", "Love So Fine" (again, this song sounds reminiscent of *something),* and a marvellously low-keyed send up of rock & roll madness entitled "Cracking Up". *Labour of Lust* represents more than an idle play on words – songs like "Dose Of You" and "Susan" are riddled with references to advanced state of phallic protuberance, and girls measurements, meaning Lowe was horny or simply overstating the case for healthy heterosexual relationships in the great rock tradition when writing the material for this album.

If people will relax "lie back and enjoy it" instead of worrying about whether Lowe actually lives up to the dubious designation of "power-popper" to the letter, they may come to realize that Lowe is making some of the most enjoyable music to grace our shores for a while.

J.C. Costa

Produced by Nick Lowe

Atlanta Rhythm Section

Underdog (Polydor)

The Atlanta Rhythm Section, invariably the most stately member of the post-Allman Brothers southern contingent, comes up with another solid, "meat and potatoes" effort on *Underdog,* their latest release for Polydor. By now, these grizzled veterans of the southland musical odyssey (producer Buie and guitarist/vocalist J.R. Cobb were originally members of the legendary Classics IV in the early-mid-sixties) have settled into a comfortable gold/platinum groove and, unlike contemporaries to the north and west, they feel no need to impose cosmetic change on their music to keep up with the times.

Being a die-hard fan of hokey, off-the-wall minor-chord "slush" singles, it was a special bonus to discover a classy, extended reprise of "Spooky" (hit single by the afore-mentioned Classics IV) tucked away in the middle of Side II. Lead singer Ronnie Hammond, not always known for his restraint, handles the nearly silly lyrics ("Just like a ghost you came out of my dream/so I'll propose to you on. . .Halloween") with great affection and taste, and the brilliant lead guitarist Barry Bailey plays a devastating series of solos that build in impact without straying from the basic melody line.

"While Time Is Left" explores some uncharacteristic material in 3/4 time with Bailey's guitar working in deft counterpoint to Dean Daugherty's quasi-Baroque keyboard while tunes like "Do It Or Die" and "It's Only Music" clearly demonstrate ARS' easy mastery of blues-rock forms. The lyrical message implied by "It's Only Music" and "I Hate The Blues" (which segues into an unmemorable version of Ashford & Simpson's "Let's Go Get Stoned") seems to indicate a desire to downplay the overwhelming influence of music in contemporary life with some biting commentary on the southern "blues mystique" thrown in for good measure. A bit sleepy in terms of overall tone, but what do you expect from Doraville, Georgia?

J.C. Costa

Produced by Buddy Buie, engineered by Rodney Mills

Joni Mitchell

Mingus (Elektra)

Since Joni Mithcell ended her folk rhapsody era with *Blue,* she has continued to defy her audiences, testing both them and herself with a series of albums that, while remaining distinctively Mitchell, display a musical development uncanny for its depth and artistry. With *Mingus,* her dedication to the great bass player, she has produced a jazz album with all of the nuances, subtleties and power necessary to be evocative and demanding.

To much of her audience, this will prove to be a "hard" album, for little is compromised for those that hang on the drip of every lyric. Collaborating with Mingus on many of the pieces written by him must have more easily enabled her to do what must seem the impossible: to interpret jazz into lyric form. Gone are the lyrics of sentimental America, making way for the sharp, definitive lines that cross the cultures and cut deep like much of Mingus's music.

To say that Charlie Mingus was always reaching, always taking chances with his music would be an understatement of grand proportions, but Mitchell seems inately aware of how to develop the music through tasteful arrangements. Although she admits in her liner notes that she used many musicians in the development of the tunes, the final amalgamation of artists is impressive with Jaco Pastorius (bass). Wayne Shorter (soprano sax) Herbie Hancock (electric piano). Peter Erskine (drums), Don Alios (congas) and Emil Richards (percussion).

On Side One "A Chair In The Sky" displays Mitchell's vocal power as she weaves her chant-like tones over the interweaving lines of Herbie Hancock and a very plaintive Wayne Shorter. Mitchell has also shown a development in her guitar style, abandoning the finger-picking folk style for, as in "The Wolf That Lives in Lidnsey", a percussive, hard sound that explodes with a texture that adds a depth and coolness to the piece. Making it clatter and buzz, she forces attention to the sound before interjecting a sweet harmonic which floats over the congas and the howls of wolves.

Side Two opens with the up-tempo 'Sweet Sucker Dance". Composed by Mingus, Mitchell's lyrics bounce and weave through the tempo with her characteristic changes in octave and tone. There builds an almost manic sense of jazz licks with Herbie playing some great electric piano cut across by Shorter's sharp and definitive interjections.

On "The Dry Cleaner From Des Moines" the bass jumps up front and stays there. The song is a high point on the album with great lyric content and an impressive, biting brass arrangement by Jaco Pastorius The album closes with a Mingus classic, 'Goodbye Pork Pie Hat" which displays some derivative bass work and some classic soprano sax by Shorter.

Joni Mitchell's tribute to Mingus is a beautiful album that obviously derived from Mitchell's desire to be honest to Mingus' work. Apparently, he heard all but "Goodbye Pork Pie Hat", before he died. There will, no doubt, be other tributes to Mingus and Joni Mitchell's is sure to stand up front with the best of them.

Recorded at A&M Studios, Hollywood, and Electric Lady Studios, New York.

Bill Stephen

Recorded at A&M Studios, Hollywood and Electric Lady Studios, New York.

Atlanta Rhythm Section

Joni Mitchell

Joni Mitchell

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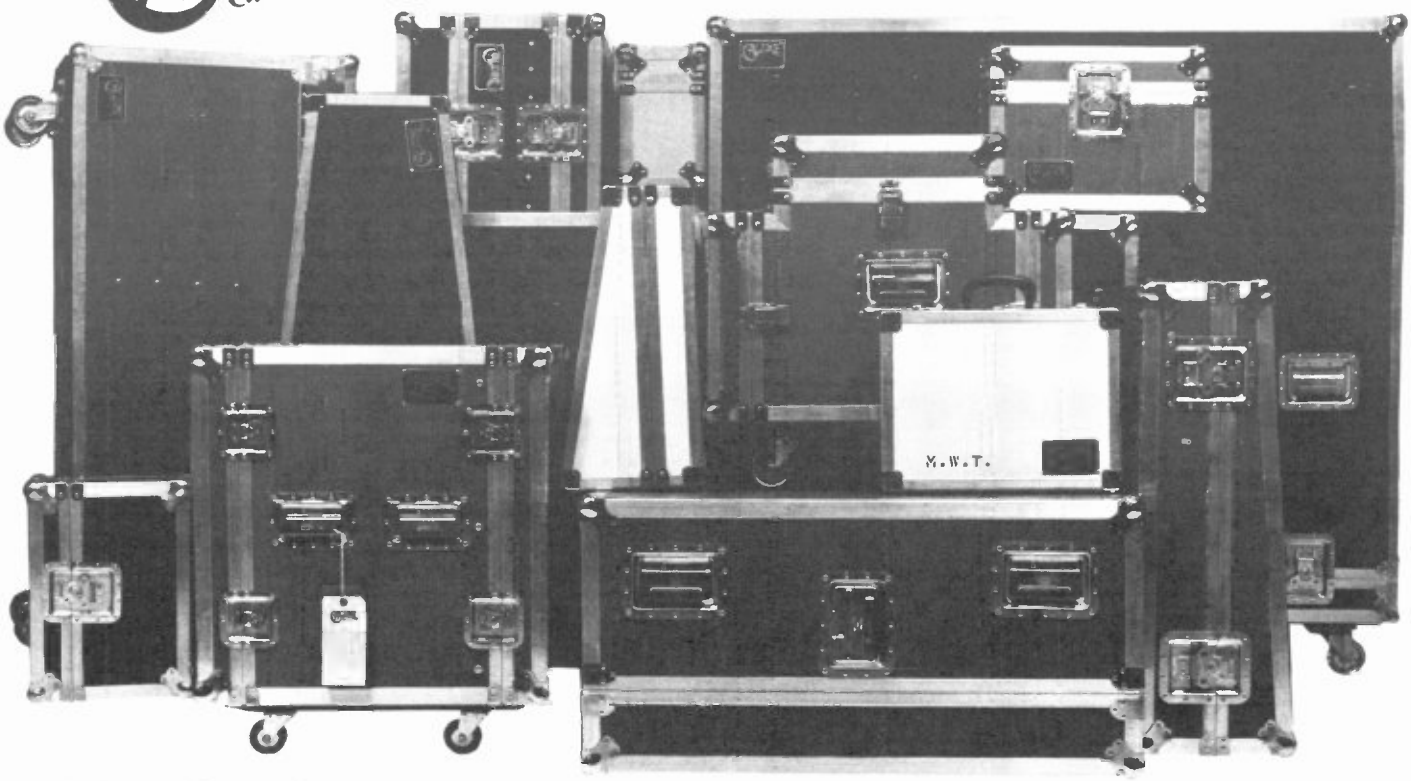

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All musicians know what a hassle it can be to make a quick attempt to get an instrument in tune, only to spend what seems like an age getting it right. No matter how good your ear it can sometimes prove impossible to tune up especially for gigging musicians battling against a multitude of distractions.

But with the growing number of electronic tuners on the market this infuriating guesswork is being removed. Visually there is no mistake, your either in tune or your not. At the flick of a switch you can now tell at a glance, with the help of illuminated dials and screens, whether you're sharp or flat. To a large extent tuning by ear, for the less accomplished, is a hit and miss affair – trial and error. But by combining aural technique with a visual read out, quick and accurate tuning is made easy. If you're experienced it can speed up your tuning technique and the novice will enjoy more consistent results.

The range of products now on the market is wide and varied, both in price and function. Take as an example the Conn Strobotuner, a device which detects musical tones and compares them with a fixed reference, a scanning disc. It turns at 12 different precise speeds like 12 tuning forks, corresponding to the 12 notes in the equally tempered scale.

An octave is usually divided into 12 equal parts, called semitones or half-steps. When more accurate measurement is required the hundredth part of the semitone, called the cent, is used. One semitone is equal to 100 cents and 1200 cents = 12 semitones = 1 octave. Most tuners express their readings in cents deviation from the tones of the equally tempered scale based on the American Pitch A of 440 cycles/sec, or Hertz (Hz). – deviations are tones sharper than standard and minus deviations are tones flatter than standard.

For certain purposes it is desirable to know the actual frequency in Hz corresponding to a given reading in cents. Certain scales or "cents-frequency" tables have been devised and are available to help with the conversion of readings on a semitone scale to actual frequencies. They can also be employed to find the location of a given frequency on a semitone scale, or the number of cents representing the interval between two frequencies.

All tuners do the same job but the way they get their results is slightly different. Here we look at some of the tuners which are now available and explain just how they help to eliminate those tuning blues.

Morley Digital Guitar Tuner DT-4400 $90

The DT-4400 is a digital unit giving a fast and accurate readout for guitar, bass and keyboard tuning.

It is the size of a cigarette packet and yet contains all solid state integrated circuit design and reads any frequency from 1cps to 9,999cps, being accurate to 1cps.

The unit accepts all standard guitar cables, is battery operated and turns on automatically when the plug is inserted. It can check the fundamentals as well as harmonics on lead and bass guitars and the red LED displays are easily visible even in dimly lit areas.

To tune, you simply pluck the string and a visual readout of the vibrating string is given every half second. As the string vibrates, the tuner holds the last reading until the string is plucked again. It can also be used to match the pitch of another instrument.

Surrounded by a high impact resistant case, the DT-4400 is both durable and easy to handle, and slips easily into the pocket.

Circle 880

Roland Boss TU-120 tuner $199.50

The magic tuning box from the Roland Corporation is marketed under the Boss label. It is a neat little stroboscopic 12-note unit incorporating a variety of interesting technical features, as one would expect from this innovative company.

The Boss TU-120 incorporates function, octave and pitch selectors, a 16 LED display, built-in microphone, calibrator and monitor. It can operate off batteries or a direct AC line and is ideal for all types of instruments.

Electric instruments are plugged into the tuner and acoustic instruments are picked up by the microphone.

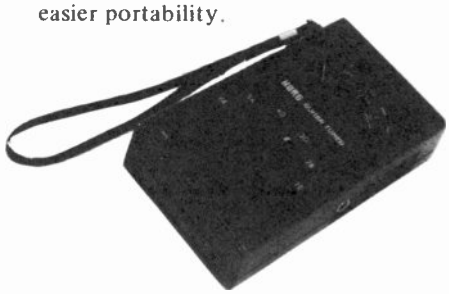
The system tunes over a five octave range and tuning by ear can be done over a three octave range. Easy to use, small and compact, the Boss gives perfect tuning at the flick of a switch.

Circle 881

Korg GT-6 Guitar Tuner $100

This compact and lightweight electronic tuning standard, designed expressly for guitar and bass, features a six-position note selector switch (6E, 5A, 4D, 3G, 2B, 1E) and a meter with built-in lamp for viewing in the dark. The GT-6 also has an instrument input jack (electric guitar and bass) *and* an output or "Amp" jack that permits the user to listen to the guitar while tuning.

To get in tune, you just turn the note selector knob to select the pitch for the opening string of the instrument from 1 to 6, adjusting the pitch until the needle on the meter lines up with the centre scale indicator – A-440. Korg also includes features like a built-in microphone for use with acoustic instruments a battery check button, an A-440 Hz adjustment screw (for periodic adjustments of the unit's overall accuracy) and a wrist strap for easier portability.



Circle 882

Peterson Scanning Strobe Tuner Model 700 $525.00

The Peterson Model 700 is designed as a visual tuning standard calibrated to a precise degree of accuracy for the equi-tempered chromatic scale. A solid-state electronics instrument, the Peterson Scanning Strobe Tuner operates independently of line voltage or frequency, making it possible to tune your instrument under "brown out" or low voltage conditions. The Model 700 also features an eight octave range, vernier pitch control,

image clarifier and a large readout. The Vernier Pitch control is continuously variable one half semitone sharp or flat from A-440 and is calibrated in hundredths of a semitone, allowing the player to tune to any pitch in the full eight octave range or to precisely measure any frequency.

The Image Clarifier is a sharp cut-off filter which eliminates the upper partials from the display on the Strobe Disc so the lower partials are more clearly displayed. This is especially useful with tones rich in harmonics, like the bass notes on a piano. An ambient light filter was also included to help reduce the glare when the tuner is used under bright light conditions.

To make the whole tuning process even easier, the folks at Peterson have developed a "hands free" concept involving a button on the front panel which can trigger a scan up and down the chromatic scale – or you can use a remote foot switch control. As the note is switched it will light on the front panel, the upper case letter being in the key of C and lower case letters transposing for the E-flat, B-flat and F instruments.

Conn Strobotuner Model ST-11
$405.00

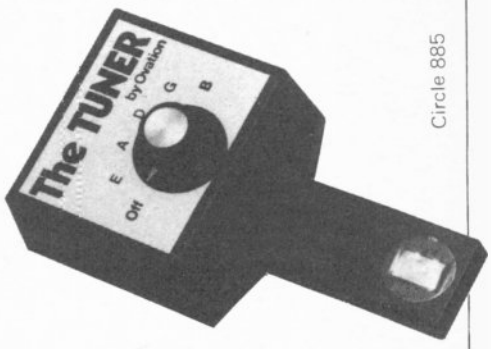
The Conn Strobotuner functions on an optical illusion known scientifically as the *stroboscopic* effect – an effect responsible for the apparent backward rotation of objects such as wagon wheels seen in western movies when the wagon is obviously moving forward. The "wheel" in the Strobotuner is driven by a synchronous motor at 12 different speeds depending on the note setting of the selector knob. The disc is made of translucent plastic with neon lamps placed behind it, which explains the orange glow that shines through when the tuner is running. The neon light is actually shutting on and off with the very same frequency as the tone played into the external microphone. When all of these elements are exactly synchronized, the stroboscopic effect is shown as a semi-circle of motionless lines around the disc. If the tone is sharp, the lines will appear to the *right* or clockwise. If the tone is flat they will appear to move to the *left* or counter-clockwise. If everything's in tune, the lines will seem to stand perfectly still.

Assembled with solid-state parts, the Conn Strobotuner is actually a small digital computer designed with nine integrated circuits for hours of continuous use and accuracy. The unit is accurate within 1/100th of a semitone. The ST-11 is designed for use on 120 Volt, 60 Hz household supplies commonly used in U.S.

Ovation's "The Tuner" $38.50

"The Tuner" provides a stroboscopic light source which is specially designed for visually tuning both acoustic and electric guitars with enough flexibility to tune other fretted instruments like five string banjos and 12-string guitars.

This unit differs from others in the field in that it is placed directly over the neck of the guitar – after you've preset the selector knob to the particular open string (five in this unit – E, A, D, G, B) you want to tune. Setting the guitar on a relatively flat surface – your lap may do if you don't have a lumpy body – you insert "The Tuner" so the tuning window is under the 6th string and set the control knob to the corresponding note E. Just follow the same procedure for the rest of the strings. When you pluck the string you'll see a vibrating image (the strobal string) if it's out of tune – as you slowly adjust the string to proper pitch, the movement will slow down. When the string is properly tuned, the strobal string will be motionless. The unit is light, portable and easy to use.



JMF "Mini Tuner" $99.50

The JMF "Mini Tuner" is a five note (E note stop doubles for the first and sixth strings like the Ovation unit) electronic tuning standard primarily designed for use with 6-string guitars and basses. Front mounted controls and an ample 2½" window mounted meter which gives the tuning indication make for maximum user convenience while a switchable light meter is provided for viewing in poor lighting conditions.

Octave ranging on the "Mini Tuner" is automatic from E-41.2 through E-659.25 – note selection includes E, A, D, G and B. When the user gets a center scale reading of A-440 it indicates an accurately tuned note referenced to the standard A-440 scale with each division equalling a 4-cent change. Other features include an internal condenser microphone for use with acoustic guitars or amplified electrics, a sturdy aluminium case, optional AC line adaptor, separate in/out jacks, and a large, easy-to-read meter scale.

Understanding Synthesizers

PART 6

BY TONY HORSMAN

Introduction

Last month I explained that a synthesizer keyboard module in its simplest form produces two output signals – the keyboard voltage and the keyboard gate pulse. The most important use of the keyboard voltage is the control of VCO frequency, and I am going to start this month by showing how one keyboard can be used to control two or more oscillators. Then without going into details until next month, I will introduce the voltage-controlled amplifier (VCA) and the envelope generator (ADSR) and explain the role of the keyboard gate pulse.

Additive synthesis using two VCOs

Two or more oscillators can be used to produce new sound qualities by additive synthesis – a technique I described in Part 3 when I introduced harmonics and frequency spectra. In that article I showed the outputs of four sine wave oscillators being added together in an attempt to produce a waveform resembling the sawtooth wave. It is possible to add or mix together *any* two waveforms to produce new sounds. All that is needed are two oscillators and an audio mixer as shown in Fig.1. The control voltage inputs are *both* connected to the keyboard voltage output of the keyboard module (see Part 5), and the audio outputs of the VCOs are connected to the amplitude controls (usually called "level controls," or "faders") at the mixer inputs. (You will notice that I have labelled the oscillators "VCO modules" 1 and 2. This would usually be abbreviated to VCO1 and VCO2 but the idea is to remind you that a VCO module incorporates an input control-voltage mixer and frequency controls as I described in Part 5).

Let's imagine that we have just played the A above middle C on the keyboard; the keyboard voltage would be steady at, say, 2.6 volts. There would be no need to hold the key down because the keyboard memory (see Part 5) would keep the keyboard voltage constant, at least for a minute or two (after which it might "drift" noticeably). Despite the fact that we have pressed note A on the keyboard, by adjusting the frequency controls of the two VCO modules, *any* two notes could be generated by the VCOs. However, to keep matters simple, let's imagine amplitude control 2 to be turned right down (see Fig.1) so that we can only hear VCO1, and let's tune VCO1 to 440 Hz (the correct frequency for the A above middle C) with reference to a tuning fork or the "standard oscillator" which is sometimes provided in the synthesizer. (Having tuned VCO1 it might be worth tapping A on the keyboard again just in case the keyboard voltage has drifted). Now if amplitude control 2 is turned up, VCO2 will be heard along with VCO1 and by setting the frequency controls of VCO2, the two oscillators can be tuned to any interval apart, for example an octave, or an octave and a fifth.

