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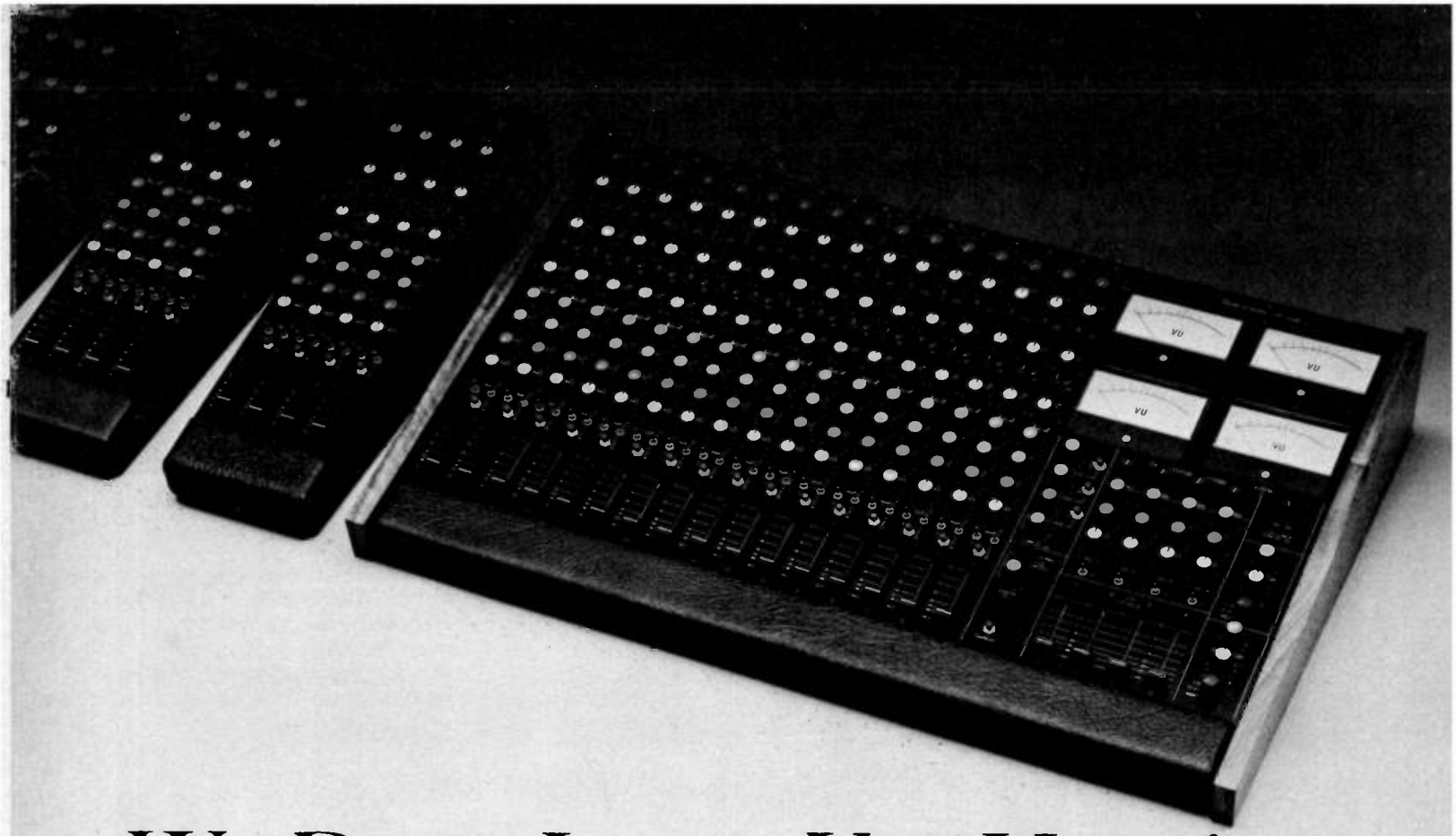

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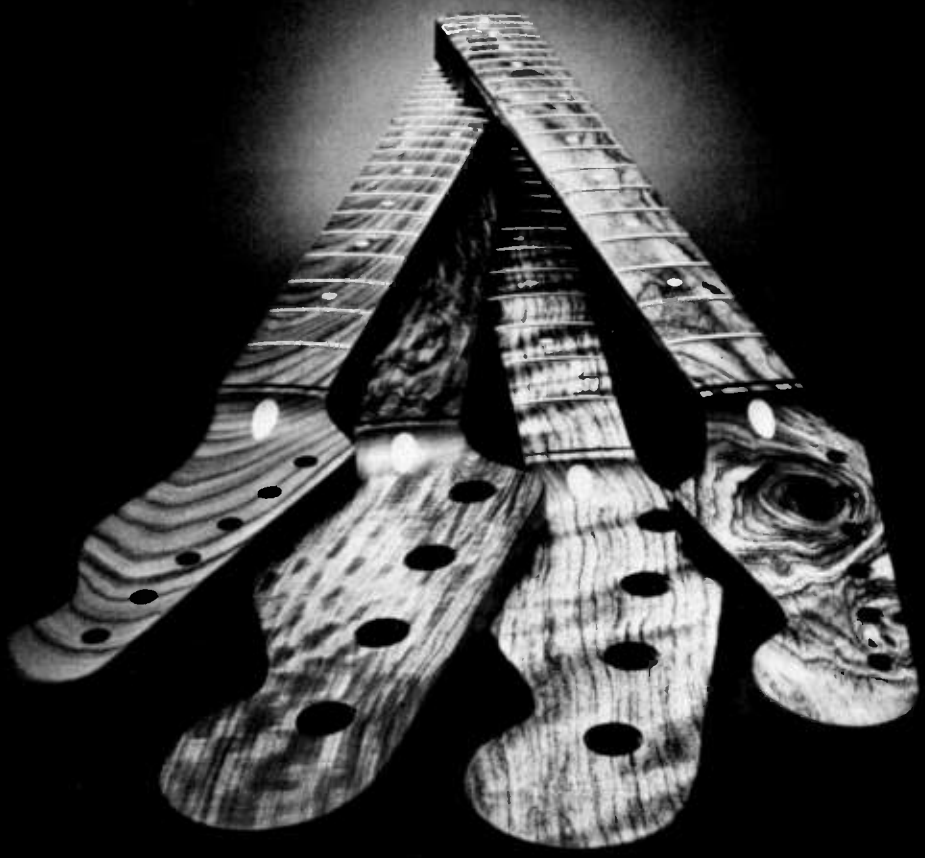

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A Personal Look At I.M.&R.W.

Since the beginning of International Musician and Recording World in 1974, it has grown and expanded to encompass the entire world as its market at a speed that has both astonished and pleased us. Our exceptance, we feel, is due to one basic factor: we are musicians — from the president to the mail clerk our background comes from personal experience in the music industry and on the road with other musicians. It's because of our associations in the music business that we thought you'd like to get to know us a little bit better.

It was out of the desire of a drummer, frustrated with the "on-the-road" music scene, who wanted to make a major contribution to musicians and the industry that supports them that the original Brtish edition of IM&RW took root. Little did President of IM&RW Richard Desmond know that the publishing express train he started would leave him little time to pick up the sticks, as IM&RW USA, IM&RW UK and IM&RW Europe (in the German language) exploded across the music scene.

Still startlingly young at 27, Richard (often known as Rick) looks back on his years as a musician as tough, educational and not without laughs. At the age of 12, he started taking drum lessons and quickly took to playing hooky from school so that he could travel Britain as a pro and semi-pro musician during those heady years immediately following the Liverpool Sound and the British Beat boom.

Although admitting to playing far more gigs than he could ever remember, he does recall sharing the stage with such pop luminaries as Nick Lowe, Andy Summers, John McVie, Rory Gallagher and Zoot Money. But by 19, the budding businessman began to turn his hand to the music business.

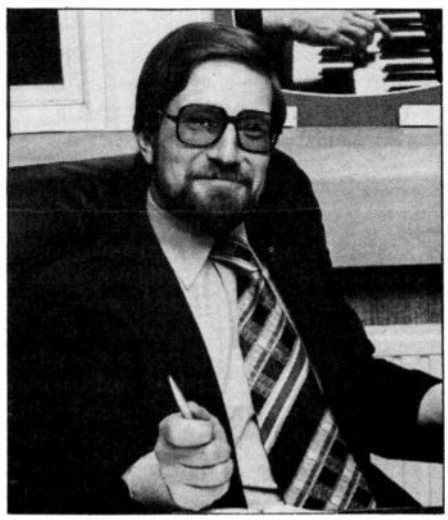
In the beginning he promoted rock concerts, regularly presenting the biggest names in business. One of his funniest experiences, now, is to remember booking Led Zeppelin only to have a mass walkout because they were too loud.

The merger of his business talent with his musical background seemed the perfect catalyst which began the roll to a publishing empire which started with the founding of the British Beatles magazine — run from a telephone booth.

Despite steering the three IM&RW titles through the publishing game, Richard also oversees Home Organist and Leisure Music as well as an international advertising agency, Advertising Practice International (API). Still, he manages to keep in touch with his musical roots sitting in with bands here and there, and can still recall with glowing memory of the quest for the perfect drumkit. "I've still got that Ludwig kit," he said, "I'd always wanted one in those early days and I made cheaper kits look like them until I finally bought Bill Bruford's old kit."

Oh well, once a drummer . . .

Next month the revealing story of Ray Hammond.



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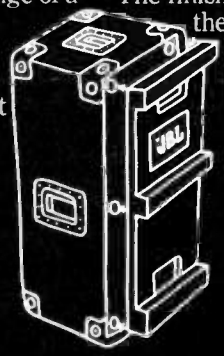

Their housings are made of the best birch ply available. The front covers fit flush to protect the drivers and grilles during travel. The finish is extra-rugged. Even the voice coils have unique protection: To minimize bounce during transit, they're automatically shorted when there isn't a plug in the input jack.

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Hear JBL's new Cabaret Series soon. Because your sound system should be as good as you are.

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See and hear JBL's Cabaret Series at NAMM, Booth #4002.

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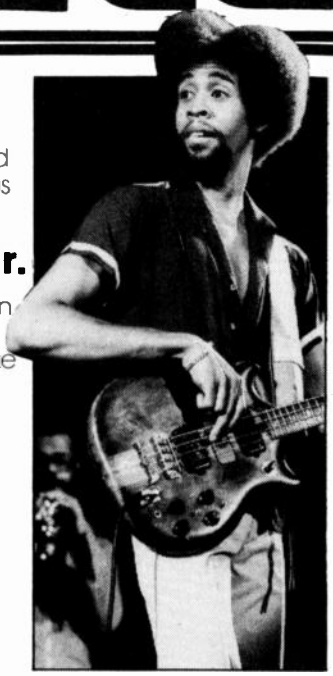

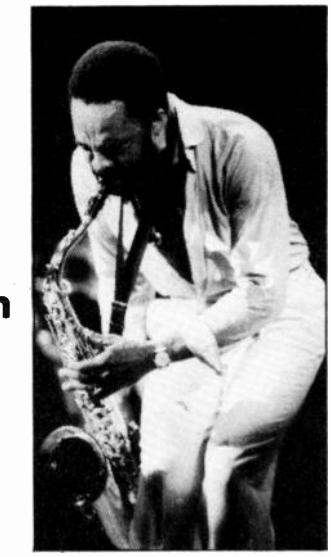

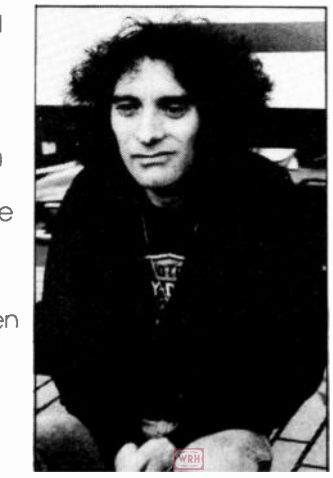

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Letters

Aid to a Scavenger

Help. I am involved in a scavenger hunt and one of the five items on my list of things to get is a stereo album entitled *As Perscribed* by a group called the Phoenix Angel Steel Harps Orchestra.

I was in hopes that perhaps one of your readers could help me locate the album. I have about run out of ideas. I have written the copyright division of the library of congress, I've written to DJ's all over the Caribbean, Bermuda, Jamaica and Haiti in hope that they might have heard of it, since I feel that it might have been a steel band popular in that area in the late Fifties, early Sixties. Nothing. I have written to over 60 record finder outfits, record reviewers and newspapers on both coasts and still nothing.

If one of your readers has ever heard of this album or the outfit I would really appreciate hearing from them. A prompt reply would be appreciated as there is a deadline involved.

Mignon Diane Lauber
PO Box 1625
Juneau, Alaska 99802

MARRIOTT/WEST

First of all I'd like to thank you for your recent article on Steve Marriott (and Leslie West). Marriott's been ignored by the press over the past few years and I think it's been unfair because he's consistently put out good, energetic, raw but tasteful rock & roll and has never compromised himself or his music. He's a captivating showman, (obviously) an amazing singer and to anyone who's taken the time to really listen, a highly underrated songwriter. Yet he's been completely ignored. Of the last three albums he's released I have yet to see a review of two of them. They weren't promoted and his short-lived post-Humble Pie band, Steve Marriott's All Stars, was hardly given a chance. (I do wish your article had touched upon that particular band, at least for a moment.) In view of all this, your piece on Marriott was a welcome treat.

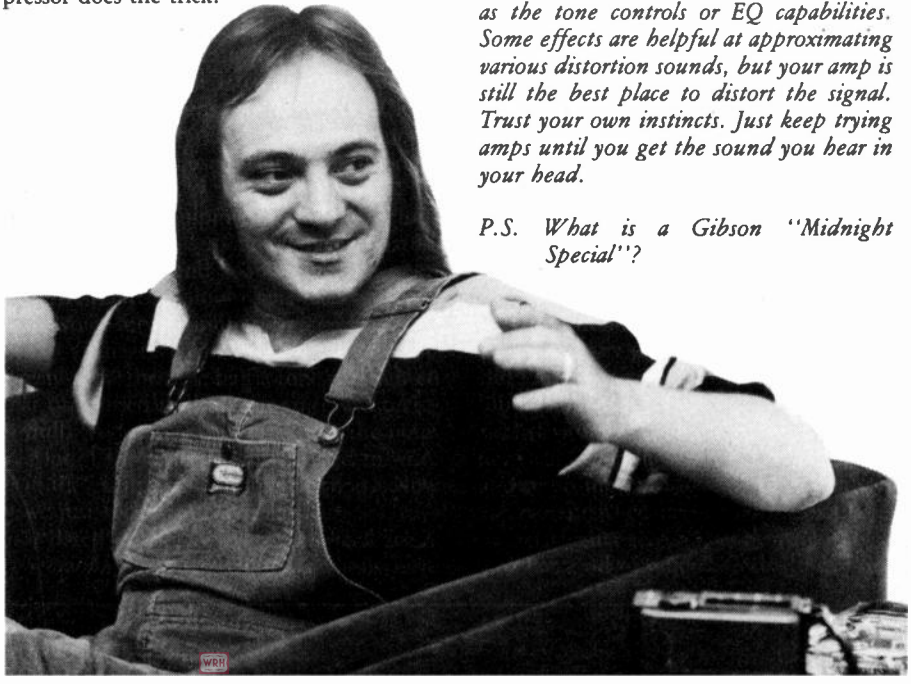
I'd like to write him and I was wondering if you might provide me with an address where I'd be sure to reach him. I'd appreciate it very much. Also, if you could fill me in on any recent developments with his band, I'd be anxious to hear any news. Finally, I assume the article in your magazine was an edited, cut-down version that primarily dealt with the information "highlights." I realize that in the interest of space and practicality it would be impossible for you to always print every word of a conversation. What I'd like to know is whether or not I could purchase a transcript of the complete interview?

Jim George
1529 Luzerne St.,
Reading, PA

Marriott and West are currently recording at Fane Productions Studios (115-B Harvey West Blvd., Santa Cruz, CA 95060). The new band, The Firm, is still putting down tracks there and I'm sure the studio would forward any correspondence. As for a transcript of the interview, sorry, what you read is what you get.

Getting THE Sound

I was wondering if you could help me? I've been playing guitar now for about two years—a Gibson "Midnight Special" through a Yamaha 50 watt amp. I recently sold the amplifier because I couldn't get a good rock & roll sound from it. It did have a distortion unit but it didn't sound that good. From reading your magazine, and by questioning other people, I feel I should get a tube amplifier (the Yamaha wasn't a tube). If I do get a tube amp will I need to get any other effects to give me that scorching, screaming heavy rock sound? I'm really confused by all of the effects on the market. If I get a solid state amplifier will I need any effects to get that tube sound? I've been told that a compressor does the trick.

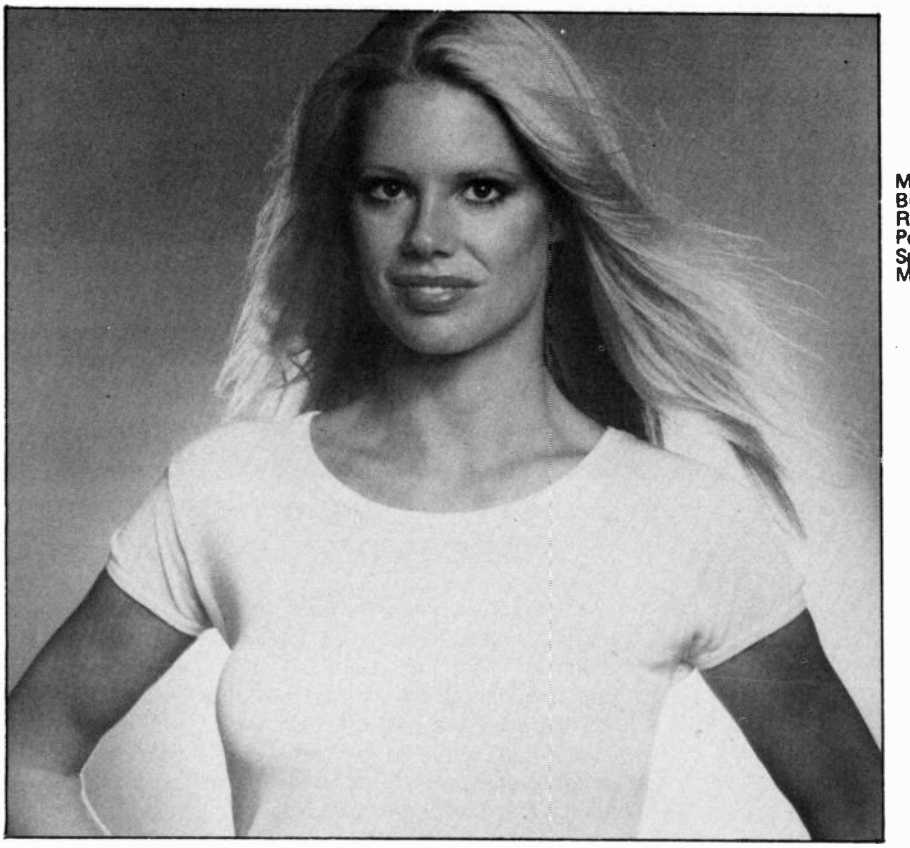


All I want is to get an amp which is in the $500-$800 bracket, preferably 100 watts, that gives me the rock sound. Could you please give me some advice on what to do? I want to be able to get a sustained, distorted, screaming lead such as Jimmy Page, Ted Nugent, Mick Ralphs and other heavy rock & rollers. I would greatly appreciate it if you could help.

Rick Roberson
913 Redwood Circle
Burton, SC

Getting a "distorted, screaming lead such as Jimmy Page, Ted Nugent, Mick Ralphs and other heavy rock & rollers" is also a function of the guitar used (pickups) and your playing technique, not just amplifiers. But without getting into specific recommendations, it helps to remember that "tube" amplifiers are not necessarily more effective than transistor amps at getting a thick, distorted sound. Improved circuitry and master volume or overdrive functions, as well as certain hybrid tube/transistor units, have blurred the distinctions between the two. For $500-$800, you have a fairly wide choice in the 100 watt range, although you might need only a 50 watter depending on where you're going to be playing. Remember! Contrary to myths about sound promulgated in the last decades, more watts or more amplifiers do not give you a raunchier sound. Just louder. Try out a variety of transistor and tube amps in the 50-100 watt amp range and pay particular attention to the overdrive or "boost" functions offered as well as the tone controls or EQ capabilities. Some effects are helpful at approximating various distortion sounds, but your amp is still the best place to distort the signal. Trust your own instincts. Just keep trying amps until you get the sound you hear in your head.

P.S. What is a Gibson "Midnight Special"?



Ms. Bree Bushaw, Radio & T.V. Personality Speaking for Multivox

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On Drums
Simon Phillips

In this article I am going to deal with the basics of how drums can be applied to various playing situations, trying to be as helpful as I can, particularly to drummers who are fairly new to the scene. As with the drum kit, sound equipment is rapidly becoming more and more technologically advanced. It can sometimes be baffling for the musician to retain his own individual sound — hence I will endeavor to talk about, and try to clarify, certain situations he is likely to encounter.

First, I will deal with the sound of drums in a live context, and before bringing in PA systems, microphones, monitors, etc., I would like to talk about natural sounds. OK. So you are set up on stage in a big hall. You have a bass stack to your left, a guitar stack to your right, and keyboards somewhere else. You have no mikes, so you have to be able to project the sound of your drums to the audience.

First, if you have a double-headed kit, you will find that it is basically an excellent projector of sound to your own ears while you are playing, although it does not project so well to the people listening in front of you. A two-headed bass drum generally produces a more boomy sound — but tuned with care, it can be made to sound extremely deep and rich — and, of course, it will always be audible to you when playing as the sound is kicked back by the front head. Also, the less dampening you employ the louder the volume will be, the more dampening, the quieter the sound.

When no dampening is used during the soundcheck or warm-up, the bass drum can sound a bit offensive, but come the gig, you will be glad you left it free of tape and foam, because with all those people in front of you soaking up those unwanted tones, you will have a nice healthy thwack down there.

Tom-toms with two heads produce a full, tonally good sound which can be varied to your own personal preference by careful tuning. Again, take care with dampening for the same reasons which apply to the bass drum. Double-headed tom-toms again supply you with a pretty good natural monitor system, as the sound is projected back up and around the drum, but great importance must be placed on the natural balance of the kit — don't drown out the tom-toms with your favourite crash cymbal or whatever. Try to make the kit sound like a total instrument rather than a few drums and cymbals put together at random.

With single-headed kits there is a little problem. Our portable monitor system is no longer there to such a great extent because, with the bottom head gone from the tom-toms and the front head removed from the bass drum, the sound just ain't gonna hang around! I find the disadvantage of single heads is

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Simon Phillips, one of Britain's busiest session drummers has worked on albums by David Coverdale, Gordon Giltrap, Art Garfunkel, Dave Greenslade Roger Glover and Jack Bruce. He is currently with Stanley Clarke's new Band

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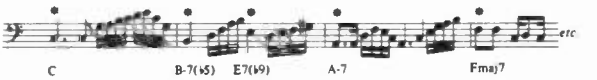
On Bass

Jeff Berlin

Some of the greatest moments in any player's life are the times when he can acknowledge to himself that he is, indeed, improving as a musician. It is truly an exciting period when you can see your improvisational skill developing and changing. Improvising can be a spontaneous act of creativity, or, it can be a well thought out and organized process where the player has conceived the form of his solo before playing it. Without a doubt, any musician who investigates improvisational exercises will develop twice as fast as those who constantly repeat the same licks.

I once saw for sale in New York City, an electric bass with the fretboard looking used from the nut to the fourth and fifth fret. The rest of the neck looked brand new. I don't know who owned the bass or what kind of music he played. But, after seeing the condition of his bass neck I knew the kind of versatility the player had. The point is, that most bass players do not have the facility or melodic comprehension to play solos or just rhythm section bass parts with any musical command.

If you think these are heavy words try to solo at any speed you want through the Beatle tune "Yesterday". What you will find is that you will probably land on the root note of each chord change when you get to it. The following example illustrates this. I'm using the first four bars of the tune as an example and I'm putting an asterisk over the first note of each chord change.



This example is indicative of the lyrical concepts of most electric bass players. It shows how limiting such soloing can be. Constant jumping to the root note of each chord prevents the resolution of melodic ideas that may occur before the chord change arrives.

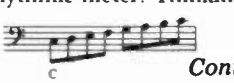
The desirable way to play lyrically in our soloing is to learn how to approach and play into chord changes in a step-wise motion (for this particular exercise). If you get some of this stuff under your belt, you'll probably quit your day job and never come out of your bedroom because you'll be practicing all the time.

Staying with the tune "Yesterday" we shall treat all the chord changes diatonically. All the examples will be written in order to connect the chord changes in a diatonic scale starting on C.

We will try to ascend to the highest point on the bass (since most players don't have two octave necks we will call E flat the highest point) and then descend to the lowest by connecting chord changes in step-wise motion.

I'll do the first three bars with you. First, I want you to try to understand what I'm saying, then I want you to play it.

The first chord change in "Yesterday" will be C. We will use eighth notes as our rhythmic meter. Thinking diatonically we'll play the C scale.



Continued on page 144

Jeff Berlin is currently a member of the Bill Bruford Band He has worked with most major jazz artists and spends a good deal of time as a session bass player.

On Sax and Flute

Alan Holmes

Sooner or later most players will find themselves in a situation where their tuning has become suspect. Last month I dealt with the more obvious physical factors, but there are some rather more subtle, and at times baffling, reasons for tuning difficulty.

A fact well known to oboists is that the reed affects the tuning and, when making and adjusting double reeds, correction can be made for flatness and sharpness in specific parts of the range. What has this to do with the sax? Well, the oboe is a conical bore instrument like the sax but because of its very narrow bore many factors common to the sax become much more critical. If the tuning of the sax is poor on certain notes where it was previously acceptable, this can be caused by a change of reed brand or by a reed becoming tired and altering its playing characteristics. A simple reed change will often cure this but it can be caused by a piece of cork or felt becoming too squashed or falling out, thus affecting the height of the keys. On the oboe wearing of the cork under the thumbplate mechanism, which is only the thickness of a sheet of paper, will badly affect the Bb and C, so check the sax over regularly to make sure it is working correctly. It is much easier to do this at home than at a recording session when all eyes are accusingly on you and time is two dollars a minute plus overtime for the other musicians.

Many of the more gifted guitarists are using meters to tune up between numbers and with the Korg or Pearl types, this can be done very quickly and silently. Unfortunately it is impossible to tune a saxophone up silently, so you really have to make adjustments to flatten off as the temperature rises while you are playing. Under very strong concert lighting this could amount to as much as an eighth of an inch flatter than the dressing room mark.

Recording studios have an even more subtle and irritating effect of being generally too cold for brass instuments. This causes quite noticeable pitch changes on second takes, as, after a few run throughs and the first take, the instrument has become thoroughly warm from the heat of the breath. The four or five minute break while a playback is heard, is enough for the instrument to become cooled in the air conditioning and this is enough to put the first minute of the number out of tune. Warming up in the clinical, time conscious atmosphere of the studio is frowned upon but in practice is quicker than having to do another take because the tuning was out. If your parts have long breaks between them on the track, it becomes necessary to blow gently through the instrument away from the microphone to keep it up to playing temperature.

Longer instruments suffer more from this than short ones. A baritone will need more warming up than a soprano and an alto flute more than a concert flute. Under studio conditions a silver flute has a noticeably faster warm up time than a nickel silver owing to the excellent heat conductance of the silver. So apart from the superior tone, there is yet another reason for paying the extra for a silver flute.

Whenever the temperature rises or falls from around 70 degrees Fahrenheit you will get tuning problems, and movement of the mouthpiece much more than around 3/16" will put the instrument out of tune with itself. Knowing what's happening,and why, helps.

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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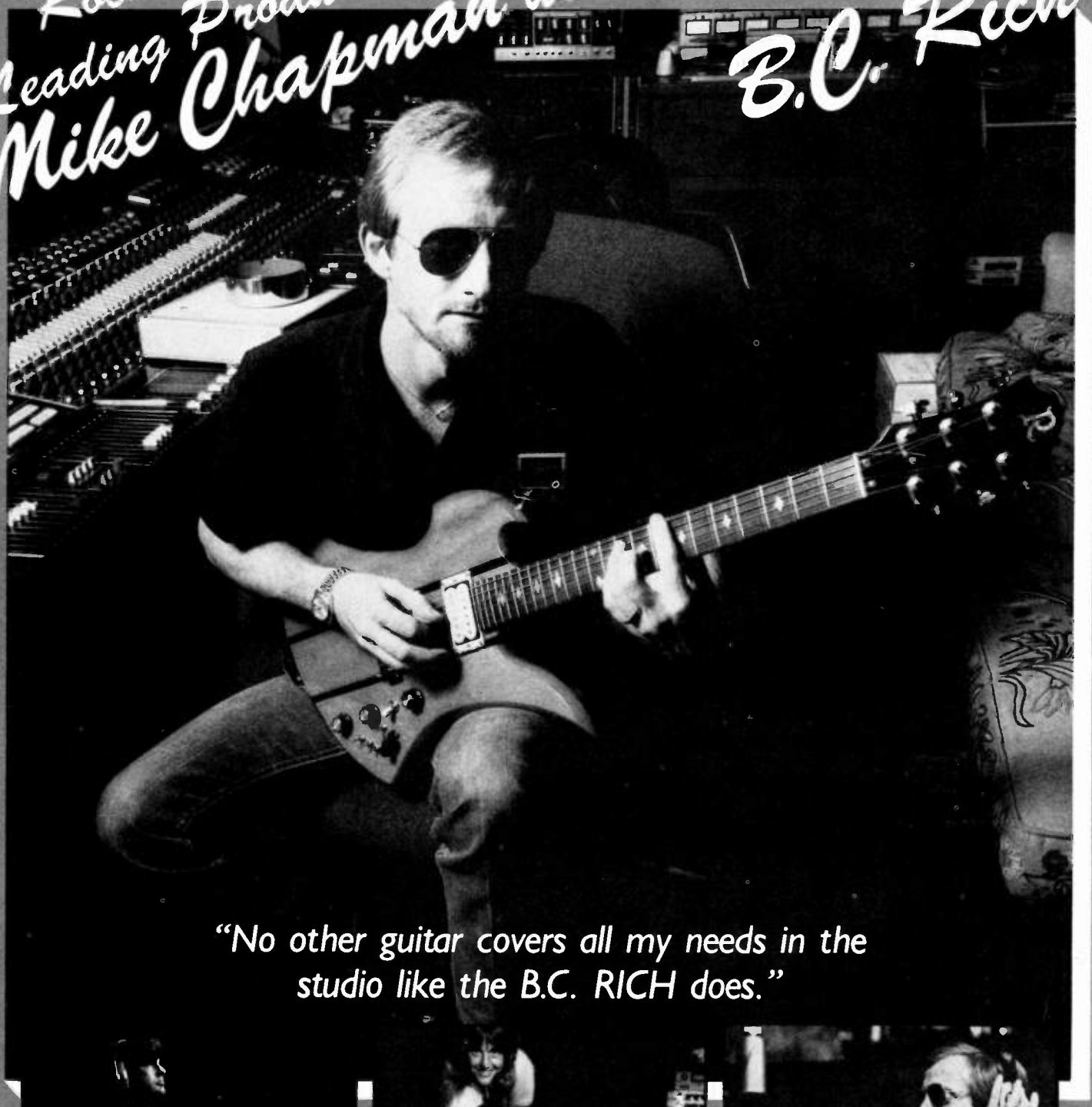

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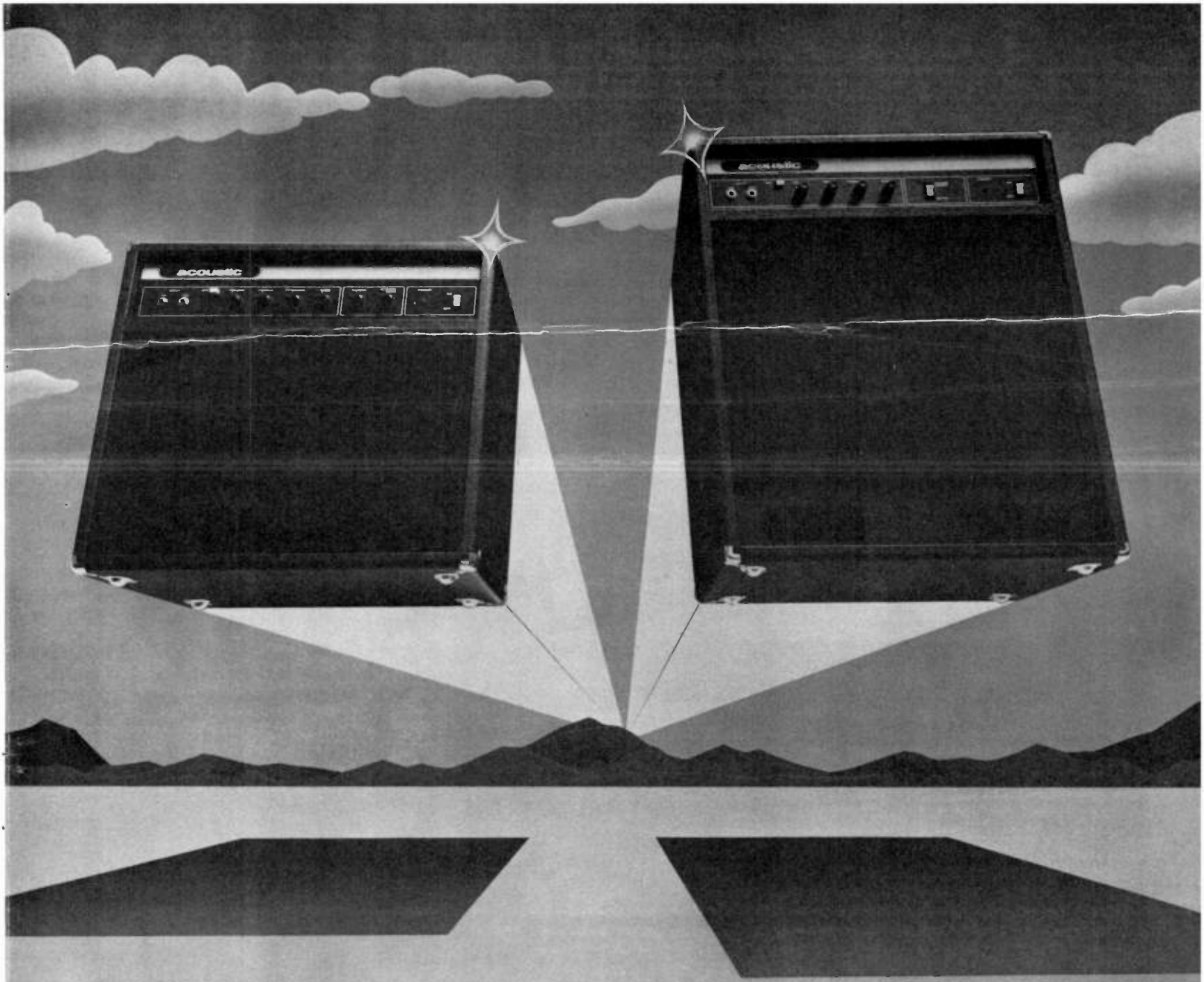

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ALBERT LEE

Going Solo

It was with a sense of relief that Albert Lee put the finishing touches to his first solo album. For a while it looked to be an ill-fated project with a history stretching back to 1975. As a much sought-after top flight guitarist, circumstance seemed to conspire against its completion. It was only recently that this quiet spoken Englishman finally felt ready to put together his long overdue album.