If you have access to a synthesizer with two VCOs, you will very soon discover that in order to produce new sound *qualities* by additive synthesis, the higher oscillator will usually have to have a relatively low amplitude. You will also find that you are restricted in the choice of intervals between VCO1 and VCO2. For example, if VCO2 is tuned a third above VCO1, unless VCO2 is very soft you will probably hear two notes. If VCO2 is tuned an octave or an octave and a fifth above VCO1, you will probably hear only one note with a different tone quality. The reason for this is quite simple: if VCO2 is producing a fundamental which is a harmonic of VCO1's fundamental (see Part 3), the ear simply recognizes the combination of the two VCO outputs as *one* harmonic spectrum i.e. one note with a new tone quality. If VCO2's fundamental is *not* a harmonic of VCO1's fundamental, the ear more easily detects that two notes are sounding. (Remember that the second harmonic is an octave above the fundamental; the third harmonic is an octave and a fifth above the fundamental).

Synchronization

Now let's return to the keyboard; the two VCOs were tuned after note A was pressed. When another note is pressed, the keyboard voltage will change and produce the *same pitch change* in both oscillators (see Part 4) which of course is exactly what is needed to produce the *same harmonic spectrum* in the new note. However, no two oscillators are perfectly matched and it is common to find that if a wide range of notes is played on the keyboard, the interval between the two oscillators will in fact vary only slightly. If this is troublesome, it is

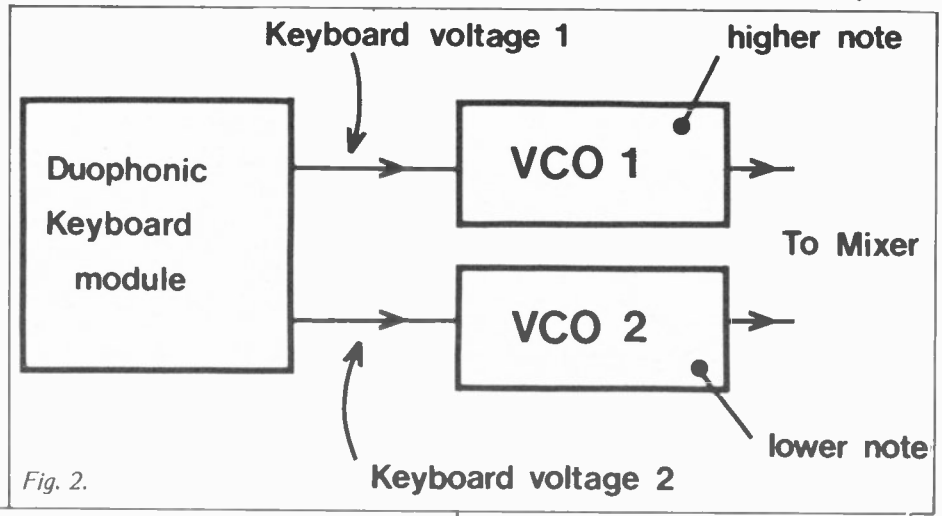


Fig. 2.

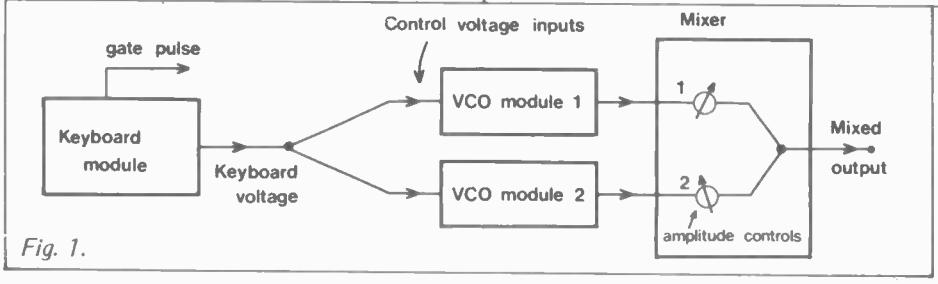


Fig. 1.

usually possible to *synchronize* the two oscillators, making the higher VCO oscillate at an exact multiple of the frequency of the other. "Sync," as it is called, usually introduces some distortion into the synchronized oscillator waveform; this *can* be useful as an additional means of sound coloration – but it can also produce some very unpleasant periodic "clicks"!

Parallel harmonies

An exciting use of two oscillators is the production of two audibly separate notes of comparable volume, tuned a fifth apart. Things which would be technically difficult or impossible on organ or piano keyboards (such as fast passages of parallel fifths) then become relatively simple. Try a chromatic run of fifths using two VCOs, then try doing the same thing with one hand on an organ keyboard if you don't believe me! To get the maximum impact from this technique, the amplitudes of the two VCOs should be similar, and harmonically rich waveforms such as the sawtooth or pulse wave should be used.

Duophonic keyboards

Many synthesizer keyboards produce only one keyboard voltage; if two or more keys are pressed down simultaneously, the keyboard voltage will correspond to the lowest or highest key. Such keyboards are said to be *monophonic* – only one note can sound at a time (unless the set up shown in Fig.1 is being used to produce parallel harmonies). Some synthesizer keyboards are *duophonic*, producing *two* keyboard voltages (see Fig.2), one corresponding to the highest and one to the lowest note pressed.

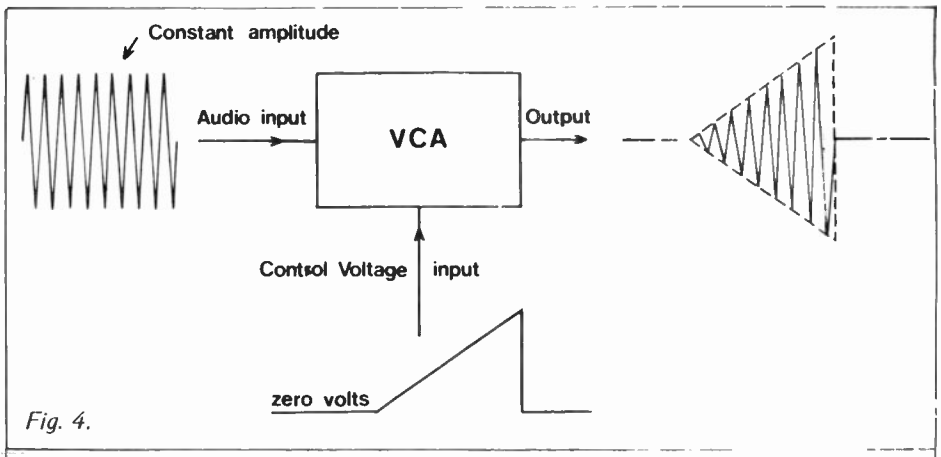


Fig. 4.

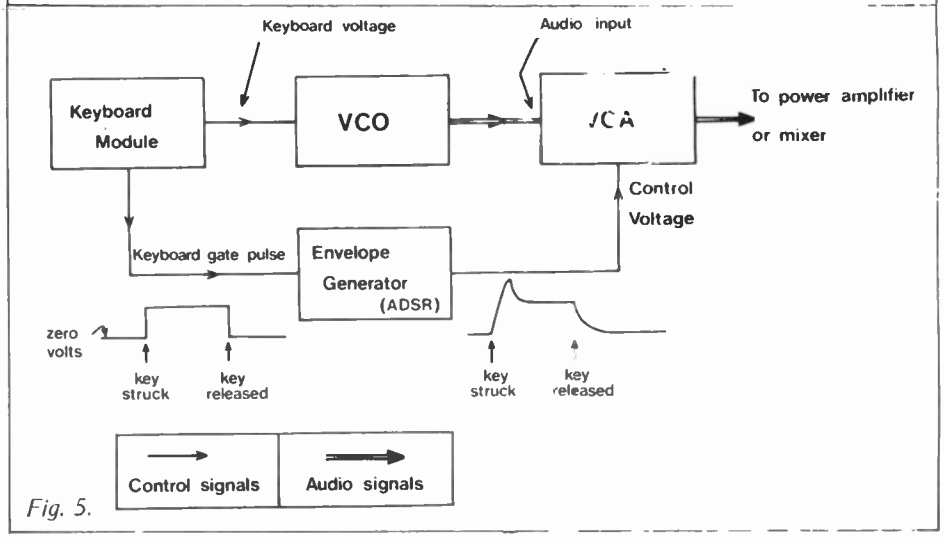


Fig. 5.

(When only one key is pressed the two keyboard voltages are the same.) All duophonic keyboards should really contain two memories, otherwise when the last note is released, both oscillators jump to the last note played. Although duophonic keyboards allow two independent parts to be played simultaneously, there are certain restrictions on playing technique which are best discovered by practical experience! *Polyphonic* synthesizer keyboards which allow the player to produce 4 note or 8 note (or even fatter) chords are extremely sophisticated (and consequently very expensive) and I will be discussing these later in the series.

Voltage-controled amplifier (VCA)

Voltage control is something we have so far considered only in relation to the frequency oscillators. However, the great importance of the voltage control idea derives from the fact that *any* function of a synthesizer module which can be manually controled can, in principle, be voltage-controled. Synthesizers contain amplifier modules which control the amplitude of audio-signal waveforms, and in these modules the amplification is voltage-controled.

The amount by which an amplifier output is magnified relative to the input is known as the (voltage) *gain* of the amplifier. In a conventional amplifier, the "volume control" effectively determines the gain. ▶▶

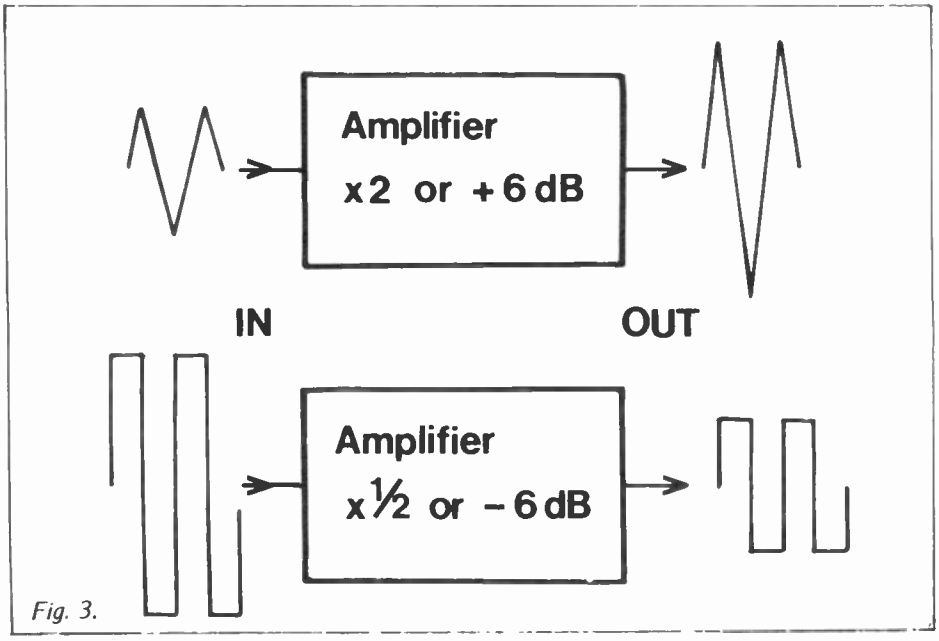
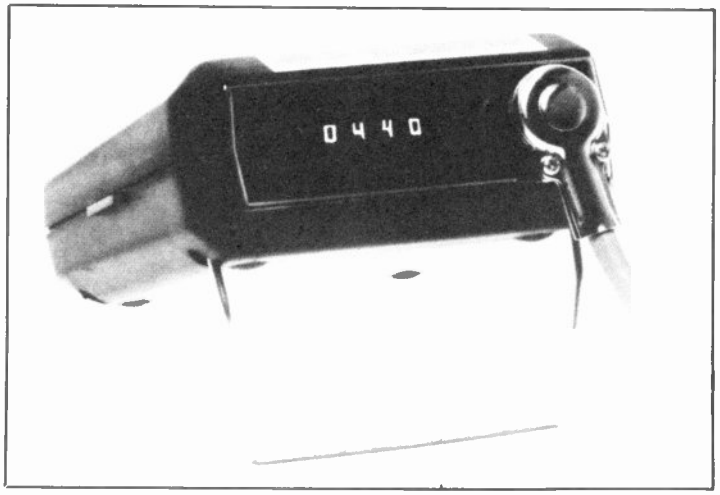


Fig. 3.

New Morley Digital Tuner Reads and Locks in on Frequency



At last, a no-nonsense, precision digital tuner no larger than a pack of cigarettes for fast, accurate and easy guitar, bass and keyboard tuning. And for only $89.95!

Unlike any other tuner, the solid state DT-4400 is easy to read. Pluck a string and you get a visual, digital readout every half second with the unit locking in and holding the last reading of the fundamental frequency until the string is plucked again. No readings jumping around in tenths and fading from sight. The DT-4400 locks and holds so you really know where you are. Besides fundamentals you can read harmonics too.

In fact it's so foolproof even a novice can tune up in a minute to the concert pitch readings for guitar and bass imprinted on the case. Plugging in your guitar cable automatically activates the 9 volt Alkaline battery which will last many months.

Because it scans from one cycle per second up to 9,999 cycles per second you can also use it for electric keyboards such as organ, piano and synthesizer. And it's accurate within just one cycle per second!

The Morley DT-4400 is protected by a high impact resistant case for durability and also features a two position stand for floor or table top easy reading. Included with the instructions is an illustrated chart of correct frequencies for the various instruments.

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Fig.3 shows an amplifier module operating at different gains, which can be expressed as x1, x4 etc. or in decibels (see Part 1). Actually, the amplifier output can be *less* than its input, but we still call it an amplifier!; in this case the gain is negative e.g. -6dB, 12dB (see Part 3).

In a voltage-controled amplifier (VCA), the gain is under the control of an externally applied voltage (as shown in Fig.4). When the control voltage is zero, the amplifier gain is so low (typically less than 1/1000 or -60dB) that the amplifier is effectively switched off. As the control voltage is increased, the gain progressively increases. So if we connected an oscillator to the amplifier's audio-input and (somehow) increased the control voltage from zero, we would initially hear nothing, then a sound which became progressively louder (see Fig.4).

I will be saying more about the VCA next month, but I have described it briefly here so that the envelope generator introduced below will make more sense.

Envelope generator (ADSR)

The envelope generator, more often called the ADSR module for reasons which I will explain next month, is the most important source of the control voltage for the VCA. Between them, the envelope generator and the VCA effectively break up the continuous oscillations produced by the VCOs into the discreet "notes" we expect to produce when playing any instrument – with the possible exception of the Bagpipes!

Have a look at the set-up shown in Fig.5. Suppose you have just switched the synthesizer on and no key is depressed on the keyboard. The keyboard voltage might be anything. Whatever it is, it is determining the oscillator frequency, and the oscillator's output waveform is reaching the audio input of the VCA. The keyboard gate pulse is not present (i.e. the input to the envelope generator is zero volts) as long as that pulse does not appear, the *output* of the envelope generator will remain at zero. This output is the control voltage for the VCA gain, so the VCA is effectively switched off. The oscillator's waveform is blocked by the VCA, no audio signal is reaching the power amplifier, and you hear nothing.

Now, suppose you press down a key on the keyboard, then release it. The keyboard voltage immediately changes to its new value and stays there. The keyboard also produces a keyboard gate pulse which stays "high" as long as the key is depressed, returning to zero when the key is released. This pulse "triggers" the envelope generator which produces a waveform of the type shown in Fig.5, *once* and once only. This waveform increases then decreases the gain of the VCA, the oscillator's signal reaching the power amplifier and speaker as long as the key is held down. So by their combined efforts the keyboard gate pulse, the envelope generator (ADSR) and the VCA produce a discrete "note" from the continuous train of oscillations generated by the VCO.

If you can find copies of Parts 1 and 2 in which I described "amplitude modulation" and introduced the idea of the "envelope" of an audio waveform, you will realize why the source of the VCA's control voltage is called the envelope generator. If not, it will become clearer next month when I describe in detail how the envelope generator (ADSR) and VCA work together to produce the changes in loudness (dynamics) within each note.

Building a Solid Guitar

BY STEPHEN DELFT

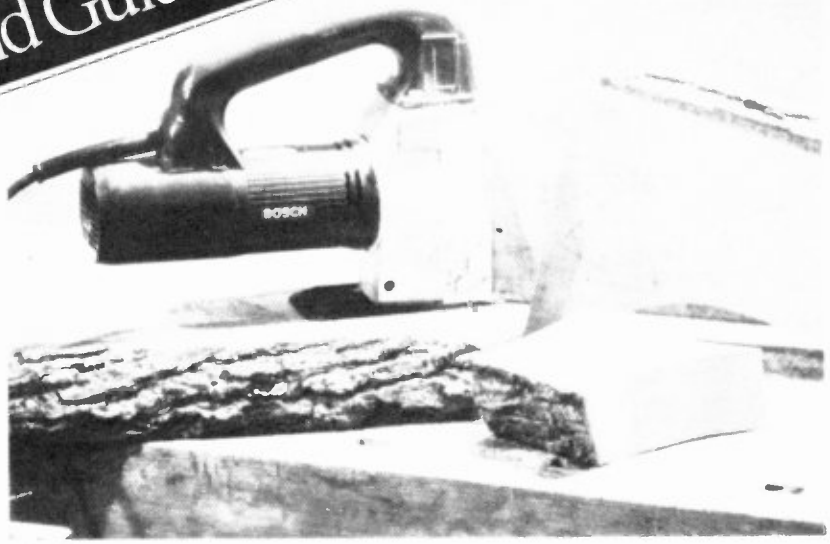


Photo 1

I want you to have some freedom to decide the shape and style of your own instrument, and to make this possible, the plan has some unusual features. The area of the plan between neck joint and bridge includes all the critical dimensions. There are four asterisks on the plan; if you join them up, the resulting box, will contain all the parts of the plan which should not be changed. The rest of the body shape is entirely up to you.

If you cannot find a satisfactory shape from your own head. I have drawn one possible shape for you. The electrical controls can be almost anywhere, as long as the recess at the back does not come nearer to the bridge than the two dashed lines shown on the plan. The body can be as thick as the piece of wood you are able to find: I would suggest somewhere between 45 and 50mm.

If the wood is rough-sawn and a bit warped, allow about 10mm for straightening and smoothing.

You can use almost any hardwood which has been properly dried, or alternatively "kilned." I prefer Lime, Sycamore and Mahogany. A few other possibilities are Aformosia, Teak, Obeche, Jelutong. The last two will bruise rather easily, and may look better if finished with an opaque color. They can look rather dull under clear lacquer, and are tricky to stain evenly. Lime, Obeche and Jelutong are the softest and easiest to cut. Teak and Aformosia are the hardest and heaviest.

I find it much easier to cut the neck socket *before* cutting out the body shape, particularly when using a portable router to cut the socket.

If you use only the softer or medium hardwoods for the body, a bandsaw is not necessary for cutting the outline. A good portable Jigsaw with an 'elliptical' cutting action, as described for cutting out neck pieces, will work very well. The type and condition of the blade is very important; it should be coarse and razor-sharp. When cutting curves or through irregular grain, the underside of the cut may wander, so leave a wider margin under these conditions.

These saws can be rented from hire shops, but you will probably have to buy the right blades from a specialist tool shop. Bosch/Lesto/Holzher blades with ground sides and big teeth are the most suitable for this job (and worth their high price) so try to get a saw which will accept this type of blade. Use the fastest-cutting setting on the saw for straight cuts, and the slowest setting for tight curves.

As you will see from the first photo, these saws are perfectly capable of cutting up a 2" board. I use one myself; it is often more convenient than a bandsaw, but if the blade has lost its edge it is useless on thick wood. If the blade shows signs of overheating, either it is blunt, or you are trying to force it round too sharp a curve.

However heavy or clumsy the piece of wood you are cutting, support it each side of the cut so that the two pieces still remain stable after the cut is finished. The easiest way is to put it on a flat floor on four carefully spaced bricks.

If you cannot find a wide enough piece of wood for the body, do not despair. You can buy a narrower piece, twice as long, and glue up the body from two (or more) pieces. Make the joints fit as well as you can and stick them with Titebond wood glue. The timber supplier may be willing to plane the joint surfaces for you.

Transferring the plan details to the body can be tricky. The body outline is not critical and if you intend to copy the one on the plan (shame on you!) it can be pricked through onto the timber with a sharp scriber. The shape and position of the neck socket and bridge mountings must be *constructed* from the measurements marked on the plan, together with a center line drawn along the front of the body block, and at right-angles down each end. It is a good idea to pencil in the outer shape very lightly, then draw the neck socket and the beginning of the cutaways (where the body must be exactly the same width as the neck and fingerboard) and then draw in the final body shape to fit the center line and the established beginnings of the cutaways.

You can cut out most of the body shape now, but leave the bridge mounting holes and pickup recesses until later. (If there is any error in fitting the neck, the bridge can be moved a little to position the strings correctly.) I find it easier to leave the cutaways and the neck fixing area uncut at this stage, until the neck is exactly fitted and ready to glue on. If you have no access to power tools, for cutting out the body, use hand tools as described for cutting out neck pieces. In this case also, blunt blades are useless.

The bridge used in the original was a Japanese copy of the Badass. There are other similar units, and little or no modification may be needed to suit them,

Cutting the neck socket

As I see it, whether you intend to remove the waste wood from the socket with a power drill, a portable router, mallet and chisels, or a coal shovel, it is still a good idea to saw as far as possible down the sides of the slots, just inside the lines. Now it may occur to some of you who have tried similar tricks in the past, that it is quite difficult to saw a slot in a block of wood when one end of the slot is 'stopped' i.e. when the slot starts from one edge and stops dead somewhere in the middle of the piece. A saw, by its nature, has to be pushed backwards and forwards, and it won't go forwards into a dead end. You can cut a stopped slot with careful backwards strokes, but the saw teeth are pointing the wrong way for this and progress will be very slow. If you look at the body plan, you will see that the fingerboard pickup is mounted just beyond the end of the neck socket. Most pickups will require a recess in the body about 15 to 20mm deep in this position. (The bridge-end pickup will usually only require a recess of 5 to 10mm, and this should be kept to a minimum because of its closeness to the bridge mountings). Although it is not advisable to cut the entire pickup recess by the neck socket at this stage, you will find it much easier to saw the sides of the socket if you bore two holes in the front of the body as shown in photo 2. The exact position and depth of the

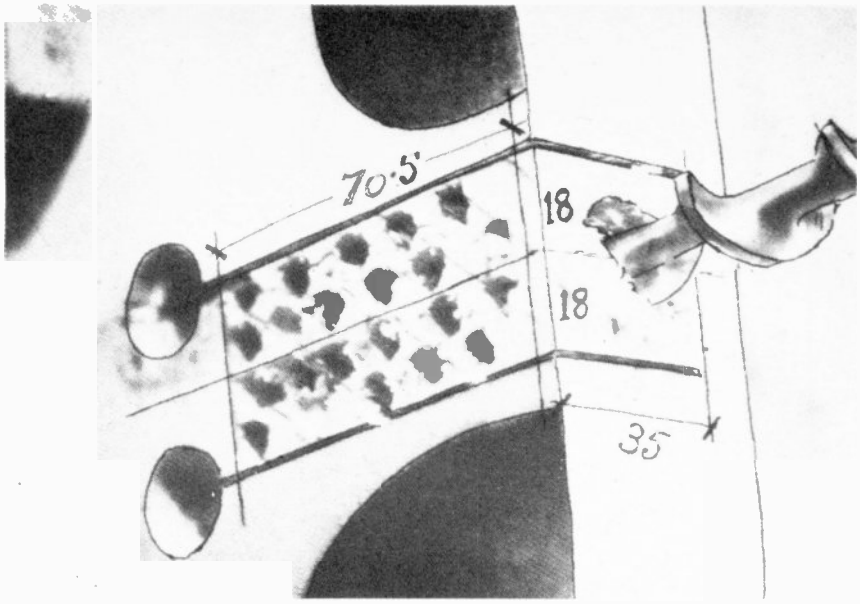


Photo 2

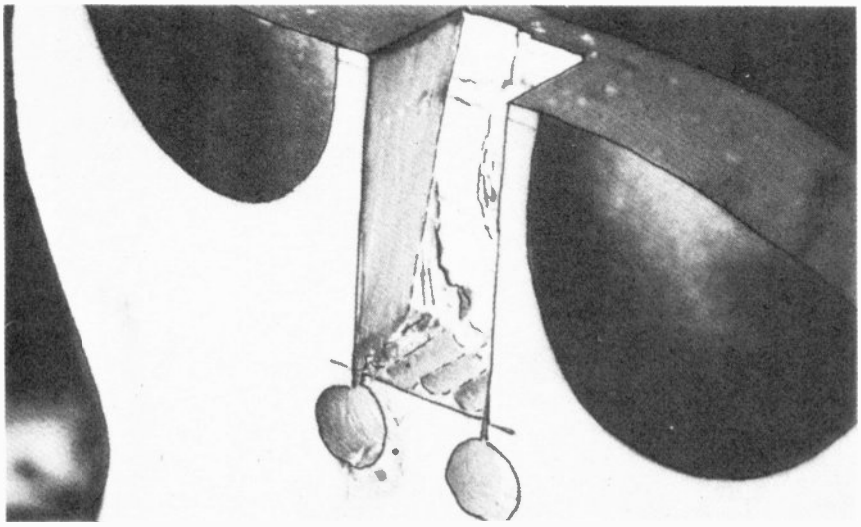


Photo 3

holes is not critical. The hole centers should be on the extended lines of the sides of the neck socket; the hole diameters should be about ¾ inch; the depth of the main part of the holes should be about 18mm and not more than 20mm; the outer edge of the holes should be about 3mm from the marked end of the neck socket.

With these holes bored, you can saw *most* of the sides of the neck socket, starting across the front outer corner, watching the direction of the saw along both the front face and the end face at the same time. When the saw is in about 20mm along front and end, change its angle gradually so that your cut ends up just touching one of the large holes, and comes about 30mm down the end face. Then carefully deepen the slot, using the width of the large hole to allow the saw some backward and forward movement, until the saw cut just hits the bottom of the large hole and the 35mm depth marking on the end face of the joint.

This is as far as you can go. Now cut the other side, once again on the waste side (inner side) of the marked line. If you have trouble sawing straight, practice a similar joint on scrap wood. If you still have trouble, leave an extra millimetre clearance between your saw and the line.

Beyond this point, how you go about removing the waste wood depends on what tools you have available. Obviously, if you have a portable electric router, it will remove the waste easily, taking cuts of about 6mm depth at a time. It is worth making a simple template jig for the router to ensure that it cuts just on the waste side of the saw cuts. Otherwise, cut carefully by eye, but keep clear of the saw cuts and finish the job off with a chisel. A router will not easily cut the sides of the socket accurately; its main advantage is in removing waste right up to the bottom inside corner and in cutting the bottom of the socket flat and parallel to the front of the body. If you do not immediately understand the meaning of this paragraph, leave electric routers alone.

An alternative method involves the use of a woodworker's brace and bits and a drilling machine if you have access to one. The details are shown on Photo 2. By drilling the waste wood full of holes, it becomes easier to remove. Begin by drilling from the front of the body, using 10mm or 3/8 inch bit. I find it best to use standard sharp engineers drills in a drilling machine, but you can cut nearly as fast with a screw-nose 'Jennings pattern' woodboring bit in a carpenter's brace. The bit should have a spiral shank of approximately the full cutting diameter for at least the depth of the holes you need (35mm). A longer spiral will make it slightly easier to drill straight. Woodworking bits with a cutting head on a narrow shaft will cause trouble. Don't try to use a hand-held electric drill for this job, but a portable drill on even the cheapest drill stand will do very nicely with a standard engineers drill. Don't put screw-nose wood boring bits in powered drills even if they do have round parallel shanks; they will corkscrew their way straight through the body in seconds.

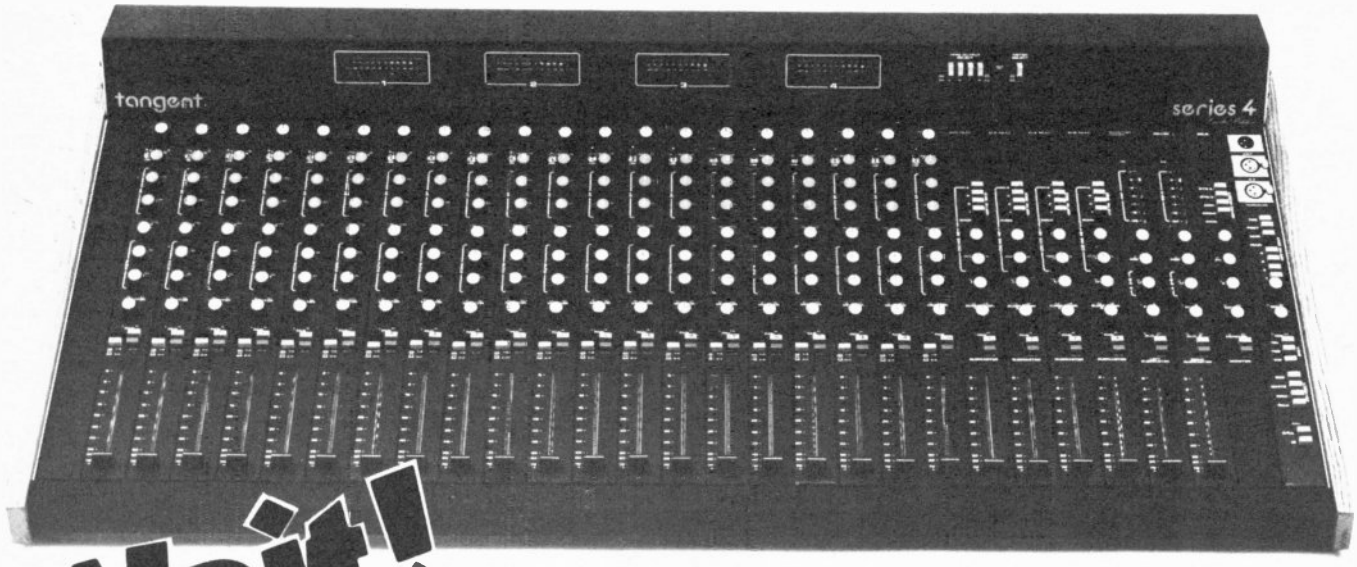
All these holes in the front can also serve a very useful purpose in marking out the bottom of the socket for you. This must eventually be cut accurately, if you want a strong neck joint, and you could run into some problems if you have already chopped out too much wood while removing the waste. If you drill all the holes at right-angles to the front of the body (which is necessary anyway for the ones near the edges) and all to the same depth, then you have only to trim the bottom of the socket until you are level with the bottom of all the holes and it will be about right. I suggest you measure to the tip of an engineers drill and trim until only the marks of the drill tip remain at the bottom of the socket. If your drilling machine or drill stand has a depth-stop, use it but keep checking! They have been known to slip. Masking tape round the drill will give you a second check.

If you are drilling with a brace and bit, you can use tape round the shank of the bit and/or a clamp-on depth stop for woodworking bits which is sold by good tool shops. If you have difficulty drilling at right-angles with a brace and bit, get someone to check both ways with a square as you are drilling. The point of a screw-nose bit extends well beyond the main hole, and I would recommend measuring drilling depth to the spurs which cut the outer edge of the hole, and then trimming the base of the socket until faint circular grooves are just visible on the bottom, surrounding each small hole from the screw-nose of the bit.

When all small holes are drilled, I find it useful to run a ¾ inch bit endways through the waste wood as shown in photo 2. Photo 2 also shows the dimensions for marking out the socket.

By the time this large hole is drilled out, there really is not much left to remove, and most of what is left almost falls out! Photo 3 shows the socket with most of the waste removed. The inner back corner must be trimmed with a sharp chisel and also the sides, where the saw could not reach earlier. Do not trim any part of the socket exactly to the lines just yet.

About to buy a mixer that's merely stereo?



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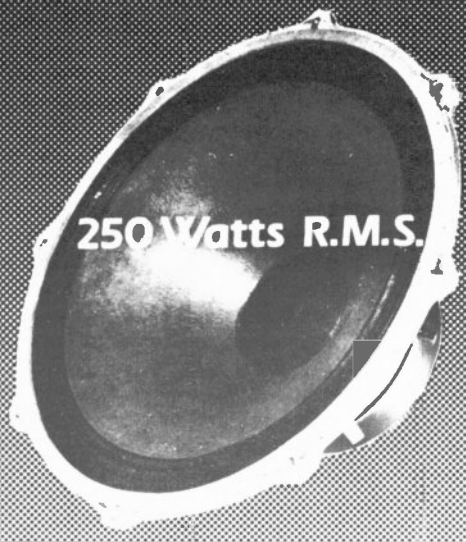

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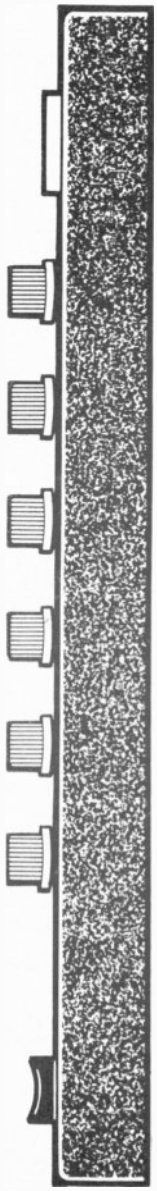

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TWENTY YEARS OF UNICORD

This year marks the 20th anniversary of Unicord, a unique marketing firm based in Westbury, New York who, under the leadership of founder and President Sidney Hack, has grown dramatically since its early days as an importer of chord organs. A characteristic aspect of the company's rapid development has been a consistent series of "firsts" within the MI industry. Unicord was the first company to import moderately priced Japanese "copy" guitars. They were the first to develop a low-cost keyboard synthesizer. They have the singular corporate honor of being the first company to join forces with Gulf & Western. And, most recently, they were the first company to offer a reasonably priced guitar synthesizer with pre-programed preset control and separate variability for each preset function in one unit.

Sitting behind a desk in his modern office located in the "business" half of Unicord's spacious and comfortable new headquarters just off the Wantagh parkway, Marketing VP Mitch Haber leans forward and gets right to the point.

"We don't see ourselves as a distributor, we see ourselves as a marketer. Working with clients to improve and update their products."

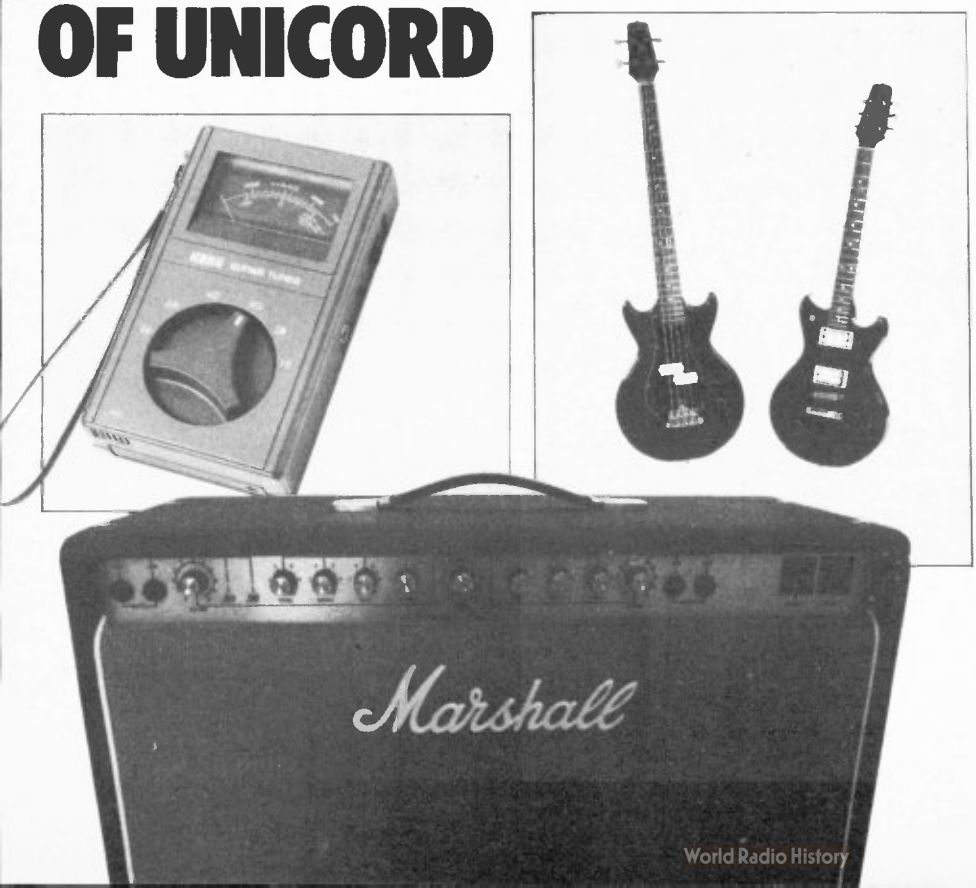
This attitude, a basic component of Unicord's philosophy, is perhaps best illustrated by the company's long-standing position as sole importer and marketer of Marshall Amplification in the United States. When Unicord entered into a working relationship with Jim Marshall back in 1967, the dark green powerhouse amps were not well known in this country. Through the efforts of Unicord, a leading American group of the day – The Vanilla Fudge – began to use and popularize Marshall amps. Later on, major British acts like the Who, Cream and the Jimi Hendrix Experience helped to consolidate the widespread popularity of the Marshall name. But there was a problem.

As a leading American rocker put it to President Sidney Hack, "Marshalls are the greatest amps in the world . . . for the first ten minutes". The amps, essentially wired for England's voltage system (220), had an alarming tendency to blow fuses and other random parts at the most inappropriate of times (see Procul Harum's "Power Failure" on their *Broken Barricades* LP). Unicord, mainly in the person of ace engineer/technician Tony Frank, took matters in hand and set about to completely "convert" the Marshall units for optimum American usage. Working in close collaboration with Jimi Hendrix and, following his tragic death, with Jimmy Page of Led Zeppelin, Frank developed the Mark II series of amplifiers which featured more powerful (and expensive) tubes, sturdier transformers and beefed-up electronic components to overcome the problem of overheating caused by the shift to American voltage. Since then, the company has also been instrumental in assisting Marshall with the design and development of the new Marshall 4140 "Country/Club Combo" (which features distorted *and* clean sound) amp and the 2150 (100 watt combo with a single 12" speaker).

Another phenomenal growth story at Unicord is embodied by the emergence of the Korg Co. In the mid-sixties Korg was primarily manufacturing rhythm machines, but under the capable guidance of their talented Chief Engineer F. Mieda, they soon developed the K-1 synthesizer, the first low-priced keyboard synthesizer on the U.S. market. Over the years, Korg has become a trendsetter in the electronics and related MI field, offering the first low-priced electronic tuners – the WT-10 and the GT-6 (for guitars) – as well as the SE-500 and SE-300 Stage Echo units. Besides a stunning array of keyboard synthesizers (the MS series), the company has more recently offered a line-up of goodies for the guitarist like the Korg MS-03 Pitch to Voltage Converter which is designed for effortless interfacing between virtually any guitar and synthesizer available.

Their most recent innovation is the revolutionary new X9-11 Preset Guitar Synthesizer that allows any guitarist to plug right into the unit and get eleven mixable voices without any modifications to his or her instrument. Housed in an attractive, streamlined chassis, the unit also features five mixable synthesizer voices with separate envelope generator control and variable filter, six mixable instrument voices with variable parameters, electronic solid-state switching, three position octave switch, "normal" and "Fuzz" guitar, infinite sustain, portamento, interval switching and more. All of this will be available for around $500 and should be in the stores by the end of the year.

And if all of this wasn't enough, Unicord also markets the STAGE amplifier line (low- and medium-priced transistor amps), WLM organs from Finland, Westbury electric guitars and the highly popular Zanki cymbals. As we walked through the company's mammoth warehouse/technical facilities where technicians were hard at work converting some brand new Marshall amps fresh in from England, Mitch Haber underscored all of this dynamic growth with a statement that may well be Unicord's unofficial motto, "Unicord has kept a step ahead of the industry".