The release of *Hiding* (A&M) reflects the many influences that have shaped his style over the years. His track record is impressive and his reputation has opened the way for him to play with a whole host of luminaries. At different stages he has played with Chris Farlowe and the Thunderbirds, the Crickets, Joe Cocker and was a key member of Head, Hands and Feet who broke up after cutting three albums. For over two years he was a regular with Emmylou Harris and the renowned Hot Band and more recently has been touring with Eric Clapton.

"As far back as 1973 I was supposed to do an album for Atlantic but I was a bit of a naughty boy and let things slide. It was a case of being too busy running around the world playing with different people to actually sit at home and put it together. About 1975 I started the album for A&M but a lot of things went wrong. We shifted from studio to studio, started off with 24-track and then changed to 16-track — it just wasn't right. I had a break for a while and sort of lost contact with A&M until I started working with Joan Armatrading and resumed contact with them. They were still keen for me to finish the album so I got back into it.

"There are two tracks from those original sessions which I felt were worth keeping. Recording with other people over the years you think you learn a few things, but when you go in there doing your own thing you make mistakes — it happens to everyone. But I'm very pleased with the album and I feel very relaxed now that it's out. After all this time it was beginning to feel like a cloud over my head but now

that I've got it under my belt it will be a big help when I get down to do another one."

The album was recorded in Los Angeles, in the Enactron Truck Mobile, owned by Emmylou Harris's husband, producer Brian Ahern. And the musicians used by Albert were mainly Emmylou and the Hot Band. Albert who has lived for the past few years in nearby Malibu, felt it would be the most comfortable atmosphere to work in.

"It was recorded in different ways. Some of the stuff was based on what I'd done with Head, Hands and Feet. When I was doing those albums I'd put down the basic track, which is myself, and bass and drums, and then we'd put all the guitars and piano over the top. I did that with some of the tracks but others were recorded the way Emmylou likes to record with about five or six musicians, so you don't have to do many overdubs. It's good to mix it up because if you just do basic tracks and pile stuff on top it can be a bit thick sounding and layered. It doesn't seem to breathe like a live track where everyone is listening to each other.

"The truck is a huge thing, I've never seen anything like it. It's got its own dubbing room, two 24-track machines and main mixing room. I think they mixed quite a lot of the *Last Waltz* there. It was real hard work and although Brian Ahern was the producer, I had the last say. A good exchange of ideas from everyone working on the album went into it. The material came along mostly during the sessions and there's quite a lot left over. It's strange how different people record. Some can go in with 10 or 12 songs and that's it."

Although he still records with Emmylou, Albert is no longer a regular member of the Hot Band, and has just finished a three-month tour of America with Eric Clapton. In all they did some 47 dates and plans are now taking shape for them to do an extensive European tour later in the year. "The American tour went really well and we had Muddy Waters opening up for us. It's great playing with Eric because our styles are that different. I think we really complement each other — it's not a battle. We kind of bounce off each other.

"The tour was really well planned — none of this getting up early in the morning and traveling all day to the next gig. We had our own jet and we'd stay in one city for about a week with a number of gigs being within one hour's flight from the city. We'd leave for the gig about six, get there about half an hour before we were due on, do the set, rest for a while and fly back. This way we had the next day to ourselves. At the moment there's only Eric and I in the band. The last band had been together for about five years and they all thought it had come to the end of the road and it was time for a change.

"There's talk of us coming back in October to rehearse a new band. He's looking for bass, drums and maybe keyboards. I won't be doing much for the next couple of months until I get back on the road with Eric, that's going to be Europe, probably Eastern Europe, perhaps Israel and then on to Japan. I'm committed to working with Eric but it's not a big commitment because he only works a few months out of the year, so I'll be free to do other things."

Other projects will include putting his own band together to do a few gigs in America to promote *Hiding*. He is likely to team up with Rodney Crowell of the Hot Band who has also done a solo album, and some other members of the band. Emmylou Harris is expecting a baby so the band is off the road. Albert says there is a possibility that he may do some gigs in Britain although there are no definite plans. He has been a professional player since the age of 16 when he first went out on the road with the Larry Parnes rock stable, backing people like Dickie Pride, and making $25 a week brandishing a Hofner Futurama guitar.

Today he uses mainly Telecasters but has some 20 guitars in all, both acoustic and electric. "I've got about four or five Telecasters and a lot of acoustic guitars. I've got some Everley Brothers, an original Everley Brothers given to me by Don Everley, a J200, but I think my favorite recording guitar is a Martin 00028.

"When I'm working in the studio there's about eight guitars that I use quite a lot, depending on what I've got to do but all of them get used at one time or another. I'm not a glutton for guitars, I do pick them up quite a lot when I'm not expecting it, but I'm not one of those guys who goes out and buys guitars to put them in the cupboard. I like to think I've got a use for them.

"My amplification is Music Man. I got to use one before they came out on the market and I was knocked out by it. Previously, I'd used Fender Twins, but Music Man seemed an extension, taking things a bit further. The 8 x 10, 130 watt is my favorite all rounder but of course I use a bigger one with Eric."

Life in America suits Albert but he does admit to missing England. He started going out to the States around 1973 and his trips gradually got longer until he was spending more time there than at home. There was little for him to do in Britain, while in America he got to meet and play with people he had idolized for a long time.

"I think I do an equal amount of studio work and touring but I don't really like to think of myself as a session man. It really suits me to be able to do different projects with different people. I'm very lucky because I really like to play around, it doesn't matter who with, but obviously the better they are, the happier I am." Joining up with other people and adapting to playing different music never seems to be a problem for Albert. Quite often in the past he's gone in cold, with little or no rehearsal, and produced the goods. He's also adept at adapting to different touring schedules but once in a while he does run in to difficulties.

"Probably the hardest gig I've ever had was working with Joan Armatrading. The problem was that her music was so far removed from anything I'd done before. I really enjoyed it but it took a while to really get into. More often than not though it's really easy to slot in. It's healthy to change what your doing now and again. I'd meant to leave the Hot Band earlier to get stuck into my album but something would always come up, a tour, other recordings."

Work with Clapton will keep him busy for a while but he has no way of knowing what other type of work lies ahead. There can be nothing new on the horizon and then all of a sudden offers of work will flood in. However, he would like to produce another solo album in the future. "*Hiding* is based on my influences over the years. I've been playing for 20 years and first went on the road in the Sixties, so I've picked up a lot of influences. It's a fair cross section of the stuff I've been into. I don't know if it's a good thing, because people like to put an album on and listen to one type of music. *Hiding* is varied. I supose if I directed myself a bit more and made a concerted effort to become a big rock star, I might get further on in a certain direction, but I'm pretty happy the way things are."

Sean Higgins

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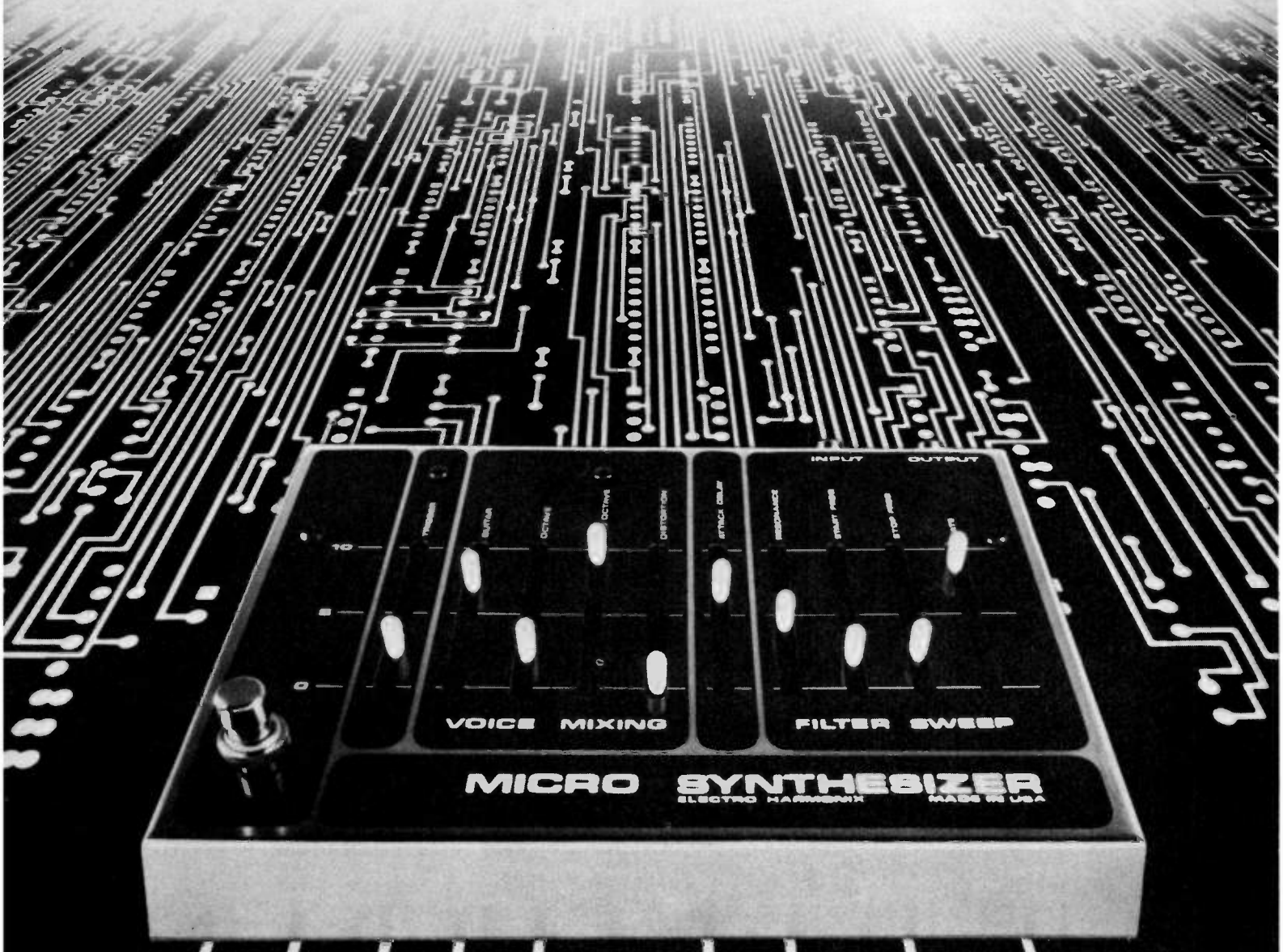

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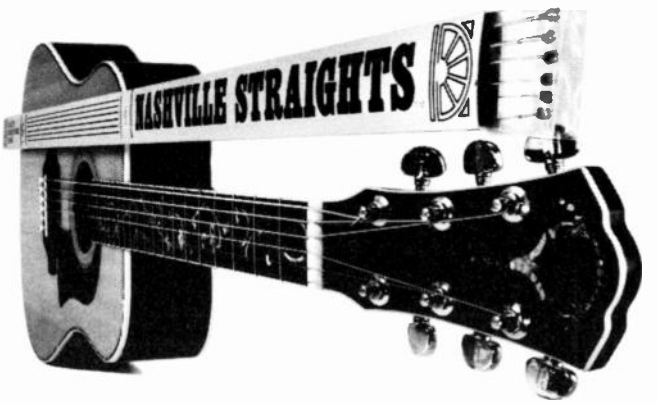

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By Alan Holmes

The Magic of Grover Washington

In 1975, an album called *Mr Magic* by Grover Washington Jr. rose to number 14 on the charts— thus creating the industry term "crossover jazz." In the process it opened up record company check books to today's current crop of jazz funksters, many of whom would be anonymously jamming in their local bar if it were not for Grover, Creed Taylor's Kudu records and Bob James, the arranger and conductor. This album created a style and a trend which still continues to be successful for many, even though the man who is *Mr Magic* has since moved on.

Grover's father had a C melody sax which the then very young G. Washington Jr. liked to try out his budding talents on until, lo and behold, one Christmas his very first tenor sax appeared under the tree.

"I really wasn't into the one and two hours of practicing a day," said Grover. After I got past the mundane exercises and started playing some of the melodies, that's when things started to happen as far as my involvement with music is concerned.

"I took it upon myself to play more and more, working on my tone, technique and different moods and colorings of music. The first mouthpiece I had was for a beginner, but I found very shortly that I used a lot of jaw pressure which means that I had to use a harder reed. On my tenor I play a number 4,on my soprano 5, on my alto a 4. My tenor mouthpiece is a 130/0/M Berg Larsen which is equivalent to a number 10 and the one I have used for around 14 years. I think most sax players have a record player in their heads playing exactly what they want to sound like or what kind of compositions they want to do and strive to get as close to that mental record as possible."

His progress was very rapid and he claims to have been working in clubs at the age of 12, but the big break came after a spell in an army band and a succession of day jobs and club spots in the evening. These spots became very depressing and he up playing for a while until his wife made him start again. He had been given a chance by John Hammond to record for the Impulse label and when Hammond moved to CTI's Kudo label, he took Grover with him.

One day at the studio, he was running through some horn tracks for an album by altoist Hank Crawford when Creed Taylor asked if he could play alto. Grover admitted he didn't own one and was asked if he could play a rented one the next day and do the album instead of Hank, who couldn't make the date. After half an hour's practice the album was duly cut and *Inner City Blues* became Grover's first

album for CTI. This was followed by *All the Kings Horses* and *Soul Box*, an increasingly successful series of which the last five: *Mr Magic, Feels So Good, A Secret Place, Live at the Bijou* and *Reed Seed*, have all been gold. *Reed Seed* was produced by Grover and marked the end of his association with CTI which went bankrupt. A remarkable feat considering they had George Benson, Herbie Hancock, Stanley Turrentine, Bob James and Hubert Laws signed to the company at various times.

As one of the most consistantly successful recording instrumentalists, it was interesting to find out how Grover sets about making an album. "I start practicing before I go into the studio with the group I am going to use for the record, so that we know exactly what we are going to do before we go in. We lay the basic tracks down over a period of two weeks and then there is a couple of weeks for overdubbing the "sweetenings" of which there really aren't that many. Then we get down to the cleaning of all the tracks and the mixing, taking the album to Rudy Van Gelder, who is the only one so far as I am concerned who can really master an album and bring out what musical content is there so that it stands out.

"Then we start working on the test pressings and get an approval on the cover art which can take six or eight weeks to be completed and has to be started before we go into the studio. We get the liner copy and copyright stuff for the tunes and all the people who were involved in the production of the album and then just wait."

He has a set pattern of recording which is fairly straightforward and doesn't involve too many "tricks." "In the studio I don't really have any special tricks. I like to put the sax down at the same time as everybody else is playing because you feel electricity between the musicians. If you have to do it after the rhythm section has already laid their tracks down, you have to work yourself into a kind of psyched up thing. You close your eyes and visualize yourself doing it with all the musicians. I have been fairly lucky in that I can do that in different contexts for other people when I have to, but I prefer to do it when everybody is there instead of playing off earphones in an empty studio.

"What I play affects what they play, also there is eye contact and the things they use to get you going. So far as mikes, I don't have a real preference except that Rudy Van Gelder has a special mike he made up himself which records soprano real well. looks like a super thick Big Mac hamburger and hangs above the horn, but he won't give the secret away to anybody. On stage I use a Sony ECM 50 condenser lapel mike of the type interviewers wear on TV. I just clip it by it's crocodile clip to the bell of the horn I am using."

His current band is called Locksmith and is the result of checking out a lot of musicians till the right ones were found and they have been with Grover since *Live at the Bijou*. After being forced to work with the CTI 'Mafia' of backing musicians, who at one time seemed to appear on so many albums, it had long been a personal goal to have a permanent unit to take out on the road as well as record with.

Grover has solved the hazards of travelling with four saxes by having a gigantic Anvil case made like a small wardrobe into which his set of H Couf saxes fit into recesses cut into thick foam rubber. A fascinating solution to a difficult problem. The drawback is that you can't get to the saxes before the sound check, but according to Grover it makes them difficult to steal, as it takes two strong roadies to lift the case.

"I don't like to fly at all, as it takes at least a couple of days for my ears to pop and, with airlines getting stricter about taking instruments in the cabin with you, I had the big case made which really protects them well.

"On our recent tour we were doing seven concerts in 21 days and because I can't take the saxes up into the room I am thinking at least part of that day about the adjustments I have to make with the horn. So lately its become a thing of mental practice as opposed to physical and mental practice. The sound check is the only time you get to play and try to get a sound that will be representative of the sound you hear on record.

"When you do a concert you have to make it feel like a warm club. You have to change a place like the Hammersmith Odeon into a little 250 seat place where everybody feels like they can put their feet right up on the edge of the bandstand."

So where does Grover see his music going?

"We are trying to not be predictable but also not changing for changing's sake. Just as you feel it, and as you are growing as an artist. Each piece is like a musical tone poem and in a way like painting with different colours in sound.

"We try to keep every new album different so that we are not prescribing to a formula. You are allowing room for your personal growth and the growth of your audience. Hopefully you are learning something so that you can keep all future albums different. The current album *Paradise* has more music on it than any of the others to date and I hope the next will be different again.

"I would like to think *Mr Magic* opened up territory for other artists to be accepted on their musical merits and not just because some record company paid them to play it. It widened the audience to the point where many of them who wouldn't normally go to a club, would come to check you out to see if you were as good as the album. To check and see if the album was a studio contrived hype and not a happening in person. This puts pressure on us to be at least as good as the record and show other things too. Like putting an Oliver Nelson tune 'Stolen Moments' into the set to let the people know that we just didn't learn the music of today, we started to learn about music from yesterday, so we have a foundation and are not shallow musically or intellectually and this is a natural extension of the music. From our own point of view, we just try to let them know that everybody has a different point of view.

As the father of young Grover 3 who plays cowbell at the end of the stage set, Grover Jr has some specific views on teaching even though he doesn't have time for individual pupils. "I like to talk to kids about the kinds of experiences I've had. It is the kind of information I like to impart to the younger kids who think it's all just a lark, because it isn't. It's like any other profession or art. There's a lot of desire, a lot of hard work and a lot of overcoming the misconception of the public about what a musician is.

"We don't get the respect of the public as professional people. Just because the saxophone is not a symphonic instrument and one of the last to be invented, people say it's a bastard instrument, they automatically say that it's not a *bona fide* instrument and it's up to us to work and communicate our point of view.

"In the future I think playing is going to open up like a big oak tree. It will flower and drop off seeds here and there and they will make their own mainstreams. These will have their own offspring and it will just go on and on until hopefully it will become a universal thing where no kind of music is really put down, it will be looked at as an art form in itself if they are serious and they present it in the right kind of way."

Grover's equipment

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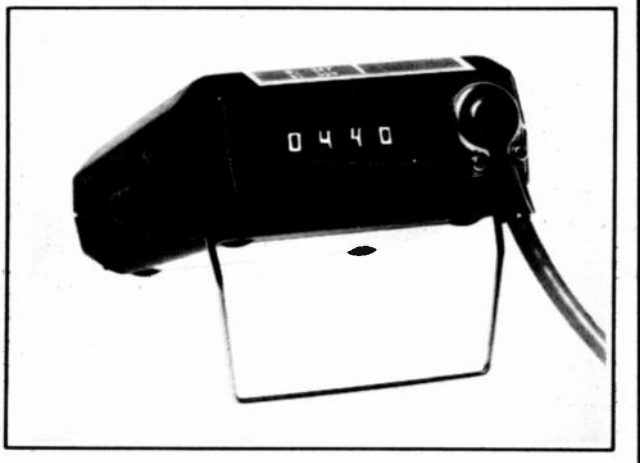

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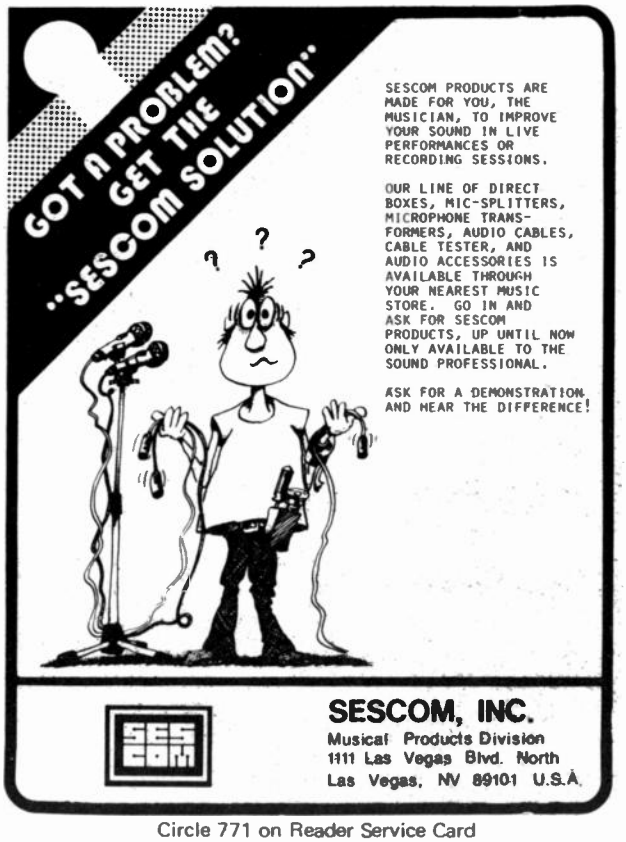

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"I WORKED 22 YEARS FOR THIS GUITAR."

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These days it's "fashionable" to bitch about high prices and the marginal quality of most "name brand" guitars, but "snob appeal" and lack of a viable alternative have enabled the "great corporate ripoff" to continue. Now, if you are a player who's interested in a unique blend of craftsmanship, caring, technology and are daring enough to actually pay **less** to get **more** of what you want, then I earnestly ask that you try our "labor of love". We're proud of our instruments and we think you owe it to yourself to check them out."

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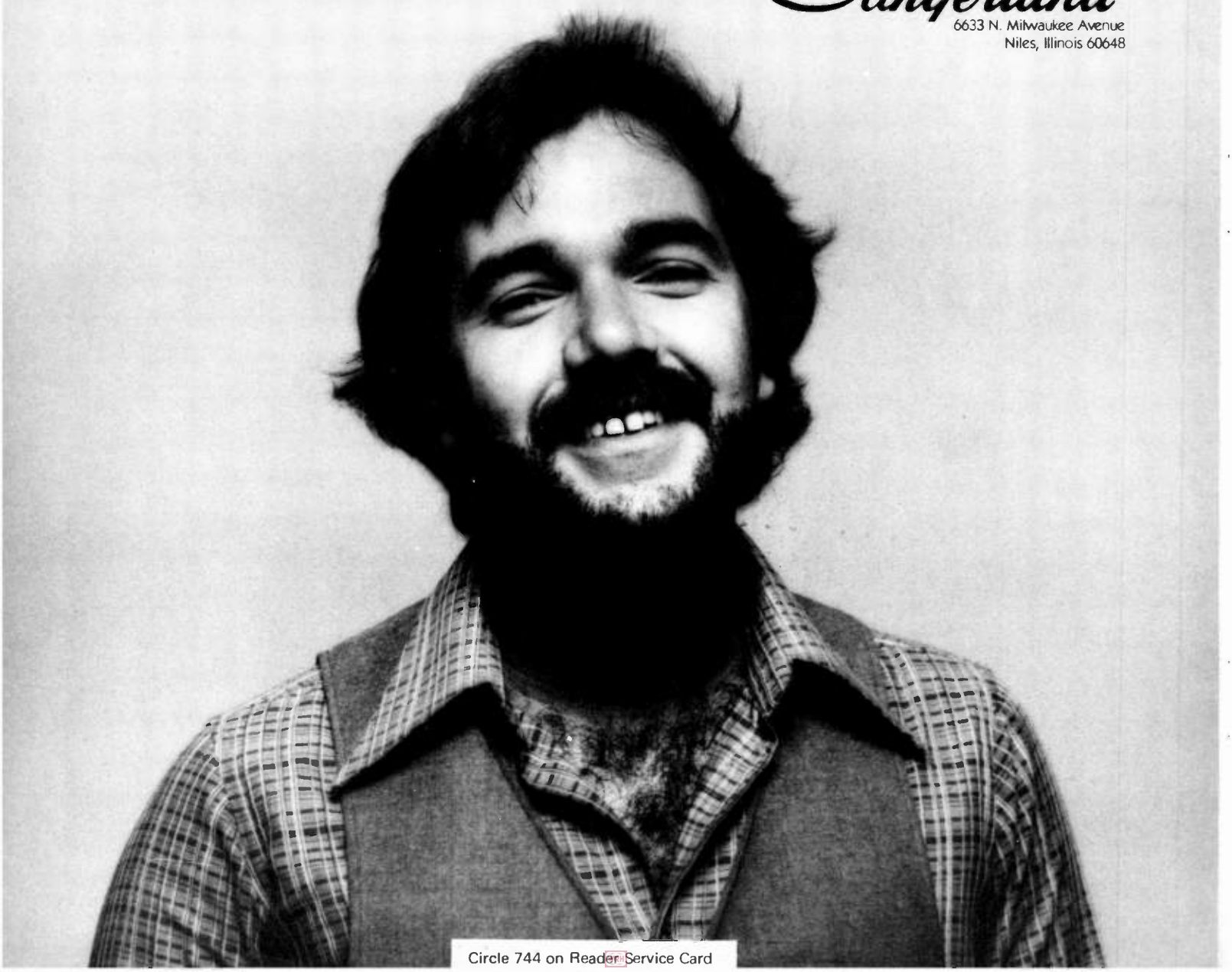

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FROM PAST TO PRESENT

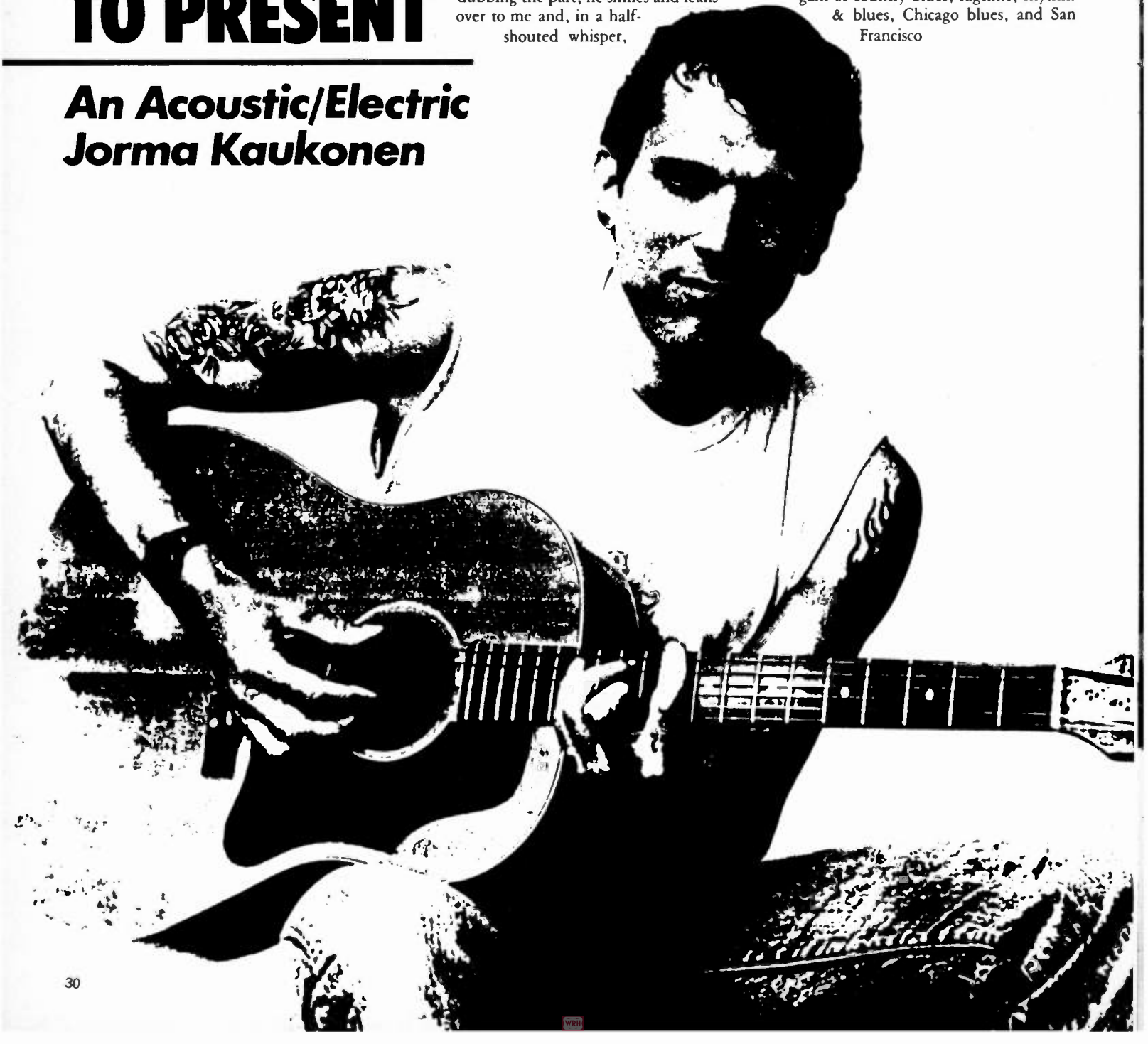
An Acoustic/Electric Jorma Kaukonen

The scene in Studio D of Wally Heider's San Francisco facilities is a study in barely controlled chaos. Standing behind the control board, a red Stratocaster slung business-like over his shoulders, Jorma Kaukonen is deep in conversation with his current engineer/producer, David Kahne, while around them flows a steady torrent of family, friends and acquaintances including former Hot Tuna drummer Bob Steeler and Jorma's wife, Margaretta.

Jorma's face takes on a look of studied concentration as he and David work out a part to be overdubbed on his current solo project for RCA Victor. As he finishes dubbing the part, he smiles and leans over to me and, in a half-shouted whisper, assures me that this is not *normal*. Tonight's progress is slow, and in the last five nights in the studio, he has laid down five tracks complete with overdubs that need only the final mixdown to be a finished product.

Jorma Kaukonen has come a long way since he first picked up a guitar 22 years ago. Today he is an accomplished musician of the first order, and though he is no longer a part of the two bands his distinctive lead guitar helped to make famous, the Jefferson Airplane and Hot Tuna, he still plays to sold-out houses wherever and whenever he appears.

His distinctive guitar style is an amalgam of country blues, ragtime, rhythm & blues, Chicago blues, and San Francisco



psychedelic rock & roll. A style that he pioneered along with Jerry Garcia, John Cippolina, Barry Melton and a few others.

Jorma was born on December 23, 1940, in Washington, D.C., where his father, an employee of the U.S. Foreign Service, was then stationed. Washington is where he spent his youth and first began his musical education.

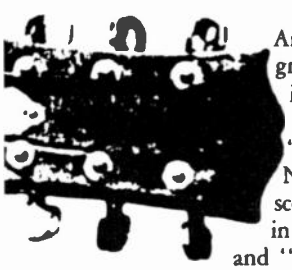
He took piano and violin lessons for about eight years, most of which he had to be literally dragged to, and even when he did learn his lessons, he learned them mostly by ear, aggravating his instructors, no end.

At the age of 16, he obtained a Gibson J-45 and began learning the guitar. A friend showed him a few chords and from there he learned a few simple bluegrass and country tunes. After expanding his repetoire, he started to play small clubs and coffee houses in the D.C. area.

He met bassist Jack Casady a few years later through Jack's older brother, Chick, then a classmate of Jorma's. Jack was playing guitar at the time, and the two, finding they had a lot in common, set about forming a band with Jack on lead guitar, Jorma on rhythm guitar and vocals, a friend playing the bass strings of a guitar and another friend on drums.

Their gigs consisted of material that can still be heard in the catalog of songs performed by Hot Tuna—songs by Buddy Holly, Chuck Berry, Bo Diddley, Little Walter Jacobs, Jimmy Reed, the Everley Brothers and others. In those days Jack used a Telecaster while Jorma would amplify his J-45 by using a Webcor tape recorder with its microphone tucked up under his belt buckle.

Jorma started college at Antioch, a small but well-known liberal arts school in southwestern Ohio, and here he started to learn the ragtime fingerpicking style of the late Reverend Gary Davis as taught to him by his roommate, Ian Buchanan. Ian, a close friend of Davis', recorded several folk and blues albums on the Prestige and Elektra labels during the 1960's.



Taking advantage of Antioch's workstudy program, Jorma ended up in New York City were he eventually met the "Rev" and others in the New York City folk scene, as well as playing in various basket houses and "hoots" around Greenwich Village. It was here that he started to expand his musical horizons and add to his growing vocabulary of licks.

Soon after this period however, he dropped out of Antioch and joined his parents in the Phillipines where he continued to play guitar and develop his chops. Eventually he returned to the U.S. and the University of Santa Clara, a small Jesuit college south of San Francisco, where he graduated with a B.A. degree in Sociology.

After leaving Santa Clara, he met and played with various members of the San Francisco Bay folk crowd such as Paul Kantner, David Freiberg and David Crosby. Jorma's knowledge of the fretboard so impressed Kantner, that when he and Marty Balin decided to form a "Folk-Rock" band, Paul immediately thought of Jorma as the lead guitarist.

Jorma accepted the position, and though he had no real background in electric rock & roll, he immediately started to build a reputation as one of the innovators of the "San Francisco Sound." The "Sound" that would deluge the world in the 1960's.