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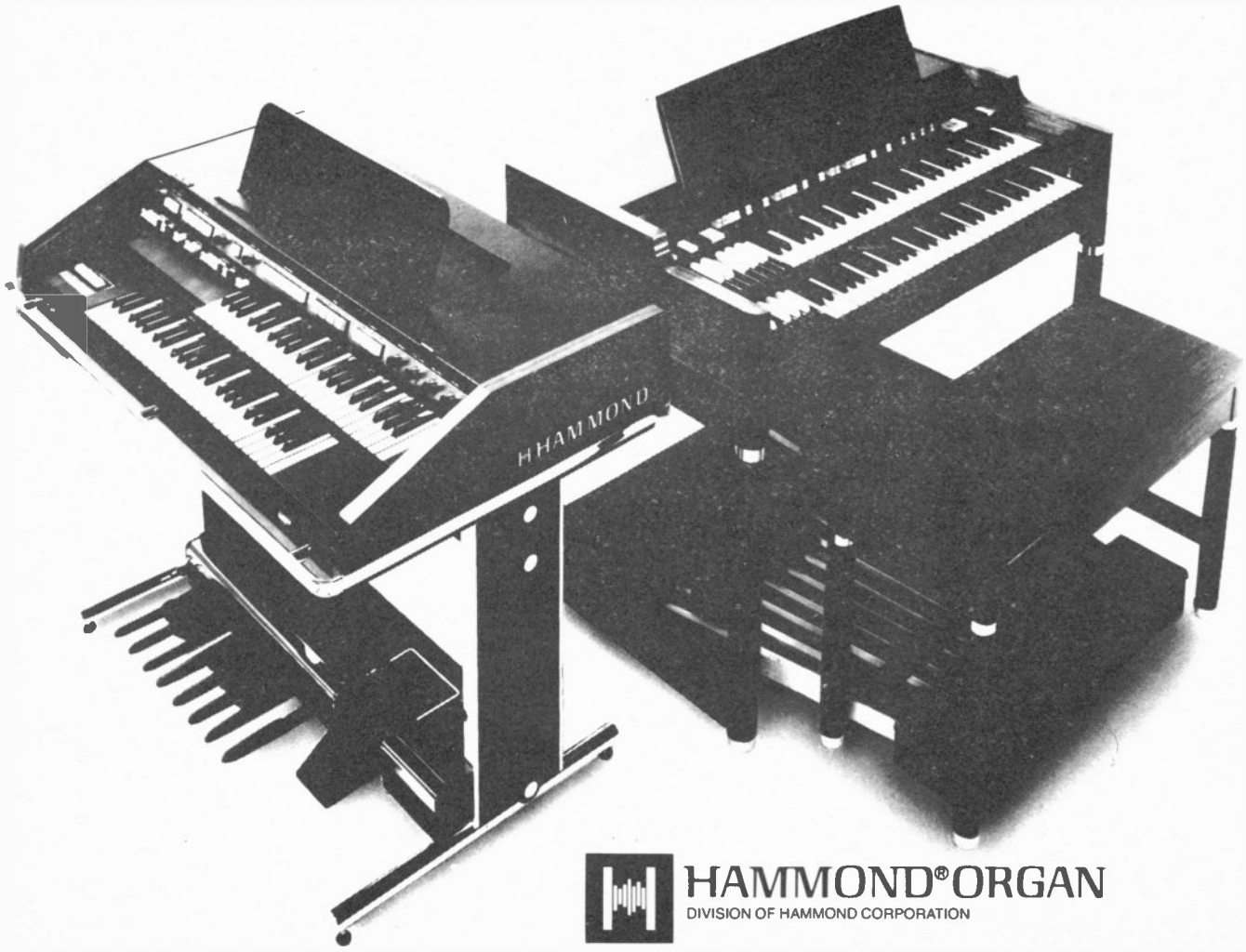

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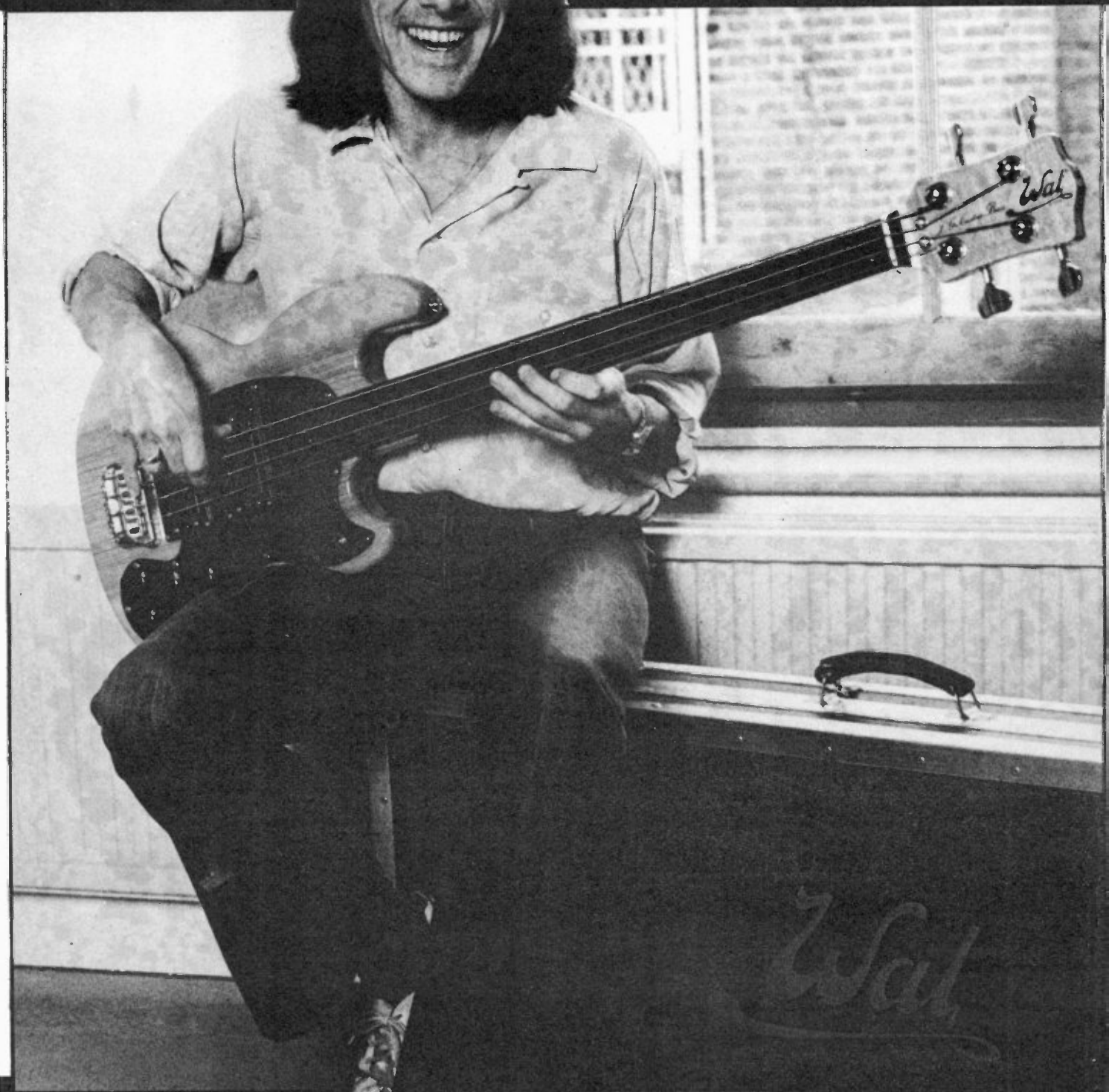

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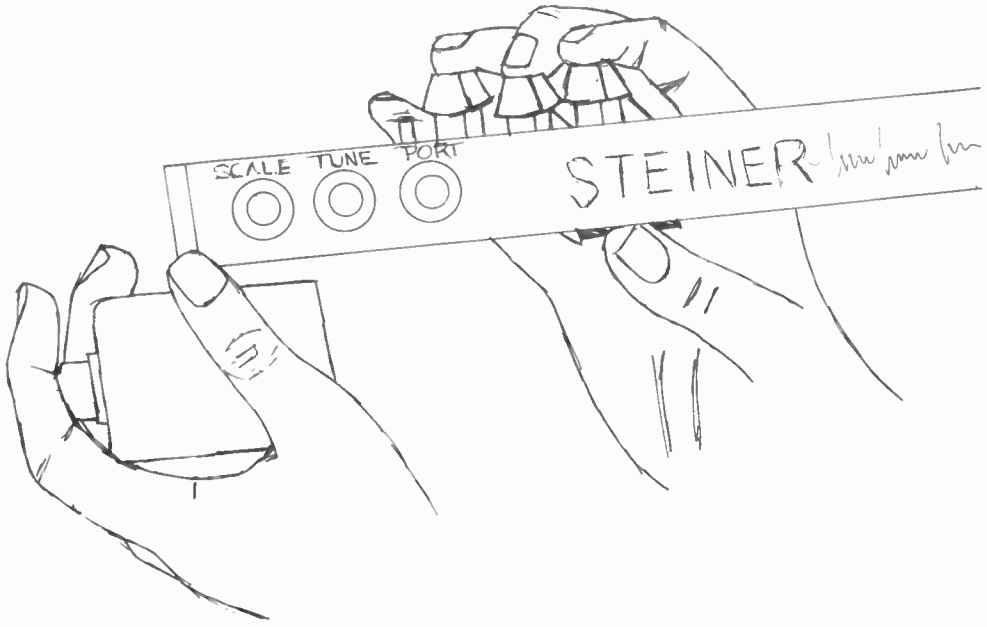

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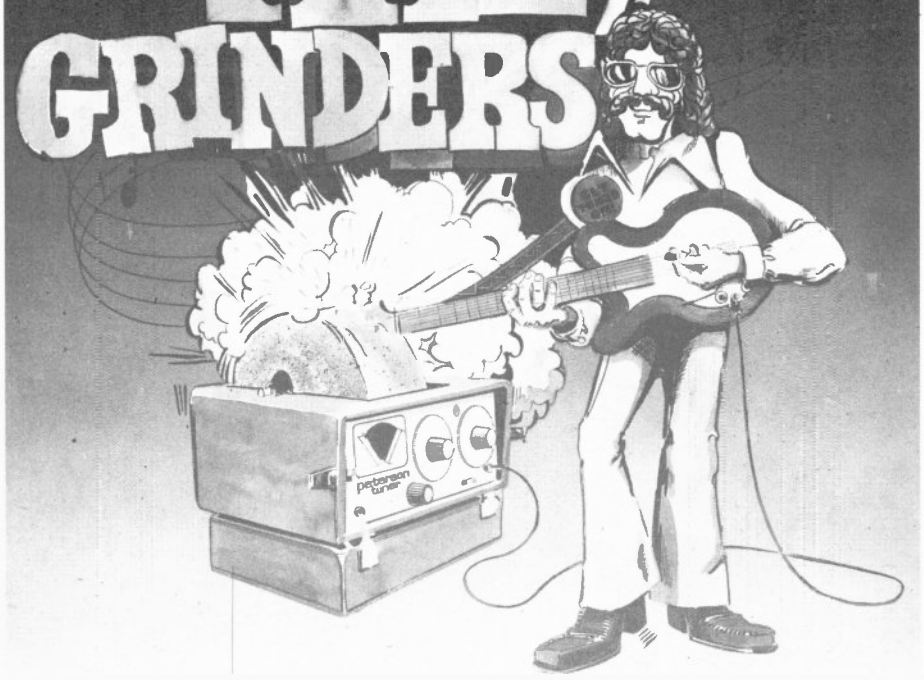

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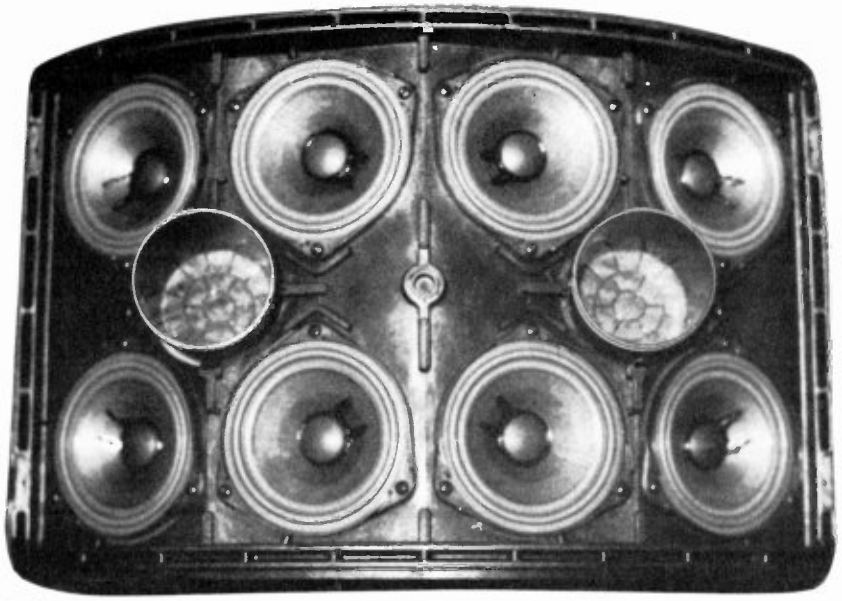
Speakercheck

Bose 802 System
$895
(WITH EQUALIZER)
$780
(WITHOUT EQUALIZER)

The Bose 802 is a total concept loudspeaker system of very small physical size and weight, intended for practically any application from PA to musical instrument amplification, from stage monitoring to conventional theater and cinema systems. The total Bose package includes a live performance mixer and power amplifier, but we shall only be concerned here with the performance of the 802 loudspeaker system and its equalizer.

The Bose Corporation has its own, often unconventional, way of doing things. While respecting this originality as we consider the various design features of the product, we must be objective in terms of whether or not it performs its task to an acceptable degree — always bearing in mind the price and mechanical features of the design as well as its performance.

Apart from the fact that virtually the entire loudspeaker is made from plastic and that a rather unusual arrangement of drive units is employed, the outstanding departure from conventional speaker design is that electronic equalization has been employed to normalize the frequency response of the system. This takes the form of a small black box, AC powered, which must always be connected between the signal source and the input to the power amplifier. Fact: it works, as was clearly shown by comparing the response plot of the unequalized loudspeaker with the proper frequency response plot as given in the results presentation. In its raw state, this loudspeaker would have no part to



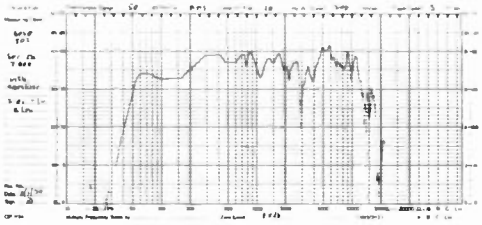
BOSE 802 PROFESSIONAL LOUDSPEAKER SYSTEM

Performance specifications and test results

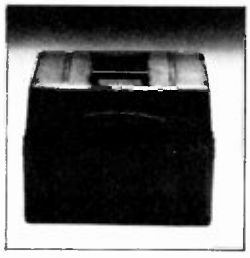
520mm wide x 340mm high x 330mm depth (340mm incl. cover)
Weight: 16Kg (approx. 36lb)

Parameter	Manufacturer's rating	Test result
Sensitivity	Not stated	98dB @ 1 watt @ 1 meter on axis. averaged between 200Hz and 10KHz.
Useful frequency response	Not stated	40Hz-18KHz @ -20dB 50Hz-16KHz @ -12dB
Rated input power	160w continuous	See text
Distortion	Not stated	3% above 500Hz, rising to 10% @ 300Hz and 40% @ 100Hz
Impedance	8 ohms	9.5 25 ohms
System resonance	Not stated	120Hz
Polar response	Not stated	82V x 88H @ 1KHz 214V x 126H @ 2KHz 66V x 158H @ 4KHz 100V x 100H @ 8KHz included angle at -6dB

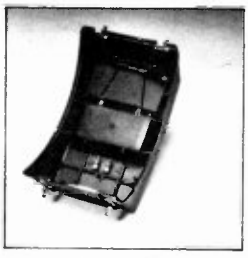
Note: all tests were carried out with equalizer in circuit.



As a storage case for equalizer, cables, etc.



As a transit cover.



As a tilt stand for monitoring.

As a stacking plinth.

play in live performance sound at all, whereas its performance with the equalizer in circuit is very good indeed. What is basically happening is that the equalizer is boosting frequencies at which the tiny loudspeakers are not particularly sensitive so that more power is delivered at those frequencies. There seems to be two main boosts applied, one of about 15dB at 60Hz, the other of about 18dB at 15KHz, with a gradual tailing off between the two so that no boost is provided at all at 600Hz. All very clever stuff, resulting in virtually flat frequency response between about 200Hz and 12KHz with only slight dropping off at each end to -12dB at 50Hz and 16KHz. So far, I am impressed.

I remain impressed as the mechanics of the unit are considered. The cabinet is injection moulded from high impact plastic in two parts. The baffle panel, sides, top and bottom are moulded as the main shell, and the back is separately moulded and welded in place – presumably after the sub-assembly work has been completed on the connectors and wiring. This moulding represents a real commitment in terms of capital investment in tooling and in design time, as the whole assembly is brilliantly thought out and is of exemplary quality. It all looks so simple until you start to study the details. Besides having the drive unit apertures moulded in, the baffle panel also has locating lugs and mounting holes for the drive units and mounting bushes for circuit board. The cabinet walls have all necessary hardware, such as threaded steel inserts in the base to facilitate attachment to the tripod stand, reinforced corners, strip feet, slots in the top to accept the feet moulding of a stacked cabinet, etc., and the whole moulding is very well ribbed on the inner faces to provide rigidity and freedom from self-resonance.

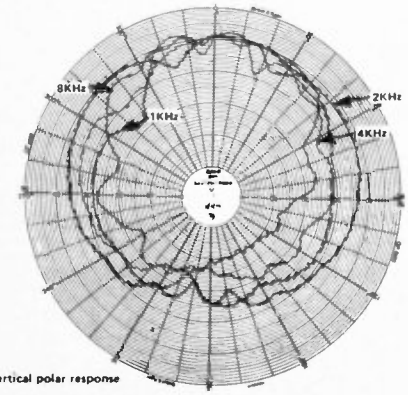
The separate back panel moulding is similar and includes a large recessed connector panel. In addition to these, there is a third moulding which serves as a clip-on front cover, as a tilt stand when the loudspeaker is used as a floor monitor, as a plinth when the units are stacked vertically and has a deep recessed carrying handle and stowage compartments for the Bose equalizer, cables, spare fuses, etc., incorporated into the moulding. The only metallic components in the whole assembly are the screws which retain the drive units and circuit board, the jack and XLR connectors and the clasps on the transit cover/speaker stand moulding. The quality of moulding and finish throughout is of a very high standard indeed and, used in this way, plastic must be considered a viable alternative to the more traditional cabinet building techniques. It is tough, durable and visually attractive and provided the moulding is adequately braced, it has few drawbacks from the acoustic point of view.

The arrangement of the connector panel warrants a little further consideration. The design of the moulded dish into which this panel is fitted is such that the jack sockets are blind – i.e. there is no air leak into the cabinet through the connectors whether the plugs are in or out. Unfortunately, however, not so much thought has been given to the arrangement of the XLR connectors because, strangely, both of them are male. By convention, the input connector should be male but the link-out facility should be female, so that any live contacts are shrouded by the rubber insert. As fitted, if XLR type connectors are to be used, it will be necessary to carry non-standard cable sets, one will be a conventional three-contact male-to-female lead to connect the loudspeaker to the amplifier output, but link cables between cabinets will need to be female-to-female. Not a very sensible arrangement at all, especially in the light of the attention to detail found in almost all other aspects of the design. Another useful feature is the inclusion of a 4A fast-acting fuse to protect the speaker from damage in the event of an amplifier breakdown or of overloading the cabinet, and also to ensure that if one cabinet in a stack should break down, it does not shut down the power amplifier and take the whole system out. Good thinking.

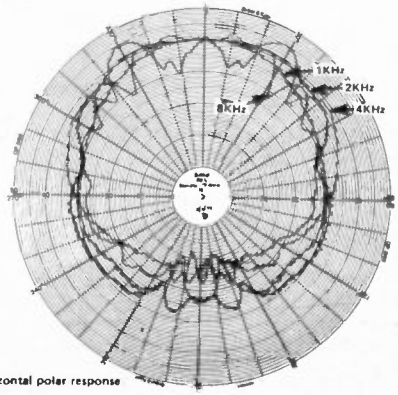
Eight full range loudspeakers are fitted as shown in the photograph. Each drive unit is just 115mm in diameter and of 1 ohm impedance. All units are wired in a series chain to achieve an 8 ohm nominal impedance. This type of arrangement sometimes suffers from a loss of transient response, but has the advantage that in the event of a breakdown with any unit, the whole cabinet will shut down, thereby preventing the destruction of the remaining drivers by overloading. Even the loudspeaker chassis are moulded in plastic. Again, this is of a sensible and rugged design and there is no reason why they should not be plastic. A large ceramic magnet is fitted – almost as big as the chassis itself – and the tiny cone is carried on a soft PVC foam roll suspension. Rather nicely made, and either manufactured by Bose themselves, or by an established loudspeaker manufacturer to Bose's requirements. The Bose logo is stamped all over the chassis moulding, the center dome and the magnet, so as to leave no doubt as to their origin.

It is interesting to see that Bose has now done a 180° turn and decided that a ported type of cabinet design is better after all. In their brochure for the Bose 800 – the immediate predecessor of the 802 – they state: "Multiple drivers in an air-sealed enclosure provide smoother response than ported bass cabinets (often boomy) or horn loaded drivers (which often sound piercing or 'peaky') . . .". While in the new brochure for the 802, it would now seem that: ". . . the reactive air columns greatly increase bass response while lowering distortion by reducing driver excursion at low frequencies."

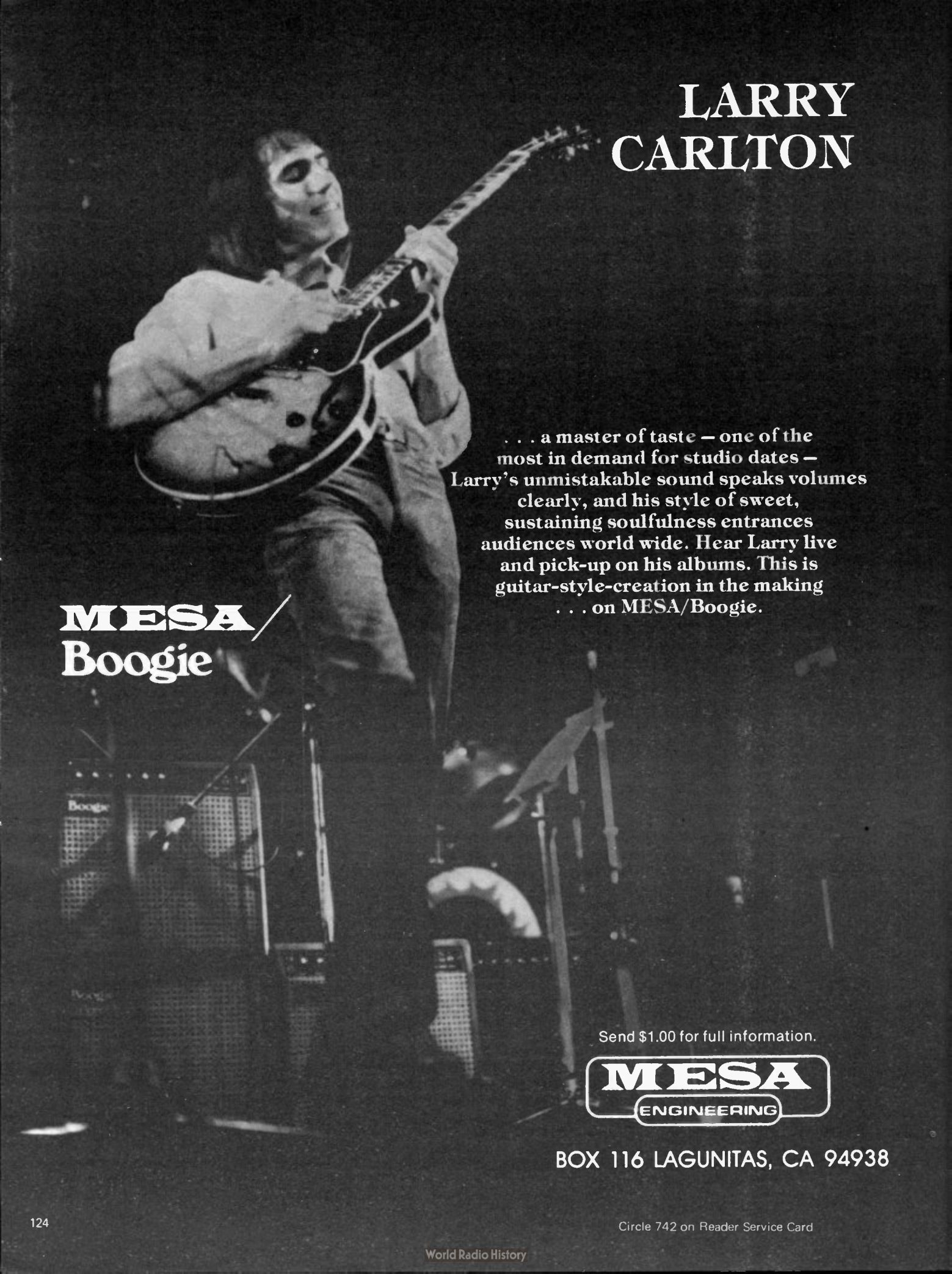
The term "reactive air column" is simply a technical term for the two reflex tunnels now fitted to the 802 which terminate at the two "eyes" at the front of the cabinet. Most people involved in loudspeaker design have ▶▶



Vertical polar response



Horizontal polar response



Circle 742 on Reader Service Card

known for years that a properly tuned cabinet will exhibit improved bass response and better piston control at low frequencies. It is interesting to note that Bose did not seem to think so when the 800 was designed, and now would have us believe that a reflexed cabinet is the best thing since sliced bread! I suppose that this is what commercialism is all about. The only difference with the Bose reflexing system is that gauze filters are fitted over the inner face of the tubes, which prevent the ingress of foreign particles and also offer some degree of acoustic resistance to the movement of air in the tube. The tubes can be removed from the front of the cabinet so that these filters can be periodically replaced and, again, the retaining clips for these tubes have been cleverly incorporated into the baffle panel moulding and a large threaded ring, screwed to the tubes from the front, holds the grill panel in place.

While inspecting the interior of the cabinet, I was intrigued to find a small circuit board screwed to the inside face of the baffle panel. Using a mirror through one of the loudspeaker apertures, I saw that it consisted of a festoon lamp bulb connected in series with a capacitor. Wondering what this might be, I traced the wiring through the cabinet and discovered that the series connected lamp and capacitor were wired across the lower four loudspeaker units. The value of the capacitor is such that at frequencies above about 4KHz, the reactance of the capacitor will become lower than the impedance of the four loudspeakers and therefore the lamp bulb will be dissipating more energy than the loudspeakers. Unfortunately, there are no markings on the lamp to indicate its voltage or wattage rating, but from the construction of the filament, it is a low voltage, high wattage device. A most unusual arrangement, whose purpose can only be to bypass the bottom row of loudspeakers at higher frequencies. I did say that this was an unusual loudspeaker!

What of its performance? The frequency response we have already discussed, and the sensitivity at 98dB for 1 watt is not particularly high, but is a vast improvement over the earlier Bose 800, and is probably as good as one is likely to get in a loudspeaker of these diminutive proportions. The power rating, however, requires some discussion. As music is not of a sinusoidal nature, it is not considered a fair test to feed in the full 160 watts of sine wave, and so we made a first power run at 100 watts. Though the unit was not audibly under stress at this level, the frequency response plot showed evidence of severe limiting at the lower and higher frequencies, coupled with very high levels of third harmonic distortion – as high as 40% or even 50% at frequencies below about 120Hz. The effect of this limiting was a fairly steep roll-off in response at frequencies below 300Hz and above 3KHz. A second run at 50 watts showed a notable improvement, but some limiting was still in evidence at below 100Hz. At 25 watts input, the response curve had regained its original shape and all seemed well.

I have not been able to establish whether this limiting is due to intentional electronic limiting incorporated into the equalizer unit, or to mechanical self-limiting by the loudspeakers themselves. I would suggest that the very high levels of distortion present at low frequencies would indicate that the latter is probably the case. However, there is nothing to suggest that the unit will not handle its rated input power without breakdown. The problem seems to be simply one of its frequency response being modified as input power is increased, and of high distortion levels at the lower frequencies.

The other performance peculiarity is in respect of the polar response in the vertical plane. It does not appear to obey any of the established laws of physics in relation to the radiating array. Note that at 1KHz and 4KHz, the vertical dispersion is good – although as the polar plots show, it is asymmetrical, the 82° at 1KHz consisting of 26° downwards and 56° upwards. However, at 2KHz we find an almost omni-directional characteristic and at 8KHz the dispersion is again beginning to widen out. In the horizontal plane there are no problems whatsoever, and the unit behaves as one would reasonably expect from such a design, with a usefully wide and controlled pattern throughout the range. Even at 16KHz (not shown on the plot to avoid confusion) the horizontal dispersion is a reasonably uniform 98°, which is good at this frequency. I have not had the time to go into the mathematics of the vertical peculiarities, but I suspect that it might well have something to do with the lamp/capacitor network altering the power levels fed to the bottom row of drive units. I can see no other explanation, as relative power levels between units are an important controlling factor in a multiple array such as the Bose design.

Listening to music through the system is a pleasure. The sound quality is crisp and punchy, with a surprising quality at the low frequencies. My listening panel thought the performance very good indeed on music by Queen, Abba, Fleetwood Mac, etc. at an average power input of about 10 watts. Used with a microphone, the performance is particularly clean and full and acoustic feedback does not seem to be a problem – even in a smallish room.

How can I summarize the Bose 802? The manufacturing quality is first rate. The design exercise has been carried through with minute attention to detail, resulting in a product that is totally functional and totally suited to its intended application. The performance is generally good, although I have reservations about its ability to handle low frequency information at high power levels, and am not entirely happy over the vertical dispersion charactertistic. It is normal to use the 802 in fours, in two stacks of two, and under these conditions, the low frequency response is considerably enhanced. For long-throw applications, two stacks of four will provide very good coverage of a fairly large auditorium.

The unit must never be used without the associated equalizer, and conversely, the Bose equalizer must never be used with any other type of loudspeaker system. Because of the way the equalizer works, the Bose 802 can only be used to advantage with a power amplifier capable of substantially more output power than is actually needed to drive the loudspeakers and something between 200 and 300 watts per channel would seem to be about right. The Bose 800 power amplifier will deliver about 800 watts into four cabinets. In terms of power input and sound level output, the system is not particularly efficient, but it works – and generally works well. You are not really sacrificing all that much in performance for the obvious advantage of the incredibly small size, light weight and convenience in use afforded by the versatile design. However, a system based on the Bose components will not be cheap. **Ken Dibble**

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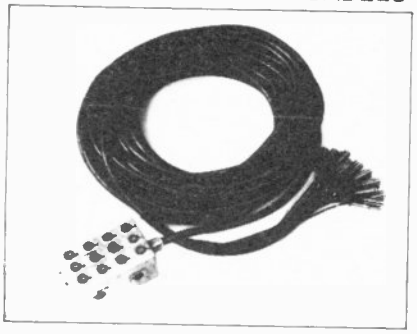

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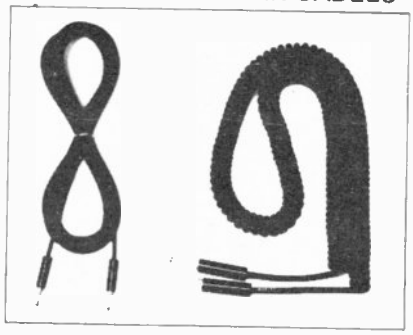

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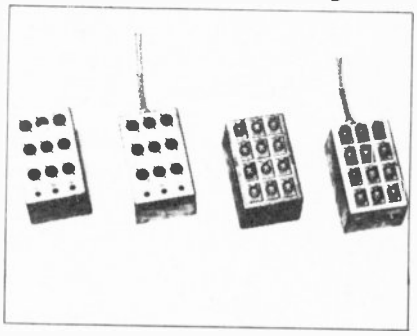

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RECORDING WORLD

Nashville

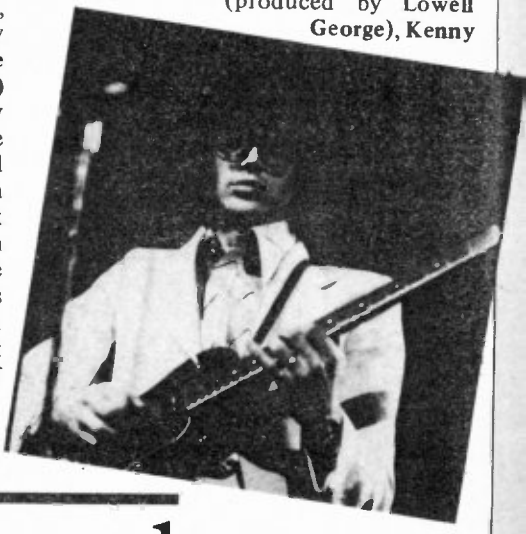
A spot check of local studios indicates that the accelerated touring season of early summer leaves most of the studio activity to "Jingles, overdubbing and mixing," but some interesting new projects have emanated. For example, there's nothing new about Owen Bradley being in the control room of the Barn (which he owns) when **Loretta Lynn** is singing, but a recent set of sessions found **Sissy Spacek** singing although, witnesses vow, it sounded "just like" Loretta. Another Bradley property, Music City Music Hall (old RCA) has been the location of sessions for **Dave and Sugar, Charley Price, Jim Ed Brown** and **Helen Cornelius**, and **Dottsy**, all for RCA, and **Rusty Weir's** first venture for Vogue Productions with Jim Vieneau at the helm . . . **Moe Bandy** and **Joe Stampley** pulled a surprise of their own at Fan Fair by previewing a duo single, from which an album is growing – recorded at Columbia and at Jack Clement. Clement has also been the point of origin for two **John Wayne** tributes, both of which were recorded BEFORE the Duke's death – one by **Paul Ott**, produced by Fred Foster for Elektra, and one by the **Kimberleys**, produced by Bob Alexander for Pied Piper. Other Clement activity includes **Larry Butler** producing separate sessions on **Kenny Rogers** and **Tommy Cash**, and **Fred Foster** finishing a **Sonny James** album, as well as a disco record by **Debbie Peters**, whose father is classic country songwriter **Ben Peters**. . . Across the river at Woodland, diversity continues to reign: **David Wills, John Conlee, Donna Fargo, Conway Twitty** and **Loretta Lynn** hold down the country side, while the **Happy Goodman** family represents gospel and an international flavor is given by the first American sessions (two weeks worth) by the Japanese group **Alice and Dick Curless** cutting a record for exclusive distribution in Sweden.

San Francisco

David Rubinson's Automatt has been hosting CBS's French group **Shakin' Street**, Capitol's **The Durocs** and Elecktra/Asylum's **Sweet Bottom** as well as ex-**Steve Miller** guitarist, **Greg Douglass** and his band and jazzman **Eddie Henderson**. . . At Bear West Studios, the **Tasmanian Devils** are still hard at work under the watchful eye of producer Eric Jacobsen (Lovin' Spoonful / John Sebastian). **The Sons** are back together there as well, with their production being headed by saxophonist **Pee Wee Ellis**. Ex-**Herbie Hancock** drummer James Levi is also busy with a solo project. . . **Francis Ford Coppola's** cinematic opus, **Apocalypse Now**, is still the main project at Different Fur Studios, with owner/synthesizer genius **Patrick Gleeson** heading the milestone effort. **Marty Balin (Jefferson Starship)** and **Bob Heyman** are both working on an as-yet-untitled rock opera, while Fantasy recording artists **Fever** are also working busily on their latest. . . Wally Heider's has been hosting ex-**Doobie Brother Tommy Johnston** for a solo effort, with assists from **Nicolette Larson, Sammy Hagar** and the **Tower of Power** horn section. **Jorma Kaukonen** is also at work on his new solo album for RCA Victor, with **David Kahne** producing. . . John Altman Studios has had **Mel Martin and Listen** – for Inner City Records – jazz pianist **Sue Muskarella** (Pacific Arts) and **Ivy and the Eaters**. . . Former **Creedence Clearwater Revival** bassist **Stu Cook** has been in Xandu Studios producing **Rocky (ex-13th Floor Elevators) Erickson and the Aliens**. . . Fantasy Records' studios, Berkeley, have been busy with dates by **Bill Summers, Rance Allen, Paradise Express, Toni (ex-Joy of Cooking) Brown, Idris Muhammed** and **Sonny Rollins**. Sidemen on Sonny's dates have included **Larry Coryell** on guitar, **Bill Summers** on percussion, **Jerry Harris** on bass, **Al Foster** on drums and **Mark Soskin** on keyboards. . . **The Hawaiian Dogs**, the **Readymades**, the **Runz** and the **Blitz** have all been at work in Richmond's Tewksbury Studios, while 1750 Arch Studios, Berkeley, have had folk artist **Kate Wolf** (Kaleidoscope). . . North of San Francisco, the Record Plant, Sausalito, has had CBS's the **Hounds**, Warner Bros.'s **Van Morrison**, RCA's **Jesse Barish** and CBS's **Flint** (ex-Grand Funk Railroaders). . . Tres Virgos, Mill Valley, has hired Ritchie More as their head engineer. Ritchie, among others, worked on the Beatle's **White Album**. . . Hun Sound in San Rafael has had **Pablo Cruise, Commander Cody** and **Tower of Power** in their studios, while **Taj Mahal** recently cut a direct-disc, "live," album at Crystal Clear Studios, San Rafael. At Sonoma Sound Studios, Cotati, **Barry Melton (Country Joe and the Fish)** has been working on his latest solo album, "Music is Medicine."

Los Angeles

In and around town things are moving with the usual frantic pace that marks the industry. At Cherokee Studios **Styx Hooper** is being produced by the **Crusaders** for MCA; **Bob Seeger** is in for Capitol; **Long John Baldry** is putting it on tape for EMI; and the **Pages, Jessie Barish, Oz** and **Jean Luc Ponty** are also putting in time at the studio. . . **Maynard Ferguson** is finishing up his sting at A&M Recording Studios (Columbia). **Gladys Knight** is being produced by Jack Gold there as is **Johnny Mathis**, and **John Davidson, Manolo** and **Brothers Johnson** are doing their latest efforts there. . . Filmways/Wally Heider Recording continues to grab off a top share of the talent around town as **John Denver, Little Feat** (produced by **Lowell George**), **Kenny**



On The Record

by
Scott E. Kutina
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RECORDING WORLD

Loggins and the **Kinsman Jazz Band** are eating up the studio time. . . At Capitol Record Studios they continue to mix up their acts covering a broad section of the music spectrum hosting **Bob Seeger, Neil Larson, Seawind, Brenda Russel, Eddie Money** and **Al Martino**. Doing mastering on their long awaited album is **Fleetwood Mac** and **Sammy Hagar, Little River Band** and **Anne Murray** add to the prestigious clientele of the studio. . . **Donna Fargo** is mixing her latest album at Westlake Audio and **U.K., Terri De Sario** and **Patrice Banks** are recording there. . . At Larabee Sound **Brainstorm** is cutting their latest disco tracks. Just to keep the studios out of a niche, **Ronnie Hawkins & The Hawks** are working there as is **Juice Newton, Jim Capaldi** and the songwriting team of **Sawyer & McCloud**. . . It seems to be the month of self-producing at the Record Plant with **Stephen Stills** producing himself for CBS as is **Dave Mason. Riff Raff, Mikel Japp** and **Survivor** are also spending time at the Record Plant, as is **Aretha Franklin, 1994, Debbie Boone,** the **Jefferson Starship** and **Rod Stewart**. . . Over at Gold Star Recording **Neil Young** is polishing off his live album for Warner Bros. with **David Briggs** producing and the **Ramones** are in with veteran producer Phil Spector.

New York

Things seem to be a bit slow in the Big Apple but Electric Lady Studios continues to record some of the top acts hosting **Blondie, Lonny Liston Smith** and the **Toru Oki Blues Band; Mike Oldfield** is also in the studio recording the newest Exorcist theme. . . Over at Sound Idea Studios the **Same Jones Big Band** is putting in time for Sea Breeze Records and **Walter Murphy, Diego Verdaquer** and **Rich Leder** are working on their albums there. . . Arif Mardin is working with the lady of camp, **Bette Midler,** at the Atlantic Studios and Roy Thomas is in producing **Foreigner**. . . **Ray Davies** is producing **The Kinks'** first USA recording at Blue Rock Studio for Arista. Stephen Galfas, producer, also completed the recording of **Phillip D'Arrow's** "Burn the Disco Down" there; **Alan Gordon, Gary Bonner** and **Jake Jacobs** (formerly the "Magicians") have reunited in the Blue Rock Studio for some new tunes.

The Lyon of Newport Beach

Out in Newport Beach, California there's the sun, the surf and the sand. There's also the Bay Club hotel, wonderful restaurants and . . . well, what more can one say: it's a resort, of sorts. One more thing tucked away in the small town just sounth of Los Angeles, is Lyon Recording Studio; a state-of-the-art studio that provides, as owner Curt Lyon likes to describe it, "the perfect atmosphere for a working vacation. Artists come here and they 'live' here."