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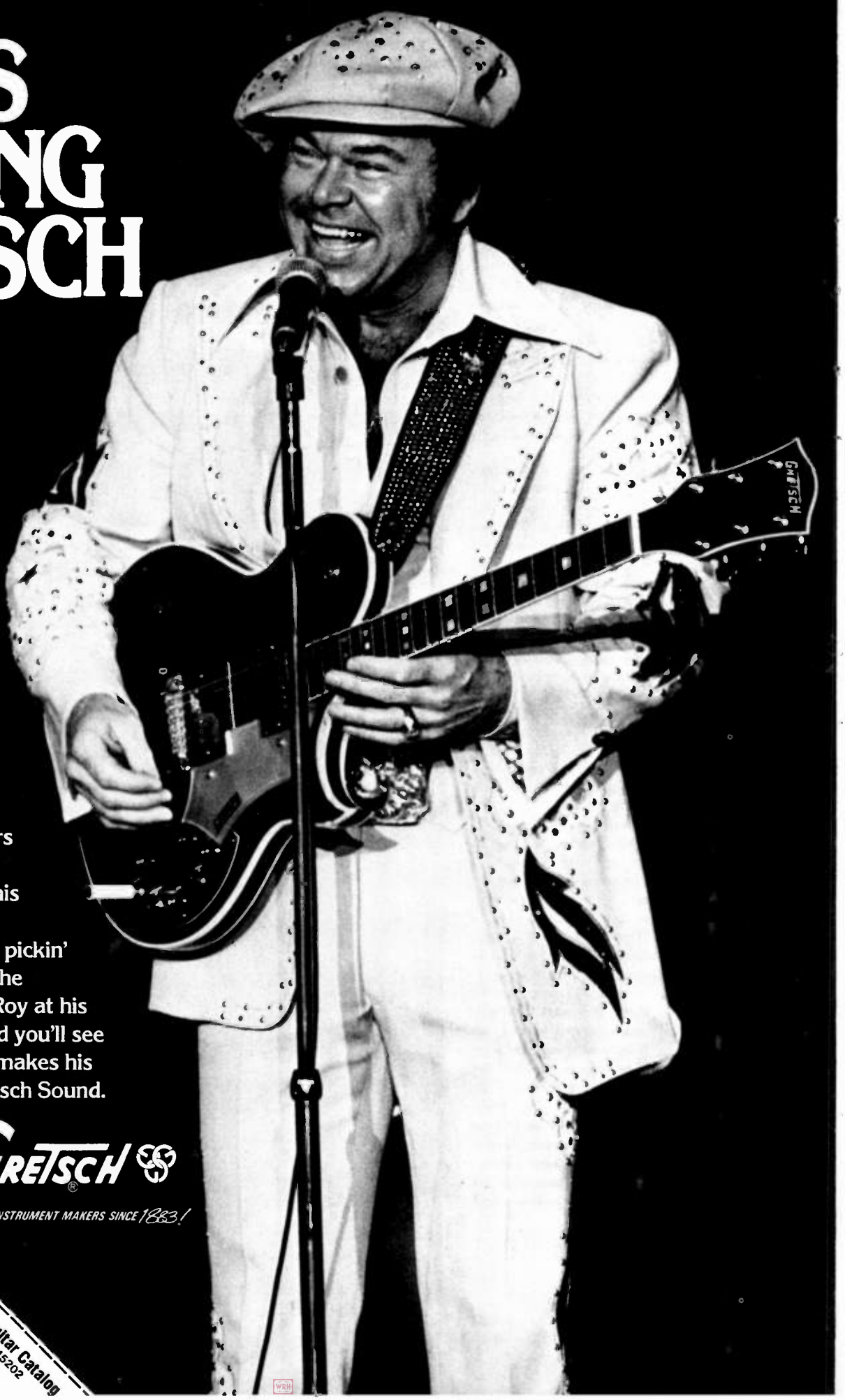

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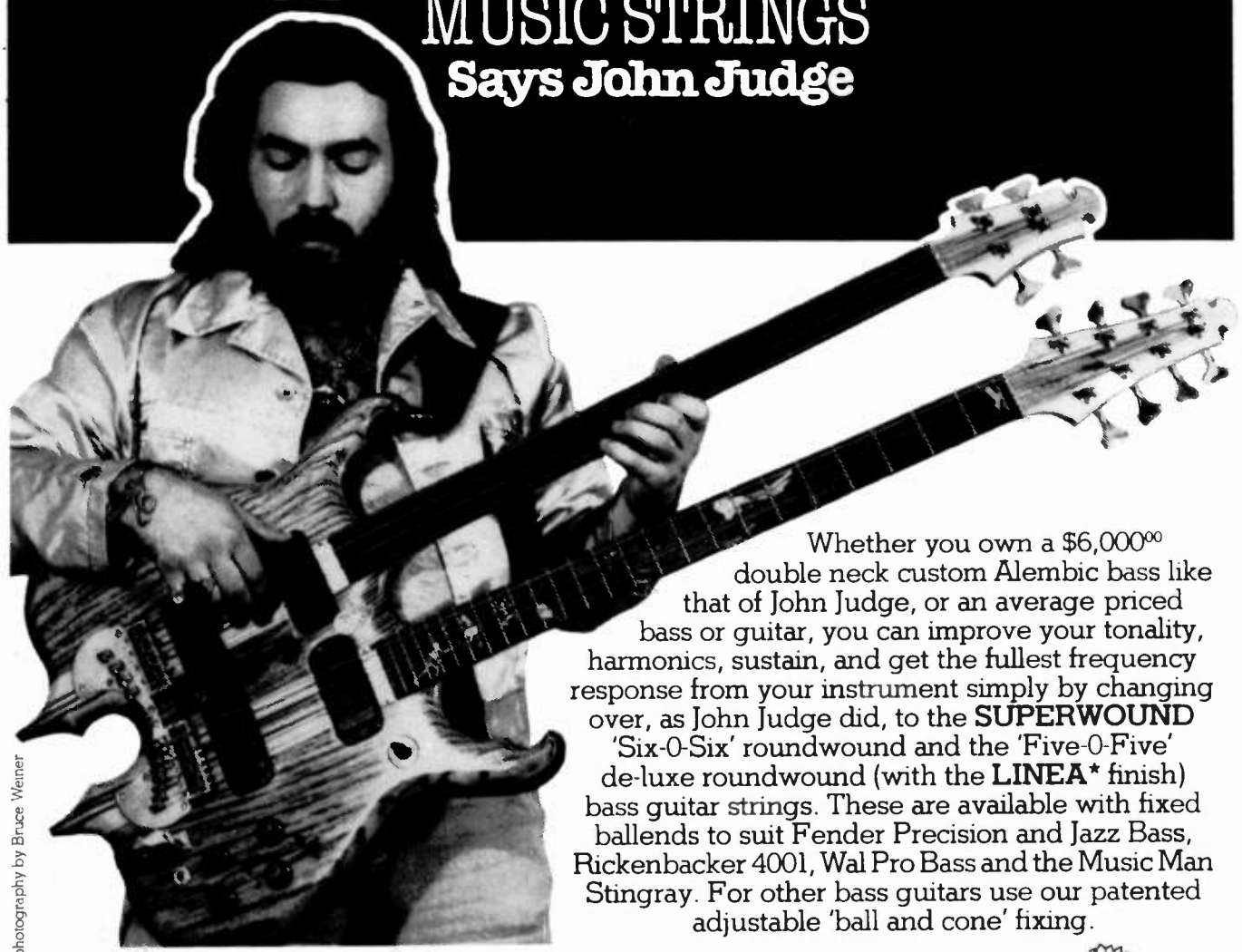

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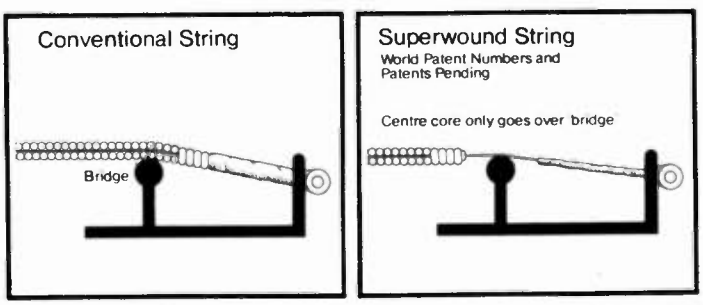

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Jorma Kaukonen

plane, Jorma and Jack Casady decided to strike out on their own, staking out a little piece of musical territory that eventually became a considerable chunk of heavy metal, post-psychedelic electric blues known as "Hot Tuna."

For seven years and nine albums, including a posthumous "Best of" album, *Final Vinyl* (Grunt BXL-3357), Hot Tuna was a serious contender for the "Loudest-Electric-Rock-and-Roll-Blues-Band-in-the-World" crown. Right up there with Led Zeppelin, Foghat and, of course, the Rolling Stones. They were also well known for playing on into the wee small hours of the morning if permitted.

But all good things must end and in 1978, Hot Tuna disbanded amicably. Today, Jorma is actively pursuing a solo career; playing and touring the U.S. as well as recently finishing a solo studio album for RCA entitled *Jorma* which contains a collection of all new, original compositions. His concert appearances include old tunes from the Airplane and Hot Tuna days as well as selections from his critically acclaimed solo album, *Quah* (Grunt BFL 1-0209), and the forthcoming *Jorma*.

On stage, Kaukonen uses a pair of custom-made Ovation electric/acoustics—a "Custom Legend" and an "Adamas." He strings these guitars with Martin "Marquis" medium-guage strings, and plays them through a 60 watt Fender Deluxe Reverb amplifier equipped with a 12 inch JBL speaker.

In the early days of Hot Tuna, feedback from his Gibson J-50's was an almost insurmountable problem. Tonal quality was constantly being sacrificed to the acoustics of the room or hall that he was performing in. But with the Ovations, Jorma feels these problems have now been solved.

His Fender Deluxe amp has been slightly modified by the addition of a master volume control and the removal of the bias tube, which has been replaced with diodes. This, according to Jorma's equipment man, Michel Casady, "takes less power to run, and leaves more power for the rest of the amplifier to use." Jorma has also been experimenting with a Roland Jazz Chorus-120 on stage and in the studio. He points out that he's pleased with the cleaner sound that it gives him in both situations.

Jorma's effects set-up on stage is a sophisticated but simple to use system. The guitar signal is sent through an MXR "Phase 90" phase shifter, then into an MXR Flanger, and then into a Carl Countryman "Direct Box."

The signal is then split, going both to the amplifier and directly into the main and monitor mixing boards. The amplifier and guitar are then miked for additional tone and texture.

Kaukonen's amplifier settings vary from room to room and from hall to hall. They are usually very low, with most of the tone controls set not much higher than three. The volume is then controlled by mixing boards and Jorma using his guitar's volume control.

When he does set up for the "heavy" electric music, he uses a red 1972 Stratocaster and an early model, reverse-body Firebird III which he strings with Ernie Ball "Regular Slinkies." His amplification set-up consists of 100 watt Custom Hi-Watt stacks, with each speaker cabinet fitted with four 12-inch Electro-Voice speakers.

The only modifications to these have been the installation of cooling fans, "because they tend to overheat and blow tubes like crazy," and the addition of a power-boost switch which changes the channels from a "clean" sound to a "dirty" sound. The amps are usually turned all the way up, depending on the size of the hall. They are also miked through the boards and occassionally run directly through the boards.

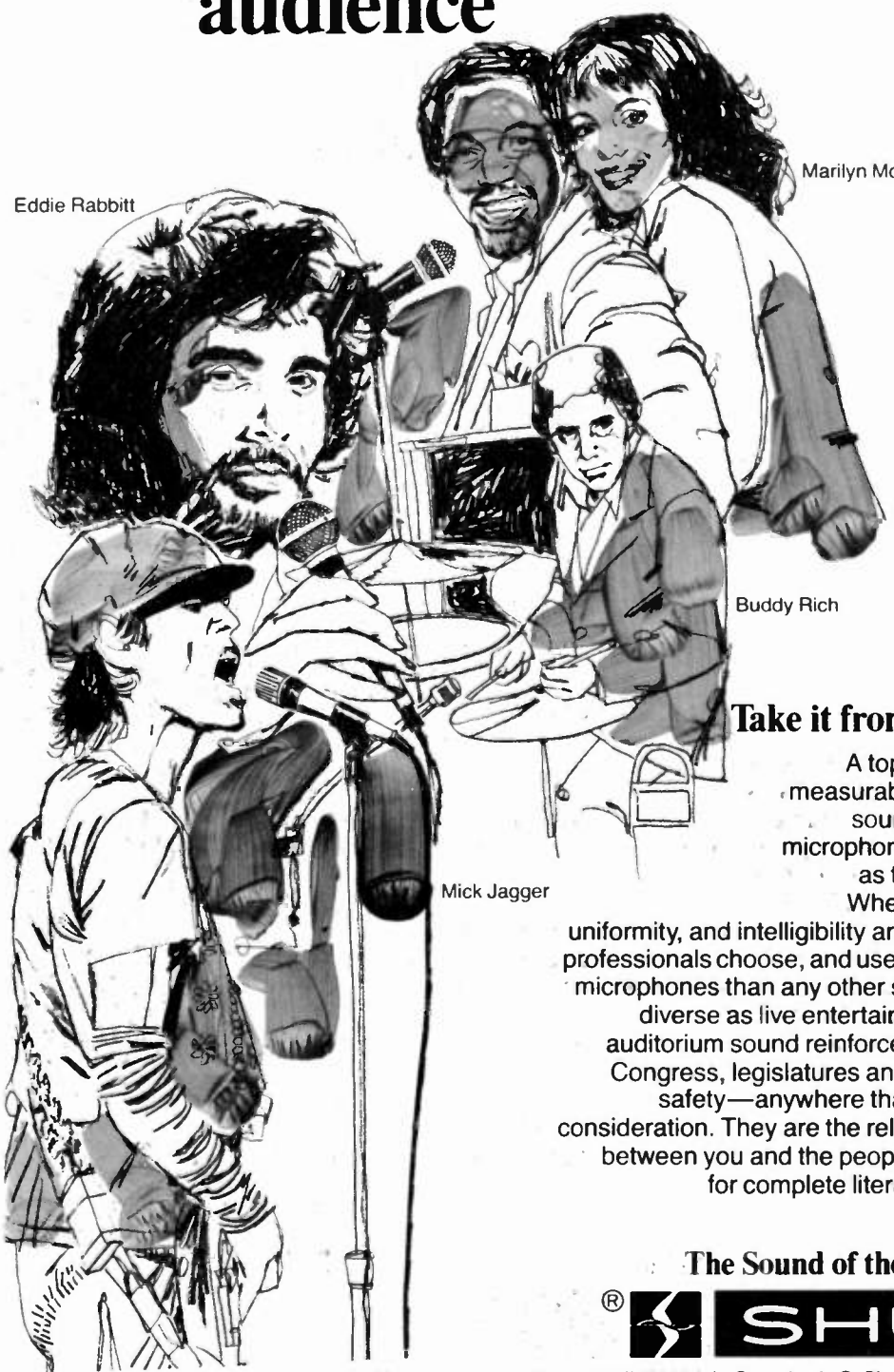
Jorma's effects set-up for his heavy electric music consists of first sending the signal through an Oberheim Voltage Control Filter, then into an MXR "Distortion Plus," a "Cry Baby" Wah-wah, an MXR "Phase 90," MXR "Flanger," and then finally into the amplification system.

For his unique playing style, Kaukonen uses his thumb and first two fingers, along with a plastic thumb pick and two national metal finger picks. On occasion, he also uses a Herco heavy gauge flatpick if the song calls for one.

At home anywhere on the fretboard, Jorma can play with ease in any key, though he has a perference for first position keys such as C, D, E, G, and A because he likes the resonant sound of open strings.

He also plays in a variety of opening tunings (G, D, E, and dropped D) for the availability of open strings and the drone-like effects that can be achieved with them. On stage, he'll usually tune his Adamas to open tunings for songs like his rendition of Blind Blake's "Police Dog Blues," which is played in open E Tuning (E, B, E, G#, B, E). When he needs an open tuning for his electric music, he will tune one of his Stratocasters accordingly. ▶▶

fact: the microphone is your link with your audience



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Jorma Kaukonen

His collection of guitars is not large, but it is focussed on his personal taste in guitars and his own particular playing style. At the moment, it consists of three Gibson Firebirds: a 1968 two pickup, non-reverse model with a sunburst finish; a Black 1971 two pickup "reissue" reverse model (#33) boosted with two Badass pick-ups; and an early '60's two pickup reverse Firebird III with sunburst finish.

He also has three Fender Stratocasters: a 1957 model, painted like an American Flag; a 1969 model painted green, and a 1972 model painted candy apple red. Three other Gibson guitars round out his electric collection: a 1969 ES-345 "Stereo" (A fine guitar."), a 1975 L5-S and a 1976 Explorer reissue.

Jorma's acoustic collection includes his two Ovations,the "Adamas" and the "Custom Legend," an early 1920's Dobro, a 1970 Dobro, a 1942 Gibson SJ, a 1947 Gibson J-45, a 1959 Gibson J-50, a 1964 Gibson J-50 and a 1967 Martin D-18 12 string guitar.

He also owns a pair of genuine Rock and Roll oddities—one is a Coral Electric Sitar and the other is a hybrid, double-neck guitar designed and built especially for him by Rick Turner of Alembic. It is made from parts of a Gibson SG and a Fender Stratocaster, including both necks as well as parts of the body, wiring, and hardware.

When queried about New Wave, Punk music and the state of the current rock scene in general, he responded by saying that, "I like George Thorogood. I think he's a good player and it should be interesting to see what he develops into. As for the new music, there's hardly anything new under the sun, and a lot of the punk stuff sounds alot like 1950s music. I do like Devo. I think their concept is funny and very satirical. That is one of the main things missing from a lot of the groups today, concept and content."

Jorma talks enthusiastically about his future plans which include solo touring and the eventual reformation of a permanent electric band with Bob Steeler on drums, Denny "Boredom" on bass and perhaps another guitarist which Jorma can play off of. Kaukonen is a great admirer of the English style of rock & roll as played by Peter Townshend and Eric Clapton, he likes to play heavy chords behind another player as well as the lead lines from those chords. "As a band, the music is beginning to really come together, and we can plan on getting out and playing some good music while having a good time doing it."

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STANLEY CLARKE

ON FUSION 1980

By Jean - Charles Costa

"I've been coasting for the last two years"

Both the jazz and rock press have been quick to condemn Stanley Clarke's latest album *I Wanna Play For You*, a two LP set of live and studio material intended as a summation of his solo career since leaving Return To Forever, for its repetitiveness, "showiness" and, the inevitable jibe in this situation, its *self-indulgence*. Ironically enough, many of these judgments are easily as facile as what the critics conceive Clarke's music to be on recent solo albums. They bespeak the obvious while completely missing the point.

Until a surprisingly frank and open exchange of views via the transcontinental phone lines, I also had some doubts about Stanley Clarke's latest recording. At times, the sequencing on *I Wanna Play For You* does seem haphazard and somewhat unfocussed. And Clarke's flashier tendencies as bass soloist are more pronounced than ever: his playing on tracks like "My Greatest Hits" and "School Days" virtually overwhelms the listener with its full panoply of effects, "unreasonable" speed and pyrotechnics.

But this was not destined to be a "reasonable" album. Judging from the collective heat of the live tracks and the extensive use of photographs from live concerts on the inside gatefold, Clarke takes the title of this album quite literally. Added to the fact that this album doesn't promise anything radically new or different from Clarke (for reasons which he made clear further on in our conversation), *I Wanna Play For You* stands as a somewhat impressionistic overview of Stanley Clarke's dazzling and always controversial rise to the top rank of contemporary bassists—something he was quick to acknowledge in a conversational exchange marked by his honesty, generosity and reflectiveness.

The "overview" aspect of the record "was my whole intention with this album. A lot of people don't get that, but it's actually a summation from the early days of Return To Forever, actually from the first time I picked up the electric bass until now.

"While I was doing that album, I was writing for my next album in which the music is *really* different. This new music I'm coming out with is much more 'experimental' than anything I've done before and the writing is very involved. So I was also putting out this album (*I Wanna Play For You*) which was rather easy to do. I got the studio stuff, mixed it up—a few live things and some things that were already there—put it together and got it out. It was like I was saying to myself or whoever was listening to it, 'this is a period, a statement of things that I've done, and here it is.'"

This "new" music which Clarke made constant and enthusiastic references to throughout our conversation is obviously different enough to elude easy definitions or labels. The most apparent change involves an entirely new cast of supporting musicians and a more strictly *compositional* approach, but the underlying feeling behind Clarke's impending stylistic transformation reveals more about the man and his attitude toward his craft than rooms full of liner credits or track-by-track breakdowns ever could.

"This new stuff I've been working on is gonna be very interesting. People are going to be shocked when they hear it. There's a lot of acoustic bass stuff, I've been practicing a lot. I'm a funny guy, before I make a real heavy statement about something, I have to make sure all the loose ends are taken care of. Sometimes I go through periods where I do things that aren't worth more than a 7 1/2 or an 8 on a scale of ten. When I do that 'ten,' I like to make sure it's a ten, not go for a ten and lose because something's fucked up. I'd rather skate a little bit. To be honest about it, I've been coasting for the last two years as an artist. I don't feel embarrassed or weird about saying it either. I've been doing a lot of thinking about music and society and I'm very close to making another statement. Something where someone might say, 'Wow, I've never heard *anything* like this before.'

"That's the beautiful thing about statements. When they come, there's nothing else like them and it's obvious. When I came on the so-called jazz scene, the way I was playing was really wild and arrogant but the bass players at that time *needed* that. All the guys I'd see were into boredom and apathy. I got fired from a lot of gigs, but in the end a statement was made."

Another recurrent theme in our talk was youth and that special kind of energy expended by younger players who seemingly have nothing to lose. At one point, he mentioned that the New Barbarians tour with Ron Wood and Keith Richard made him "feel like a kid all over again. It was a ball." More importantly, his new band is made up of "fantastic" young players who, despite the fact that they're still semi-unkowns, "sound the closest to the music I'm going to be making in the future." A somewhat tentative query about who they are brings forth a voluminous and excited response from Clarke.

"It's wild. They're a brand new band, same instrumentation but the players are different. You might know the drummer even though he's not that well known yet. His name is Simon Phillips, he's 22 years old and he's one of the most exciting drummers I've ever heard. He's been practicing for the last couple of years and now he *really* has his shit together. I got a guitar player who played with me on the *School Days* album—this guy's from Hawaii and his name Icarus Johnson. And I finally got a great keyboard player, a guy named Steve Boch. All of these guys are closer to the music I want to play, more 'comfortable' with it. You listen to them play and you get the immediate feeling that these guys are totally 100% professionals, as opposed to the guys who are great players but their professionalism is inconsistent.

"The last band I had was a very exciting band, but they just weren't consistent. Some nights we'd sound fantastic, some

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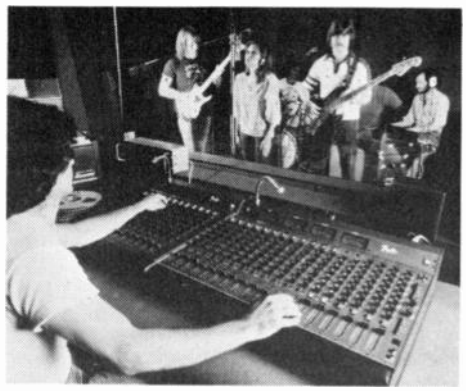

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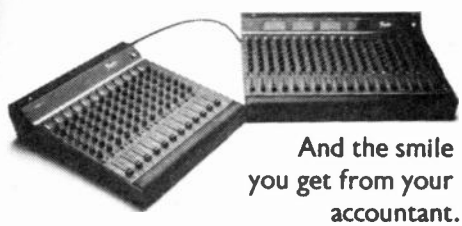

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nights we'd sound *all right*. This band has that excitement, probably a bit more 'cause they're younger and they have that 'thing.' When a guy is 21 or 22, there's something that comes off the body that I remember having when I was 21. It's like an uncontrollable energy and all you need is someone to say, 'Try this...' Like Chick Corea did with Al DiMeola, myself and Lenny White. We were wild dudes, wild people, but we went to school to study the music and we could read any type of music he could put in front of us. That's what this band is about. All the guys are real young and I'm just channeling each guy's energy enough so the music sounds great. This is the most energetic band I've ever had."

A rather extravagant claim, considering the high-powered instrumental units Clarke has been associated with over the years. But it is generally acknowledged that energy is a coefficient of youth in most any musical context, and the key here is Clarke's reference to *professionalism*, which means more than consistent standards of performance. It means the ability to read anything Clarke puts in front of them and interpret it. A crucial facet, that according to Clarke, is lacking in most young jazz-rock or "fusion" players and it is quite possibly one of the main reasons why the fusion movement has largely deteriorated into funk rehashes and "desperation-disco" music.

"When I think about the jazz-rock or 'fusion' movement or whatever you want to call it, I actually get sad. There was a movement there—like today you have the 'punk rock' thing and the re-emergence of old rock & roll. Jazz rock was a new thing and it definitely got diluted. And the reasons are obvious. The groups basically broke up because of guys trying to be stars, personal hassles, egos, bad leadership, all those problems.

"Back in the beginning, you had three 'name' groups—The Mahavishnu Orchestra, Return To Forever and Weather Report. I've got to hand it to Joe (Zawinul) and Wayne Shorter especially, 'cause they're sticking it out although their music's changed a lot. When they added Jaco Pastorius I thought it was a great move because I really like his playing. But anyway, Mahavishnu Orchestra broke up and each one of those guys formed a band. Return To Forever broke up and those guys formed different bands and the guys that had spun off from Weather Report formed bands, and then all those bands broke up! And the reason why it happened *isn't* because the artists are trying to sell out and it *isn't* because the artists don't want to do it. It's because the *players* aren't there, I'm tellin' you man. No offense to the younger guys but there's only a handful who could do it. This band is the first band I've had in my solo career where *all* the guys could read. So now I can write music a particular way and get it done."

Point well taken, but what of the plain fact that many jazz rock "pioneers" like Clarke, Chick Corea and John McLaughlin have done some of the best work when bouncing off each other. Isn't there a special inter-relationship between the original players from the first three fusion bands that can't be duplicated, no matter how talented the supporting players?

"It's obvious. When I get around guys like John and Chick you can see it in their faces, realizing the mistakes that were ▶▶

STANLEY CLARKE

ON FUSION 1980

Photos by Henry Diltz

made. It's strange for me and Chick to be on the same show but not in the same band. I have a feeling that all of this stuff is gonna come around in the Eighties. In my opinion, the funk-jazz thing has run itself out, all the guys are starting to sound the same. It's like disco, you don't have 'originals' any more. It'll take a big push to get things going again, but it's happening. Everytime I see a young musician who's 18 or 19, every bass player I hear, they're sayin' 'Yeah man, you're the greatest, but when you were with RTF, that was the *shit.*' I've only heard that statement about 3,000 times. As a matter of fact, I am personally going to see to it that Return To Forever records again. We *are* going to make another record, *I'm* gonna see to that."

In the meantime, Clarke will continue to pursue his musical directions with a great deal more foresight and intelligence than people give him credit for. To accomplish that end he still has an impressive collection of electric and acoustic basses (lovingly detailed in a photo on the liner sleeve of *I Wanna Play For You*). Besides a dozen "original" Alembic custom electric basses in different woods, Clarke has a varied and extensive collection that mirrors his eclectic approach to the music.

"Yeah, I used to use Gibson and Fenders. I like the old ones. I still have an old Fender 'Precision' and an old Gibson. The rest are custom basses or basses that companies give to me. The Alembic basses are the 'earlier' ones—I had a bunch made in the days when they were handmade. Each one has different features, different woods, different weights. I'm into the weight of basses. I have one Alembic that sounds incredibly heavy but is actually very light—a kid could play it. That's my favorite bass."

Clarke also uses an interesting variation on the electric bass, the Carl Thompson "piccolo bass."

"To be honest, it's not totally his (Thompson's) instrument. It was my idea and he built it. He thought I was crazy when I first asked him to build one. It's actually a bass that sounds an octave higher than a normal bass, but it had to look exactly like a conventional electric bass. The strings had to be as long, though not as thick, the frets had to be as wide—that was the problem; I have big hands and I couldn't play it if it was just gonna be a guitar with bass strings on it."

Clarke's collection of European contrabasses includes an old Italian bass (late 1790s or early 1800s) and a hundred year old German instrument. He is actively searching for an old French bass like the one Ray Brown has ("it's shorter than normal basses") and if anyone actually has a legitimate one to sell, he or she is encouraged to let Stanley know about it.

His amplification set-up consists of four bass bins (he uses two at a time) with Gauss speakers, four mid-range cabinets (two have tweeters for full-range response with Vega speakers—all powered by Crown amplifiers and an Alembic preamp). The only effect used by Clarke is the Roland "Space Echo," to get a little delay in his sound.

Normally he takes four Alembics on the road with him and he's just had a new one made for the prepared or "open" tunings which he is currently using. An avid endorser of Rotosound strings, he mentions that "the Rotosound people have just developed some special strings for me to use with the new Alembic. Their strings have always given me the clarity and tone I need for my sound. They do chew up the frets a bit, but I just have my basses refretted if it becomes a problem."

In closing what has been a genuinely pleasureable and informative exchange, I ask Clarke about his totally distinctive attack on the electric bass, an underrated component part of any instrumentalist's approach.

"The attack and fingering or shaping of the notes is *so* important, man. That's what makes a sound *likeable*. Jaco has that too. In fact, his electric bass sound is closer to what I get on an acoustic bass. My electric bass playing is harder. It's all in the way you pluck the bass—not the types of notes, that's secondary—something so subtle it's often overlooked."

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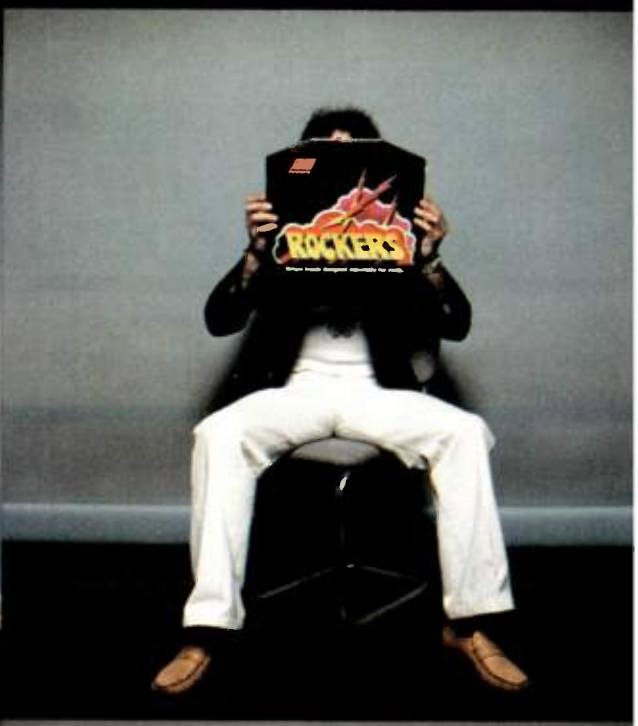

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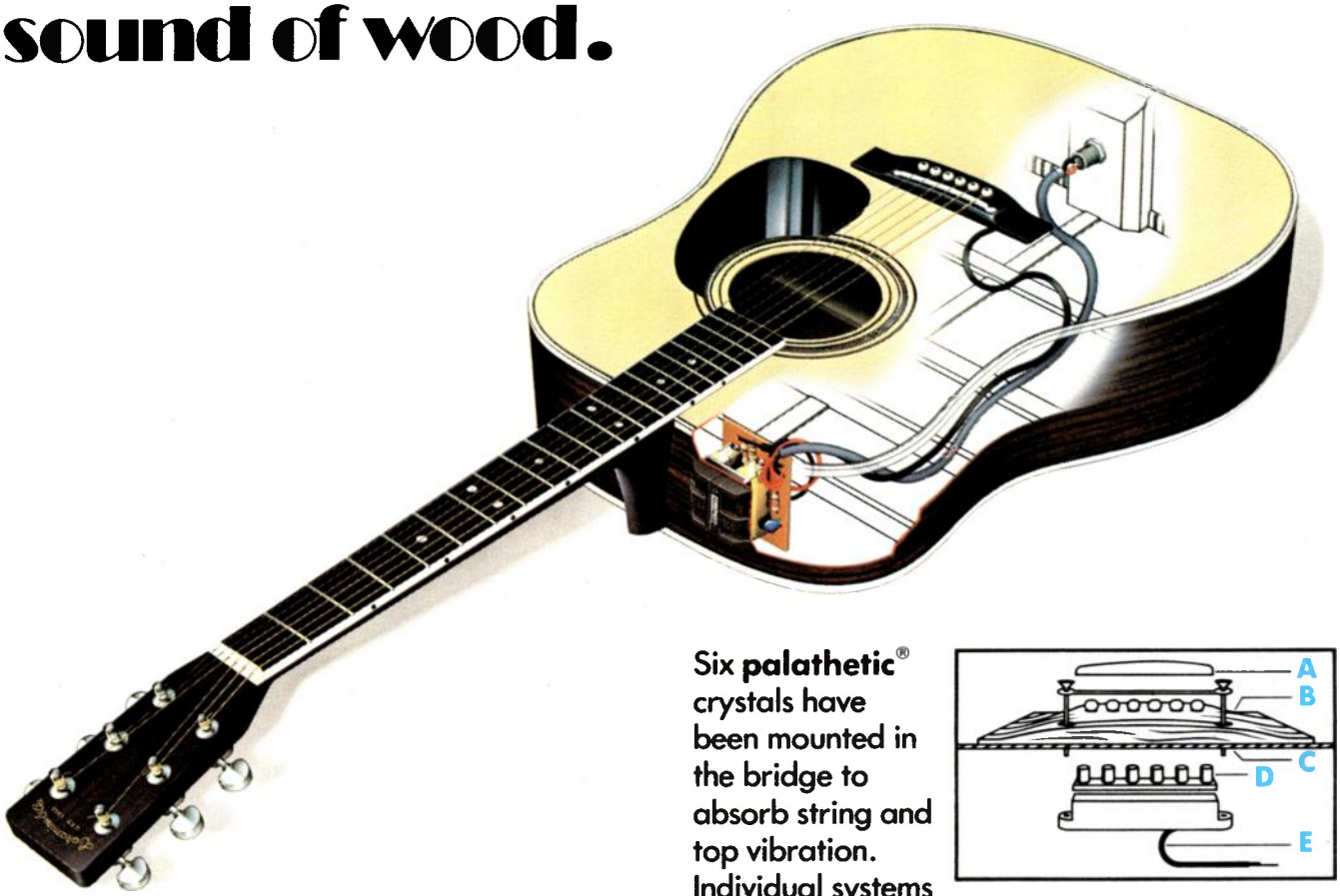

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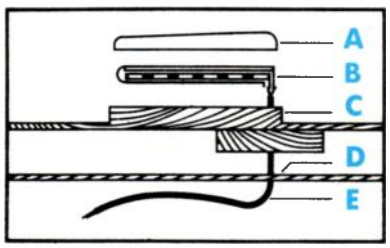

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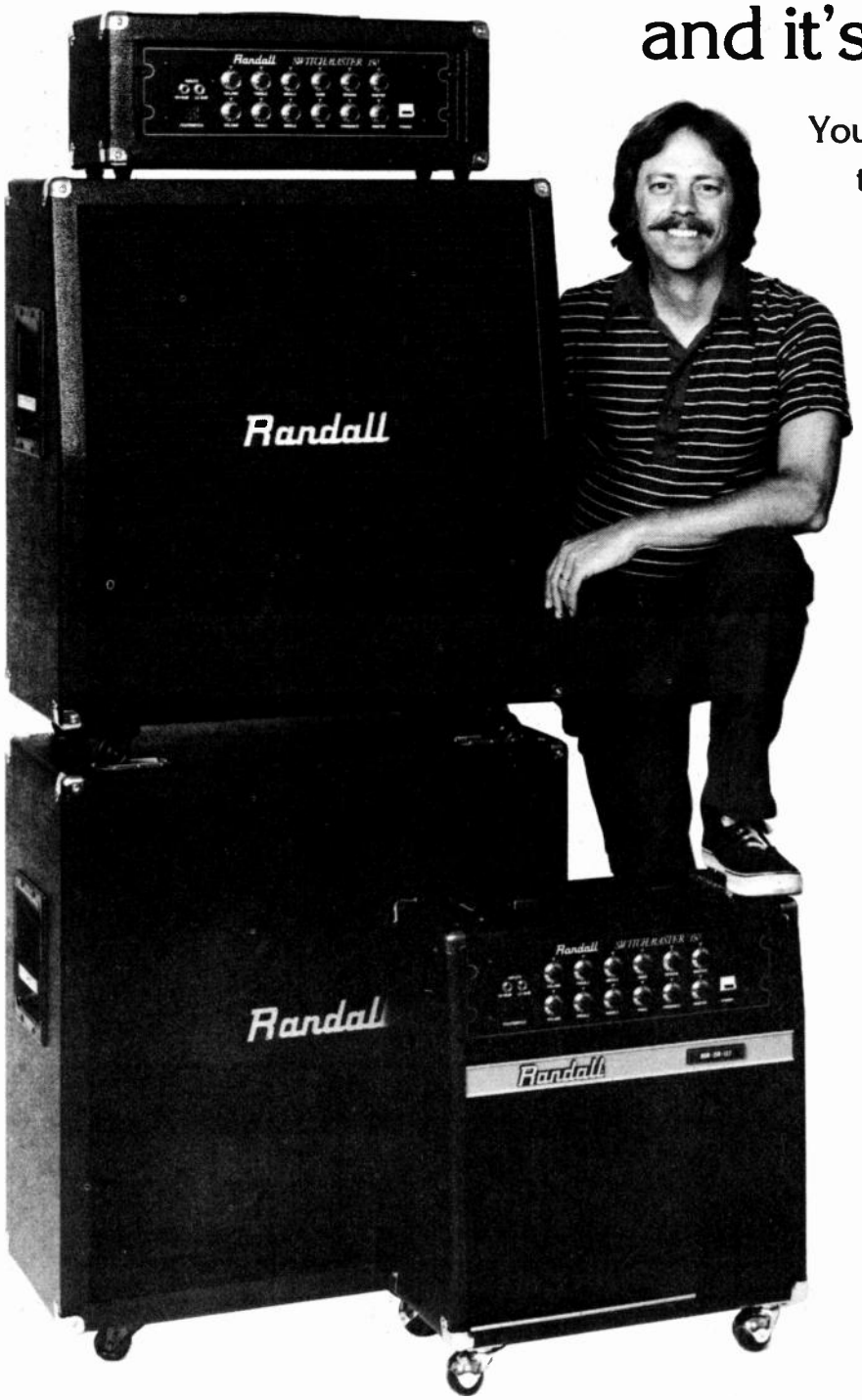

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THE AMERICAN FEDERATION OF MUSICIANS
'Catching Up With Today's Musician'

For any musician, entering the world of professional music must seem a lot like jumping into a very cold ocean wearing nothing but a life jacket with a slow leak. Not only is there the immediate fear of drowning, there's the constant fear that every predator known to the "deep" will find them easy prey. And with a survival rate that makes a job on the bomb squad look attractive, it's no surprise that only the most determined and resilient make it through.