Curt has, basically, summed up the philosophy of Lyon Recording Studio, but it goes a bit further than just a place to enjoy. There is a definite commitment to offering the most sophisticated facilities in an atmosphere that is conducive to hard work and creativity.

It was because of their desire to offer the best that they closed down the studio for four months in the early part of the year. Reconstruction and growth only come from success and the studio had experienced decent growth since its inception as a small, 8-track studio handling primarily local Orange County work consisting of jingles and documentaries.

Curt moved down the coast from Portland, Oregon where he'd received a degree in Communications from the University of Portland and had done his apprenticeship. "I started sitting in on sessions at Northwestern Sound, where "Louie, Louie" was recorded, and I eventually got a job at a 16-track studio called Rex," he explained. "But I wanted to open my own studio in Newport Beach so I came down over Christmas vacation and found the location. I got a small bank loan and my brother and I built it ourselves."

The initial investment on equipment, although seeming large at the time, was tiny in comparison to the impressive array of modern studio technology that currently fills the control room. "We invested about $18,000 in equipment," said Curt. "We had a Tascam 8-track, 2-track and an 8-track with dbx. We also had a small complement of microphones and a Tascam customized Model 10 board; it was a 16 into 8."

Curt had initially become interested in recording because of his own musical talents. He plays guitar, piano, bass and a "lot of other instruments." Trying to overdub and perfect his own compositions lead him to buy a Teac 33-40 (it still sits in the control room). Now with the studio built he returned to his music and began writing jingles and submitting them to companies on spec. While doing this he met David Coggin, whose background in radio announcing proved invaluable in marketing the studio and its product. David has been with the studio ever since.

Lyon Recording Studio was a success and Curt feels that their ability market themselves was a primary factor. "We thought that if we made it look very slick, which we did at the time, we could charge more than any other 8-track. Just because of the appearance, because of the fact that we approached it as a business instead of a hobby and that we were intent on not being super cool and real hip and all that garbage, it allowed us to have a large enough market to support the studio."

Looking to update to 16-track put them on the trail of equipment which resulted in a direct jump to 24-track. "I found an MCI 428 24-track and an Ampeg MM 1100 available, so I decided to go for it."

The complexion of the studio immediately changed. "All of a sudden people like Alfonso Johnson, Randy Bishop and Martin Glen started using us for demo albums," explained Curt. "They started using it because it was comfortable, close to the water, seemed to be a nice place to work and seemed to be competently run and well equipped and maintained."

Demand once again pushed the studio into expansion and with the option of an additional 1200 square feet adjacent to their existing rooms they decided on the major revamp in terms of space and equipment and facilities," said Curt.

Designing and constructing the rooms were obviously of major importance and the studio employed a local company, Express Sound Company, to do it.

"The owner, Jerry Smith, took it upon himself to do it and he consulted

closely with us," explained David. "We told him pretty much what we wanted. We'd worked in some adverse situations and there were a lot of details we wanted taken care of."

In a small studio, it's important to be able to handle a wide variety of circumstances and be diversified enough to cope with special demands. "We wanted the versatility of having live rooms and dead rooms," said Curt. "He bended to these particular needs, utilizing some of the live and dead end theory that he's been working on; he also experimented a little bit in the control room."

Jerry Smith did his job well and the studio design resulted in this: The main room is basically floating on a thin layer of rubber to keep the sound isolated in that room and to absorb any street rumble. It is hollow and has a fairly lively sound. The walls are oak and the room has a pleasant, warm feel.

The drum booth, directly behind the main room, is not floating. It is an extremely dead room and has a platform built on a cement slab with sand completely poured down over the floor. "You walk in that room and the pressure just drops," said Curt. "We wanted a room where we could record a bass drum or something that is so solid that you don't get any reflection from the floor or anything."

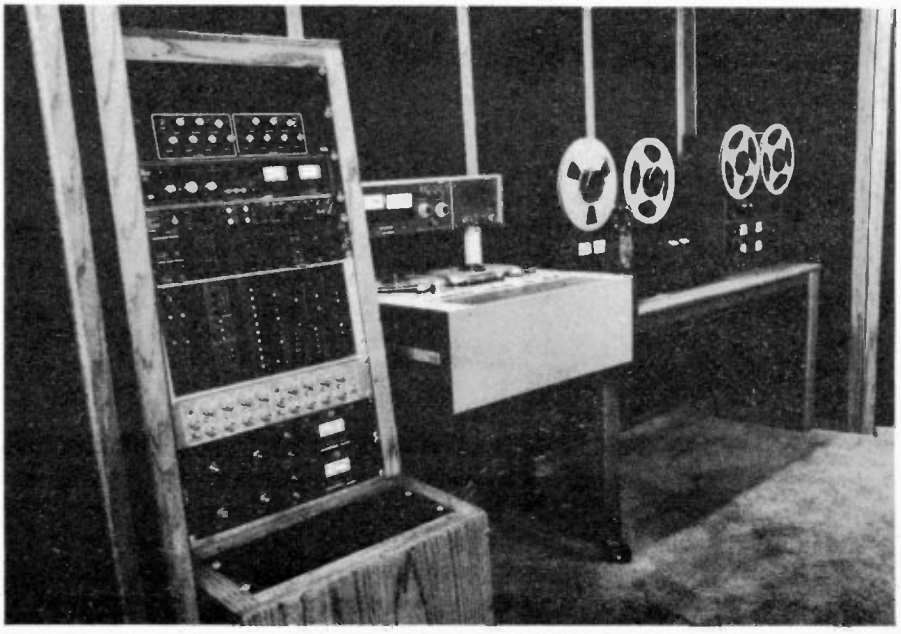
The third room, which initially feels like a hall way but it probably one of the most diversified areas of the studio, offera live/dead combination. It has mirror and oak in three 13" segments; 13" of mirror, 13" of oak, etc. Curt explained: "It's a live room where we decided that because wood has too mid-rangey characteristics, we would offset it by using glass. But because glass looks ridiculous, we decided that mirror would be better. Three-quarters of the room is live, and a quarter is dead. This gives us the flexibility of putting two people in a situation where you might want one live or one sort of dead."

The control room is approximately 25' x 25', is oak panelled with specially built oak cabinets for the gear. It is so comfortable it feels more like a living room than a control room. But the full window allows perfect sight into all rooms and the equipment layout is designed for optimum efficiency and accessibility.

It's immediately obvious that Lyon Recording Studio hasn't cut too many corners in their reconstruction. Their equipment break down proves they were intent on supplying the best in the latest technology. They now use the 24-track MC1 528 C Console. Which is fully automated. They have an Ampex 24-track machines, a Studor half-track, a Technics half-track, Uri limiters, Orban Parasound EQ, Scamp rack and Del talabs Digital delay. They also use Neuman U 87 microphones and AKG 414's, AKG 421's and 452's; they also have the normal complement of mikes necessary for daily use. They have also added a Dolby system for those that want to use it.

Kenny Loggins has recently recorded at the studio and other "name" acts have made block bookings, but mum's the word, of course. When asked if Curt Lyon would continue to do the major portion of engineering for the studio, he replied: "I only do the engineering when someone comes into the studio without one. Now the studio is being booked by artists who have their own engineers. But I'm hoping that I won't get into a situation where the studio itself will become so popular that I won't be able to engineer anymore. I don't want to be a studio owner who becomes a flunky and just walks in and out saying, "How is everything? Oh, great.' and then walking out again. I'm too involved in what I'm doing."

If past performance is any indication, Lyon Recording Studio will indeed become enormously successful and popular. But Curt will hardly become a flunky. At 25 years old he's already established a major studio and he's sure to find something else to grow with.



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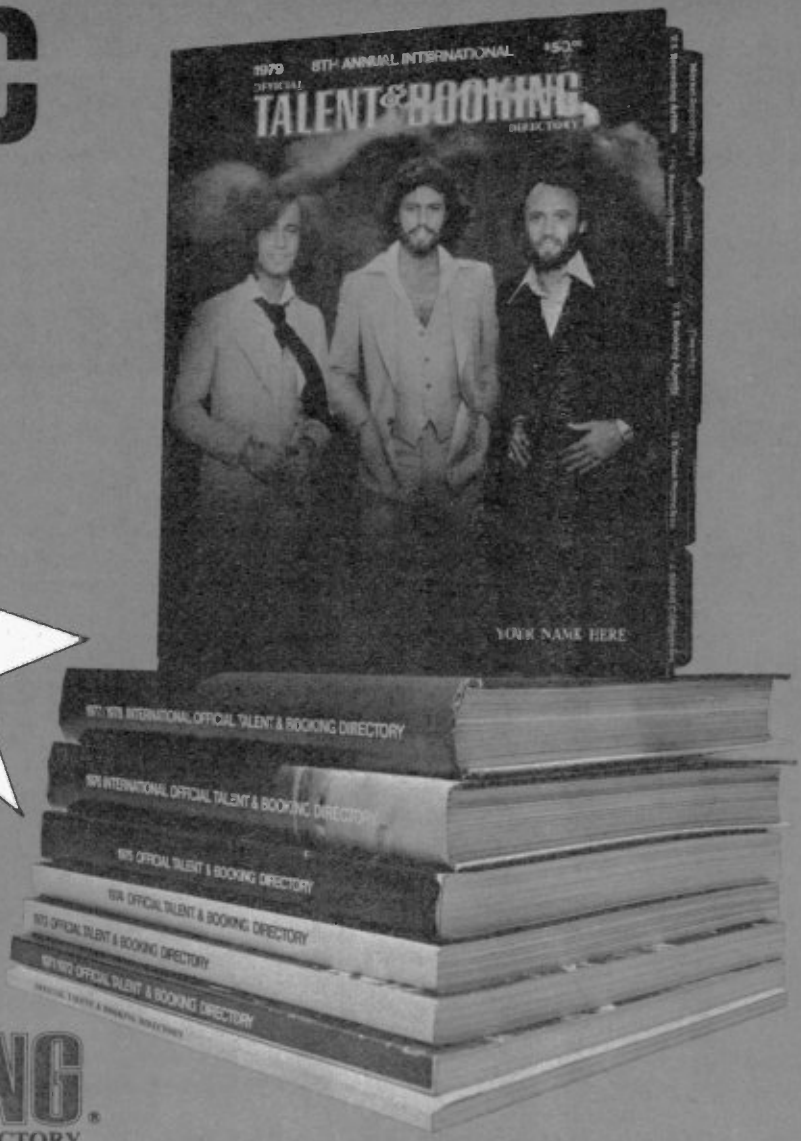

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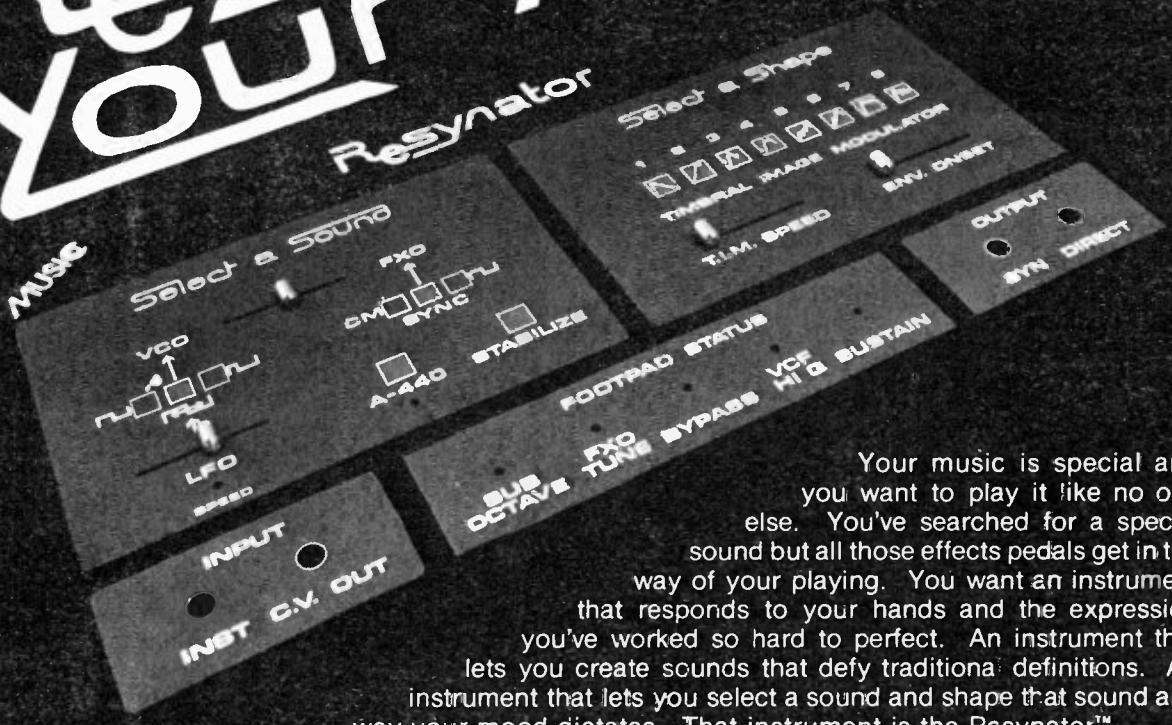

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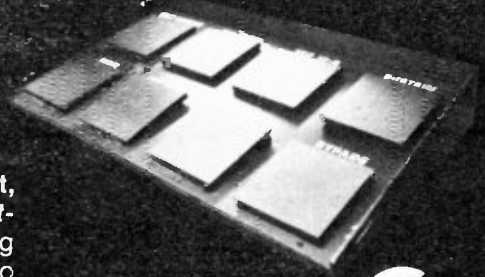

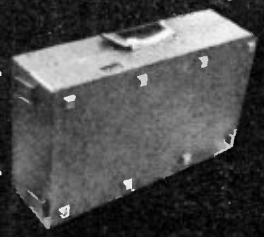

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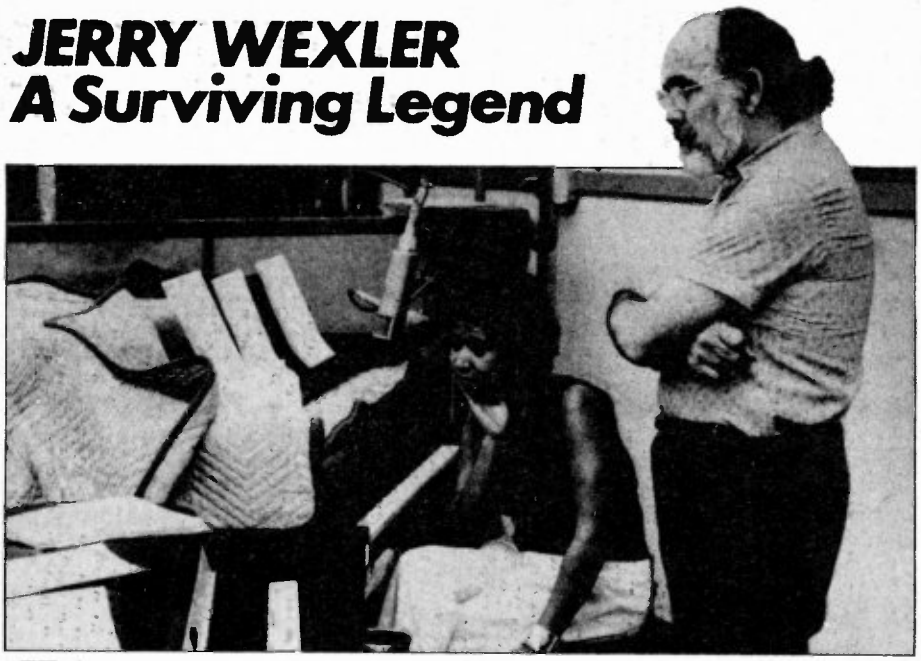
JERRY WEXLER
A Surviving Legend



The pages of IM&RW are filled with articles about the legendary or semi-legendary. In a business as mercurial as music, two or three hits strung together by an artist or producer is enough to confer on that person an aura of great importance, however fleeting it may be. But then there are a few whose heads are not turned by the first flush of success, whose commitment and integrity are more fixed than the Top 40 and whose repeated visits to the charts suggest something more substantial than merely being 'hot'. Jerry Wexler is one of these. If he is not altogether comfortable with his legendary status, it is not because he can't carry the weight, it is simply that he is far too active at the age of 61 to slide into the passive role of elder statesman. While younger men waft agreeably into semi-retirement, content to push paper, Wexler is still happiest when he is in the front lines, in the studio, making records.

It is impossible to capsulize Wexler's entire career, but basic history is in order. He came into the music business in 1948 as a reporter for *Billboard*, where he learned the nuts and bolts of the industry and sharpened his editorial skills

Like many others in America in the early '50s, Wexler's life was unexpectedly altered by Senator Joseph McCarthy's Commie hunts. Asked by a *Billboard* editor, presumably caught up in McCarthy's Red paranoia, to compile a dossier on the Weavers and Pete Seeger, Wexler "told them what they could do to themselves" and went on to join the publishing firm of Robbins, Feist & Miller.

A mutual interest in record collecting as well as Wexler's proclivity as a song-plugger, as he describes the publishing task, brought him to the attention of Ahmet Ertegun and Herb Abramson, co-partners in the fledgling Atlantic Records. When Abramson was drafted in 1953, Ertegun took on Wexler as a partner and the golden era of Atlantic – and American rhythm and blues – had begun. Among the artists who recorded for Atlantic in the ensuing years were LaVern Baker, Ray Charles, Aretha Franklin, Joe Turner (whose "Shake, Rattle and Roll" is considered by many, along with "Sh-Boom" by the Chords, also on Atlantic, to be the first bona fide rock 'n' roll record), the Drifters, Soloman Burke, the Coasters, Ivory Joe Hunter, Barbra Lewis, Wilson Pickett, Ben E. King and Otis Redding, not to mention the galaxy of white rock stars the label was later to boast.

No fan of popular music could fail to take pleasure in the anecdotes and historical footnotes Wexler has stored in his head, and he himself is still enough a fan to be enthused by them as well. He recalls his earliest orientation to music: "As a record collector, I had my own fix on the way that I could hear music. It was terribly subjective, but I got great satisfaction from early Bessie Smith, Louis Armstrong and Jimmie Lunceford records. Then I jumped from this pristine awareness into a state of totally unwarranted arrogance. I said to myself, 'I could make that record.' I was totally wrong, of course. When I finally got my shot to go into the studio, I found that I was pulverized, paralyzed by fear. I couldn't elicit a respectful response from the musicians, even though I was footing the bill.

"The first thing you've got to do is win the battle of the sidemen, otherwise you can't go out and ask a player like Bernard Purdie for, say, a different pattern on the foot drum, without getting an ill-concealed sneer or snide remark to the bass player to the effect of, 'Look at the schmuck who's paying my check.' It took me a long time before I had enough confidence in my own taste and knowledge to go out to the musicians, which is absolutely necessary. Because of the important aspects to producing a record, one has to be be able to change the music when it needs to be changed. If you can't do that, then you're not a producer".

Wexler hardly lacks for confidence in the studio now. He is especially at home at Muscle Shoals in Alabama where he has worked in tandem with Barry Beckett in producing records by such artists as the Staple Singers, Etta James, Sanford & Townsend and, most recently, Bob Dylan. The Dylan LP, *Slow Train Coming*, was done on the heels of Wexler's production job on Dire Straits' second album, *Communique*, and Wexler employed Straits members Mark Knopfler (guitar) and Pick Withers (drums) on the Dylan sessions. This is the most recent in a long succession of timely musical marriages that Wexler has brought about. (Did you know that Joe South plays guitar on Aretha Franklin's *Chain of Fools*?).

To watch Wexler in the studio is to witness a man in full command of his craft, a maestro who employs his own vocabulary of words, body language and gesticulations in the recording process. "I'm at a certain disadvantage in that I don't know the names of the chords and the different keys and so on," he says, "but it hasn't really hurt me because I'm not embarrassed to go out and sing it to the musicians or to somehow arrive at it by trial and error. There are times, when voicing a chord for a background group for example, when it's much more comfortable for me to have an arranger to sing the notes over the

talk-back, or to have someone like Tom Dowd or Barry Beckett who can go out and play the chord on the piano and assign the notes to the singers. But when it comes to giving a mix or spotting voices in the arrangement, I have no problem laying it out."

Wexler lets humility get the better of him if he suggests that his production prowess is solely reliant on his ability to think on his feet. His philosophy of how a record should be made is manifest in every session he has presided over, a set of criteria rooted in common sense and a prominent work ethic which he traces back to his depression-era childhood. According to Wexler, there are three basic ways of making a record: "One is to go into a bar in the South Side of Chicago, find a Howlin Wolf bring him into the studio the next day, and duplicate what he did in the bar This is the documentary method . . . in the Forties and Fifties, all records were made this way. Then there's the Phil Spector method, where you envision a total concept and then bring forth a confection where the artist is just one tile in the overall mosaic. This is the prototypical producer in the mind of the public and the industry. And the third way, I call it serving the artist, is where the singer and the song are foremost and the object is to take the best approach for bringing out that talent."

Wexler not only fits into the latter category, he may have invented it. "My endeavor," he says, "has been to keep the production aspect as unobtrusive as possible so that people could just feel the music without being made cognizant of the bones, the substructure. It's like when you surrender yourself to a good film, you don't sit back and say, 'Gee, that's beautifully directed.' People shouldn't have any awareness of production values as they're undergoing the experience of a record." Jerry Wexler is an artist's producer.

Wexler first applied these precepts in the mid-'50s to sessions for Chuck Willis, the Drifters (with Clyde McPhatter on lead vocals), Ray Charles and Joe Turner, among others. Atlantic was on to a musical trend that would blend black and white audiences, something which Wexler called 'cat music' but which gradually became known as rock & roll. All this time, all recording was done in mono, where the producer's foremost concern had to be with the mix because, as Wexler puts it, "you might not get a second chance." But with the advent of stereo, the modern era of recording was born.

It was late in 1957 that the first 8-track sessions took place in Atlantic's studio/offices above Patsy's restaurant on West 56th Street in Manhattan. These were done on the Ampex Three bought by chief engineer Tom Dowd (Ampex One belonged to Les Paul and Mary Murphy, Ampex Two was owned by Jimmy Carroll Mitch Miller's contractor at Columbia Records). It is open to some debate as to exactly which were the first 8-track sessions there, but the concensus is that Chuck Willis inaugurated the Ampex Three with his classics "Hang Up My Rock and Roll Shoes" and "What Am I Living For". Wexler and Ertegun also had the wisdom to make the Ampex Three available to independents like Leiber and Stoller (who Wexler credits with being the first in the new recording era to consciously utilize production and arrangement values on their sessions with the Coasters and, later, the Drifters) and Bob Crewe.

Phil Spector, who had come from California to work for a year as an apprentice to Wexler and Ertegun, also cut his teeth on Atlantic's miraculous new machine. Unbelievably, no one followed in Atlantic's footsteps, at least not right away. For nearly four years, into 1961, Atlantic was the only company doing its recording in true stereo.

"When we started with the 8-track," Wexler recalls, "Leiber and Stoller used to work just as hard getting the mono mix because they didn't trust the Ampex. They'd go back and remix it afterward. There was a certain wisdom in this, too, because the better the feedback to the musicians, the better the results. One thing a producer has to constantly be aware of is the cue systems. You can go through a whole take only to find that the rhythm guitarist didn't take his best shot because he couldn't hear the bass properly. So I always make a little speech at the outset: 'If you're not getting the right mix on the earphones, tell me right away and we'll get you what you need. Sometimes musicians will not respond, even if you go out and picket them with sandwich signs." This may strike the average concert-goer as somewhat ironic, to think that the same artist who will waste an audience's time complaining on stage about the sound would hesitate to be as exacting in the studio, where such grappling should take place. Wexler has learned over the years not to trust each musician to ask for what he wants, or even to know what he should want in the first place.

But this leads to one of the ways in which an experienced producer exercises control over a group of musicians: by manipulating what they hear. "Sometimes we have to psych them out," Wexler says, "and decide in the booth what we're going to feed them, depending on what's going down. If it's a singer who's having pitch problems, we'll feed them an acoustic piano reference, the basic pitch reference. Or if somebody's having trouble with a certain rhythm, we might just feed them the sock symbol or the foot drum, depending on what we're going for. If it's a sophisticated musician, what I call a contributory artist like Ray Charles or Aretha Franklin, we'll just ask them what they want to hear. Then you have to determine the *amount* you're going to give them . . . the less volume in the phones, the harder they play and sing. Sometimes singers who ask for too much level will defeat themselves because you get no attack, no projection. In most cases, we feed them the least the law will allow to make them play and sing hard."

In many ways, advanced recording techniques have made the task of the modern producer to take the music as it is created and break it down into its component parts, then put it back together in its refined state for the record. Many latter-day producers, although expert in dissecting the music, don't seem to quite get Humpty Dumpty back together again; like a chef who over-cooks the nutrients out of his food, they lose the guts of the music in the technological process. Because of his dedication to preserving the artist's craft, and his overriding affection for funk, Wexler is rarely guilty of what he describes as "a tendency by producers to become enamored of their tracks and to forget about the breathing bodies out there".

Perhaps one reason that Wexler has never discounted the 'breathing bodies' is that he has never wholly embraced the technology of recording, relying on an engineer or co-producer to keep up the mechanical end."Tom Dowd always knew infinitely more about the technicalities than I did," Wexler readily admits, "I learned a great deal, not so much on the electrical side, but on the

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pragmatic side. Like which microphones to use in which situations, the right way to go after a mix, and so forth. When reverb came in, and equalization, and echo, and 8-track, and 16-track . . . Tommy Dowd was my shepherd through these phases. I only learned the practical end of how to use the machinery and what to expect when it came out."

But Wexler has never been known to discard a useful tool, no matter what the source, and now he employs occasional studio tricks when applicable to a specific artist. He has used echo delay, flanging (a method of producing a delayed effect) and, a machine called the Aphex Aural Exciter. "Aphex is a way of restoring ambience. "Wexler explains. "A record has to have a certain amount of air around it or it sounds dry and rigid. This sense of space was very important with Dire Straits used on their first album . . . a lot of it we got from the room (at Compass Point studios in Nassau, Bahamas) which was very good acoustically. But when you can't get it naturally, you can use this Aphex process to create the illusion of air. Of course, you can get too much air and your music sounds like its coming out of any empty ballroom. But the point is that there is a lot to be aware of and it is up to the engineer to bring these things to the producer's attention. The producer's best concentration should be on getting the groove"

But the increased automatization of recording brought about other changes in the music industry apart from the immediate improvement in sound quality. In an indirect way, the increased dominance of the producer and arranger in the making of records was the impetus for the next phase in the development of Atlantic Records: the opening of the South. Ahmet Ertegun and Herb Abramson had made early field trips to New Orleans, recording sides with Professor Longhair, Blind Willie McTell and Ruth Brown, among others, and providing a springboard for Jesse Stone (who wrote "Shake, Rattle and Roll" under the pseudonym of Charles Calhoun) to show his genius for flexible rock & roll arrangements. (Ertegun later told Charlie Gillett, in his excellent history of Atlantic, *Making Tracks*, that "Jesse Stone did more to develop the basic rock & roll sound than anybody else, although you hear a lot about Bill Haley and Elvis Presley.") But it was in the early Sixties, when the standard studio techniques of using written arrangements had run their course, that Wexler spearheaded the move to Dixie.

"The fact is," Wexler says, "that by 1962 we had run out the string with arrangers. The stink of the studio was on all our records and I found myself at an impasse. I was bored with that particular studio sound and suddenly, by mistake, I discovered that down South they were recording with head arrangements made with the studio rhythm section. I found that we could make woodshedded, evolved records in the South better than we could make arranged records in the North." Websters may define woodshed simply as "a place for storing firewood," but to Wexler and Atlantic it meant a fresh slant and a wealth of untapped talent.

"I started going South to record with these very special players," Wexler explains, "there was Booker T & the MGs who were the house band at Stax (which Atlantic signed to a distribution deal that brought with it such artists as Otis Redding, Sam & Dave, Eddie Floyd and Rufus Thomas), Chips Moman's band in Memphis and Rick Hall's band in Muscle Shoals. These musicians were so good, I wouldn't have cared if we recorded in a barn." It is the outgrowth of Rick Hall's band, which now includes such players as Roger Hawkins, David Hood, Pete Carr, Jimmy Johnson, Eddie Hinton and the legendary Muscle Shoals horn section, that Wexler now gravitates to with many projects, sharing production chores with Barry Beckett.

Beginning with the Wilson Pickett Memphis sessions that yielded *In The Midnight Hour* and *634-5789*, which featured Steve Cropper and Booker T, Wexler began a string of Southern-made records that are considered by many to be the high water mark of his career. Of these, his work with Aretha Franklin is probably the best known, earning both artist and producer a slew of gold records and Grammy awards, followed by records by such diverse artists as Dusty Springfield, Cher, the Staples, Willie Nelson, Delaney & Bonnie, Ronee Blakeley and Bob Dylan. "Down South we can get anything," Wexler enthuses, "from a raunchy Ronnie Hawkins record, to a polished R&B record, to an immaculate white soul album like *Dusty in Memphis*, using the same matrix. It's incredible. People have a wrong notion of what goes on down there. They think there's some kind of machine that stamps out R&B tracks by the yard with no personality. The diversity there is just amazing: they can make C&W, R&B, rock & roll, even disco."

Atlantic, the last of the great independent labels, became part of the Warner Bros. conglomerate in 1967, ending an entire era of musical history. Although the sale of Atlantic to Warners had great symbolic overtones, the daily workings of the company changed very little, with Ahmet Ertegun, Jerry Wexler and Ahmet's brother, Nesuhi, retaining control. But Wexler inadvertently disconnected himself by removing to Florida, where he sought to keep up his end of Atlantic by remote control while starting up Criteria Sound studios in Florida.

"I kept making records," he explains, "but I was no longer close to the lead role I had previously assumed. If I left a gap in the operation at the time, Ahmet filled it very well. Jerry Greenberg, who had been my assistant, made the transition to working for Ahmet and the company continued to flourish exponentially." Meanwhile, Wexler settled into the pattern he has maintained ever since, even though he resigned from Atlantic in 1977 and took on a Vice Presidency and A&R Consultant's job with Warner Bros. Records shortly thereafter. He remains very much in demand as a producer and finds himself in the enviable position of being able to pick and choose his projects.

As for future projects, at this writing Wexler's slate is clean. Whatever it is that brings him back into the studio, two things are certain: it will be soon (inactivity is not part of Jerry Wexler's repertoire), and it will be carefully chosen. "I've been guilty, over the years, of expending myself on projects that perhaps were not 100% worthy," he says, "Not that I'm sorry for any of the records I've made. But there is only one standard of measure in the music business . . . if it doesn't sell, it's a bomb. They may be Smithsonian entries and get rave reviews, which is very comforting, but I'm cold-blooded about it: if it didn't sell, take it away." It is the juxtaposition of this hard-line realism combined with his undying dedication to honest, intrinsically American popular music, that has helped to make him one of the few people in the industry who can successfully continue to be both a bottom line-conscious executive and a creative catalyst and producer.

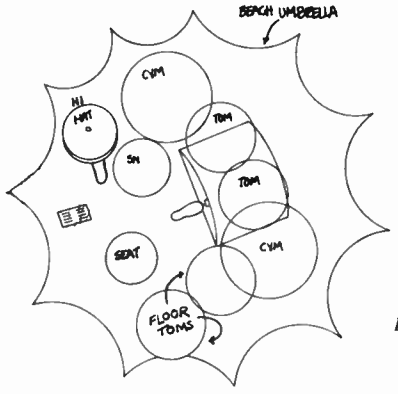
Gary Kenton

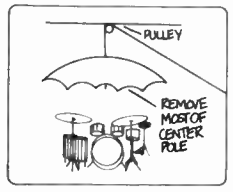
HOME STUDIO PROJECT

You will, no doubt, have noticed that the *Recording World* section of the magazine is to have its own recording studio, and it has become my task to establish the studio and knock it into shape. The general plan is to build a very flexible working environment which can be used as a test bed for virtually any type of studio equipment, and studio work. In this way we hope to be able to provide valid assessments of professional recording equipment, but also to look at equipment which will be suitable for the home recording enthusiast and for small bands to record their own demos. While our studio will not be operating as a commercial venture, we hope to do more than merely test equipment. You will be hearing more of this later.

Selecting a suitable place for the studio and then equipping it for use is a thankless task. There are a great many problems involved in setting up a studio, as anyone who has had the experience will only too readily confirm. It seems appropriate that we should run through some of the problems so that you will be able to appreciate some of the hassles involved. Added to this, a general discussion on acoustic treatment will benefit anyone recording at home. At this point I don't want you to go away with the idea that I will be talking about costly construction in a large studio environment. I certainly will not. On the other hand I don't want you to think that we are going to skimp and work to a very meager budget, we won't do that either. But there would be little point in me discussing expensive and bulky maneuvers that will require major structural changes. This will be of little use to the home recording enthusiast. We are not looking to build a complete studio from the ground up, we too wish to convert existing premises for our own use and hopefully the solution to some of the problems encountered will be helpful to anyone doing their own recording.

The actual format that our studio takes and the various acoustic treatments employed will be reported as they take place, so for the moment I will confine the discussion to relatively simple yet effective means of acoustic treatment within existing structures.





Drum kit

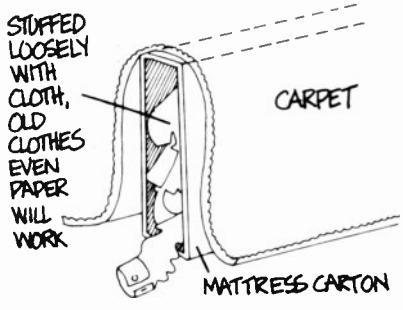
The Venue

If you are going to work in your present house then the considerations that follow won't apply, but if you are contemplating a move, then we have a choice, and there are many important considerations to make. First and foremost are the areas to be avoided. Most of these relate to external disturbance which you are likely to have problems with. To be avoided are main roads, subway lines, ordinary trains, flight paths and industrial areas using heavy machinery. This last category not only applies to the noise which will be generated, but also to electrical interference. A lot of industrial equipment can generate nasty interference on the mains and this can play havoc with audio equipment. In the same bag are locations near radio transmitters or on streets used by cabs and ambulances, these can cause radio interference.

In well-designed equipment this should not be too much of a problem but many guitar amps and effects units pick up r.f. interference just like radio sets and would be of very little use to anyone. As a point of interest I know that one major London studio which is built over the top of a subway line, and on a number of their recordings you can clearly hear the rumble of trains, not a pleasant sound. Also worthy of consideration is access. If you have to load and unload a band you must obviously be able to do this with some degree of ease and of course have ample parking facilities for the band. This point is often overlooked when setting up studios in major cities where it can be almost impossible to easily park and to unload gear.

Inside

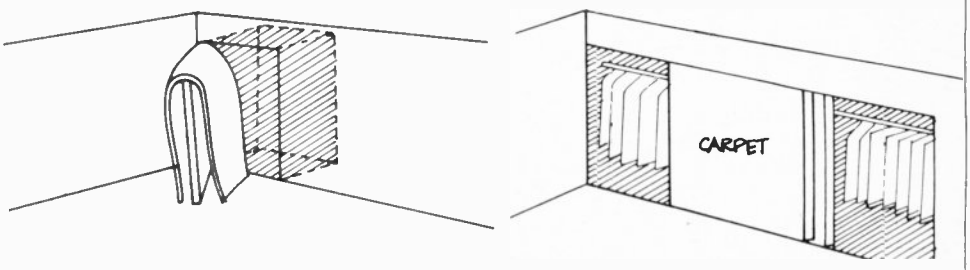
Having found a venue which is hopefully in the middle of nowhere and a long way away from aeroplanes we can now consider the rooms within the building. The dimensions of the rooms used as the studio and control room are a major influence on the results that you will get. The first thing to avoid like the plague is a totally cube shaped room, by this I mean one where all the dimensions are the same. If you have a room that is 10 feet in all directions it will produce a very strong standing wave at around 56Hz or to put it more simply there will be a very large peak in the low frequency performance which will make all your recordings sound very bass heavy. It is therefore necessary to use a room in which none of the dimensions are multiples or sub-multiples of another.



Filled carton

If, for example, the room is 15 feet wide and 10 feet high these are multiples of five foot and is undesirable. Something like 10 by 17 or even 10 by 11 is what you should be looking for. If you are only planning a very simple layout where you will perhaps be recording yourself or two or three musicians then you obviously don't need to look for a very large room but if you are planning a large group and also you are considering drastic acoustic treatment you will have to bear in mind that the dimensions of the room will be reduced by such treatment. Most domestic houses have a ceiling height of around eight feet, and this would be perfectly adequate for a simple home recording set up, but if any serious or complex acoustic treatment work is to be done, then the height would come down by a couple of feet, so such a ceiling height would obviously be unsuitable. If this kind of work is being contemplated you should be looking for a height of at least 12 feet, preferably something like 16 feet. Before leaving the dimensions of the room the most suitable shape for a room is where none of it's boundaries are parallel so a sloping ceiling and a room which tapers to one end is far more preferable than a conventional shape.

The materials of which the room is constructed will also have a major influence on it's sound, unless of course you are planning exhaustive rebuilding. Generally speaking a reasonably solid structure is a better bet than a flimsy one. Lightly built rooms can have accentuated problems at some very peculiar frequencies and give rise to enormous problems. A simple test is to play some music in the room and stand outside. You will then have some idea as to what frequencies the room is absorbing or, more correctly, transmitting through the structure and which frequencies are being reflected back into the room. In most domestic rooms this usually means that bass will be transmitted through the structure and outside, while higher frequencies will be reflected back into the room. These considerations are also important, of course, when one is considering how much sound is going to escape from the recording environment and be an annoyance to neighbors or other occupants of the building.



Cupboard and wardrobe

If you are planning on sorting out a room to rehearse in, and not trouble other people, these kind of considerations will be obviously be of most importance. On the other hand if you are planning to make good recordings and you live in the middle of nowhere they may not be of such importance. Anyway, the simple experiment of standing outside the room will tell you what kind of problems you will have to contend with in a broad spectrum of things. Other things to look for in a room's structure are it's floor. This, if it is made of concrete and reasonably solid, should not pose too many problems, but if you have a wooden floor you are likely to encounter things such as squeaky floor boards, resonances in the structure transmitted from other parts of the building and similar things.

Thin partition walls can set up peculiar resonances as can some forms of ceiling fabrication. These can lead to peculiar reflections and suckouts which can be almost impossible to eliminate. If you are only considering playing acoustic guitar or relatively quiet acoustic instruments it will obviously be far more difficult to excite structural resonances in the room, but loud instruments such as electric guitars or drums can very easily excite various parts of the structure into resonance and cause strange effects. Doors and windows are also major sources of annoyance, both tend to rattle and both are areas where sound escapes from. A good solid door is the best answer here, but draught excluder strip stops doors rattling, and surprisingly can reduce quite a lot of sound transmission. Windows are not so easy to deal with. Double glazing is very useful, but to be really effective the two layers of glass need to be very widely spaced, and be plate glass, in the same way as control room windows are made in purpose built studios. The most effective way to prevent nasty reflections coming back from windows is simply to hang very heavy curtains across them. This is surprisingly effective in minimizing reflections, particularly if the curtains are at least six inches away from the offending window.

Having concluded that virtually every room is utterly useless, we are left with a problem. In the case of a major studio the problem is easily solved – build a special room. This, however, is hardly possible for home recording but fear not, there are many ways to solve the problems.

There are two major questions which require answering before we progress any further. The first is, how much sound are you trying to stop getting out or in? The second is what kind of sound do you require? To explain this second question a little more fully, if you are recording perhaps an acoustic guitar, you may wish to have quite a bright sound which would require reflective surfaces, also a grand piano usually sounds best in a reflective room. On the other hand you may wish to have a pretty dead environment in which case you would need a lot of absorbency within the room to prevent reflections. In most cases what is required is a reasonably flexible environment in which changes can relatively easily be introduced. Quite often in a home recording environment any form of acoustic treatment, will

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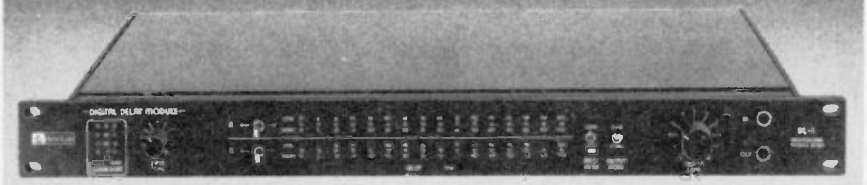

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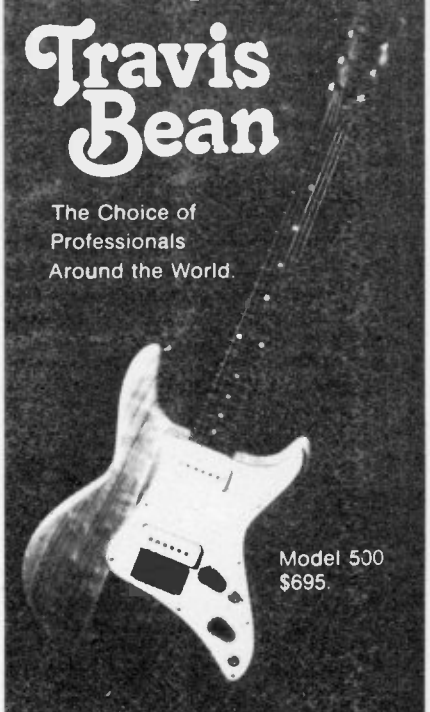

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HOME STUDIO PROJECT

be of a temporary nature, and by this very definition flexibility is what you have. A lot of measures employed in acoustic treatment will solve both questions, but particular emphasis has to be placed on certain requirements.