Ever since there has been commercial music, there have been managers, promoters and the like, ready and willing to rip-off any artist. To be sure, this is definitely a minority of people, most personal managers and others are highly ethical and responsible individuals, but it only takes one exception to result in disaster.

The picture may look bleak but there are some bright spots and one of these is the American Federation of Musicians (AFM): the biggest entertainment union in the world with a membership of over 300,000.

For nearly a hundred years the AFM has been battling for the rights of musicians; fighting for job respectability, decent wages and against abuses. Today, they represent musicians working in radio, television, studios and on records; and, of course, they represent performers with jazz bands, C&W groups and rock bands. To many of these their union membership has become a very important factor in their development and success. Dizzy Gillespie probably sums it up best:

"I've been in the business a long time. I've seen styles change from swing, to jazz, to blues, to rock. I also remember 25 years ago when musicians weren't paid royalties and how hard our union fought to get them for us. My membership in the AFM is important to me. I know the way it was, and I like the way it is."

There can be do doubt that the AFM has fought the hard fight over the past years, but in today's market many of the younger musicians are asking what relevance the union has to today's music and musicians. AFM President Victor W. Fuentealba explained that "particularly for younger musicians, membership in the AFM is even more important today than it has ever been because of the increased possibilities of exploitation. Most young musicians, regardless of their talent, are totally unfamiliar with the business practices in the music industry today, and the experience and guidance offered by the Federation are needed to undertake a career as a professional."

Young Sounds is a program developed by the AFM expressly for musicians between the ages of 14 and 21. It has been specifically designed to provide the professional help that will enable these people to enter the job market aware of their rights.

Fuentealba commented: "The *Young Sounds* program was initially adopted because of the many abuses that were occurring to young musicians by unscrupulous individuals who were more interested in lining their own pockets than the pockets of the musicians. Another purpose of the program, which Local Unions make available at their option, is to familiarize the young musician with the functions of the union. In this way, we hope to establish better communication between the young musicians and the Federation."

Knowing that money is sure to be a problem, the AFM has been farsighted enough to offer reduced dues and initiation fees which can be paid in installments over a 90 day trial period. An extra incentive pops up in that if you don't want to continue, for whatever reason, you can get a full refund at the end of the trial period. In addition, you'll get all of the benefits that regular AFM members receive.

"The thing that makes *Young Sounds* unique," Fuentealba said, "is that a young person can test the waters of professionalism without having to make a permanent commitment. It's designed to take into consideration the fact that people can change their minds."

With a membership as large as the AFM's there are bound to be complaints, many of which come from either misunderstanding or misinterpretation—some deriving from the fact that any organization that's been around a long time is going to be slow to change.

One of the most "present" complaints concerns so-called "forced entry" into the union, i.e., a session musician must join the AFM before he can get a gig in a studio. Fuentealba responded by explaining that "this simply isn't true. While we do have a union security clause in contracts negotiated by the International Union, this does not require a person to join the union immediately, although most people working under these contracts want to become members. But the requirement to join 30 days after a person begins working for an employer is governed by Federal Law; it has nothing to do with any unusual requirement by the AFM. It also exists for workers in any jurisdiction where the union representing employees has a union security provision in its negotiated contract with employers. There's a lot of misunderstanding about that, and I'm glad to be able to set the record straight."

Regardless of the reason why someone has to join the union, many question the differing set of standards throughout the union's 600 local offices. In LA for example, you must have an audition, somewhere in Idaho it may not be necessary. This also applies to the differences in initiation fees and dues. Whereas New Yorkers may pay the optimum $200 initiation fee, someone in Kentucky may pay the minimum $11.

AFM locals are permitted to charge varying amounts of initiation fees and dues due to the fact that the economic situation is different in different areas. Where there is more lucrative work for musicians in a certain area, that local will naturally charge a higher initiation fee and higher dues, and in rural areas where there is less employment at less remuneration, naturally those locals will charge a lower initiation fee. It's really a question of supply and demand, plus the amount of service a member requires and the expense of running the local union, that dictate the amounts of the fees.

With the AFM on the move, working musicians have somewhere to turn. Maybe they're not making the most of a good situation.

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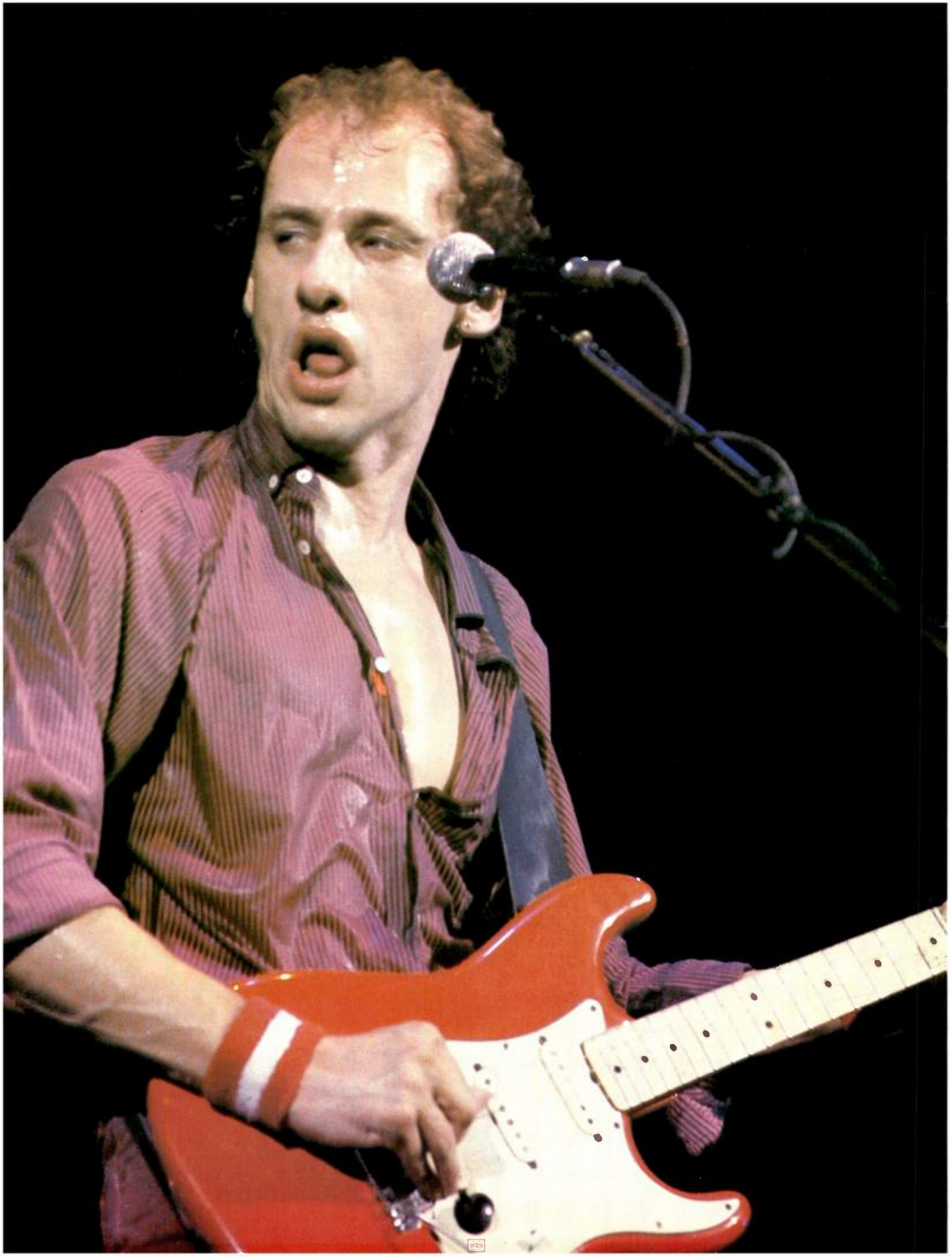


MARK KNOPFLER of DIRE STRAITS

"There's no other guitarist I'd rather be"

A quote like "you're really at the mercy of the song" underscores guitarist Mark Knopfler's elegant and subtle approach to the instrument. His uncanny instinct for phrasing and a characteristically delicate touch have brought Knopfler and Dire Straits to the forefront of the music scene in a ridiculously short time. Tim Fleming of *IM&RW/UK* caught up with Knopfler in London recently and their deceptively casual interchange revealed some of Mark's well-defined opinions about guitars (specifically his choice of Fender Strats and Ovation acoustics), guitar playing, songs, Dire Straits and his most recent sessions with Bob Dylan.

Tim Fleming: OK — so now we've nailed your lucky color, fave food and the serial numbers of all the guitars, let's get onto the biographly: I think most people by now know of your route via journalism, university and lecturing prior to the band's formation — but you've also been involved in theatre....

Mark Knopfler: I was interested in theatre as a kid when I was at school; it was partly an escape, partly another way of self-expression. That sounds a bit elevated but that's how it was. I liked to direct as well as act — I attended a couple of Drama League things that's all.

TF: Well, the directing/acting bit is there with the band, and the shows themselves seem to have an increasingly theatrical element ... if I were comparing say, last summer's St Albans gig with the one at Hammersmith Odeon.

MK: I reckon there's a theatrical element in everything — even in teaching. I was talking to Sting, singer and bass-player with Police, an excellent little band — one of the best new groups. Sting's an ex-teacher and he actually put the idea in my head. I was just wondering — trying to assess how much teaching helps you in an audience situation — it does give you a certain amount of confidence. I don't feel

nervous about playing; maybe I did a little bit more in the beginning, getting used to playing in big places. Now, I don't really feel nervous with an audience, after all, they're there to have a good time and so are you — so you're off to a pretty good start!

But you do have to project, and if you're self-conscious about what you're doing, it needs a little greasing-in — to really learn — to push it *right* out to the people at the back, whether it's 20,000 at a festival or 3,000 in a hall, you're still a small figure to them. *How* do you do it? — it's a whole combination of stuff — I can't really explain it.

And everything should always be changing — you should try different audiences — do things which aren't necessarily the most comfortable and logical things to do in terms of the business.

Reprinted from MELODY MAKER
July 29, 1978. Published in England.

Any sort of merchandise has its equivalent of the Rolls-Royce, the state-of-the-art model designed and built with quality, not economics in mind.

If the best components cost ten times more than the average ones, it doesn't matter — there will always be more than enough people who want the best and can afford to get it.

Indeed, the one characteristic that all the best quality goods share is that they are in short supply. Mass production produces the most, but it has never produced the best.

By universal consent, the Rolls-Royce of the amp world is the MESA/Boogie, a valve (tube) amp made by designer Randall Smith and his wife in a minute factory in the coastal mountains of California. But trying to actually buy one of these very expensive amps is like trying to buy beer-making kits in Jeddah.

Theoretically, they have been available for several years, but up until recently it was a case of flying over to California, or ordering one and waiting several months. MESA/Boogie amps were talked about but seldom heard, and although the situation has not improved to any great extent, it is now possible to buy them from Chappells in London, as well as a few other outlets.

Beware

But before you rush there with Access card in hand, beware. The top models will add four figures to your overdraft. Chappells were wary of quoting an exact price, but the £1,000-plus price tag is enough to make most people stay at home and dream.

Why, then, are they so sought after? And why are so few available?

The second question is the one with the easy answer. Each amp is made by Smith, tested by Smith, and shipped by Smith. As far as any box of electronics can be handmade, these are, and on a scare to ensure that "quality control" means what it says.

Smith has not arranged a distribution network in Britain or anywhere else because there would be little point, and he demands that each amp is paid for before shipping — not something to recommend it to British retailers or individuals, despite the money-back guarantee.

Ed Jones of Chappells finds them as much a problem as anything else.

"It would be much easier for me not to sell them at all. They're beautiful amps; probably the best in the world, but I get tired of telling everybody about the problems in getting hold of them. Most of the ones that we do get go to Europe, where they're about a third as expensive again."

The first question has a variety of answers. Boogie amps have become renowned for their combination of small size and high power, their versatility and sustain. One of the great masters of sustain, Carlos Santana, uses Boogie amps and has said that there is nothing like them on the market.

His musical partner and friend, John McLaughlin; has also said its the best guitar amp in the world giving almost indefinite sustain even at low volume levels. This is achieved, according to Randall Smith, through the use of a pre-amp circuit that uses more stages of amplification and tone-shaping than any other amp.

Volume controls between these stages determine the amount of signal strength and the tonal quality, and then pass them on to the next stage where they are amplified again. A guitar plugged into the first input, or the first stage, enables the player to achieve the sustain and overdrive that impressed McLaughlin.

The power of the amps can be a hazard, though, in inexperienced hands. With an amp that measures only 19½ x 10¼ x 10¼, 100 watts RMS is a surprising amount of power, and if a guitarist is pushing it to the limit, the output will be way over 200 watts, according to Randall Smith.

Apart

If this is done with just the one 12-inch speaker in the combo, it can easily blow it apart, so an optional extra is supplied that, at the flick of a switch, cuts out two of the output valves.

This leaves the 100 watts for very clean playing at a moderate volume level, or for playing loud with an extension speaker. It comes supplied with the 15-inch combo. (Various makes of speaker are available, including the standard ones made by Eminence, and special ones by Electro-Voice, JBL and Altec.)

To name all the players who use the amps would also take up pages — rock's top names probably constitute a large proportion of the people who have been able to afford Boogie amps — but Bob Dylan, Keith Richard, Pink Floyd, George Harrison, Bruce Springsteen, Pete Townshend and Supertramp make for fairly elevated company.

MARK KNOPFLER of DIRE STRAITS

TF: For instance?
MK: Well, we did a club tour on the first tour of the 'States when we already had a very successful album out there but we just decided to play smaller venues (although we'd done the bigger places in Europe) and it worked beautifully ... Yeah I think things *should* change. I'd never want to be predictable about anything.
TF: But surely, there has to be an element of duplication in performance because of the promotional side of the business ... Does that get to you?
MK: Repetition doesn't seem to get to us that much. It did to a certain extent in the 'States where we were playing two shows a night, but I find I play things differently almost every time — an audience feeling is different, a place is different — so the performance exists for *that* time and place to quite a large extent.
TF: So everytime there's something new...?
MK: Yeah, things that work in terms of your own and the audiences' appreciation might be incorporated into the act, become a stock thing, that's partly how the show develops. Conversely, there's a tacit thing where you drop either songs or methods of playing if they don't work. The same thing happens in rehearsal — there's always this process of adoption and rejection going on ... trying to play things better ... finding new things to give you a challenge.

For instance, if I were to sit down and play through the songs I might play them better technically than when I'm pushing them out on stage. But the point is pushing 'em out on stage is the way you feel you *want* to play, the way the audience *is*, therefore, you're not concerned with getting every note right.
TF: Yet a lot of the songs have a structure that parallels mainstream jazz; very tight arrangements with certain riffs "punctuating" certain words or ideas, as well as more open sections for improvisation.
MK: Mm...the bits that the lead guitar might play could be bits you can't say — so the guitar says them, but you also might incorporate that sort of thing because it amuses you: it's corny — it's cute!

But you're really at the mercy of the song. What you're trying to do is a good song, and if the guitar helps the picture, OK. The song dictates what you play, far more than your playing style. Like in the old crying blues where the slide "talked" or there's some modern song, I can't remember which, where the lyric actually stops and the guitar takes over — a sense of mutual aid in a way!

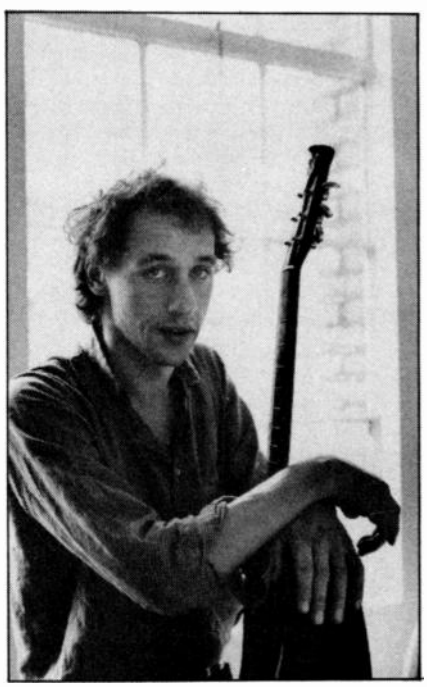
It seems to me there's very little point in having a solo for its own sake in a song, it should come in naturally in context.

And then the guitar is like another character. For instance, in "Sultans of Swing" I'm straight man to my own playing.
TF: Light years away from everyone taking breaks over the same chorus...
MK: Well *that* sort of thing is more of an exercise. I just don't have much time for a lot of technical playing. It doesn't move me. It leaves me really cold. You can admire it in the way you might admire ... well, it's too early in the morning for the right words! I don't really want to put anyone off I'm sure, but knowledge of augmented, demented, segmented and fragmented runs and chords can be a long way from *real* involvement, *real* mind and body involvement. I mean some of these rock-inspired guys, as you were saying, the notes get covered, but it doesn't mean a lot. For me, it comes back to using (or not using) all the little bits and pieces of guitar you've worked out or picked up but *in relation* to the song. For me, it's a song thing.
MK: It's different when there isn't a song — a story to tell — when it's entirely instrumental. But even then there are only a few players who stand out — people who play from the heart — exceptional soul players. Now that may or may not be allied to great technique. Django had incredible technique but he was also a great 'spiritual' player and you feel a natural sense of harmony listening to him. But equally, it might be somebody who only knows a handful of barred chords in a new band; or Pete Townshend — he's a very fine guitar player, but in his early days he might have had a more limited technique, but it didn't make any difference because it was all there in terms of feeling and commitment.

I've sat around hundreds of nights just playing — getting to the stage where you're so exhausted you're playing in a dream — you fall asleep over the guitar. It's a real love affair you know from the very beginning.

Maybe you do consciously try to learn certain licks in the early stages. You do try and get on top of something but for me it was never sitting down with the record player and turning it on/off—on/off... I never wanted to learn that way; maybe I never *had* to do that — it's strange. I think a lot of it came from (and again, I have to emphasise it's a personal thing) when I learned to play basic boogie piano, when I was about 11 maybe — and it was that real fascination, a real love affair with those three chords in a 12 bar blues: the awareness of the natural sense of the chords. It's interesting when you're teaching other people to play, they sometimes don't seem to have that natural feeling when the changes should come; or the sound of a 7th resolving a change. Same thing with transposing: hearing a C to D minor change and knowing that it's an A minor you want if you're putting the same sequence in G.
TF: Figuring it out for yourself — without any books....
MK: Yes, it was that kind of logical thing of playing the same thing in different keys — that was part of the delight of learning.
TF: Each key having its own character ... and possibilities...
MK: Yeah, and then eventually it develops, you move up the neck a little, and you start to say become aware of the playing possibilities related to different string tensions.

It's funny, to talk about learning the guitar. For me, it is hard to list 'my influences' because the whole thing is like a global jigsaw with a billion pieces and at the moment it's all in a big packing case! You can't make sense of that kind of thing — you can only hint at an overall picture.
TF:But there are lot of people right now who want to "unlock" your picking style. And I mean *your* style as opposed to that



MARK KNOPFLER of DIRE STRAITS

of another lead guitarist. But you're saying everyone's got to make their own way. Better three chord songs that really are yours, than 'Licks Off Records.'
MK: Yes.
TF: But perhaps you're lucky. Most musicians have to work analytically to some degree, but it seems intuitive, almost mystical, in your case.
MK: Mm — it was never analytic with me — always something I just heard.
TF: It does ensure that your music really is your own: but there are so many "chain" situations. A's copping B's riffs, B's copping C's and old D is busy breaking down the Albert Lee album one note at a time. On paper it does sound like theft, but in practice well...
MK: I know what you mean, but for me it's the ***way*** you bring a new chord you've worked out into your overall approach, the taste with which you apply your new discovery. Now, the discovery might be momentous — or it might just be a fragment. Improvement is so gradual you're hardly aware of it most of the time.
TF: But if you had time to be free from putting out "Lady Writer" or "Sultans" everynight and be in the (holiday) villa...
MK: — Oh I'd love that: I'd love to have more time to sit down and just play ... exactly — yeah! But sometimes you can't because of the pressures of what you're doing. But there'll always be other times coming up when you can.

My whole way of playing is full of limitations, OK I've got an individual style, a reasonable melodic sense of improvisation, a good touch, but at the same time being a natural player like I explained earlier I'm always incredibly aware of my technical limitations — lack of chordal knowledge — a whole stack of stuff I'd need to call myself a real player. I'm going to have to learn 'em. One of the great things about guitar is that you never stop learning.
TF: I find it interesting that you can get your own sound and style out of more or less ***any*** guitar — like that old £20 Japanese classical box.
MK: Well I've never been hung up about owning lots of guitars, or about what kind of guitar I'm currently using. At the same time I've got a real affection for nice guitars. You know, any player who loves guitars is going to get excited : I'm still excited by looking at good new guitars and playing 'em.
TF: The thrill isn't diminished by knowing you can now try anything and if it works OK — it's yours ...? I mean if they all got stolen one night it wouldn't kill you...
MK: No, it wouldn't kill me! I'd lose some nice instruments, but it wouldn't be an "End of the World" business.
TF: Are your main stage and recording guitars, the Strats, altered or customised, in any way?
MK: There's nothing special about them, I mean it's incredible to me how much some players seem to get into that. They seem to know all about the amps and all the strings and everything else. I envy that. But I have played on a wide variety of guitars, so that it's not as though the fretting has to be exactly this way or the strings have to have exactly these dimensions.
TF: You don't for instance see the Strats as lead voices and the Ovations as back-up guitars.
MK: Absolutely not.
TF: Just different sounds — but both linked to all aspects of your playing —
MK: Yep, there are a few things though — for instance, old Strats can be real pigs to play compared to a lot of modern electric guitars which are precision-built right down the line. They're heavy, have a good sound, and advanced pick-up design. I'm looking forward to getting into a lot of that stuff ... yet you do strike up a relationship with some guitars — like with a person — you love the thing or it's like preferring a car with a few bruises that you've broken in with you to a brand new Mercedes.
TF: But isn't the prevailing mythology with any wood guitar, be it Martin or Strat. That 'Old is Good?'
MK: No, I just do not accept that. I've been playing a Schecter specially-built Fender. It's got a new Fender neck; a custom-built Strat-style body with Schecter pick-ups and it's a delight to play. It belongs to my girlfriend and it's miles better to play than the guitars I use.

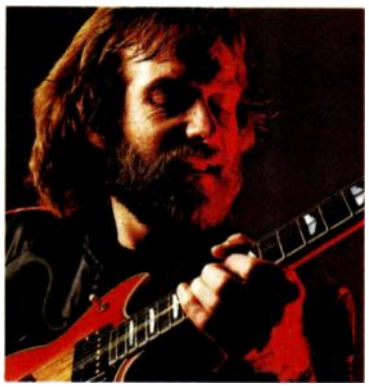
Now that we've stopped (touring) I'm going to see if I can get a guitar that plays better and sounds better. I played one of those Yamaha guitars one time and I was really impressed. It played so easy — so much sound in it. Why I haven't started playing guitars like that I really don't know! It's just an instinctive thing that, good as it is, that isn't the guitar you want. Maybe it *will* be ...
TF: So we use Charlie Kaman's bouncy guitars right!
MK: It's that combination of utility and attractiveness. It's like if you're a chess player and you want a set to play with. You don't just want a decorative set — it's got to be functional, ***but*** it's nice if it's heavy, you know, correctly weighted; it's nice if it's pleasing too because for a good chess player there's nothing like playing with a good set and nothing worse than playing with a bad one. So it's a combination of design and utility, but it's the *game* that's important. He's using the set to play the best way he can.
TF: Nice analogy, but wouldn't your chess player have such a chess set on his coffee table, I mean in between games...! Because surely most guitars can be seen as decorative as well?
MK:He might... going back to when I was a kid and used to eat up the catalogues I always wanted a red Strat and the first guitar I had was a Hofner V2, a Strat copy, and it ***had*** to be red! It's part of the Rock 'n' Roll dream: get to play the real one and make a little badge out of it! Our little logo — a bit of fun. It's dreams coming true, part of the fun of it!
TF: But does having one dream come true make it harder for others to come true?
MK: Well, a lot of people who don't get a chance to make their dreams come true stick to one dream!

It's a great thing, a very exciting and satisfying thing for you. Like when I was younger I thought, well, if I ever get to play with Dylan you know — I'd be ... the happiest dude!
TF: Tell us a bit about that.
MK: There was Pick on drums, Barry Beckett on keyboards, Tim Drummond on bass and I did guitars: I took three Ovations (Adamas 6 and 12 string and a Custom Legend), a National, a custom Tele (sunburst with white binding) and a red Strat.

I'd run through the songs with Bob in Los Angeles a couple of times and then Barry Becket came up with Jerry Wexler for one day before the recording and we did the whole thing fairly quickly in just a few days.

You see, the reality of playing that red Strat on the road is going to be different from the dream. And realising dreams is going to be different in every sense from expectations. But you are achieving it. It's so ... fortunate ... you do feel gladness about the whole thing.
TF: I remember you saying a long time ago. "There's no other guitarist I'd rather be". Now that could be really misinterpreted, but I know exactly what you mean.
MK: Yes.
TF: That's what it's all about — that says it all.

How serious are you about an electric guitar?



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Albums

Herbie Hancock & Chick Corea

Oscar Peterson

Dream Police

Herbie Hancock & Chick Corea

Herbie Hancock and Chick Corea
An Evening with Herbie Hancock and Chick Corea in Concert (CBS)

Arriving at one of the Herbie Hancock/Chick Corea concerts last year, was rather like going to church. A hushed, reverential audience sat apparently entranced by the two figures on stage facing each other across two concert grands. Yet, devoid of studio trappings, electronic instruments and distractions of other musicians, it was perhaps more evident than ever what extraordinary virtuosi these men are. Indeed, for once, the recording is even more useful to the student than attending the gig, because Herbie Hancock appears throughout on the left speaker and Corea on the right, so it's impossible to segregate their contributions.

What came across at the gig, confirmed here, is that Chick Corea displays more feel and lyricism than perhaps one expected, and was tidier and more purposeful in his solo passages. But, of course, this being a CBS release, one gets a lengthy Hancock solo outing, but unfortunately, not a corresponding Corea one.

Still, the duet interpretations are the crux of the matter, mixing structured themes to wander into more experimental areas. The starting off points range from Corea's "La Fiesta" through Gershwin's "Lisa" even to "Someday My Prince Will Come." The meanderings get a bit too much in places and the overall effect is rather flat, lacking in pacing and dynamics. Side Four is a lengthy 35 minutes, and the sound level is somewhat lower, though this doesn't detract too much. In conclusion, an important and worthwhile release, but one for the devotee rather than the half-hearted listener.

Stanley Shaw

Recorded at concerts in San Francisco, Los Angeles, San Diego and Ann Arbor, Feb 1977.

Oscar Peterson

Oscar Peterson
The London Concert (Pablo Live Deluxe Double).

In one respect, Oscar Peterson is a reviewer's nightmare. What can you possibly say about him that hasn't been said before? There are only so many superlatives. He is unquestionably the most complete and proficient exponent of jazz piano in terms of both technique and feel, and Pablo continues to release his work by the truck load.

It is typical of the man, that here we have two live double albums recorded just 16 days apart, in which two different line ups play two different programs (only "Sweet Georgia Brown" is duplicated) and both are of the highest quality. The London concert is augmented by Louis Belson and John Heard, while the Paris performance features Joe Pass and old faithful Neils Pedersen. It is probably the empathy with his regular bassist which ensures the greater cohesion of the Paris set, with fine performances from all three jazz giants.

Yet Belson's irresistible swing makes the London set equally enjoyable in a different sort of way, although one could do without the obligatory drum solo, which doesn't travel well from live performance to record. The London album is more accessible, featuring, for example, a medley of Ellington standards, a swinging "Satin Doll," and a delightful Peterson solo interpretation of "Aint Misbehavin."

However, the Paris concert is more musically satisfying and tends toward more reflective material, such as two Luis Bonfa sambas, Gershwin's "How Long" and Oscar and Joe Pass' own pieces. Indeed, the Paris set features as lyrical an Oscar Peterson as one has heard for some time.

The *Silent Partner* is Peterson's award winning film score with a rhythm section of John Heard and Grady Tate and a great line up of Benny Carter, Clark Terry, Zoot Sims and Milt Jackson. And yet, in truth, the net result is a trifle bland, although it might be unfair to criticize a soundtrack outside the context of the film. But if you have to choose between these albums, the live sets are undoubtedly worth the extra expense.

Stanley Shaw

All produced by Norman Ganz. Recorded by Basing St. Studios at the Royal Restival Hall, Oct 78. The Paris Concert (Pablo Live Deluxe Double) recorded at Salle pleyel, Paris, Oct 78. The Silent Partner — Original Film Score (Pabloe Today) recorded at RCA studios NY, March 79.

Dream Police

Dream Police (Epic)

"Delayed" by the unexpected dazzle of *Live At Budokan*, *Dream Police* succeeds not because it is a precision-tooled recording designed to reinforce the hysteria created by the live Japanese outing, but by highlighting the tension between Rick Nielsen's

genuine commitment to rock & roll lunacy and the "too smart" packaging of Cheap Trick which could turn this fine midwestern band into just another bunch of heavy-metal, comic strip bozos.

For all of the overdone album graphics and arch-paranoia embodied in Nielsen's lyrics, the "Dream Police" concept never gets off the ground. The song itself is excellent, once again showing how Nielsen can transform a standard chord progression by throwing in some rarely used changes (for hard rock); but the idea behind the song and album packaging seems to be tacked on as a commercial afterthought, ie. "Let's see what kinda crazy stuff they can come up with this time!"

Fortunately, Nielsen's inexhaustable supply of "Paperback Writer"-like guitar hooks and sneering lyrics focus our attention on the music. "The House is Rockin' (With Domestic Problems)" co-authored by Nielsen and bassist Tom Petersson is a perfect example of guitar-propelled mania bubbling under grim lyrical fragments (He said, she said it's bad for the children/He went and bought a gun") that harken back to Cheap Trick's earliest "sicko" material. Tunes like "Way of the World" and "Need Your Love" are already familiar, the latter comes off well in the studio but doesn't really enlarge on the *Budokan* version. *"I Know What I Want,"* sung with a certain panache by Petersson, celebrates the band's pragmatic approach to backstage sex while *Voices* shows that Nielsen can soften his musical approach without drowning in treacle.

Gonna Raise Hell is the most obvious miss and, clocking in at a hefty 9:18, the redundant musical/lyrical message grows old fast. The playing is excellent throughout — Zander has opened up his vocal style while keeping its intensity, Bun E. is bashing away better than ever, and the Nilsen and Petersson "Apocalyptic" guitar/bass montage is more awesome-sounding than ever. Tom Werman's production is spacious with Cheap Trick's raucous edge-iness preserved intact. A legit ⅞ of a step forward, but let's watch the cute stuff guys.

Jean-Charles Costa
Produced by Tom Wermen
Engineered by Gary Ladinsky

The Who

Quadrophenia (Original Motion Picture Soundtrack — Polydor)

"Mod-ism . . . an aphorism for clean living under difficult circumstances." *Peter Meaden.*

This cryptic line by a longtime associate of the Who identifies the raw thrust behind the "Mod Explosion" in Britain during the early-middle Sixties with more bite than Pete Townshend's ambitious exercise in nostalgic multi-media, *Quadrophenia.* Judging from the "older" material by the High Numbers, the early Who, Daltrey's Cross Section and their US influences, James Brown, Booker T. & The MG's, The Ronettes, Chiffons, Crystals and The Kingsmen on Sides Three and Four of this soundtrack album, the capacity to be *tough and succinct* was a key aspect of the mod's musical approach.

Townshend, who knows this better than anybody, still let the unshakeable need to capture the Mod "state-of-mind" on paper (as filtered through late Sixties chemical changes and Meher Baba) get the better of him. *Quadrophenia* has undeniable traces of brilliance — "The Real Me" "Love Reign O'Er Me" — but ultimately rolls over under the weight of its own "cosmic" scope. Mod, a stylistic rebellion which implicitly rejected the notion that you had to be a greasy, leather-clad boor to be an outcast from society's mainstream, might have been better served by the gritty, black and white treatment accorded to period British films like "Saturday Night & Sunday Morning." The ruthless specificity that characterized Mod — if you wore the wrong kind of tie you could get your ass kicked — is blunted by Townshend's desire to get everything into this "definitive" look at the movement that spawned the Who. The music was always enough. All of Jimmy's anger, frustration and suppressed fear as the young mod protagonist can be heard in Daltrey's reading of "My Generation."

But the Who have made enough transcendant rock & roll music to easily establish them as THE British band for our times. This well-intentioned and intermittently successful bit of retro-statement stands as another postscript to a stunning career which can hardly be topped.

Jean Charles Costa
Produced by The Who
Recording and Remix Engineer Cy Langston

The Who

Building a Solid Guitar

Part 10
Fitting The Controls

BY STEPHEN DELFT

Before cutting any more holes in the body, decide what controls you are going to use. If you want to use conventional molded guitar knobs, you will need to use potentiometers with splined shafts. There are at least two patterns of spline in use and they are not interchangeable. It may be simplest if you use Japanese pots and Japanese plastic knobs.

If you don't want to use Japanese components, I suggest you order replacement volume controls, tone controls and knobs from one of the pickups and brassbit companies. If you have pots and/or knobs already, take what you have with you when you buy the other bits you need. Before you buy anything, ensure that all four knobs fit all four potentiometers. You will require "10 per-cent log," or "Audio" pots. This is the type which is normally sold in radio component shops for use as a volume control, but radio-type pots usually have plain shafts, and/or mounting bushes with insufficient thread to go through the front of the guitar. The plain shafts will fit some of the accessory brass guitar knobs, but pots with short mounting bushes are not suitable for this project. Even some of the replacement parts for guitars have short bushes and these are not suitable, either. To use such pots, you would have to make the front of the guitar thinner, or cut recesses in the front for the fixing nuts. Either of these may weaken the guitar front: if you want to screw up your work in this way do not expect any further help from me. Other ways of mounting such pots on this kind of guitar are either unsatisfactory, or too complicated for this article.

Potentiometers

You will need Log Potentiometers with a resistance of 470 k Ohms, 500 k Ohms, or ½ M Ohms. (These are different ways of describing the same component.) As some replacement tone controls for Japanese guitars have unsatisfactory characteristics, I suggest you use volume control spares for volume, *and* for tone controls. One suitable Japanese potentiometer is marked 504042, and should be available to order, from dealers of Antoria, or perhaps Ibanez guitars. You may be able to buy, or order, suitable knobs from the same source. Don't be tempted to buy "Genuine Gibson knobs"—they are perfectly good knobs, but they probably won't fit the Japanese spindles.

The recommended selector switch for this project is the standard "Right-angle" selector switch, used in several Guild and Gibson guitars which have a control layout and mounting similar to this project. The Gibson switch used in standard Les Paul models is not suitable: you need the right-angle version.

Jack sockets come in a variety of forms. The skeleton type, made from bits of metal and plastic washers, refitted to a threaded metal bush, is not the most reliable, but it *is* easily available, and easy to fit, as long as you ensure it has enough thread. (See above notes on potentiometers.)

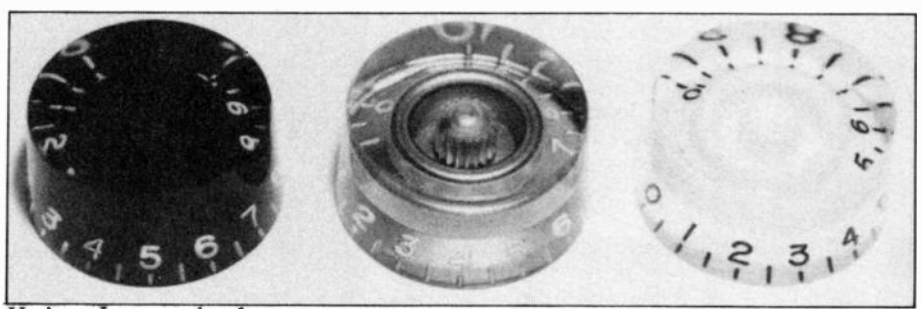
Before you start drilling holes in the body for controls, it might be useful to discuss some possible wiring arrangements. This could easily occupy 10 or 20 pages, so I must restrict myself to the more common arrangements. To help those who cannot read electronic symbols, I have used a series of pictorial diagrams. Diagrams A, B and C refer to the selection circuit, the tone and volume circuit, and the output jack connections. These circuit groups can be inter-connected in a variety of ways to give different control arrangements.

The first suggested control system is quite simple and uses two pickups, a selector switch, one tone control and one volume control. This requires one of each type of circuit section, in the order: Pickups to A/A to B/B to C.

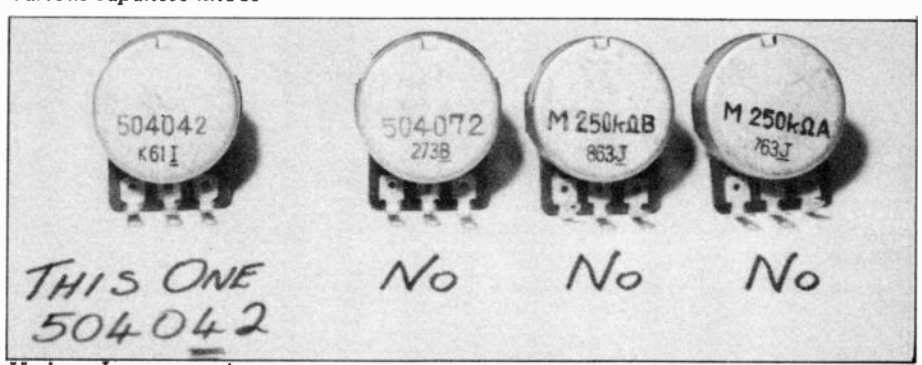
I have distorted the shape of the switch in the illustration, to show the wiring more clearly. In the real switch, the chassis connection appears *between* the other two pairs of tags. Soldering is easier if the outer tags are gently bent apart, as shown. You will notice that most of the wiring uses screened cable with an insulated wire, inside an insulated woven wire tube. This outer "braid" or screen also acts as part of the circuit wiring. If you are willing to screen the whole of the control cavity with foil, as described in an earlier article, you can use any ordinary insulated wire for all connections inside the cavity. The connections to the pickups will still need to be made with screened cable, but the rest of the wiring will be much easier. The advantages of screening the whole cavity instead of the individual wires become greater, as your control circuit becomes more complex. (Of course, if you intend to fit any electronic gadgets inside the guitar, you will probably need *both* forms of screening.)

Capacitors

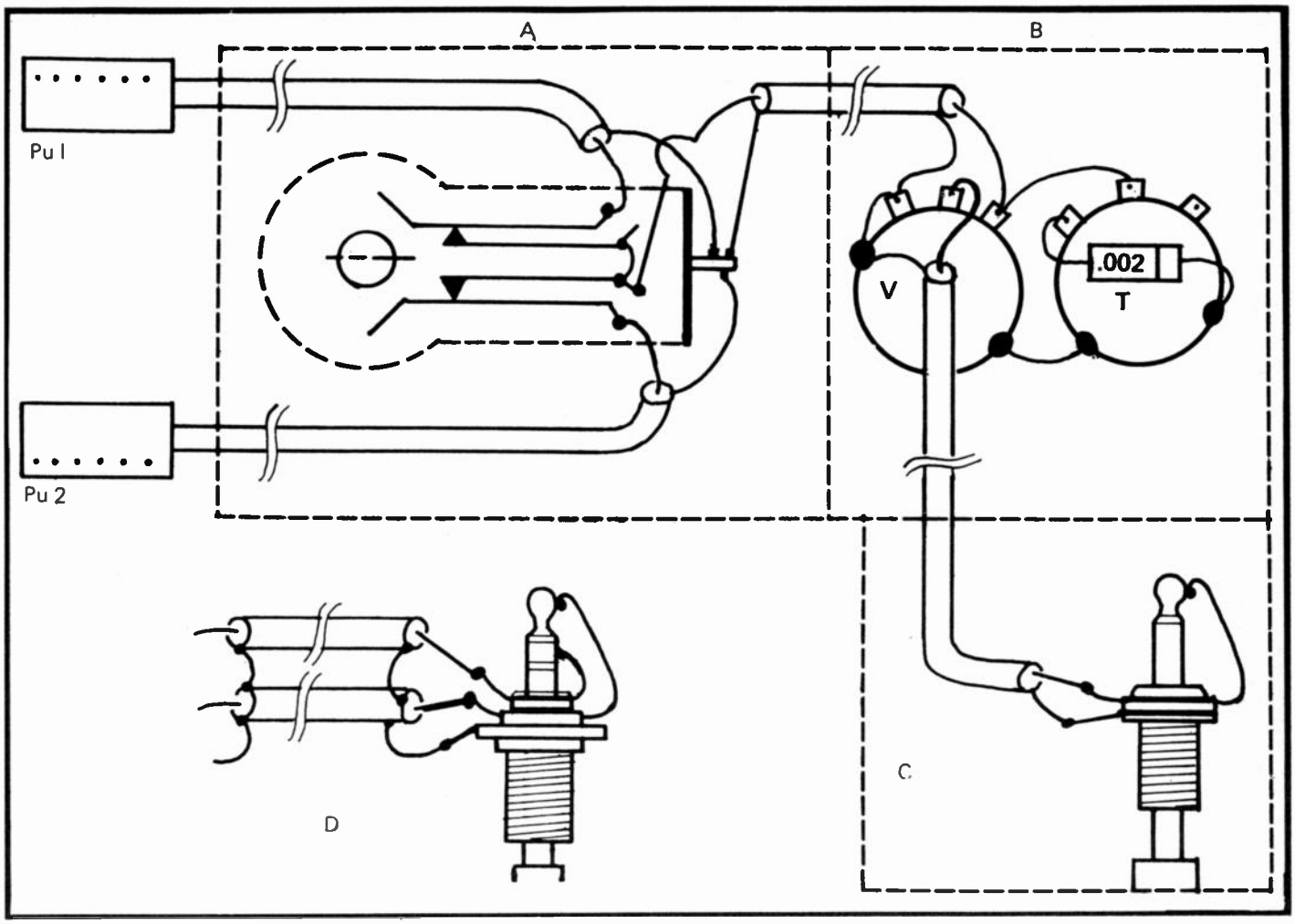
The capacitor marked .002 should be



Various Japanese knobs



Various Japanese pots



within 20 percent of .002 Microfarads, but otherwise can be virtually any type which will fit in the space available. In general, cylinder-shaped capacitors will take more rough handling than the rectangular ones with both wires on one edge. If you do *not* intend to screen the whole cavity with foil, you should try to obtain capacitors which have a band around one end to indicate connection to the outer foil. The "outer" end of the capacitor should be connected as shown in Diagram B. If you use a foil lining in the guitar, the cap, can go in either way round.

If you are unable to solder fine wires in a confined space, get some skilled help with wiring the guitar. It only requires one hair-thin strand of wire in the wrong place to silence an electric guitar in the middle of a gig, and if you have been telling everyone that your own guitar is "better than all that mass-produced rubbish," a sudden breakdown could be even more embarrassing than it is normally. Don't worry about finding help immediately: you won't actually need to do any wiring until you have made some more holes in the guitar body. However, you *do* need to decide which circuit you intend to use, how much space the components will need, and where you want the controls on the front of the guitar.

A more complex circuit, which corresponds to the usual arrangements of two volume controls and two tone controls, can be made up from two B sections, one A section and one C section. Each pickup goes to a B section; the outputs of these go to the selector switch A section, and the output from the switch goes to the jack socket.

The so-called "Stereo" wiring requires a slight modification to the above circuit. Use an "A-Gauge Stereo jack socket" as sold to fit stereo headphone plugs. Connect a pair of screened cables as shown in Diagram D. Connect the other ends to the selector switch as in Diagram A, but remove the link between the middle switch tags and connect one of the pair of inner wires to each of the tags.

If you intend to fit a phase-change switch, leave it till later, but allow for a 5 mm hole in the front panel and the same removal of wood from the back of the guitar that you would allow for another potentiometer. It is worth spending some time on deciding the exact positions of the controls on the guitar body. Keep in mind the dotted line on the body plan which allows the limit on how near the control cavity can come toward the bridge mountings.

Drilling

Whichever way you drill the holes for the control mountings, the drill will have to come through somewhere, with the risk of damage to the surrounding surface. I find the following sequence of operations useful, as it gives clean holes front and back, and is quicker and safer than using a portable router on such a deep hole. If you have a router, it will be useful for finishing off the bottom of the control cavity and later for the shallow recess of the back plate, but it is by no means essential.

Decide which controls you want, and where you want them. If in doubt, use the positions marked on the body plan. With a pair of dividers, scratch neat circles on the front, the same size as the required holes. At the centers of these circles, drill right through the body with a drill bit between 1.5 and 2 mm. This makes a pilot hole for the mounting hole at the front, and for the clearance hole at the back. Turn the body over and drill approx. 1¼ inch holes through the body centered on each of these pilot holes, until 6 to 7 mm of undamaged wood remains at the front of the guitar.

I clamp the body to the table of my drilling machine and use a Flat-bit, together with the depth stop of the machine. I do *NOT* recommend a hand-held

electric drill. You could use a 1¼ Forstner bit in a carpenter's brace, or the cheaper alternative of a 1¼ inch standard wood-boring bit, to about 10 mm from the front, followed by a Flat-bit in the same carpenter's brace, to scrape the bottom of the hole down to the right depth. Turn the body over again, clear the shavings from the bench, and drill out the holes in the front to size. If necessary, drill under-size and file out to the scratched circles. The size of the hole for the switch is quite critical. Look carefully at the half-recessed fixing nut.

Most commercial guitars of this type have a big hole under the cover plate at the back. In fact, you need only enough space to fit the components and wire them up comfortably. Place the body face-down on a clean bit of bench. With a mallet and a sharp chisel remove enough wood from between the large holes to make this possible. Some smaller holes drilled into the waste will help break it up. Except for the area around the switch chassis it is not necessary to cut *quite* as deep as the bottom of the 1¼ inch holes. Try the electrical bits for a fit and then remove them. If the main holes are not quite deep enough, SCRAPE them deeper with a sharp chisel and/or a Flat-bit in a carpenter's brace. Particularly, *never* try to re-start a Flat-bit in a hole which has in any way been modified, except very slowly, *in a carpenter's brace.*

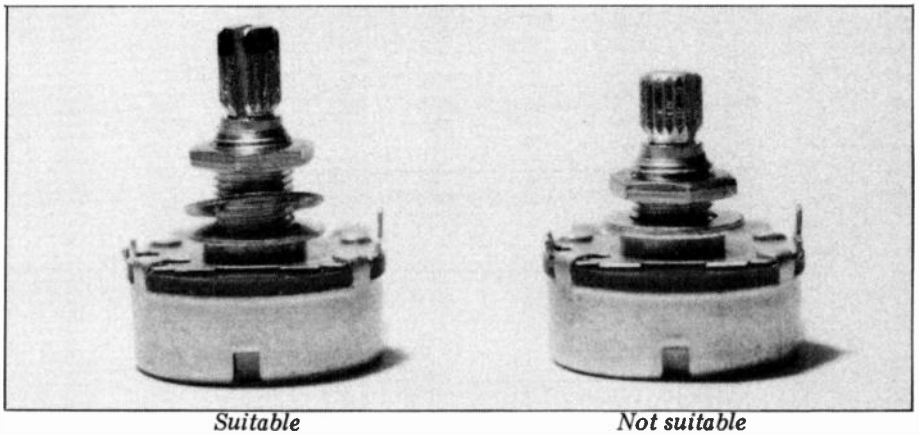
The body plan shows two wiring channels through the body. These are made with a "spearhead" drill beaten out of a bit of silver steel rod. This is not difficult to make. With normal safety precautions, heat the end of the rod to a bright red head and squash it a bit with a hammer on an improvised anvil. As it cools down, tap it a bit on one side or the other, until the flattened end is symmetrical and in line with the rest of the rod. It only needs to be about 8 or 9 mm across the wide end. Now let the rod cool slowly until it is safe to handle, and file the flattened end into a need wedge shape whose cross-section starts circular and ends at a rectangular edge 8 mm by 1.5 mm. File two flats on the cutting end of the drill to make a point including an angle of 90 to 100 degrees and put a bevel on each of these flats so that it will cut like a primitive drill when rotated in the usual direction.

Heat the last few inches of the drill until bright red and cool quickly in a bucket of water. Clean the metal bright with Emery, or Wet and Dry paper and heat again behind the edge, watching the color changes. When the whole end of the drill is between purple and dark straw quench it in water again. Try the drill against a sharp file. The metal should be difficult to cut, but there should be no place which is too hard for the file. You will easily recognize such areas, from the strange "glassy" sound the file makes as it slides over the hard surface.

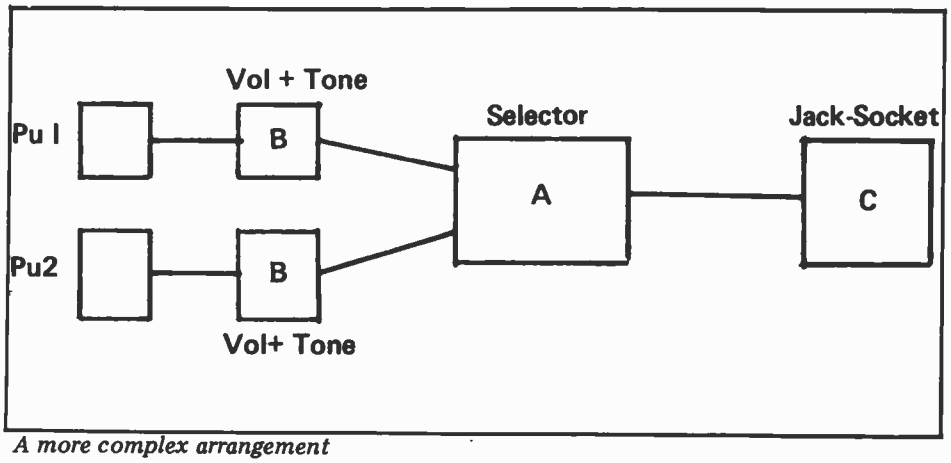
If you have any over-hard patches, your drill could snap inside the guitar, so repeat the entire hardening and tempering process and try again. If you don't fancy your chances as a blacksmith, a general engineer could make a drill accurate enough for your purposes in about 10 minutes. Equally, with a big enough hammer and rather more work with a file, you could probably make a drill tough enough for one or two holes without any heat.

Instructions for drilling the wiring tunnels are on the body plan. Tunnel A should start roughly in the middle of the body thickness and aim to pass just below the bottoms of both pickups recesses. Before you start the tunnel, drill a hole in the floor of each pickup recess approximately 15 mm dia. by 15 mm deep and aim the tunnel so as to link these two holes. If you put a bit of tape on the long drill as a depth stop, you will know if you have missed the second hole. This is not likely to happen, but if it does, follow the line of the long drill with your eye, both sideways and through the depth of the body, and extend the 15 mm hole to meet the tunnel. It is not likely to be far away!

You can start Tunnel B just below the bottom of the bridge pickup recess, by drilling another 15 mm hole, about 3 or 4 mm deep at the side of the recess. Such a crude drill may tend to 'walk' up the side of the pickup recess as you start the hole and the shallow starting hole will give you a safety margin. Tunnel B should be



Suitable *Not suitable*



A more complex arrangement

aimed to come out about halfway through the depth of the control cavity.

You can use a slow-speed electric drill after the tunnels are started. Do not force the drill, and withdraw it every 10 or 15 mm to clear the compacted shavings. Rub the drill frequently with a bar of soap. If it does jam in the hole, you are probably not clearing the shavings often enough. File a small flat on the shaft and attach an engineers' Tap Handle. If you can't twist the drill out with this, try a Locking Wrench. Now you understand why the drill must not be brittle!

When the holes are drilled, poke the remaining shavings out with a piece of stiff wire. If necessary run the drill through again until you can see light through the holes. Check that a piece of screened cable will pass through the holes and enlarge the mouth of the Tunnel B as shown on the plan. If necessary, enlarge the back cavity so that the pickup wires do not interfere with the selector switch when fitted in place.

Now it is time the body was sanded and the neck fitted. Then it will start to look like a guitar! Sand the neck and body, taking care not to narrow or round over the joint edges and ends.

Start with medium sandpaper on a cork block and work down to fine paper. Don't use sandpaper without a block: if you do, you will pay for it when you start rubbing down coats of lacquer. If you don't have blocks to fit the shaped parts, make them! Cork blocks are cheap and easy to shape with a rasp and coarse sandpaper.

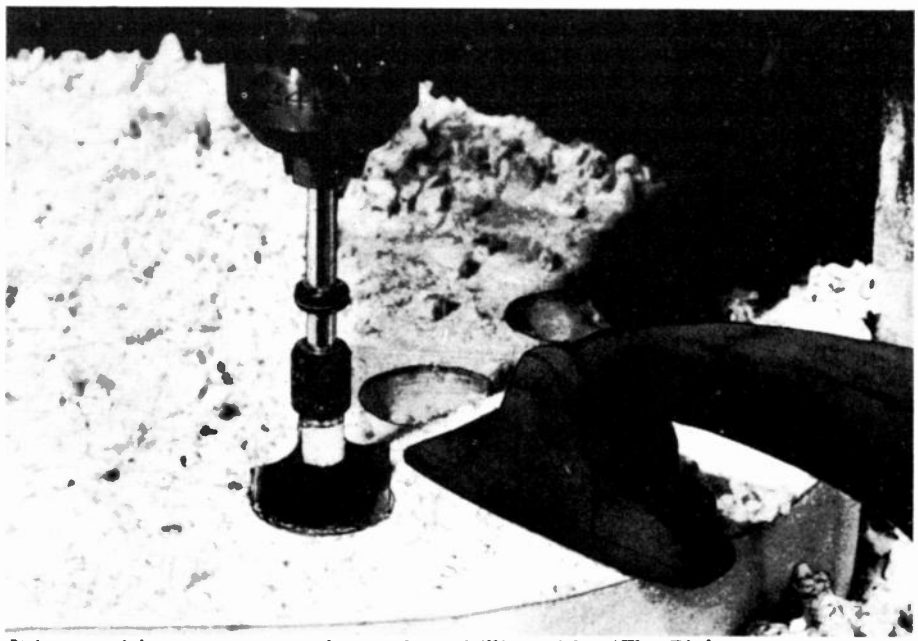
Sanding

If you want the corners of the body rounded over, this is the time to do it. You should leave sharp edges on the front of the body where the fingerboard fits over it. Let the rounding of the corner develop slowly from just beyond the end of the fingerboard. You can always trim off a little more when the neck is glued in place. At this stage the body part of the neck-joint should still be just a shade wider than indicated on the plan. This surplus should also remain until later when the neck has been glued on. In any case, round over the end of the body at the back, where it joins the neck. (See plan.) Small curved sections, such as slightly rounded body edges, can be sanded smooth with several sheets of paper over your fingers. This is for *smoothing* curved bits only—not for shaping them. Without backing, use one grade finer paper than you would use, at that stage, with a block. For instance, if you are using medium paper on a block, and you have to do some part with sandpaper over your fingers, use fine paper for this. Unsupported abrasive paper cuts faster, but leaves an uneven surface with deep scratches—hence the finer paper. Even a piece of thick hide leather or very hard felt makes a better flexible backing than fingers.

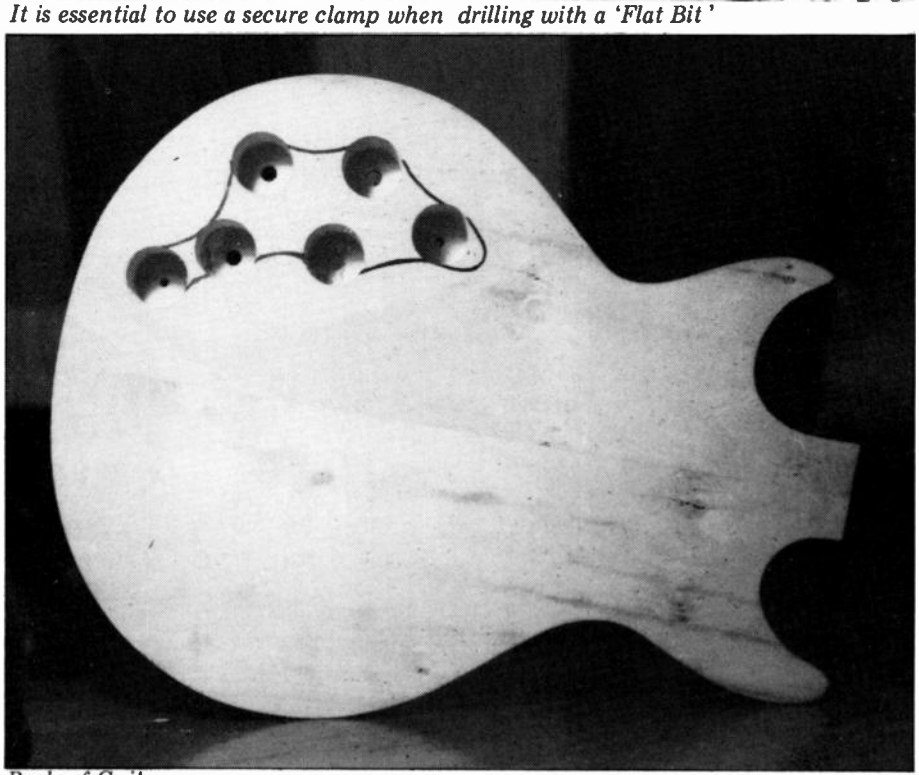
If sanding with a backing block leaves some patches of the surface un-touched, then you have dents in the surface and you will have to keep sanding until you have cut down the high spots level with the dents. If this is slow, you can use *coarse* paper first on large flat surfaces, but not on curves or edges. If you do you will never get the scratches out without re-shaping the guitar.

When you are happy with the finish on the body from medium paper assemble the neck and body without glue and clamp in place. If you have shims in the neck joint, I shouldn't go advertising the fact, but at least make sure you have them in the right way round! Using some scraps of body wood, cut two wedges which will just slip into the gaps under the end of the fingerboard. When pushed fully into place they should project between ½ and 1 mm beyond the sides and end of the fingerboard. Mark which side they fit and which way round.

There, that should keep you busy until next month!



It is essential to use a secure clamp when drilling with a 'Flat Bit'



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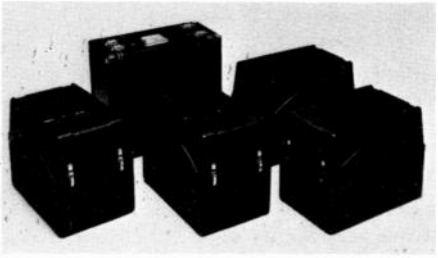

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Fender Studio Bass Combo $1545

The Fender Studio Bass amplifier is the successor to the Fender Bas 300PS amp. CBS claims that until now a bass player had to use two amps — one for studio and one for stage work because high quality "studio" amps couldn't meet the power requirements for stage work. So, the Fender Studio Bass is designed for studios and stage. It is rated at 440 watts "peak music power". Both the Studio bass and the 300PS are 100 percent valve design and belong to the same power bracket. However, a few changes have been made on this model — mos significantly, the combo configuration of this amp. Very convenient on one hand but a little heavy at about 50lbs.

Electronically, both amps are similar although there are a few changes — for example, in the output stages, the popular Fender 6550 output valves are replaced by six large 6L6 GC penthodes, while the driver and pre-amplifier use one 12AU7A and three 7025 valves respectively. Another attraction of this amp is the five-band EQ network. The center frequencies are chosen specifically for bass, i.e. 185Hz, 1000Hz, 390Hz, 190Hz and 80Hz. The whole EQ seciton can be cut in or out with the EQL footswitch.

On the rotary tone control side, we have Treble, Middle, Bass and Presence and while the Presence control did its job, we found that the Middle and Bass controls were OK when the Treble control was set below halfway, but as soon as the Treble was turned toward maximum, it tended to override the Bass and Middle controls. This can be compensated for by the EQ section to some extent, but it's certainly something to check.

There are two inputs practically the smae sensitivity, eac with its own volume control. Further there is a Master Volume, marked "Output," and by preseting it with the input volume you can get a nice clean "Fender" sou.d or a raunchy overdriven distortion. The front panel also houses the on/off standby switches and a large red indicator light.

On the rear panel, ther are ¼" jacks for speakers and Line/Recording outputs and an output tube matching (pre-set) potentiometer, which you wouldn't need to use unless you replace any of the output tubes. Next, there's the EQ footswitch socket and a hum balance pre-set pot which controls all 11 valvess in order to minimize noise. This pot may need adjustment form time to time — certainly after valve replacement. Quite simple really: just set all tone controls at a flat position, set output at approximately 5 and volume at 8. Then, by turnig right or left of center, you should observe a significant reduction of hum. This, of course, like the output matching pot, is screw-driver-adjustable.

The cabinet houses a 15" heavy duty (20lb.) Electrovoice driver with an 88oz. magnet. The enclosure itself is of ¾" plywood and the speaker is mounted from the front by eight Philips swrews and washers. Black, acoustically transparent Fender grill cloth covers most of the fornt of the amplifier, including the bass reflex section above the speaker. The rest of the cabinet is covered with heavy-duty black vinyl protected with metal corners and is fitted with removable castors. Because this combo is fairly tall and *very* heavy, I don't see any real use for the single, flush-mounted carrying handle on the top of the unit. A combo of this size really should have two recessed side grips if you're going to attempt to lift it.

The electronics are certainly worth mentioning: a proessional series of components, sensible layout and, especially, decent soldering work.

As for tghe specifications, the Studio Bass certainly does what it should do ad what we expect it to. The power measurements at the onset of clipping into 4 ohms gave an excess of 205 watts RMS, which iss slightly better than the manufacture's figures (see table).

Conclusion

I think it is well worth the price since it also comes with a five-band. The Studio Bass has an EQ footswitch as standard but the vinyl cover is optional. I think it should have been included in the price. We did not receive any kind of operator's

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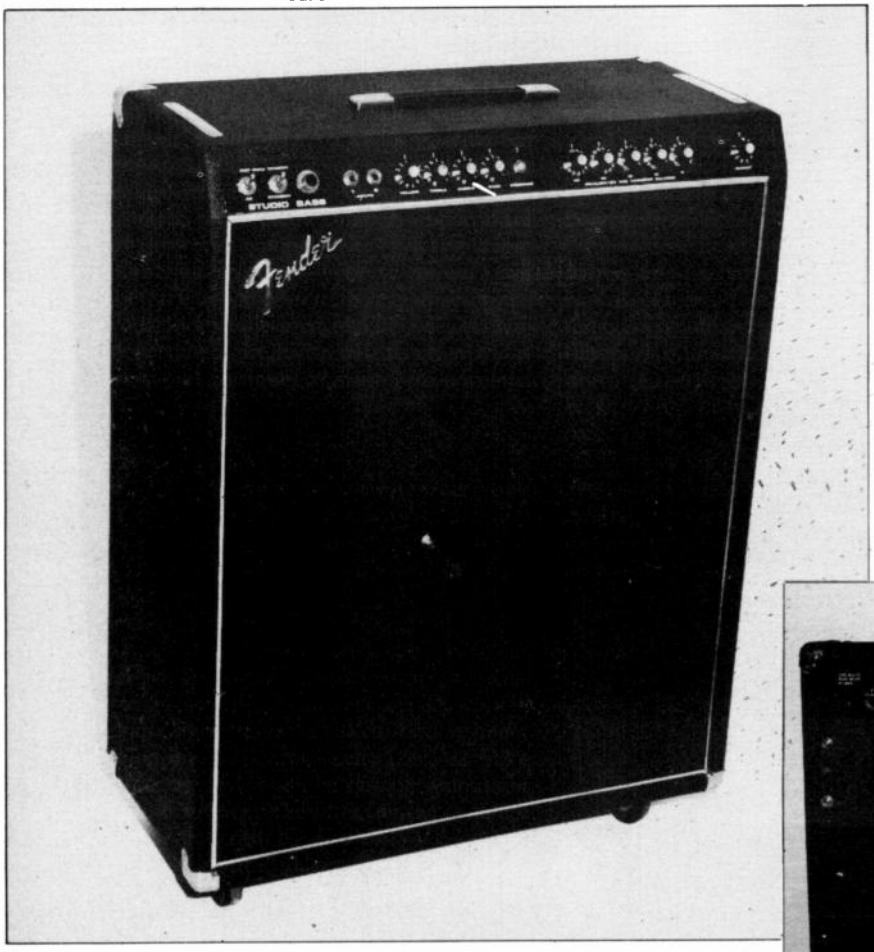
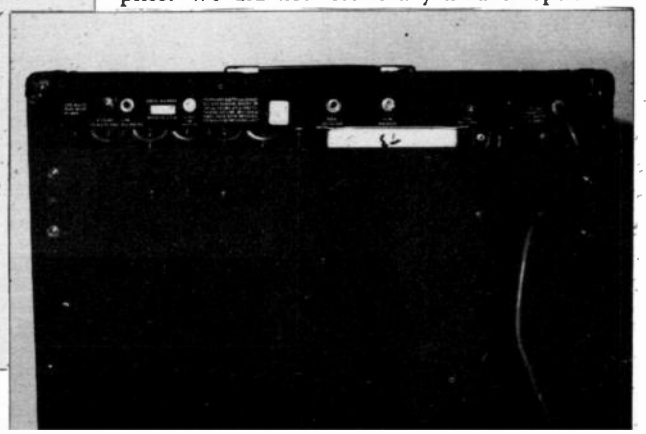




manual, schematics, etc. this time, but I'm sure CBS is providing the ful works to purchasers.