Removing problems due to transmission via wooden floors is a difficult thing to do and requires quite complex treatment which I do not intend to pursue here. However, minor problems with wooden floors are easily solved. With squeaky floorboards simply nail them down properly. The best and simplest solution to floor which are a little peculiar, indeed any floor, is good heavy carpeting. This has the ability to remove quite a few nasties, and it is usually a nicer environment in which to work than bare boards or concrete.

The area which can cause many problems and the area which is usually overlooked in the home recording environment is the ceiling. In a professional studio the kind of structural alterations and absorbers used in ceilings are complex and costly and are something which I am not going into here but will be discussed at a later date. Normal plaster ceilings will transmit most bass frequencies either out of the room or into the room from above. The n'th degree of isolation for low frequencies is beyond the scope of this article, but there are a number of measures which can improve things. One very simple yet highly effective means of improving reflections from the ceiling and cutting down sound transmission is with the use of carpeting. The heavier the carpeting the better; unfortunately, this usually means more costly, but do not be deterred. If the height of the room is sufficient the best solution is to hang carpet anything up to four feet deep in strips about six inches apart over the whole area of the room, but this is costly, requiring many, many yards of carpet, and in most domestic rooms height does permit it.

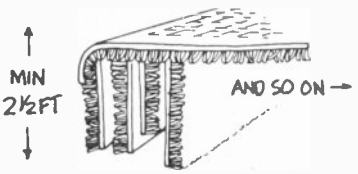
One way of using carpet effectively and not as much of it, although of course it will not be as effective, is to hang the carpet on strings or cords suspended across the room from perhaps a picture rail. The carpet is then hung over the supports in folds so that it is not a consistent distance away from the ceiling. A distance of six inches is about the minimum that you should use. Placing carpet directly on the ceiling will be of little or no benefit. If the budget will not run to the expense of buying extra carpeting, then there are a number of other materials which can be quite effective, particularly if you are only hanging the material over supports in temporary manner.

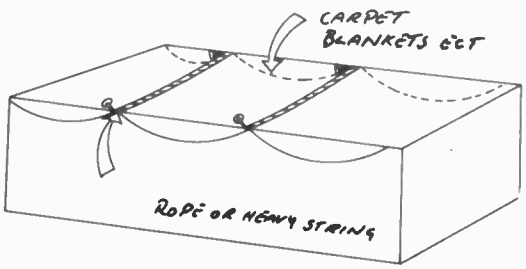
Blankets, duvets, sleeping bags and similar heavy fabrics can be very useful in preventing reflections coming back from the ceiling, but I would stress that this will not have much effect on bass frequencies as they will pass directly through. But in mopping up nasty high frequency reflections the effect can be quite dramatic. If you are only intending to record yourself playing guitar or whatever, then an even simpler trick can be very useful. Merely arranging a ridge tent-like structure with carpets or blankets with yourself inside can be very effective in preventing reflections. This structure can then be placed in the center of the room well away from the walls or ceiling and be more effective than it would otherwise be closer to the room boundaries. Before leaving the subject of ceiling reflections one very useful tip when recording particularly a drum kit, is to place a large beach umbrella over the top of the kit. This will prevent cymbal reflections coming back from the ceiling and mop up quite nasty sounds very easily.

Problems involved with walls are similar to those of the ceiling. But usually the structure of a wall is different to that of the ceiling and can pose a different set of problems. In the professional building, measures will be taken to ensure that the overall absorption of all audible frequencies is reasonably consistent and to achieve this requires the use of heavy damping materials such as rockwall and similar types of material spaced away from the wall about six inches and anything up to a foot or more thick! This then has to be adequately supported and held in position, quite a structural alteration. The outside of this surface is then either covered in some form of fabric or quite often in wooden slats with gaps between them, in this way a controled amount of reflection can be obtained if a slightly more live environment is desired. The intricacies of this kind of major work I'll go into at a later date at some depth.

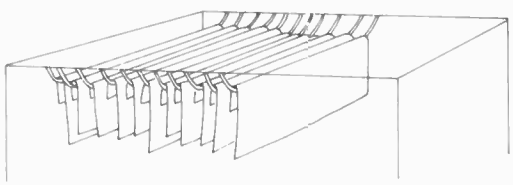
Due to lack of space I've had to skimp certain areas of acoustic treatment, many of which I hope to cover in greater detail at a later date.

Chris Rogers





Ceiling carpet and wall carpet



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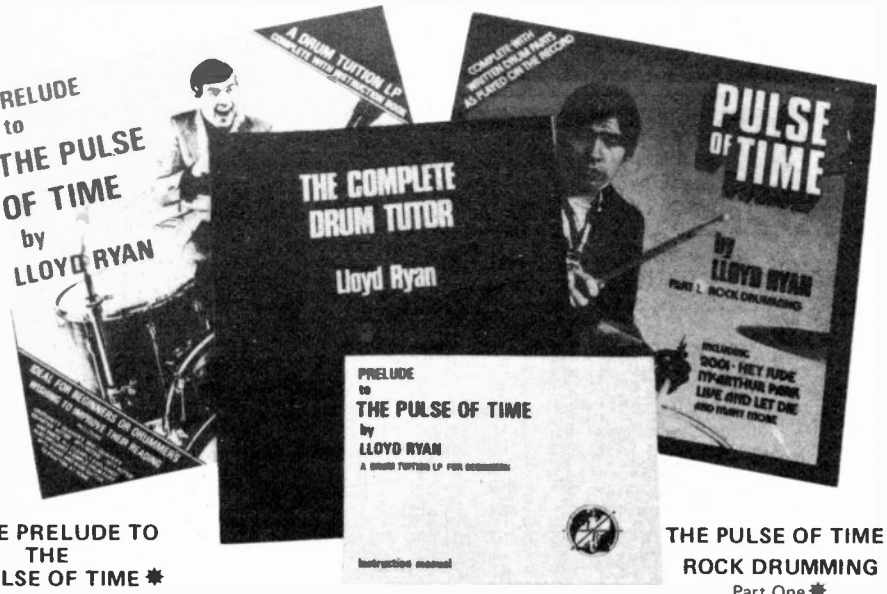

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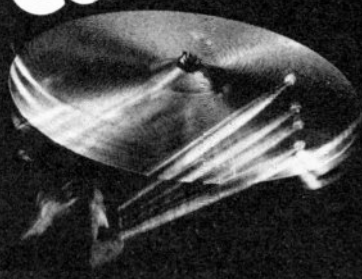

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NewProducts

TEAC Tascam Series 40-4

New from the TEAC Tascam Series is a "rugged" ¼ inch four-track recorder/reproducer named the 40-4 which features the same transport and chassis as the eight track 80-8 model. The 40-40-4 also has fully integrated circuit logic with motion sensing and a memory stop function.

The 40-4 features a combination record/reproduce head, erase and monitor heads, function and output select buttons, LED overload indicators, accessible calibration controls and a flip-up head cover. The unit also has optional four-channel DBX (DX-4), remote control (RC-170) and mic preamp module (MA-4). The 40-4 takes up to 10½ inch reels and records at 15 and 7½ ips with a dual-speed hysteresis synchronous capstan motor and two eddy current induction reel motors.

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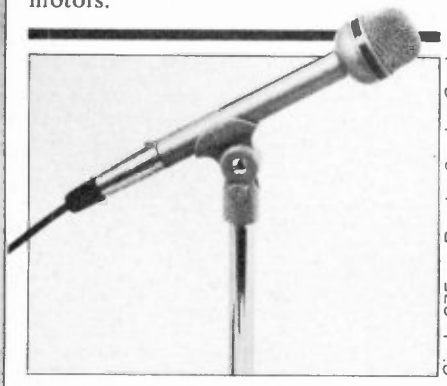

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Electrovoice Model RE18

Electrovoice recently introduced the RE18, a new shock-mounted supercardioid microphone which is primarily intended for hand-held broadcast situations. The company also maintains that the RE18 "is equally at home in any situation where ambient noise rejection and isolation from handling noise is a consideration," like the mechanical stand and lantern noise generally encountered in sound reinforcement systems.

A descendant of the legendary model RE15, the RE18 also features an integral blast filter for "P-pop" protection just like another forerunner, the RE16. The RE18's "Variable D" design helps to maintain its frequency response regardless of mike-to-talent working distance.

Mixing with Yamaha

The new EM 300B Mixer is the latest in Yamaha's EM series of mixers. The unit has a built-in stereo amplifier – power output per side: 200 watts x 2 (400w) – with 12 input channels and a 9-band Graphic Equaliser. Standard input channel features include equalisation, panning, echo/reverb send and switchable sensitivity (for mike, instrument or line level sources). Separate master controls are provided for left and right program, monitor, auxiliary input and reverb return. The EM-Series mixers utilize discrete and integrated circuits on plug-in PC boards.

End Cable Tangle

Tired of those endless miles of cable slowly wrapping themselves around your feet like strands of dead spaghetti? Have you had it with all that time, hassle and money spent on connectors and extra cable? Well, JHD Audio has come up with the Mainline, an ultra-sophisticated connective device they claim to be "the most significant advance in audio technology of this decade."

In brief, the Mainline will encode and combine eight signals and transmit them up to 600 feet – using only ONE standard microphone cable! The Mainline will then decode each one into eight *separate* signals for purposes of mixing.

To achieve all of this, the Mainline makes use of the very latest in analog/digital technology to create what they call a "time domain multiplexing system" for highest quality audio reproduction. There are three different Mainline encoder designs – one for balance Lo impedance mikes; one for high impedance instruments and one for mixer output signals. The Mainline comes equipped with a standard 100ft cable and is calibrated to operate with cable lengths of 25 to 600ft without affecting performance.

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On Sax and Flute:

continued from page 17

tion between the tongue and the fingers and very often the tongue will lag behind, causing a jumble effect as notes are tongued in the middle or end of a finger change. It is a very common fault for the tongue to go 'out of sync' with the fingers in very fast staccato playing and fast tonguing does need a lot of practice to build speed. It is possible to practice this without the sax by placing the tip of the tongue in the position it takes in flute playing: touching the roof of the mouth must behind front teeth.

Using the 'Ta' syllable it is possible to exercise the tongue tip without the complications of the whole instrument. The flute technique of double tonguing may also be applied to the saxophone where the rapidity is such that the tongue cannot keep up with the fingers. This involves the 'Ku' syllable produced by the back of the throat alternated with the 'Tu' syllable. Tu Ku Tu Ku Tu Ku Tu Ku. It is important that the Tu and Ku have the same sound and the Ku needs a lot of practice before it can be used without altering the jaw and thus the tuning. To gain really complete control of double tonguing as applied to the sax can take years before it is indistinguishable from single tonguing.

Tonguing gives the precision and punctuation the performer needs to interpret music fully and therefore is an essential part which must be mastered if your playing is going to have a tight, precise diction, which is the language of the musical artist.

On Bass

continued from page 15

D one octave above the fretted note at this position also D of course. Whilst this harmonic is still ringing on, hit the harmonic at the fifth fret position on the D string and the same note is produced a D at the same octave pitch as the one ringing on the G string.

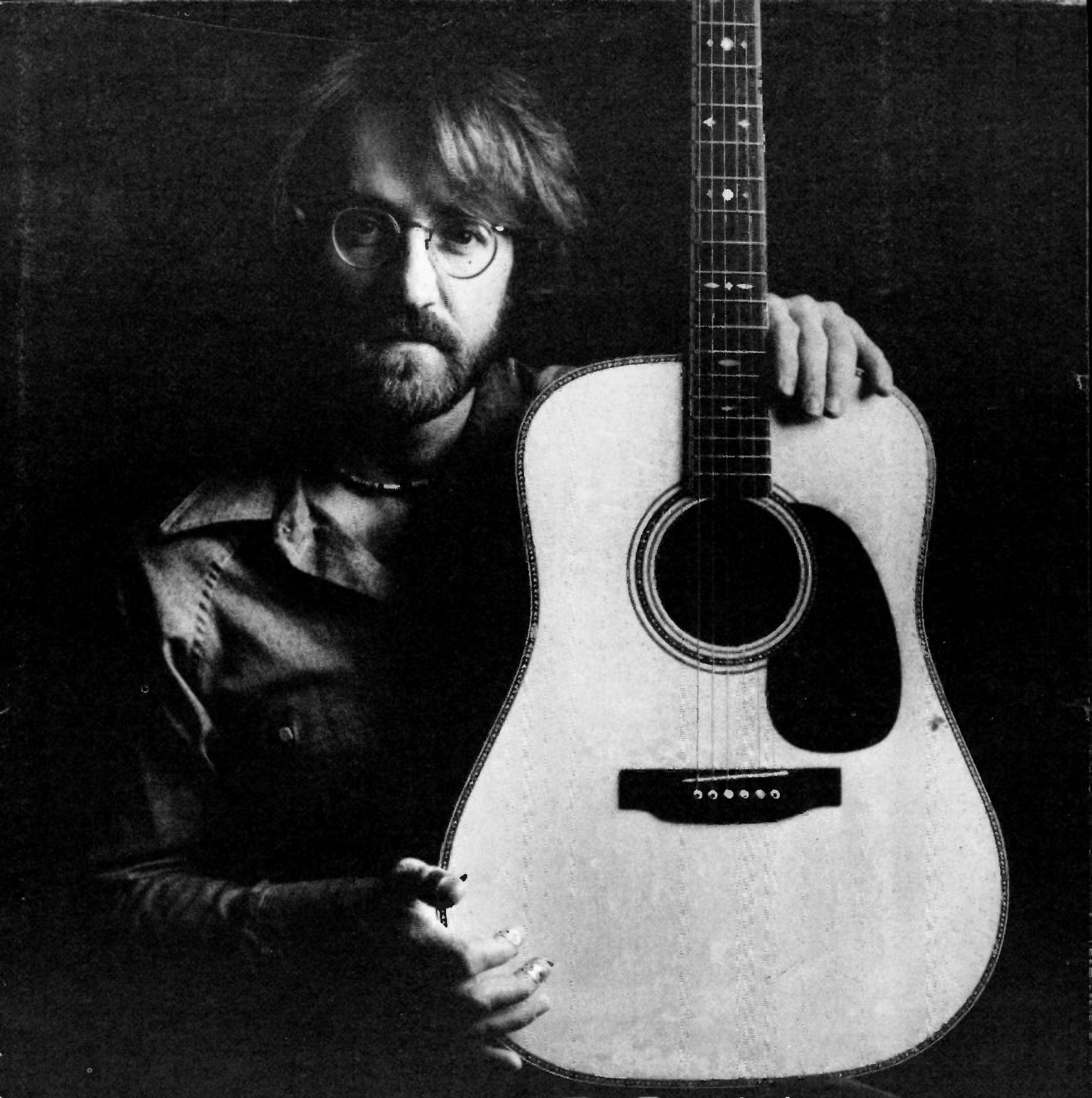
The fretted note at this position is a G, and the harmony interval of the harmonic note just obtained is one octave and one fifth above it. These two harmonics, unless already perfectly in tune, should be inter-vibrating rapidly or slowly depending on how far out they are. With the tuning peg, flatten or sharpen the D string harmonic to the G string harmonic as required to slow the vibrations down until they stop. The speed of vibrations does not indicate flatness or sharpness just "out of tuneness" on either side so be careful at the critical point as it's easy to go over into the reverse state from which you have come.

This procedure is then repeated in the same way with tuning the A string to the now in tune D string, using the same fret positions for harmonics, although you may find it more difficult at first to obtain harmonics on the lower, thicker strings the same procedure and harmonic positions are used to tune the E string, and new, preferably roundwound, strings make this much easier.

The advantages of using harmonics for tuning become increasingly apparent on the lower strings especially the E of course, where to tune the open string exactly can prove to be extremely difficult due to its low pitch.

When all four strings have been tuned in this way, re-check the G string twelfth fret harmonic with its original tuning source, as the now slightly different tension on the neck, could have altered its pitch slightly.

AD INDEX



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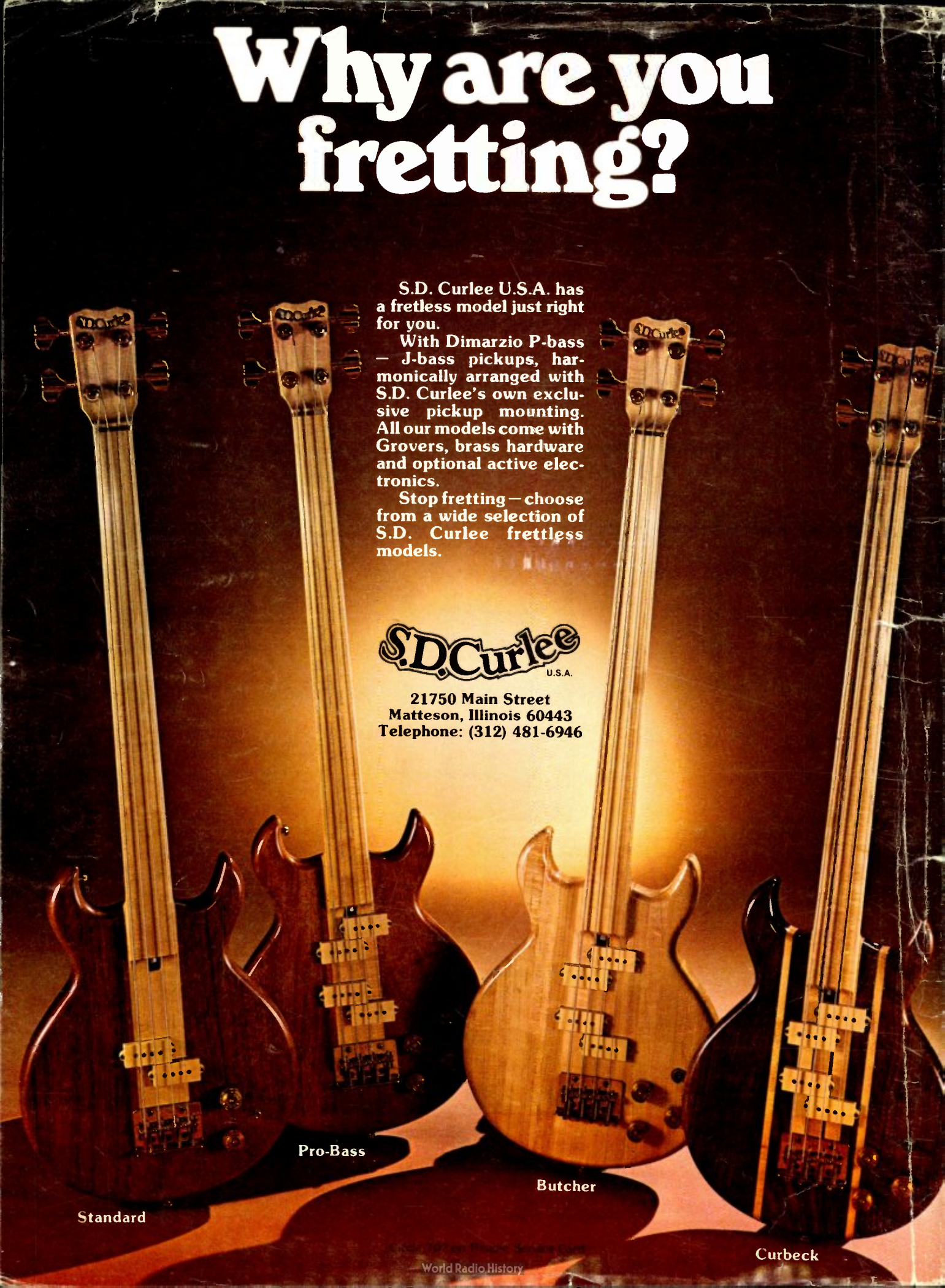

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