As far as te sound is concerned, a Fender bass amp is a Fender bass amp in the same way as a Fender is a Fender. The Studio Bass has the same deep, warm, rich sound that I used to associate with the Bassman. The best thing about it is the EQ section, which means that it really can fairly be described as a studio amp in that a very wide range of tones can be easily obtained. I was disappointed with the Middle and Bass rotar tone controls as they seemed to work against each other and the Treble control. This could be a fault in this particular sample — I really hope it's a one-off fault. On the other hand, if it's by design, I don't really get the point.

Mark Sawicki

Dr. Mark A. Sawicki MSc(Eng.), Phd, is a consultant in electronics who also designs and builds all kinds of electronic equipment.

PARAMETER	*RESULT*	*TEST CONDITIONS*	*COMMENTS*
Specific power output, Ref. 1KHz	205.92W RMS 161.10W RMS 148.84W RMS	Onset of clipping into 4 ohms Onset of clipping into 8 ohms Onset of clipping into 16 ohms	Manufacturer claims: 200 Watts RMS output power, 440 Watts "peak music power". The power amp stage uses six 6L6GG power penthodes, specially designed for Fender amps.
Total harmonic distortions (THD) Ref. 1KHz	3.21% 3.45% 3.40% 3.28% 3.19% 3.02% 3.01%	@ 200W RMS @ 150W RMS @ 100W RMS @ 50W RMS @ 30W RMS @ 10W RMS @ 1W RMS } into 4 ohms and 1KHz measured in channel No. 1	The THD levels are quite "equal" across the whole power range (1-200 Watts), and reasonable for a valve amplifier. Mainly second harmonic. The pre-amplifier/driver stage uses three 7025 and one 12AU7A valves.
Input sensitivity for 200W RMS (28.28V RMS) output signal. Ref. 1KHZ	38.52mV RMS 41.10mV RMS	Input No. 1 } Tone controls flat, Input No. 2 } EQ flat, "Output" at 9	Slightly on the "low" side. The input sensitivity largely depends on the settings of the tone control potentiometer. Will suit most basses.
Tone controls (swing in dB)	38.21dB 9.85dB 26.70dB 14.58dB	Treble @ 6KHz; M, B, P flat Middle @ 700Hz; T, B, P flat Bass @ 50Hz; T, M, P flat Presence @ 3KHz; T, M, B flat	Both Treble and Bass controls are quite efficient. Middle control accentuates tone of the middle register and Presence control the level of higher harmonics of fundamental bass tone frequencies.
Equalisation and harmonic balance (swing in dB)	37.85dB 43.12dB 27.33dB 35.71dB 18.61dB	Band No. 1 @ 1850Hz Band No. 2 @ 1000Hz Band No. 3 @ 390Hz Band No. 4 @ 190Hz Band No. 5 @ 80Hz } Tone controls flat	Nice and symmetrical. EQ circuit with its range (80-1850Hz) is specifically designed for bass instrument applications.
Signal/noise ratio	Better than 68dB	Treble/Middle/Bass/Presence flat, equalisation and harmonic balance flat	Quite good (for valve amp) but could be better. This figure consists mainly of hum noise and probably comes from the power supply section. Hum balance control potentiometer (pre-set) provided at the rear panel.
Capacitance load test	OK	2μF non-electrolytic capacitor and 4 ohms dummy load	Capacitive loading did not show any wrong tendency to instability when tested with 1KHz and 10KHz square wave signals, however speakers load above 8 ohms is not recommended.
Open circuit stability test	OK	Dummy load removed, tone controls/ EQ max., Volume/"Output" max.	Acceptable.
Short circuit test	25 seconds	—	No ill effects. Worked when short was removed (25 secs. only). Should a fuse blow there is no spare.

Drumcheck

Ludwig Sound-Projector II

PRICE UNAVAILABLE

This month's test set from Ludwig is a little unusual inasmuch as I can't find it anywhere in the Percussion 80 catalog. I can find the individual components but not the actual set (at least not in the same material). Really, it's a Sound Projector II outfit number 2102 but made from six ply, wood shells and features Ludwig's extra-long, open-ended power toms and their power bass drum.

The actual sizes are 10 × 9, 12 × 11, 13 × 12, 14 × 13 with a 16 × 16 floor tom, 22 × 16 bass drum and, of course, the inimitable 6½-inch deep Supraphonic 402 snare drum. Additionally, the set has completely Hercules stands, two boom cymbal stands, two concert tom tom stands, hi-hat and snare drum stands and as-per-usual, Ludwig's trusty "Speed King" foot-pedal.

The reason it's called a "Sound Projector" I hope will be obvious from the accompanying photograph. Fitted beneath each of the open ended drums are plastic scoops (projectors) which do just that. They direct the sound in a forward direction to give better audibility. Let me explain.

With an ordinary double-headed tom tom, the two heads and the shell work together in a sympathetic way — first of all to produce a round sound, i.e. clear, and secondly to *spread* that sound. The latter function is taken care of by the shell. Drums without shells (Roto-toms) do not have this facility for sideways spread and the sound simply goes up and down. This is why most knowledgeable drummers who use Roto-toms *without* reflectors play them at what often seems to be a painfully acute angle in order to stand some chance of directing their sound toward the audience. So, Remo invented his reflectors, half-shell and full-shell with the intention of directing the sound at the audience without necessitating play at an uncomfortable angle.

The sound projector is actually a lightweight scoop about 3/16-inch thick made from high impact ABS. It's actually a half parabola (you *could* say like an inverted Hollywood bowl), a demi-hemisphere which has all its curves equal to the radius of the drum it is to be fitted to. ($r = 5$ on the 10-inch drum.) Anyway, enough of the physics lesson. The inside of the scoop is completely smooth, presumably to enable the sound to flow, and the outside has a sort of leather-grained feel to it. I tested the projectors both from the playing position and from the audience position and, as with North drums, it's very difficult to hear any real difference from the playing position — on removing the projectors (a very simple step since all the projectors are held on with Velcro) one can hear a slight change from behind but nothing really significant. However, from the front the difference is particularly marked, the drum becomes more audible. I'm not convinced that the scoops make the drum louder as Ludwig claims they do. I would say that the sound becomes better directed, therefore clearer, and more audible — which possibly *seems* to amount to increased volume. Ludwig also says that the projector offers pronounced definition of the fundamental notes. I found this difficult to appreciate until I simulated fitting the unit to the snare drum. (I can't understand why Ludwig doesn't do this — they could attach it via the snare head tension screws.) I then began to notice a *real* difference in the sound as it was directed forward. But, without instruments to measure this difference I couldn't tell exactly what was happening, except there seemed to be more bass fundamentals becoming audible. I'd be interested to see what the scoop could do for a *narrower* snare drum!

Bass Drum

This is the first Ludwig power bass drum I've played, although I've seen them at a couple of trade shows. The power basses are all six-ply and built with solid rock-maple counterhoops. The difference is in the extra depth shells though — 16 instead of 14 inches deep. This gives, as Ludwig claims, extra punch since it results in approximately 13 percent more drum.

The drum has the usual 20 "classic" nut-boxes with pressed steel, double claw-hooks and the usual cast handled, curved "T" shaped, timpani type tension screws. The drum also boasts not one but *two* pairs of the latest ½-inch, square-stock, forward-pitched, heavy-duty, fixed-radius curved spurs locked solidly into position with Ludwig's big plastic "hand-sized" knobs with angled, sure-grip rubber feet. The drum comes as usual with felt strip damper(s).

The sound of the drum is very fine, its got "balls" and plenty of definition. I preferred it without the front head on since this is far more the sound I'm into these days. Double-headed it sounds pretty good but for me it is somehow passé. But there are lots of musical styles it would suit double-headed, although I don't see that anyone would need the extra depth of the "power bass" for this.

Tom Toms

This Sound Projector II outfit has five tom toms,all open ended, *including* the floor standing one. As I said the "power toms" are all an inch deeper than normal. 12 × 8 becomes 12 × 9 etc. etc. The 10 and 12-inch drums are mounted together on the hi-hat side of the bass drum and the other two on the right. All the mounted toms have more nut-boxes per head than normal — the 10 has six, 12 has eight so has the 13, and the 14 has 10. These extra tensioning positions make for much more even tuning. Well done Ludwig! The 16-inch floor drum has the normal eight casings. Every drum with the exception of the snare had Ludwig's own "Silver-Dot", see through plastic heads which I like. Strangely enough, none of the mounted toms have internal, under-batter-head operating dampers. This omission I'm in two minds about. The 16-inch drum has the damper and benefits from it, and since the Ludwig P-4066-2 Internal tone control doesn't rattle in the "off" position (unlike most other manufacturer's mufflers) I would have thought it not too costly to fit them anyway. All the mounted toms have a female clip attachment to connect to the up-dated Sturdi Lok concert tom holder stand, bolted to their shells — more of this later. All the mounted tom toms have a good bright sound which their extra depth shells help to round out a little. The floor tom is actually an ordinary 6-ply classic tom tom but with only *eight* nut boxes. (On reflection the bottom edge of the tom is not *meant* to be a head bearing edge and so is not

machined like one. So there is slight difference.)

Snare Drum

As I said, the snare drum with this outfit is the renowned Supraphonic 402. In my last Ludwig review I talked glowingly about the other Supraphonic — the 400. Well, this snare drum is exactly the same as the 400 except for an extra one and a half inches in the shell depth.

The 402 has a beautifully made one-piece seamless shell whose edges are flanged at 45 degrees into the drum. This is kown as an *inverse flange*. There's a strengthening bead in the shell center which is a concave indentation around the circumference. This serves to stop the shell from "buckling" out of line. Ludwig's tasteful Imperial double-ended, nut boxes, of which the 402 uses 10, seem to be the same now as they were on the 1932 Ludwig and Ludwig I bought in New York many moons ago. The drum has pressed steel, triple-flange hoops which go a long way to giving the drum its bright, cutting sound. (I once replaced the hoops on a 400 with a pair of Gretsch cast hoops and the difference was very interesting. The sound became much "darker", more what I look for in a recording drum.) The snare strainer mechanism is the part-cast, cam action P85. It's adjustable and the 18-strand metal snares are attached to it with cord. The strainer is a single end throw-off type and its buff-end, the P32, just keeps the snares still (and straight). The 402, like the 400, does not have a snare bed (an indentation in the shell edge which accommodates the snare), nowadays snare drums have gradual decreases in their shell depth for 2½ inches or so to left and right of the snare mechanism points. This maintains equal, even tension on the snare head and means it's no longer necessary to change tension on the two screws about the snares to get a good seating. In the case of a snare bed this was the way it was done.

The 402 and the 400 have a large spring steel, felt padded damper which works internally under and against the batter head. This damper is actuated by a strong looking chrome thumb-screw. Some years ago all Ludwig dampers worked on a lever which pushed against and wedged the rectangular damper to the head. Unfortunately, this unit could be knocked from "on" to "off" by strong playing. It couldn't be used *half-on* either.

The sound of the 402 differs very little from the 400 at the high end of the spectrum — it's the bottom end where the extra shell depth shows. It's still as bright but has a lot of depth and "balls". It's my considered opinion that any adjective of the superlative kind can be applied to the 402. I'll start off with crisp, bright, sharp, cutting, strong, loud, beautiful, fantastic, etc. — you can supply the rest.

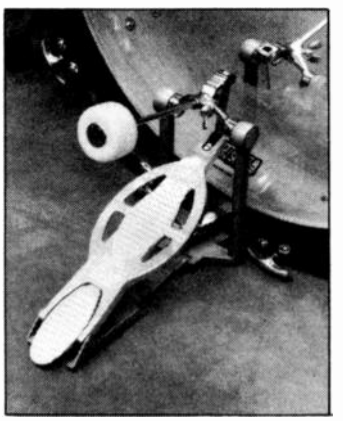
Accessories

The Sound Projector set comes complete with Ludwig's Hercules stands. They are made from much wider bore tubing and all have bent tubular-steel tripod legs with massive rubber feet. The feet aren't like the walking-stick ends these days but instead are angled at the bottom where they "sit" on the ground and thus give a much larger contact area. This eliminates the chance of "slipping and sliding". As I said, *all* stands have these tripod bases and as I remember I said once before, it would be an unfortunate player who could persuade one to fall over. Nowadays, the height arrest screw at the top of each stage uses an old style cast block with a captive nut inside and large plastic handled screws called "hand-sized-knobs" which really do allow you to lock-up tightly every adjustment position on the set including the cymbal tilter. As far as Ludwig is concerned, I preferred the clamps which came with the Atlas stands and were made of pressed steel and held constant pressure all around the tube. The cast variety of clamp grips at only one position by pressing *into* the tube.

The Hercules hi-hat stand has tubular tripod legs and thick down tubes. As far as I can see,it's the same specifications as the "Big Beat" stand with center-pull and an adjustable expansion spring. As usual there are two spurs fitted — one adjustable in the bottom of the twin post assembly frame and the other below the heel-plate. The top cymbal clutch is new — launched in Summer '78 it has a large wing-nut on the bottom, a sensible oval over-sized locking nut on top and a strong height adjustment and locking "T" bolt. All other locking screws use the hand sized plastic wing-nuts. The pedal itself is joined to the center pull action with a very strong plastic substance called Lexan, which has been with Ludwig for a long time and I have never broken (or seen broken). I've commented on this pedal before and although the Hercules is not as gigantic as some of its competitors it does much the same job and with a positive action.

Ludwig's snare drum stand is almost the same as the old and famous Atlas. Now, though, it has tubular steel legs (the tripod type of course) instead of the flat steel which it used to be made from. The principle is the old Buck Rogers one with its adjustable basket type retaining action to lock the snare drum to the stand. The unit has three arms which have their ends bent at right angles and sheathed in rubber and are joined to the threaded down tube on a boss with a clearance hole. A nut,with a pair of rods sticking out diametrically, acts as a locking ring when it pushes up against this boss and tightens the arms to the drum. There's also a flat steel, drum tilting mechanism arrested by a flat plate pressing against the basket top which is positively locked with one of our large plastic screws, as is the height adjustment.

I've reviewed Ludwig's Speed King pedal before but just in case you haven't heard my comments on what must be the most famous foot pedal in the world, I'll go over the facts again. It was first manufactured in 1937 and it's an adjustable compression-spring model with a one or two piece cast foot-plate and a beautiful feel. The connecting link between the footplate and the cam axle is made of pressed steel and I feel this link's strength is the pedal's weakness. Because this link is so strong other parts of the pedal, like the cast-footplate or the cast rocker assembly which retains the beater, have the tendency to fracture. If the pedal had a leather strap, which would no doubt spoil its feel — that strap would be a weak link but when it broke it would be easily and cheaply replaceable. This would save excessive strain on the cast parts. I would have thought that the Lexan pull that the hi-hat uses ▶▶



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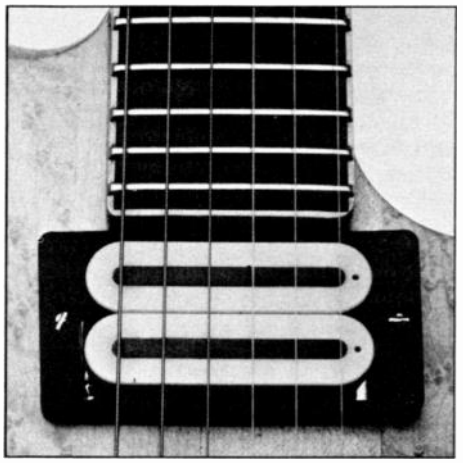
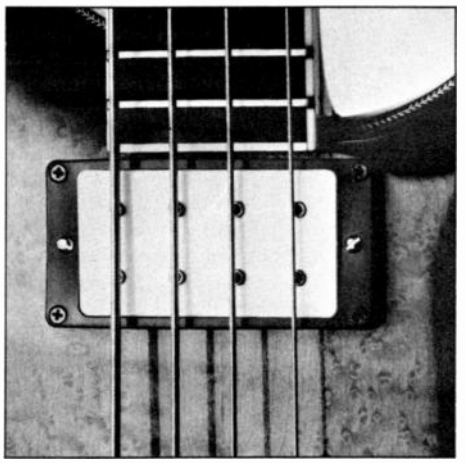


X2N POWER PLUS™

This pickup is a new addition to the DiMarzio line. It is designed specifically for solid-body guitarists playing music requiring maximum output and harmonic distortion. The X2-N comes with 4-conductor wiring, to allow all tonal options. Model DP-102

Specifications

Inductance—10.33 Henries
Impedance at 100Hz—15.58K
Impedance at 1,000Hz—66.50K
Impedance at 2,500Hz—162.9K
DC Ohms—14.5K

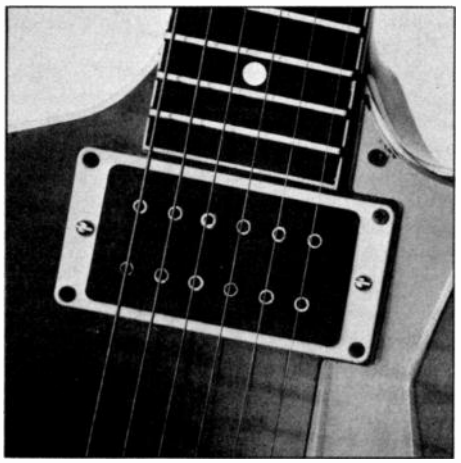


MODEL G™ BASS PICKUP

This is our newest bass pickup. It is identical in size to a standard humbucking guitar pickup, and uses the same mounting hardware. The Model G has slight adjustable pole pieces, enclosed in a creme cover. A four wire cable is standard, permitting dual sound and phase reversal, as well as other options. Model DP-121

Specifications

Inductance—8.82 Henries
Impedance at 50Hz—14.76K
Impedance at 500Hz—31.27K
Impedance at 1,000Hz—57.28K
DC Ohms—14.5K



SUPER II™

The Super II has an entirely new format. It is entirely enclosed in a black cover, and now features four conductor wiring, allowing all wiring options. The basic sound has not been altered—it is almost as hot as the Super Distortion, with special emphasis placed upon a strong treble response. Model DP-104

Specifications

Inductance—5 Henries
Impedance at 100Hz—9.7K
Impedance at 1,000Hz—32.4K
Impedance at 2,500Hz—76.5K
DC Ohms—8.7K

ACOUSTIC MODEL QUICK-MOUNT PICKUP™

The Quick-Mount is a high output, humbucking pickup which can be installed easily in most acoustic guitars. It has six adjustable pole pieces to compensate for different string types. The Quick-Mount is fully shielded, and comes complete with Belden cable and a Switchcraft metal jack. Model DP-132

Specifications

Inductance—0.834 Henries
Impedance at 100Hz—3.75K
Impedance at 1,000Hz—6.43K
Impedance at 2,500Hz—13.63K
DC Ohms—3.75K

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would have solved these problems. In the past, I have broken 'Speed King' pedals at every conceivable position. Footplates, saddles, the feet which go under the bass drum hoop and in one severe case the beater rod had fallen foul of my heavy foot. Nevertheless, I have cheerfully paid out for replacements over the years. I find it the easiest pedal to use because its feel is so perfect, smooth and easy. The spring tension is not easily adjustable since one needs a screwdriver and the pedal upside down *off* the bass drum which is a little inconvenient. But once the Speed King is set up it normally doesn't need any further adjustment.

Ludwig bought the patents to the Ghost foot pedal a few years ago and since then I have wanted to get around to playing one of the Chicago-built ones. My original knowledge of it is probably inaccurate, but it was invented by John Ramsey, allegedly a dentist from New York. (However, for New York substitute the American East Coast city of your choice and make the profession of the inventor whatever turns you on).

The Ghost is grey stove enamelled and is of completely cast construction — except, that is, for the normal Ludwig beater rod and its retaining wing bolt. I'm surprised that Ludwig hasn't beefed up this rod for both of its foot pedals, as so many of the other manufacturers have. There's a one-piece cast foot-plate and once the stretcher bass plate underneath it is joined to the pedal proper, the pedal plate itself is difficult to move sideways. This is because two shallow but fat pins on the base plate locate into a pair of holes on the framework. The Ghost has two springs joined inside a pair of shallow cups fixed with their faces vertically to the side of the base assembly. I wasn't able to open these cups up to look at the springs, but I understand there are two clock-type flat springs inside. One is wound clockwise and the other anti-clockwise, i.e. one throws the beater toward the drum head, the other away from it. In its factory setting I found the pedal unresponsive, even sluggish, but once I changed the stroke and moved the beater position away from the drum it became more manageable. I also found the pedal much more controllable with my heel down (an alien way of playing for me), on the one-piece foot plate. It may well be the best way to get fast backward and forward movement of the beater. This control characteristic has everything to do with the very firm, double parallel cast metal linkage which joins the beater unit to the foot plate. This strap/linkage allows the player to bring the beater back from the head with his heel (rather than lifting off the toe pressure and letting the spring do it), but this method gives no bounce at all. So, if you're a bounce player — i.e. you play with your toe down and your heel up — this may not be your sort of pedal.

The Ghost is a really good pedal with quite a pedigree but with, I feel, a limited market which, strangely, is at opposite ends of the playing spectrum. The jazz or traditional/orthodox player who doesn't lift his heel — and the heavy rocker who's looking for strength in a pedal. I have seen broken Ghost foot plates in the past and I understand it is possible to break the springs. Inexplicably, Ludwig does not seem to list replacement springs in their parts catalog but I'm sure they must be available. I found it tricky to set up the pedal as far as locating the base plate to the framework is concerned — it's downright painful to join to the bass drum hoop from the sitting position. I suppose it's meant to be fixed from a kneeling position. Mind you, once attached it's a very solid piece of engineering.

Two mammoth cymbal boom stands come with this five tom tom set. Their tripod bases are exactly the same as the snare drum stand's. The bottom and second stages are of very large bore tubing and at the top of these is a huge, cast, splined ratchet which looks after the boom's angle. This boom is held in position by a large eye ring which encircles and holds the boom and is locked steady with another plastic hand-sized, wing-nut. The boom arm itself is telescopic and the first stage of it seems to be the same diameter as the top stage-down-tube. Its second stage is the top part of the ordinary, standard Hercules cymbal floor stand. At the very end of this tube is an extremely heavy-duty cast-ratchet tilter which has two large metal washers at top and bottom with two good thick felts in between. Around the threaded part is a plastic sleeve and everything is locked in position with a large metal wing-nut. This screw thread is ridiculously puny compared with the rest of the stand — I realize that this is to accommodate the cymbal but I have it on good authority that a larger hole in the cymbal would not have any terrible effect on the sound of it.

The concert tom tom holders use the same tilter mechanisms as the cymbal stands although they only have *two* stages. It's called the Clip-Lok model and instead of a hand size plastic knob to lock the tilter position (like on the cymbal stand) it has a nut and bolt to enable it to fit in between the toms. Other than this it uses Ludwig's spring-steel-loaded, inverted, slightly "V" shaped, pressed-metal female receiver plate bolted to the drum shell which contains and locates one of the also inverted "V" shaped spade fittings fixed at the top of the tilter. There's a felt ball which fits on to the top tube below the "V" shaped clip and successfully stops the tom toms from rattling. Ludwig's holder is without doubt the ***sine qua non*** of all concert tom toms. They were also, to the best of my knowledge, the first.

Conclusion

So, what do I think of this Sound Projector set? Well, in principle, I like it. It's strong in sound and construction; its fittings are strong and up-to-date; its image is also strong and up-to-date. Oh yes, its price too is strong and also, alas up-to-date! But it *is* a seven-drum set, and it ***will appeal*** to a certain sort of drummer who wants a single headed set but with extra-ordinary projection. This guy no doubt will save up to buy it, especially since it's now available with wooden shells. I should like to try the projectors on a ***double-headed*** set — that would definitely be food for thought.

While I think of it, the set I saw was in white Cortex but is apparently available in any one of 20 different finishes except stainless steel.

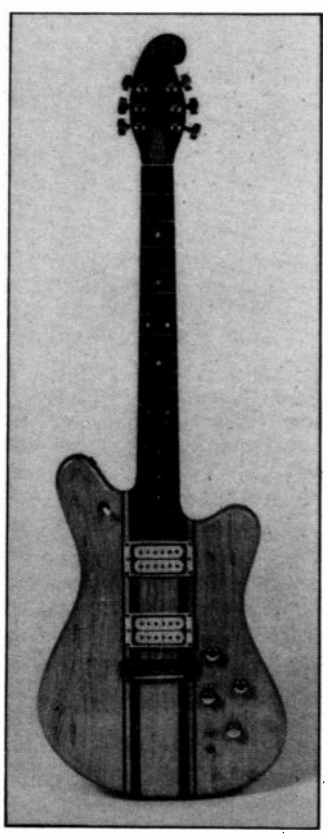
Bob Henrit

C.F. Martin Electric Guitar $660

This instrument is one of a new range of electric guitars made by the C.F. Martin Co. Although the company is primarily associated with acoustic instruments, they do have some previous experience with the manufacture of electric guitars. Apart from various electrified acoustic models, between approximately 1961 and 1967, Martin produced the F- and G- series shallow-body electric semi-acoustic guitars. According to Mike Longworth's book "Martin Guitars," production ceased in 1967 because of the increasing demand for Martin acoustic instruments. (Somewhere there must also be a few proud owners of the Martin "shoulder-bag" portable amplifier, which seems to have anticipated the ubiquitous "Pignose" by about 10 years).

The F- and G- series models were semi-acoustic instruments and "electric" models such as the D 28 E were basically standard Martin acoustics. To the best of my knowledge, this new range of electrics does represent Martin's first serious involvement with completely solid-body guitars.

I am not exactly sure why one of the best-known acoustic guitar companies has chosen this particular time to launch a range of electrics. I am sure there is still room for a few more, but the world is not exactly starved of solid guitars at the moment. After playing the guitar for some time, it occurs to me that Martin may have tried to produce an electric guitar which will appeal to musicians who already play and appreciate Martin *acoustic* instruments. If this were so, it would hardly be surprising to find an electric guitar, with a neck which feels rather like a D 28 and a sound which is closer to Crossover/Country than to basic rock 'n' roll. The fingerboard measures just 42mm across at the nut, which is quite average for an electric guitar, but the neck is fairly deep and chunky: the combination certainly reminds me of the feel of some Martin Jumbos, although it would be difficult to say exactly why.



The pickups are made by Mighty Mite and appear to be very similar to the "distortion" model; they can *also* provide a very clean sound, with suitable amp settings. In addition to the usual selector and phase switches, this instrument has a small 3-way switch which operates a coil-tap on each pickup. In the "up" position, it cuts out one of the coils on the fingerboard pickup, in the center it is inactive, and in the down position, it cuts one of the coils in the bridge pickup. This does limit you to using the coil-tap effect (for a slightly brighter and crisper sound) on either one pickup or the other one, but it is a very efficient use of one switch, and the disadvantage seems to appear more in theory than in practice.

Unfortunately, our review sample refused to perform as intended and needed a small re-wiring job on the coil-tap switch. As supplied, the fingerboard pickup was permanently "tapped", apparently as a result of some internal fault in the switch. In the process of removing and replacing the switch wiring while trying to find the cause of the problem, I seem to have kicked the switch into its proper mode of functioning and it now works correctly on both bridge *and* fingerboard pickups. There can't be many places where you can have a guitar repaired free of charge and reviewed at the same time! Each pickup has the usual volume and tone controls, although these are not identified on the metal knobs. The volume knobs are the two nearest to the bridge. In common with several recent designs, this electric guitar has neither numbers nor pointers on or around the control knobs. This gives a simple and clean appearance to the front of the guitar, but it does make life hard for the player who needs to set up tone and volume settings before starting to play. I do wonder whether players actually want controls without any form of indexing. A numbered plastic skirt clipped to the underside of the knob could easily be fitted or removed to suit individual taste. Alternately, which "brass bits" supplier will be the first to make a brass control knob with long-lasting, easily readable numbers?

The bridge and machine heads look very similar to units which will be familiar to many of our readers, but in each case there is a small surprise involved. The bridge is a genuine Leo Quan Badass guitar bridge: American type, not Japanese look-alike. However, it also carries a small paper label underneath saying "Made in Germany". As it happens, I do know the maker, a large firm with a reputation for good work, but discretion requires that I leave any further revelations to Leo Quan. The machine heads are in the familiar style with metal buttons and cast metal enclosed gearboxes. However, they are made by a relatively new and unknown American company called Spurzel. There seems to be some play in some of the machine head units, as fitted to this review guitar; but it is my experience that the method of fitting some of the more sophisticated kinds of machine heads can influence the final standard of performance. Unfortunately, there is not enough time available for me to strip down the guitar head in order to settle the point. I do have one other set of the same basic model of machine heads from the same maker, and they appear to have almost no play at all in the mechanism.

The body of this Martin electric is made from laminated maple and American walnut. When it is seen from the front, it gives the impression that the neck is fitted right through the body as the center section. This is a currently fashionable image in electric guitars although not at all essential for good performance. In fact, the Martin does not have a straight-through neck: the neck is of mahogany, apparently in one piece, and joins onto the body around frets 16 and 17. The neck is quite rounded at the back toward the nut end, and gradually changes to an almost flat-backed profile by the time it joins the body. There is no heel at the back of the neck to interfere with high position playing. Although the neck has "square" corners where it fits against the body, these are carved away within the first two centimeters, giving the best possible access to the top end of the fingerboard, short of using a straight-through neck construction.

The body side of the neck joint has a strangely angular appearance at the back. On playing the guitar, I did not find this any great inconvenience, but I have fairly large hands and I tend to keep my thumb at the back of the neck. This may represent

good technique to some people, but it is in no way universal among electric guitar players: many play with the left-hand thumb well round the bass side of the fingerboard. These players may be tempted to take a piece of sandpaper to the back of the neck-to-body joint. Obviously, there has to be something left to glue the end of the neck to, but I don't think blending over a few corners would seriously weaken the guitar's construction.

The head shape is most unusual and is one of the few totally "new" head patterns for electric guitar. Actually, it is not entirely new, it probably owes more than a little to Stauffer, but that is a long time before electric guitars were thought of. It is nice to see a head which does not look vaguely like the heads on three other guitars. I think experience may show that the makers could usefully leave a bit more at the back behind the nut. Martin do not normally fit adjustable truss rods to their guitars. On this electric instrument, they have made an exception to the rule and there is a conventional adjustment point in a recess next to the nut. This may be covered by a pretty metal plate; but the recess still makes a substantial hole in the neck at its thinnest (and, inevitably, its weakest) point. The guitar head is relatively long and also slopes back at a considerable angle to the line of the neck. In the same way as the Gibson Firebirds, this long angled-back neck may be broken off rather more easily than one would wish, if the guitar is carried in an unsuitable case. The case supplied with this sample is contoured inside to support the neck and body, while leaving the head "floating." This is as it should be, but I must strongly recommend purchase of the official case with one of these guitars. It is unlikely that any standard type of case would protect the head adequately without careful and fairly rigid internal blocking: a scrap of soft foam under the neck will not do!

Electric guitars (and expectations) have come a long way since the 1960s. In some ways, this Martin guitar is right up to date. It has good frets, a fingerboard which is only moderately cambered, a brass nut and other metal fittings of high quality. It is also supplied with recessed "straplok" sockets and matching locking spigots for attaching to the guitar strap. It has good-sounding pickups and quite a wide variation in possible tone settings. On the other hand, there is no attempt to screen the wiring around the controls and switches. The metal back plates (also a fashionable image at the moment) are poorly-finished and would benefit from more than four small screws to hold down a large plate. This is the second guitar I have seen recently, without any internal body screening, where the makers have fitted a metal back plate and not even bothered to connect a ground wire for it. Under the circumstances this seems to be something of a missed opportunity. A piece of plastic, lined with kitchen foil, would be of more practical use, if supplied with a little wire loop to ground it. On closer examination, the brass-colored back plates are not solid brass, but appear to be steel sheet, brass electroplated and lacquered.

Overall sound

On individual strings, the instrument has a powerful and versatile sound, and I am very impressed. However, when all strings are played together, it becomes apparent that the sustain times for the lower strings, particularly the bottom E string, are many times longer than for the top strings. If you play a 6-string chord around the lowest positions, the treble strings have a perfectly reasonable decay time and then die away, while the bottom note goes on . . . and on . . . and on. Now I am sorry to seem so hard on a new design, there may well be many players who find this type of performance very useful and desirable, but personally, I find it inconvenient and not likeable. I can cope with guitars which have a slightly longer sustain at the bass end (in fact it is very difficult to eliminate this tendency entirely in large-scale production), but I think this Martin represents a fairly extreme case. I think it is a pity, because the design has taken several fresh looks at electric guitar production, which is always a good thing from time to time, and it usually produces a few good ideas.

I think this new instrument shows promise, although it does not at the moment suit my own tastes in electric guitars, and it might benefit from a few very small changes to shapes and fittings. It would be interesting to see next year's model; perhaps with a slightly more rigid neck or a slightly less massive body — and with more adequate screening inside.

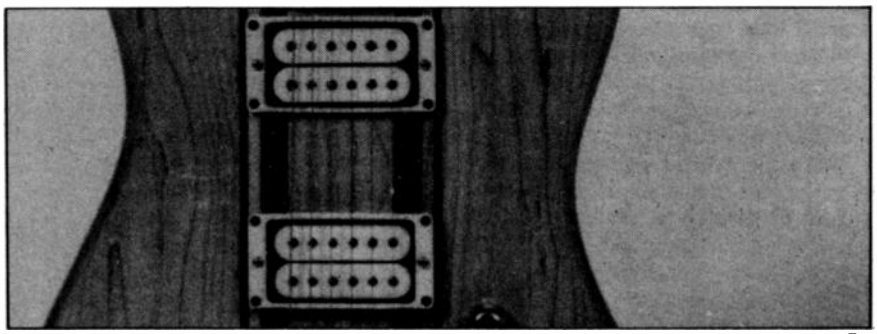
Our review sample was supplied with correct intonation and reasonably good action settings at bridge and nut. Apart from a slightly reluctant switch (now cured) all knobs and switches operated smoothly and in a convenient and useful manner.

Stephen Delft

Circle 843 on Reader Service Card

Measurements on Martin electric guitar

Scale length *645mm*
String spacing at bridge *50mm* (this is still adjustable as no notches have been cut in the saddles)
String spacing at nut *34mm*
Fingerboard width at nut *42mm*
Depth of neck at fret 1 *22mm*
Depth of neck at fret 12 *24mm*
Depth of neck at fret 15 *25mm*
'Heel' starts around frets 14/15
Body joins at frets 16/17
Treble side cutaway to about fret 20
22 frets on fingerboard
Action as supplied *1.7mm* treble/*2.1mm* bass
Lowest 'standard conditions' action *1.4mm* treble/*2.0mm* bass



Crown PSA-2 Power Amp $1,495

The Crown PSA-2 self-analysing amplifier is a relatively new addition to the well-known range of products from Crown-Amcron International based in Elkhart, Indiana. USA. Their contribution to the audio industry becan circa 1949 with a range of patents and inventions related mainly to the field of recording. In 1962, they developed the first silicon solid state professional quality tape recorder, in 1964 the Crown SA 60-60 was the world's first stereo amplifier with direct coupled input and output. More recently, in 1977, their DL2 Controller revolutionised pre-amping with its digital logic, digitally controlled modular system with seperate control, phono and power modules, in addition to its computer interface capabilities. 1979 saw the launch of the Crown SA-2, the first power amp to use built-in computers to maximize performance of the amplifier's output transistors.

In short, the PSA-2 is the latest innovation from a company well-known for breaking new ground.

Construction

The PSA-2 is a high power system's amplifier for professional amplification of frequencies up to 20 kHz starting from DC(OHz). Designed with "self-analysing" circuitry, the PSA-2 automatically analyses its own dynamic environment and thus is able to control the output level relative to the output transistors safe operating area. The obvious purpose of this design is to provide maximum output as well as maximum safety.

As day to day practice confirms, the power amplifier's output stage and its protection is the most critical circuit area of any power slave amp — here the output transistors operate in the AB class of operation, where quiescent current is carried by both the output stage (16 rugged 150 Watt transistors with total power dissipation of 2400 watts), as well as the driver stage. As Crown claims, the PSA-2 Self Analysing circuit employs an "analog computer" in each half of the output stages. This enables it to respond to instantaneous output device junction conditions. The computer's output controls the continuously variable limiting circuitry to provide the appropriate operational limits for most possible conditions encountered. The PSA-2 was designed to operate safely and continuously into a variety of speaker load configurations.

The following listing will give you an idea of the power you may expect when connecting various load impedances to the output of the amp:

400 watts	(both channel operation) into 4 ohms load over a a bandwidth of 20Hz to 20kHz with no more than 1 percent THD.
250 watts	(both channel operation) into 8 ohms load over a bandwidth of 20Hz to 20kHz at no more than 1 percent TDH.
600 watts	(both channel operation) into 2 ohms load at 1kHz with no more than 1 percent THD.

Mono, ie bridged output operation, allows for even higher power levels:

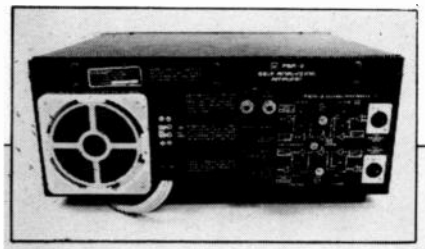
1200 watts	at 1kHz into 4 ohms. Ref 1 percent THD.
750 watts	at 20Hz — 20kHz into 8 ohms with about 0.12 percent THD.

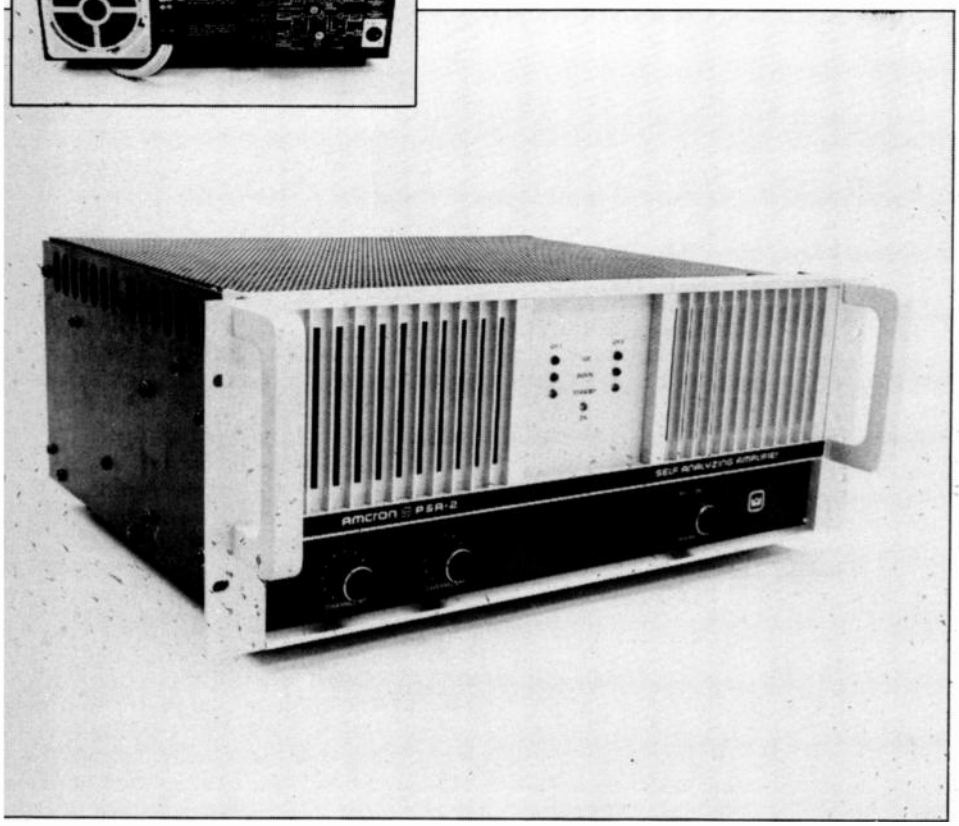
The PSA-2 is designed for standard 19" rack mounting as well as "stack" mounting without a cabinet. The basic measurements of the amp are as follows : height 7", width 14¾" (without handles), total length 19".

The front panel facilities include the following: an AC rotary power switch, channel 1/2 input level controls and a range of ¼" LED indicators, ie STANDBY, SIGNAL AND IOC (Input Output Comparator).

The IOC facility helps the operator to identify certain problem areas such as "too high" input, not adequate load impedance or internal amp problem, for example a need for fuse replacement.

The rear panel of the amp is occupied by a large cooling fan on the left, then a pair of unbalanced input ¼" jacks with three slide switches labelled: Stereo-Mono, Low Freq Protect and Delay. "Stereo-Mono" switch operations are as usual, but engaging the "Low Freq Protect" switch causes the amp to cycle through the "standby" mode if low frequency (DC + 10Hz) appears at the output. The PSA-2 manual claims that this problem will be recognized by the listener as a repetitive pop or "thump" through the loudspeaker (every 4/5 seconds when Delay is used). This would, of course, require





immediate attention if it happened during work.

The right hand side of the rear panel incorporates the remaining amp control facilities, ie PSA-2 balanced input modules, a pair of XLR Cannon sockets of 20k ohms impedance providing balanced input on both channels, plus an individual HI/LO Pass filter, and a compressor. Gain adjusting pots operate independently for both amp channels. The only controls common to both channels, ie serving both simultaneously, is the AGC Threshold Adjust and the previously mentioned Test Tone switch. The AGC Threshold adjusts the point at which the automatic Gain control is activated. The purpose of this control is to compensate the operational gain depending on the specific situation.

A word about the PSA-2 output termination — there are two pairs of red and black molded insulated terminals, accepting continental standard 4mm plugs in the top. For bridged operations (Mono) the "Stereo- Mono" switch should be selected, secondly, both top (red) output terminals should be used as Mono output terminals. It is important to remember that the output from the PSA-2, if mono, is balanced and as such is isolated from the chassis and from the input grounds.

The amplifier's electronic protection circuitry is quite comprehensive and includes the following: protection of the output stage's transistors from elevated temperature, protection against the transformer overheating, RF anti-burnout protection (via controlled slewing rate, voltage amplifiers), input overload protection, protection against short/open circuit operations, protection against mismatched loads, protection against "chain destruction" phenomena.

Additionally, the line for the power supply, 120V AC, is fused with 12 amps 250V type ABC (or 240V AC — 6 amps). The low power supply and cooling fan is fused with a 0.5A- AGC fuse on 120V AC or 0.25A type AGC fuse.

Conclusion

For some time professionals, when searching for extra large power levels for all kinds of gigs, have found that among the best international names is Crown. In fact, when reading reports of systems used by Led Zeppelin, The Who, McCartney, Genesis, Bad Company and many other bands, the Crown name appears frequently, providing the "building block" for indoor systems up to 30,000 watts or over 60,000 for outdoor. The question is: why?

Well, reliability and outstanding performance is the answer. The Company's reputation has been built up over the last 30 years and their DC 300 A power amplifier certainly is the most common workhorse in many serious installations.

When considering the PSA-2 amp as a new addition to the already excellent range, it cannot be regarded as a replacement for any of the current production models. This amp with all its advanced features is classified as a complete power system of its own. Indeed, the Crown PSA-2 power amplifier is a very flexible piece of equipment and as such is designed to operate safely and continuously into a variety of load configurations.

Our power measurements show that Crown's specifications are adjusted rather conservatively as the "onset of clipping" figures indicate up to approx.30% more power available than specified.

The rest of the spec is quite accurately adjusted. Overall, the amp's performance, including the practical listing test, is excellent.

Quality of workmanship and components is of the usual high Crown standard and certainly the amp looks, and is, a first class design. On top of everything we've said here, I should mention the excellent instruction manual, consisting of five substantial chapters with all the schematic diagrams you could possibly need — Installation and Operations, Theory etc. In fact, nothing is omitted, which just shows Crown's confidence in their product and all this is supported by a full three year warranty.

A Small but nevertheless important message for Crown — For God's sake change the A/C power line for one having live, neutral and ground color coded. As it is now, the live and neutral are both plain colors and *identical*. When in Rome do as the Romans.....!

Mark Sawick

PARAMETER	*RESULT*	*TEST CONDITION*	*COMMENTS*
Specific Power Output (WRMS) Ref. 1KHz	*Chan. 1 Only* 718 W RMS 499 W RMS 296 W RMS 164 W RMS *Chan. 2 Only* 714 W RMS 497 W RMS 295 W RMS 163 W RMS	Onset of clipping into 2 ohms Onset of clipping into 4 ohms Onset of clipping into 8 ohms Onset of clipping into 16 ohms Onset of clipping into 2 ohms Onset of clipping into 4 ohms Onset of clipping into 8 ohms Onset of clipping into 16 ohms	CROWN PSA-2 spec. claim the following: a) *Power O/P (2 ohms)*: 600 Watts RMS per channel, 1 KHz @ 1% THD. b) *Power O/P* 350 Watts RMS per channel *(4 ohms)*: 20 Hz- 20 KHz @ 0.08% THD c) *Power O/P (8 ohms)*: 220 W RMS per channel 20 Hz -20 KHz @ 0.05% THD d) *Power O/P (4 ohms)*: 1200 W RMS *bridged* O/P 1 KHz @ 1% THD e) *Power O/P (80 hms)*: 700 W RMS *bridged* O/P 20 Hz -20 KHz ● 0.12% THD f) *Power O/P* 440 W RMS *bridged* O/P, 20 Hz *(16 ohms)*: 20 KHz @ 0.08% THD
Total Harmonic Distortions	Less than 0.002% Less than 0.05%	Ref. 20 Hz-1KHz @ 220W/8 ohms Ref. 1 KHz-20 KHz @ 220W/8 ohms	For *bridged* "mono" operation, however, exclusive of balanced input module, the following figures are typical: less than 0.005% from 20 Hz -1 KHz and increasing linearly to 0.12% @ 20 KHz Ref. 800 Watts/8 ohms.
Intermodulation Distortion (JD)	Less than 0.01%	Ref. (60 Hz 7 KHz) 4:1 Test S.M.P.T.E. into 8 ohms	The same test related to bridged "mono" work identifies less than 0.015% I.M. Ref. 0.25 Watts @ 500 Watts into 16 ohms.
Input Sensitivity for 220 W RMS (41.95 VRMS) output signal	Ch. 1 only: 2.08 VRMS Ch. 2 only: 2.11 VRMS	into 8 ohms/1 KHz into 8 ohms/1 KHz	CROWN spec claim the following: Input Sensitivity: 2.1 volts for 220 watts/8 ohms (Stereo) **2.2 volts for 500 Watts/16 ohms (Mono)** Voltage gain: a) 20 + 2% or 26 dB + 0.2 dB at Max Gain (Stereo) b) 40 + 2% or 32 dB + 0.2 dB at Max gain (Mono)
Frequency Response	+ 0.11 dB or + 0.2 dB	Ref. 20 Hz-20 KHz/1 Watt/8 ohms Ref. DC-20 KHz/1 Watt/16 ohms	For PSA-2 balanced input module frequency response is claimed as "flat" as + 0.2 dB Ref. 20 Hz - 20 KHz
Hum & Noise Level	approx 115 dB below rated output approx 110 dB	"A" weighted reading "DIN" audio band weighted reading	Very good. True RMS reading on High sensitivity ANM2 Radford Noisemeter
Input Impedance	approx 20 kohms approx 25 kohms	Ref. balanced XLR inputs Ref. unbalanced ¼" jacks	PSA – 2 is normally equipped with both: unbalanced ¼" jacks and balanced input module (PSA-2 B.I.M.) which is fitted on rear side of the amp including filter, gain stage, and test tone switch.
High and low pass Filters (balanced i/p module)	18 dB/octave 18 dB/octave	Ref. 50 Hz 3 pole Ref. 15 KHz Butterworth	Butterworth filter network allows for the flattest possible response in the passband. The response rolls off smoothly into the stop band, where it approaches a constant slope of 18 dB (3 pole design)
Compressor Range (balanced i/p module)	13 dB	Ref. 1 KHz, Threshold adjustable from overload level of main amp to 12 dB lower.	Manufacturer states that wider range would aggravate feedback in live performance
Test Tone	OK	Frequency spectrum of 50 Hz 20 KHz applied directly to both inputs.	Very useful. The PSA-2 internal test tone generator is activated by the slide switch at the rear panel. Because the test tone is a 'wide band' frequency pulse, it is possible to monitor the tone throughout the woofer, midrange and tweeter range.
Phase Response	+ 0 - 13.5 degrees + 0 - 30 degrees	Ref. DC - 20 KHz Ref. DC - 40 KHz	This is 1 Watt Test.
Damping Factor (Non dimensional)	greater than 700	Ref. DC 400 Hz/8 to 16 ohms lead (both Stereo and Mono operations)	Defined as a numerical indication of an amp's ability to decrease unwanted loudspeaker movements. D.F. can be calculated by dividing the load impedance by the amplifier's output impedance which for PSA -2 is less than 12 milliohms in series with less than 1.2 microhennies.
DC Output offset	+ 10 millivolts	Shorted input	Acceptable
Slewing Rate	Greater than 30 volts/microsecond Greater 60 volts/microsecond	Ref. "Stereo" mode of operation Ref. "Mono" mode of operation	OK
Capacitance Load Test	OK	2 microfarads non-electrolytic capacitors/250V working voltage into 4 and 8 ohms dummy load.	Does not show any tendency to instability
Open Circuit Stability Test	OK	Left/right Gain and level potentiometers at MAX. Dummy Load removed	Stable during O.C.S. test.
Short Circuit Test	35 seconds		"Protection circuitry" limits the output level to protect the output stage transistors. Controlled slewing rate voltage amps protect unit against RF burn outs. Worked normally after S.C. test.

THIS IS THE EMS POLYSYNTHI

Polysynthi was designed by Graham Hinton at EMS.

An entirely new concept in live performance synthesizers. At last the problem of combining a genuinely large range of special effects with instant and dependable patch switching has been solved.

- Equally tempered, fully polyphonic oscillator bank, easily tuned and completely stable, covering nine octaves in six overlapping ranges.
- Four-octave standard keyboard with three simultaneous outputs — polyphonic, position dependent control voltage and pressure dependent control voltage.
- Two comprehensive voltage controlled low frequency oscillators with variable waveforms.
- Two ADSR envelope generators with LED displays.
- Analogue delay line for echo, chorus, flanging and reverberation effects.
- Panel ergonomics specially designed for ease of operation plus perfect reliability under concert conditions. LED-indicated control voltage switching, colour coded function areas, clear legending and logical layout give the performer an enormous range of easily patched, repeatable effects.
- Optional add-on polyphonic sequencer allows even greater flexibility. Up to ten minutes of polyphony can be stored and edited by this unique device. Hundreds of special effects with pinpoint accuracy using the latest microprocessor techniques. No other available sequencer offers a truly polyphonic memory. The programming is based on the research at the EMS computer studio, and uses many of the techniques developed specially for this very advanced studio.
- No special training needed — you command, POLYSYNTHI does it.

The EMS POLYSYNTHI is played by means of a 4-octave pressure sensitive mechanical keyboard. This supplies polyphonic information to the oscillator bank, plus two control voltages corresponding to the highest note played and the pressure applied. These voltages may be routed to the other devices.

Above the keyboard is a 6-bus switching system. Coloured switches allow the performer to choose between two low frequency oscillators (VCLFO), two envelope generators (ADSR), and the two keyboards control outputs (highest note position and pressure). The switches are centre-off and situated directly below the device to which they relate. Coloured LEDs indicate which voltages from the busses are being routed.

The main panel is divided into five coloured sections. The two red sections are the CONTROL units: envelope follower, the two voltage controlled low frequency oscillators and the two ADSR envelope generators. The centre (blue) section contains the sound SOURCES: the three waveforms from the oscillator bank, the output from the noise generator, and an external input. These sources are mixed together in any desired proportion. The two yellow right hand sections contain the TREATMENTS. One section has the voltage controlled switchable two- or four-pole filter and the voltage controlled amplifier. The other has the analogue delay line (ADL) with voltage control of delay and with variable feedback and mix.

Further USA market penetration sought Dealers and Distributors contact:
Mick Johnson Music, 227 Putney Bridge Road, London SW15 UK Tel: 01 788 3491

Circle 810 on Reader Service Card

Keyboardcheck

WLM Hit Organ $2,775

The WLM Hit Organ is made in Finland. The smart styling, practicality made aesthetic by virtue of simple austerelines, reflects the country of origin — modern but with great respect for tradition (in this case Hammond) — an instrument with an impressive lack of frills. The organ is housed in a robust cabinet constructed of thick plywood, painted black and edged with aluminium. It looks pretty tough and if you do dent it all you need is some wood filler and a small tin of black paint. The keyboard unit is suspended inside the cabinet when the organ is in transit and it only takes a minute to set up. One side of the cabinet swings down, the keyboard unit swings up and the cabinet side returns to its former position in which it now supports the keyboard.

The organ's solid construction makes it heavy enough to deter most people from trying to carry it unaided — a couple of spring-hinged handles (one at either end) indicate that the co-operation of another band member is desirable and it's a pity the handles aren't a bit less gleamingly functional looking and a bit more comfortable to grip. The organ has two manuals, each with four octaves C-C, the upper manual being offset to the right by the space of one octave. To the left of the upper manual in the space thus left clear is a row of touch-sensitive aluminum buttons, each with a small red light to indicate operation. These are: Drawbar (for manual control), Full Organ, Preset 1 and Preset 2 (internally adjustable), Chorus, Off and Tremolo (the Off button affecting the two adjacent effects).

Above the upper manual are the drawbars, each marked from 1 to 8 in the Hammond manner. On the left is the bass section — a switch consigns this either to the lower two octaves of the lower manual or to the optional one octave pedalboard. In either case the bass is monophonic, the lowest note played being the one that sounds. The bass has sustain and attack drawbars, the sustain being the equivalent of release in synthesizer terms — i.e. in conjunction with a sharp attack it is possible to obtain fairly realistic plucked bass sounds. There are drawbars for 16′, 8′, 5⅓′ (a fifth above) and 4′. Next come the drawbars for the upper manual: 16′, 5⅓′, 8′, 4′, 2⅔′ (an octave and a fifth), 2′, 1-3/5′ (two octaves and a major third), 1⅓ (two octaves and a fifth) and 1′.

This line-up is repeated for both the percussion (which affects upper manual only) and lower manual. The percussion has two extra controls for attack and decay, the decay determining the time the sound takes to fall from the initial 'ping' — not to be confused with the sustain in the bass. The percussion is primarily for use as an additive element for the upper manual 'straight' voices — to spice up the sound though it may be used as a staccato sound in its own right. It's worth noting that the percussive effect will not happen if any note on the upper keyboard is already depressed. As well as all the footages listed above the lower manual has a drawbar marked 'balance'. This affects the volume of the lower manual only — the nomenclature leads one to half suspect that boosting one manual may mean subtraction from the other but this is not the case.

The last three drawbars are effects: reverb, vibrato and brilliance. The reverb, though effective, noticeably increased the amount of hum on the instrument being reviewed. The vibrato adds a fairly fast pitch vibrato and the brilliance adds an edge to the top registrations though here the effect is not particularly marked. Of the two touch sensitive effects the chorus introduces a slow quasi-flanging gloss to the sound. The tremolo is again on the fast side — some control of speed and amount would be a useful addition.

Both keyboards are light in the customary organ manner and providing that one accepts that concept of keyboard touch, feel pleasantly positive. The optional cable-connected pedalboard adds £100 to the price. The organ has no amp or speakers of its own. Soundwise it's very much a traditional instrument — the sine-wave generator and drawbar facilities make sure of that — all in a modern, easy to move and, by today's standards, relatively inexpensive package. Sounds ideal, doesn't it? — well there are a few minor carps — the full organ preset and the bass attack drawbar stopped functioning while I had the organ in the house. A small rotary knob marked 'pitch' failed completely to effect that quality. The malfunctions end there but the fact that such an *efficient looking* machine should fail in some way is slightly disturbing.

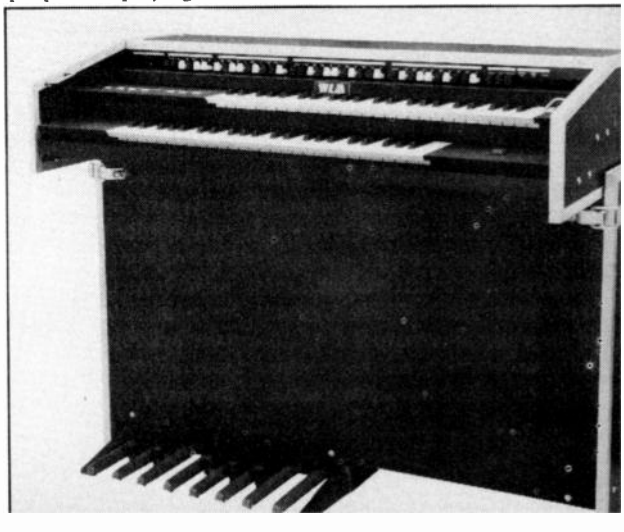
However, I don't think these factors should be allowed to detract from what is basically a simple no-frills organ — and in any case WLM provide a *super-comprehensive* selection of circuit diagrams for the dedicated owner who really likes to know his instrument. If on the other hand you, like me, haven't a clue about circuit diagrams be warned by the preceding sentences and make sure that the after-sales service is going to be there, if and when, you need it. One last negative comment — the situation of the variable controls for presets 1 and 2. To get at these you have to undo seven screws and then, assuming that your instrument is as well fitted together as the one I had, spend another couple of minutes attempting to wrest the cover off — hardly the last word in ergonomics.

Forgetting these minor oddities if you are looking for an organ that will give you a good gutsy sound with plenty of flexibility and you DON'T need a carved fake-wood music stand but you DO need a top that you can stack another keyboard on etc. — in other words a serious, purposeful playing instrument, check this one out.

Tony Hymas

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.

Circle 855 on Reader Service Card



Synthcheck

EMS Polysynthi

The Polysynthi from Electronic Music Studios (London) Ltd. — known generally as EMS — aims to give live performances sound synthesis through a fully polyphonic keyboard at a price within reach of most musicians.

Like most other companies that have expanded from monophonic to polyphonic synths, EMS has followed the trend in selecting the "switch-linked" type of instrument as the most suitable for live performances. The majority of these make use of preset controls for instant selection of user patched or in-buillt sound, yet Polysynthi provides internal audio signal connections between the Oscillator Bank (VCOB), Filter (VCF), Amplifier (VCA) and Analog Delay Line (ADL) so that sounds can be quickly made using the minimum of controls. Also, three rows of switches form control busses that allow a useful variety of control voltages and triggers to be chosen.

Cabinet and Presentation

The size and shape of this instrument makes it a unit that could go on top of some organs and grand pianos, but otherwise needs some kind of frame for support. Although it can be carried by one person, care has to be taken with the top panel and keyboard. Don't push too hard on the control knobs or you will scratch the panel; keys may become misaligned if you knock against them while carrying. The angled top surface of the instrument consists of the large metal control panel with its vivid coloring for easy selection of the various devices, and a 49-note pressure sensitive keyboard. Unlike other sensor keyboards, the whole keyboard of the Polysynthni physically moves downward as you exert more pressure on the keys. This causes a metal bar mounted underneath to pass between a photoelectric cell combination to give varying control voltage.

The panel markings are unusual in that numbered dials are printed so that they can be seen clearly looking from the keyboard without having to peer over control knobs.

The cabinet is constructed of chipboard and plywood covered in black rexine which is stapled in place. The underside has four rubber feet and a hardboard cover which can be removed for servicing. At the back are jack sockets for optional dualfoot-pedal, external input with mic/line switch, mono signal output, plus a detachable A/C powerline and sequencer socket. A handbook is supplied with clear instructions on using the Polysynthi plus some patch-charts to start you off.

Internal Electronics and Sequencer Option

This synthesizer uses a large number of CMOS chips and op-amp ICs in its circuitry which is mounted on four large printed circuit boards that swivel outward on a "piano" hinge for access to all the components. The pitches for the keyboard notes are derived from one master oscillator in a phase-locked loop device for stability in tuning, established after five minutes warm up on switch-on. This had only drifted two cycles after a further hour in fairly warm on-stage conditions.

Because this synthesizer connects directly to its own custom-built sequencer (via a 25-pin socket), it contains advanced circuitry for multiplexing analog voltages from the keyboard and main control devices. These are sent directly to the sequencer for storage in digital form (using a Z-80 microprocessor based system). Playing mistakes can be edited out and the sequencer format follows the Polysynthi simple-switching principle of operation.

The Control Panel

The brightly colored knobs are there for a purpose, providing a simple, quick means of identifying the functions of each part. In the past, many electronic organs have used colored tabs for tone identification. This visual aid, combined with a host of yellow, red and green LED lights, makes setting up easy for anyone.

Any number of notes can be played at once to make truly polyphonic music, although it must be remembered that this synth does not have separate VCF and VCA on each note.

Information from the keyboard note last played is stored in the keyboard memory, similar to normal sample/hold systems on other synths — a trigger pulse is produced. At the same time, a separate control voltage is generated from the highest notes played.

Across the matt black panel from left to right are the main synthesizer devices grouped into appropriate controls, sources and treatments sections. The two red control sections contain the envelope follower, two voltage controlled LFOs and two ADSR envelope generators. All the control voltages and triggers, apart from those connected with the keyboard, are produced in these sections and operate on themselves or sources and treatments either although pre-patched internal connection or by selecting one or more of the switches in the other two rows of control busses.

The switches work either one-way or two-way for selecting VCLFO 1 or 2 on the top row and ADSR 1 or 2 on the middle row. A switch on any control bus in the up position has a red LED indicator and in the down position has a green LED, with both lights extinguished in the center-off position. It is possible to use up to 4 switches at once on a single device. The center blue sources section contains a white noise generator external input level control and a voltage controlled oscillator bank (VCOB).

Sources

The synthesizer's main source of sound generation comes from the oscillator bank. Three waveforms are provided which can be mixed together to make a wide range of basic tones. These are a pulse-wave, square-wave and a triangle-wave.

In practice, the pulse wave has to be used sparingly, otherwise clashing overtones result from certain note combinations. The squarewave gives the characteristic hollow clarinet tone as it should and the triangle wave is also acceptable for strings or flute sounds.

A keyboard memory switch remembers the last note or chord played. The EGs can give a release time during which the note will die away after the

key is released. When this switch is off, the keyboard gives on-off electronic organ touch with only attack, decay and sustain controls operating. With keyboard memory on, it is possible to switch off the keyboard information send so that the last notes played are stored and the keyboard top note and sensor voltages can manipulate the sound as required.

A tune control sets the overall pitch of the instrument and a range switch selects 32′, 16′, 8′, 4′, 2′ or 1′ pitches for the keyboard, covering a nine octave span, all you would need for most performances. You can play a chord, then set a new pitch range and nothing will happen until you play the next notes. This is very useful, avoiding hearing pitch jumps on long envelopes. Not so useful is the clicking that occurs if you change pitches during continuous playing, but this is inevitable where a lot of electronic 'sampling' is going on continuously.

Two other sources are available from the noise generator, which can be mixed with the three waveforms, and an external input. A level control for the latter is provided so adjustments can be made. The envelope follower in the control section can be set up for maximum undistorted input level by its own gain control. The level at which a trigger is produced for the external input is set by a threshold control and yellow LED. This trigger pulse works on ADSR 1 only so this device would be used to control both VCF and VCA.

Controls

The Polysynthi controls in performance are similar to monophonic synths using separate LFO, EG, VCO, VCF and VCA functions. Two EGs give ADSR control waveforms to modulate VCLFO 1 and 2, VCOB pitch, VCF, VCA and ADL delay time. Each parameter of the ADSR can be varied from 5ms to 10 secs and ADR events are indicated by individual red or green LEDs. Output waveforms can be inverted when sent through the control busses to a device. A complete attack is set longer than the other parameters — the waveform cycle will be completed before retriggering takes place allowing continuous tone modulation. To complete the EG section there are level controls on ADSR 1 and 2 for setting the amount of control the envelope provides.

Treatments

The two yellow sections provide tone and sound shaping of the signals form the sources section and form an internally linked chain to the output: Sources · Filter Amplifier Delay or Straight Mix Output.

Instead of using switchable filters, the Polysynthi has a low pass switchable two-pole (12dB/octave) or four-pole (24dB/octave) VCF with a 'Q' or resonance control that at maximum will highlight harmonics present at the cut-off frequency without going into oscillation itself. The VCF has a direct control prewired to send a variable amount of ADSR 1 output to sweep the filter frequency. Since EGs are most frequently used to control VCF and VCA, this direct control allows most basic sound patching to be done on the panel.

Three switches on the control busses are usually left on sending separate keyboard triggers to operate the EGs and keyboard 'information' to set VCOB pitches. There is also a VCF control level for adjusting voltage waveforms received from VCLFO 1 or 2, ADSR 1 or 2 and keyboard top note or sensor via the control busses. The keyboard top note voltage can be used to open the filter on higher notes so that the same harmonic structure is produced over the keyboard range.

The VCA controls volume shape from a direct control which links variable amounts of ADSR 2 output internally. Instead of a hold switch, there is an initial gain knob which when used on its own will open the VCA to produce sustained volume levels. It can be used in conjunction with the direct and bus control voltages.

Analog Delay Line

At the end of the sound chain comes a device for adding chorus, flanging and short or long echo/reverberation effects. The delay time ranges from 100ms to 1 second and is voltage controllable from the control busses. A chorus switch has a short preset delay time, modulated by its own internal LFO to produce a much richer sound output. Feedback sets the amount of echo repeats from single to continuous howlback. A mix control sets the amount of delay and straight sound that is sent to the output socket allowing complete bypass of ADL if not required.

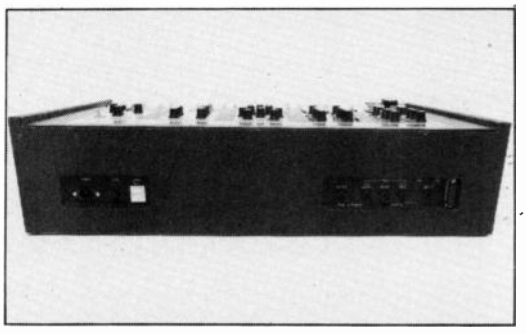
Time modulation effects enliven the final sound. They are linked directly to the synth controls to provide the Polysynthi with a special sound characteristic of its own.

Conclusion

A polyphonic synthesizer can add much to sound texture. The poly still holds a relatively high price providing a place in the market for the cheaper Polysynthi.

This EMS machine represents a compromise on its use of a single filter/amplifier system. All the controls worked effectively although I have reservations about the keyboard mechanics and found the pitch-bend springs rather heavy. The instrument is very well made inside but would benefit from a few extras on the outside; protective corners, carrying handle, cover or light carrying case.

However, its variety of controls and advanced design make this a low cost machine suitable for creating a wide range of sound textures and through its simplicity of operation should appeal to the live performance musician. **Mike Beecher**



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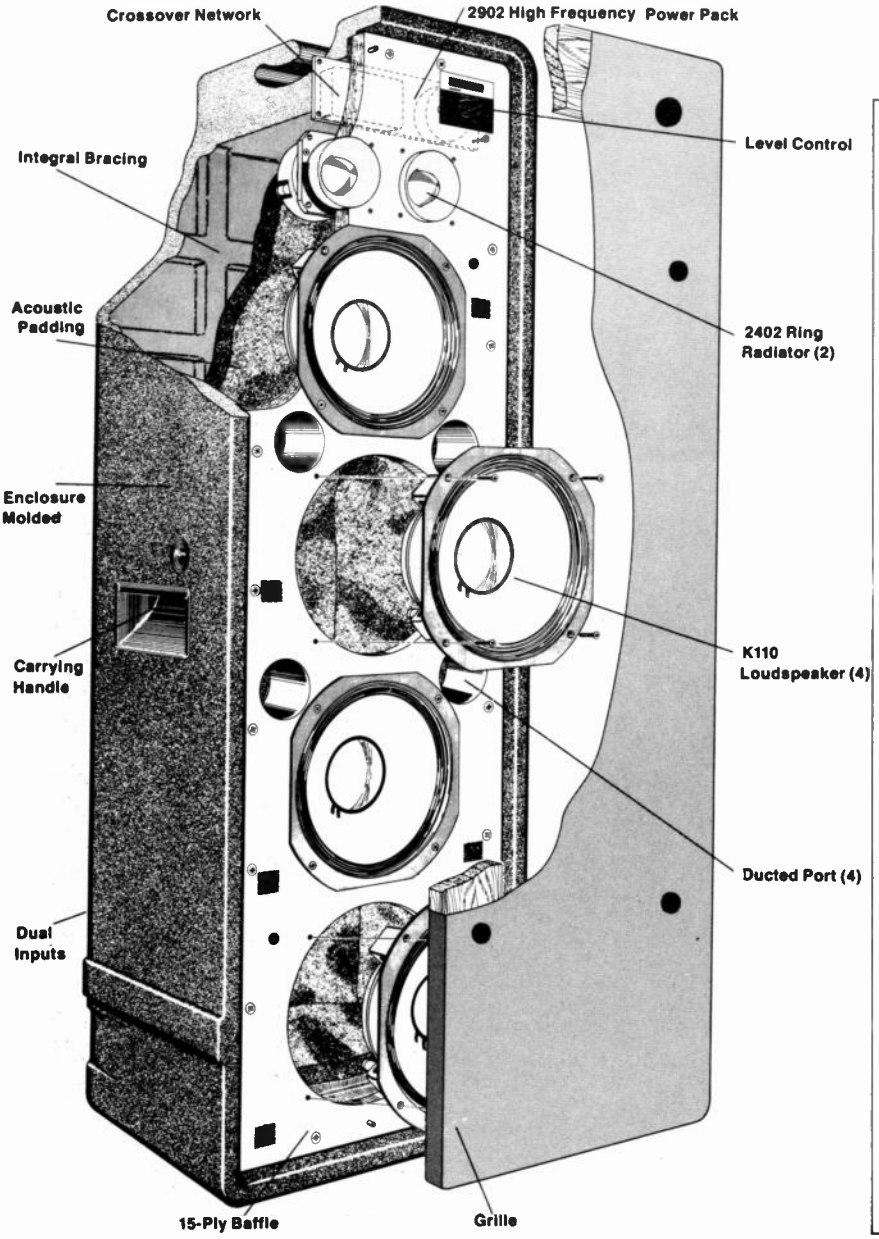
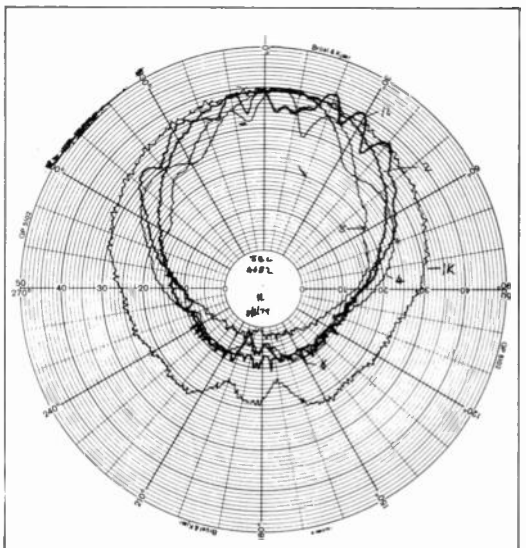
Speakercheck

JBL 4680 'Strongbox' Loudspeaker Column $999

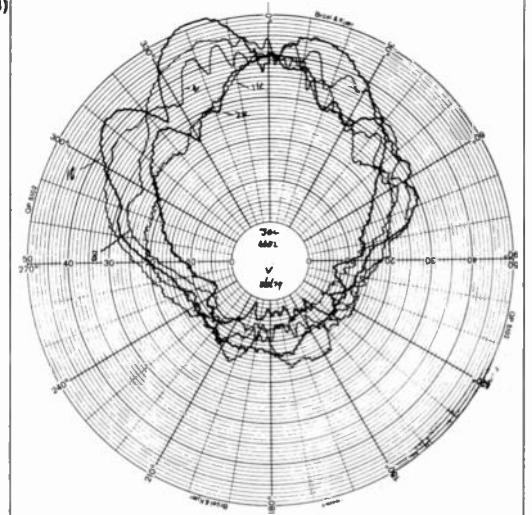
One might be forgiven if the first reaction to this review is that PA columns are old hat — long surpassed by bins and horns etc. However, for certain applications, the right column has a lot to commend it. For a start, its physical shape is probably by far the most convenient to position out of sight at the sides of the stage in a theater or smart club. Also, if properly designed there are few loudspeaker arrays that have better directional characteristics than a column, offering as they can — but unfortunately seldom do — a wide fan shaped beam that is wide in the horizontal plane but narrow in the vertical. Because the total energy from the individual components tends to combine into an axial beam, the on-axis energy level is considerably greater and does not fall off with increasing distance to the same extent as a single source. However that might be, there is little doubt that the popular image of the PA column left in the wake of its heyday in the 1960s did little to encourage further interest in loudspeaker systems of this type. It was therefore with some interest that I noticed the introduction of the JBL 'Strongbox' column a year or two ago, which not only had a rather different look about it but in place of the usual 50 or, at best, 100 watts power rating, was a continuous sine wave rating of 300 watts RMS and a continuous program rating of 600 watts!

Further investigation showed other developments as well. The usual four pretty ordinary 12" drive units were replaced with four JBL K110 10", 75w extended range drivers, and to these were added a pair of JBL 2402 'bullet' high frequency units and an associated 18dB/oct 3kHz crossover unit. That's not all. In place of the usual open back, flimsy chipboard or plywood case, was a thick, non-resonant, impact resistant, reinforced plastic moulded enclosure, with a really solid 18mm plywood baffle, into which had been fitted four special ducted tuning ports. JBL claim that after repeatedly drop-testing the 4680 from a height of 6ft onto a solid concrete floor, the only part of the entire product to fracture was the alloy chassis of the K110 drive units! Such is the strength of the moulded cabinet. Accord-





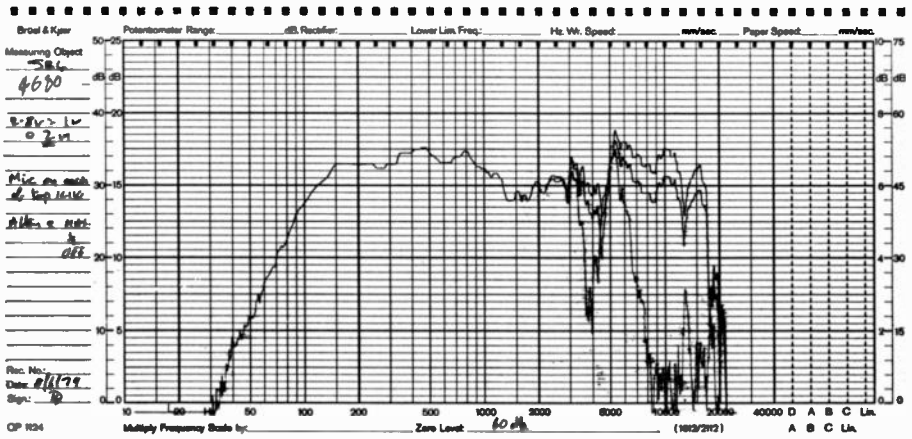
Horizontal polar response



Vertical polar response

ingly, JBL have since strengthened the K110 chassis so that even this weakness — if weakness it is, bearing in mind the likelihood of loudspeakers being dropped onto concrete from 6ft — no longer exists. Certainly, this did not seem to be another ordinary column — a fact made abundantly clear by its incredible price, (which, incidentally, is each, not for a pair!) and seemed to warrant further investigation.

This is another loudspeaker system which presented some problems in the lab, this time due to its radiation characteristics. It would be normal practice with a complex radiating array of this type to place the measuring microphone at a distance of three metres from the source, but the anechoic chamber at our testing plant does not readily permit this. Therefore, we took two frequency response measurements. The first was on the central axis of the 4xK110 drive units and this is the curve we used to assess the sensitivity figure only, as the microphone was well off axis of the two bullet HF units and therefore did not accurately reflect the actual frequency response of the entire column. The second measurement was made with the microphone on the central axis of the upper K110 drive unit, where we had established that the sound was representative of the overall frequency response, and therefore this curve was used for the frequency response measurement and is the one published with the results presentation. The microphones were positioned at a distance of two metres from the baffle panel and the sensitivity result adjusted for an equivalent sound pressure level at one metre. The three curves appearing on the published plot above about 3kHz show the frequency response with the high frequency attenuator set at max, mid and minimum position respectively. In fact, this attenuator does not seem to make a great deal of difference to the actual pass-band of the column, but has a marked effect on the relative level of high frequency content. Although the frequency response figure at -12dB points as given in our results table shows a useful response from 80Hz, it can be seen from the curve that in fact, the response starts to fall away rapidly below about 150Hz — as might reasonably be expected from a system based on 10" drive units. It can be seen from the polar response measurements that the narrow vertical x wide horizontal pattern is in fact emerging at the middle frequency band, but there are one or two peculiarities in evidence. For example, at 4kHz and at 16kHz, the vertical beamwidth greatly excedes that in the horizontal plane, which is exactly the opposite of the design objective. Also, over the lower treble frequency band, say between 4kHz and 8kHz, the horizontal spread is unacceptably narrow, at around the 40° mark. The proper performance of a column type loudspeaker is closely tied to the relationship between the cone diameter of the drive units, the spacing distances between drive units, and the wavelength of the sounds being reproduced. When all these factors are taken into account, the term 'line source loudspeaker' is usually applied. Admittedly, JBL do not claim that the 4680 is a line source loudspeaker, but it is suggested that it is this interaction between drive units at certain wavelengths that is probably responsible for the radiation peculiarities. Matters would almost certainly be improved if the crossover also removed all frequencies above 3kHz from the K110 drive units instead of just removing all frequencies below 3kHz from the bullets — which is the present condi-



Dimensions: 438mm (17¼") wide x 1,321mm (52") high x 343mm (13½") deep
Weight: 40kg (approx. 88lb)
Drive Unit Complement: 4x10" LF/MR, 2x'bullet' HF radiators.
Crossover Frequency: 3kHz
Performance Specifications and Test Results:

Parameter	Manufacturer's rating	Test result
Sensitivity	105dB at 1w at 1m averaged between 500Hz and 2.5kHz	98dB at 1w at 1m averaged between 300Hz and 3kHz — see text
Useful frequency response	55Hz-15kHz unqualified	80Hz-17kHz at -12dB with HF attenuator set at mid position
Rated input power	300w cont. sine wave 600w cont. program	Confirmed at 300w RMS sine wave
Distortion	Not stated	Better than 10% at 300w RMS sine wave at any frequency above 50Hz
Impedance	8 ohms	7.5-25 ohms
L.F resonance	Not stated	110Hz
Polar response	60°H x 40°V at -6dB	28°V x 112°H at 1kHz 30°V x 62°H at 2kHz 120°V x 38°H at 4kHz 64°V x 44°H at 8kHz 105°V x 78°H at 16kHz } included angle at -6dB

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Speakercheck

tion, but this would without doubt give rise to power handling and sensitivity problems if the present 300 watt sine wave and high sensitivity ratings are to be preserved. The present arrangement is probably a sensible compromise in view of the 4680's intended application.

There are one or two aspects of the mechanical design that in my opinion could usefully be improved. The first is the positioning and type of carrying handles, which are recessed into the sides, top and bottom of the moulded cabinet. Unfortunately, the sides handles are so positioned that the cabinet is top-heavy and tips over when lifted. If these were repositioned any higher, they would be too high to be used at all, as at normal carrying height, the cabinet bottom would not clear the ground! The top and bottom handles are such that the cabinet must be laid on its face before these can be used! The other point is the use of jack sockets as an input connector to a loudspeaker system with a 300 watt continuous sine wave rating! I am even more surprised to find that a link out jack is also provided, which means that up to 600 watts could be fed via the first jack socket if two 4680 columns were used together. Electrically, at 300 watts there will be 49 volts across the jack socket, and currents of over 6 amps will be present. At 600 watts, this current would rise to over 12 amps — which is almost as much as the current taken by a 3kw electric fire from the mains! I am amazed that an otherwise superbly engineered product from a manufacturer of JBL's repute should fall down due to lack of attention to such obvious detail.

As I said at the beginning, a most interesting product. It performs very well indeed, with high sensitivity, very high power handling capability, generally useful dispersion and is very nicely made. Application wise, the falling off in frequency response below 150Hz dictates its use as a vocal projector system, or for the lighter types of musical instrument such as acoustic guitar, clarinet, saxophone, flute, violin, etc. There is no way that the 4680 is suitable for a fully miked up rock band, as the bass guitar, bass drums and electric keyboards will make demands that this type of loudspeaker is physically not able to meet. It is by far the best column loudspeaker I have yet encountered despite the reservations mentioned and if used for its intended purpose, is capable of a very high standard of performance indeed.

Ken Dibble

Understanding Synthesizers

Part 9 By Tony Horsman

Last month I introduced filters and explained how they are used to alter the tone quality of sounds produced by a synthesizer. A filter is an amplifier with a specially designed frequency response, which in effect changes the relative strengths of the harmonics in the waveform present at its input. The most common type of filter found in all synthesizers is the low-pass voltage-controlled filter (VCF). Low-pass filters do not alter the amplitudes of harmonics in the input waveform lower in frequency than a particular value called the "cut-off frequency." Their function is to reduce

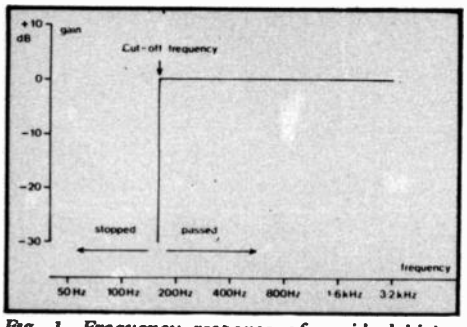

Fig. 1. Frequency response of an ideal high-pass filter (HPF).

the amplitude of (or cut off) harmonics with frequencies *above* this value. If, for example, a sawtooth waveform is sent into a low-pass filter and the cut-off frequency is reduced, the sound becomes progressively more mellow as more and more of the harmonics (which give the sawtooth wave its characteristic harsh sound) are removed. In the low-pass VCF, the cutt-off frequency is determined by a control voltage, so when the control voltage is reduced the emerging waveform contains fewer and fewer harmonics.

There are two other types of filters called "high-pass" and "band pass" and I shall describe these next, before explaining how the resonance control alters a filter's frequency response.

High-pass Filter

Wheras a low-pass filter is used to remove higher harmonics, the high-pass filter (HPF) is used to remove (or reduce in amplitude) the lower frequency components of a waveform. If, for example, a string sound was being synthesized using the sawtooth waveform from the VCO, the sound could be made more "biting" if the waveform was first passed

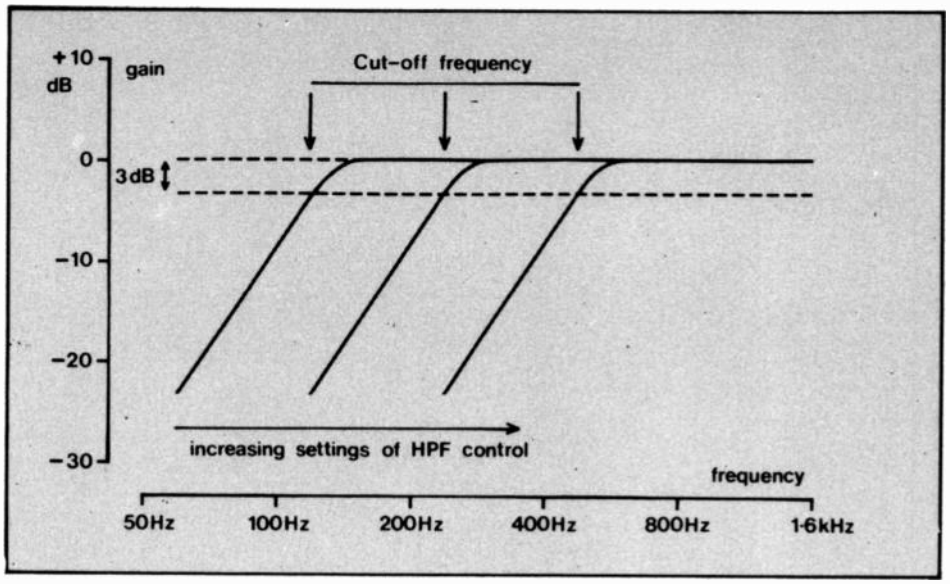

Fig. 3: Effect of varying the position of the cut-off frequency slider of a high-pass filter.

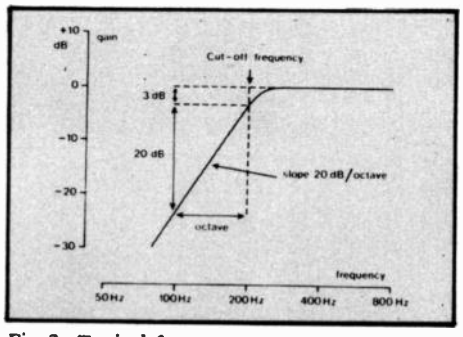

Fig. 2. Typical frequency response of a synthesizer's high-pass filter, showing how the cut-off frequency is defined.

through a high-pass filter, thereby reducing the strength of the fundamental and effectively emphasizing the higher harmonics. Fig. 1 shows the frequency response of an ideal high-pass filter: all frequencies (or harmonics) above the cut-off frequency are passed from input to output with no change in amplitude and all frequencies below the cut-off frequency are totally removed.

Fig 2 shows a more realistic frequency response, with a more gradual attenuation (reduction in amplitude) of the harmonics below the cut-off frequency. As in the case

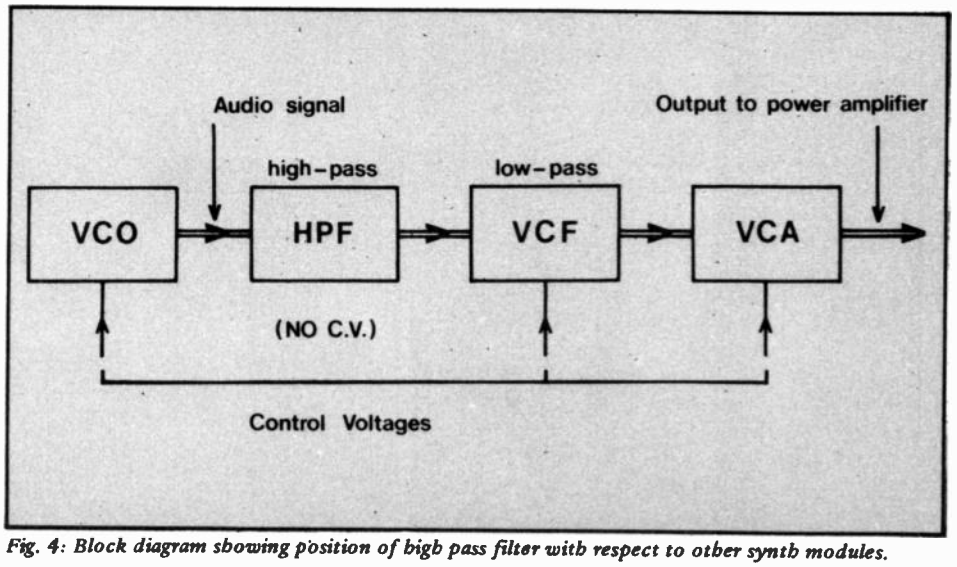

Fig. 4: Block diagram showing position of high pass filter with respect to other synth modules.

of the low-pass filter (see last month), the cut-off frequency is defined as the frequency which undergoes a 3dB reduction in amplitude, the slope of the frequency response below this frequency is typically 20dB per octave.

On most synthesizers, the cut-off frequency of the high-pass filter is not voltage-controlled and is adjusted manually with a slider which is often the only control for this module. Fig. 3 shows the effect of moving the slider on the HPF's frequency response: as the setting is reduced, the cut-off frequency is lowered. When this frequency reaches about 20Hz, the HPF will appear to have no effect—frequencies below 20Hz are inaudible. Notice that to make the HPF ineffective, the cut-off slider of the HPF should be set to minimum. To make the VCF ineffective, the cut-off slider should be set to maximum.

Fig. 4 shows the usual position for the high-pass filter, after the VCO and before the low-pass VCF. The HPF is used when synthesizing rather "thin" sounds like strings (cello, viola, violin, harpsichord and oboe) and is also used to produce fuzz-guitar sounds in which the fundamental is weak.

Band-pass filter

Looking again at Fig. 4, you will see that two filters follow one another. What is the combined effect of two filters in series like this? The high-pass filter will remove the frequencies below its cut-off frequency. What's left goes on to the low-pass filter which removes frequencies above its cut-off frequency. So only frequencies between the two cut-off frequencies are passed through the two filters in series. (The cut-off frequency of the high-pass filter must of course be below that of the low-pass filter otherwise nothing at all would emerge!)

The two filters together (i.e. and HPF and LPF in series) form a *band-pass filter* which has the type of frequency response shown in Fig. 5. This diagram shows that a band-pass filter allows through it a range of frequencies which can be selected at will by setting the cut-off frequencies.

Resonance

The controls which alter the cut-off frequencies of low-pass and high-pass filters do not modify the *shape* of the frequency responses which are always flat up to (or down to) the cut-off frequency and then decrease with a fixed slope usually of the order of -20dB per octave. In addition to the (initial) cut-off frequency control (see last month), the VCF module on most synthesizers contains a very special control called "resonance." (The resonance effect is usually, but not necessarily, restricted to low-pass filters.) In contrast to the cut-off frequency control, the resonance control modifies the shape of the frequency response and has little or no effect on the cut-off frequency.

The markedly changed frequency responses produced increasing settings of the resonance control in a low-pass filter are illustrated in Fig. 6. The most obvious feature of the modified response is the peak just below the cut-off frequency. (If the cut-off frequency is moved, the peak moves with it.) As the setting of the resonance control increases, the peak becomes more striking because the frequency response to the left of the peak is ▶▶

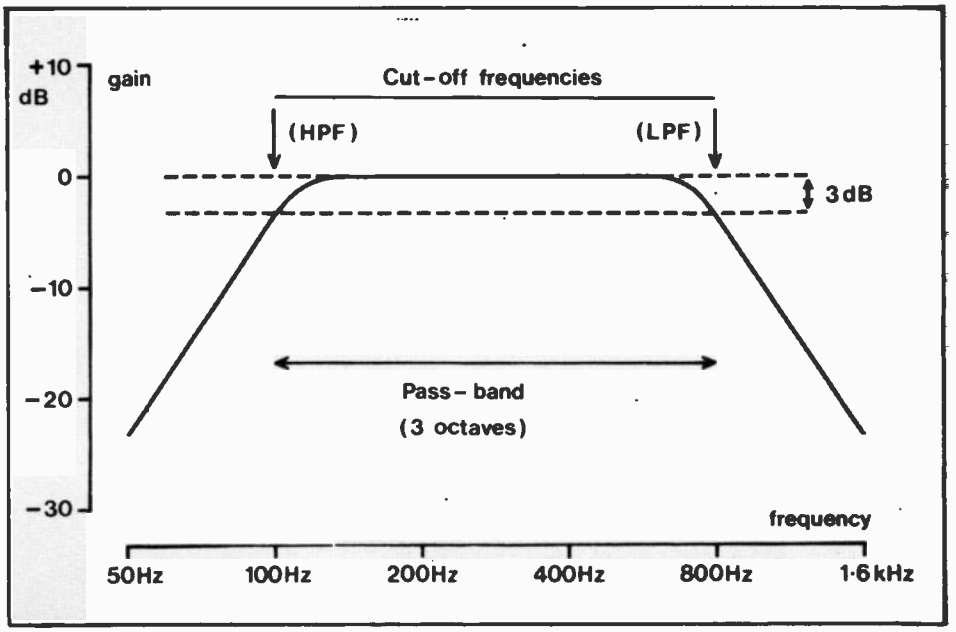

Fig. 5: Frequency response of a band-pass filter showing the two cut-off frequencies. This type of response is produced by a high pass filter and low pass filter in series.

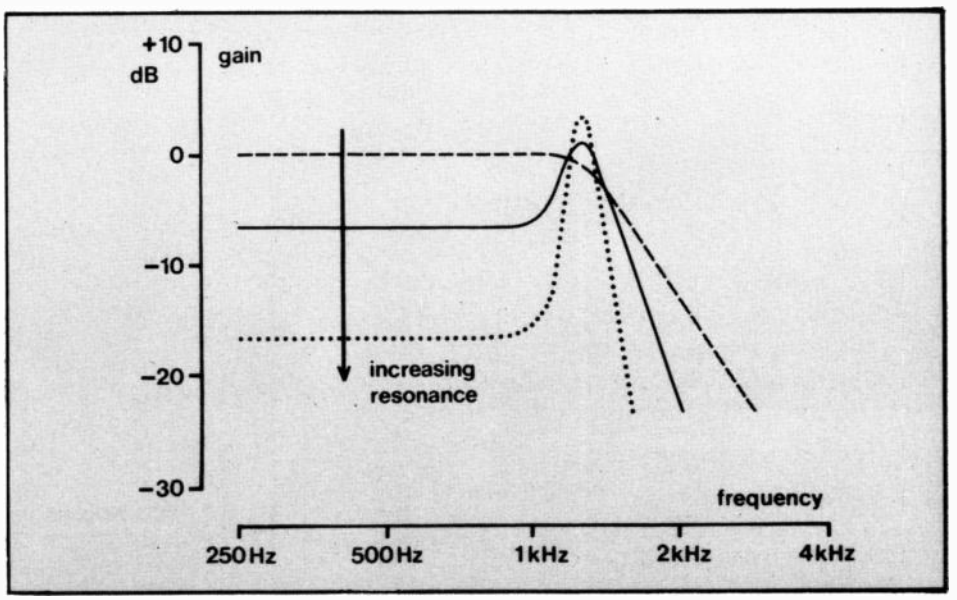

Fig. 6. Effect of increasing setting of resonance control on frequency response of a low pass filter.

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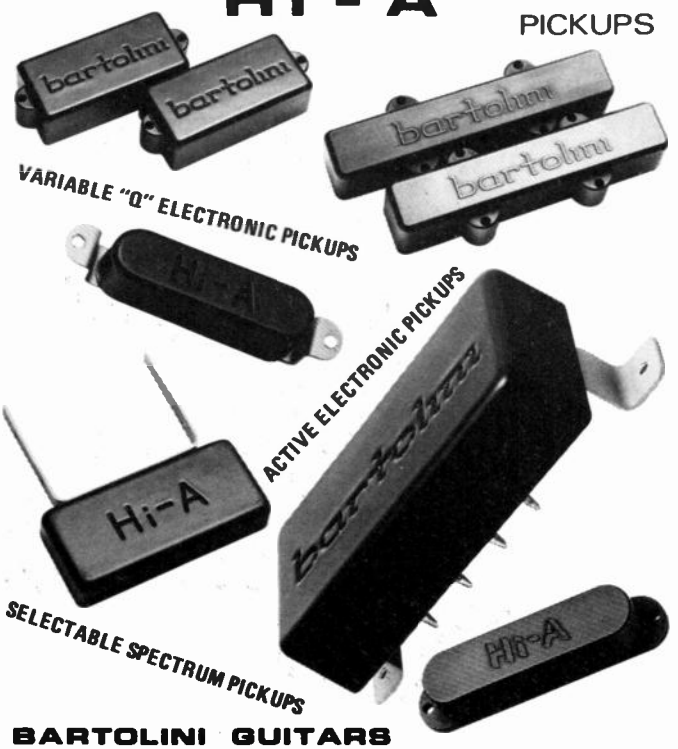

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progressively reduced. This is something which is quite commonly misunderstood: the resonance control hardly increases the amplitudes of harmonics near the cut-off frequency at all, but does effectively emphasize these harmonics by reducing the amplitude of harmonics well below the cut-off frequency. (As a matter of fact, the resonance control also usually steepens the slope above the cut-off frequency.)

Self-oscillation

At high settings of the resonance control, the frequency response of the VCF begins to look like the response of a narrow band-pass filter, and, finally, when the resonance control is advanced far enough, the filter will actually start oscillating to produce its own output waveform. This phenomenon is called "self-oscillation" and is usually avoided unless a special effect is required. However, these oscillations produced by the VCF possess two useful features. First, the oscillations have a sine waveform (see Part 2), a waveform which is often not available from the VCO; and secondly, the oscillations occur at (or near to) what was the cut-off frequency. Last month, I explained that the keyboard voltage is usually one of the control inputs to the VCF (the control voltage determines the cut-off frequency), so you can imagine that a self-oscillating filter can be "played" in the same way as a VCO. In fact, if the resonance control is advanced far enough, the VCF effectively becomes a VCO.

Audio-signal input mixers

In the articles about the VCO, VCA and VCF modules (Parts 4 onwards), I described how in each module control voltages from a variety of sources are added together in an input control voltage mixer to produce one final control voltage which determines the frequency (VCO), amplification (VCA) or cut-off frequency (VCF). Apart from the very simplest synthesizers, most synthesizers also contain facilities for adding (i.e. mixing) together audio signals. More often than not, these audio signal mixers are associated with a specific module. Fig. 7 makes this clearer: it shows the audio-signal input mixer for the HPF in a two-oscillator synthesizer. The amount of audio signal reaching the HPF from the two VCOs can be independently controlled by adjusting the appropriate input level controls.

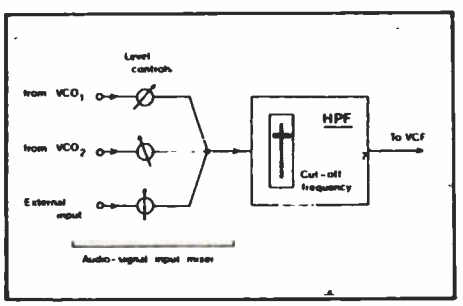

Fig. 7. Audio-signal input mixer for the HPF in a two-oscillator synthesizer. An external input allows the HPF, and following VCF and VCA, to modify sounds from other instruments or from a microphone.

The same figure also shows an external input connections, with its own level control. This is a point at which a signal from an external instrument such as a guitar could be connected directly into the synthesizer. The HPF and following VCF and VCA would then modify the sounds produced by the instrument according to the settings of the various HPF, VCF and VCA controls. For example, a keyboard player could chop up sustained chords produced by a guitarist in rhythm with his own solo. The possibilities are endless!

In this series I have now covered the essential features of most synthesizers, although there are several other modules (including the ring modulator and sample-and-hold module) to be introduced before moving on later to sequencers and polyphonic synthesizers. However, before I introduce any more modules, next month I am going to summarize the contents of Parts 1-9 in a article which will describe a complete basic synthesizer.

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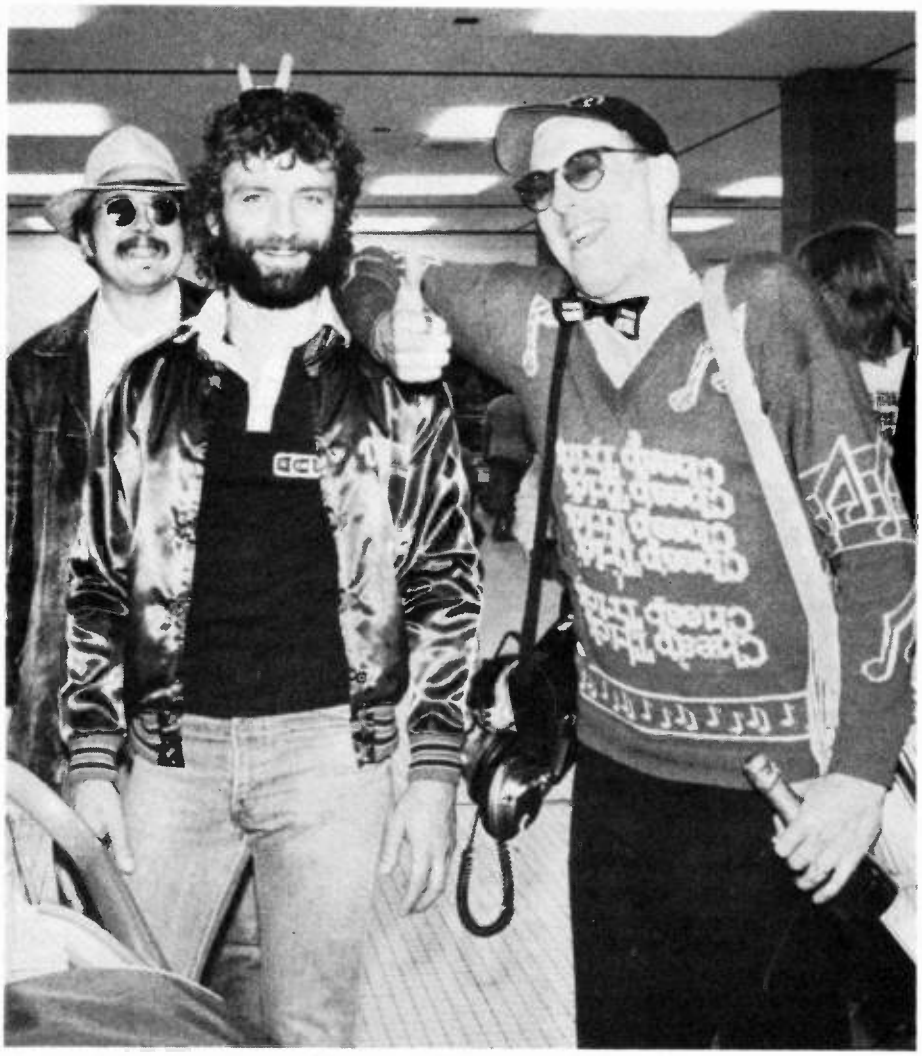
On the Road

DAVE WILMER... Rick Nielsen's Guitar Roadie

As the individual musicians from contemporary rock & roll bands take an ever-increasing amount of sophisticated and valuable equipment on the road with them, the need for particularized attention and handling from certain members of the road crew grows in direct proportion. The concept of "guitar roadie" is a fairly new wrinkle evolved over the last decade to insure a certain professional standard in the handling of perennial problems like tuning, re-stringing, repair and cleaning, theft and shipment of instruments, both individually and *en masse*.

One leading guitarist who seemingly might have more problems than most is the effervescent Rick Nielsen of Cheap Trick. Nielsen takes an average of 30 guitars on the road with him (Hamer "Explorers," Gibson Les Pauls and Fender Strats primarily) and many of these are older, very valuable models. Add this to the fact that Cheap Trick is on the road for close to 200 days a year and that Nielsen, contrary to his nonchalant "public" attitude about instruments, is actually very knowledgeable and finicky about the playability and sound of his guitars, and you have some potentially major problems/responsibilities for the one in charge of overseeing this moveable feast of electric instruments.

Fortunately, Dave Wilmer, a former musician and stagehand who hails from Cheap Trick's home turf around Rockford, Illinois, has the kind of down-to-earth, level-headed outlook (a characteristic of everyone associated with the band) that makes him perfect for the job. In an effort to nail down some of the particulars of a job that encompasses everything from watching over and servicing Nielsen's guitars both on and off the road to catching random instruments when they come flying over the amplifiers, IM&RW talked with him via telephone during one of Cheap Trick's rare tour breaks.



From left to right: Bun E. Carlos, Dave Wilmer, and Rick Nielson.

What is your background? Were you a musician or guitar repairman?

I was a musician first—not that extensive—I played guitar for a while, drums for a couple of years. A little bit of keyboards.

How did you get into this particular line of work?

I started as a stagehand in my home town and eventually met some people from Cheap Trick. They were looking for someone to work for them and they just called me up. ▶▶

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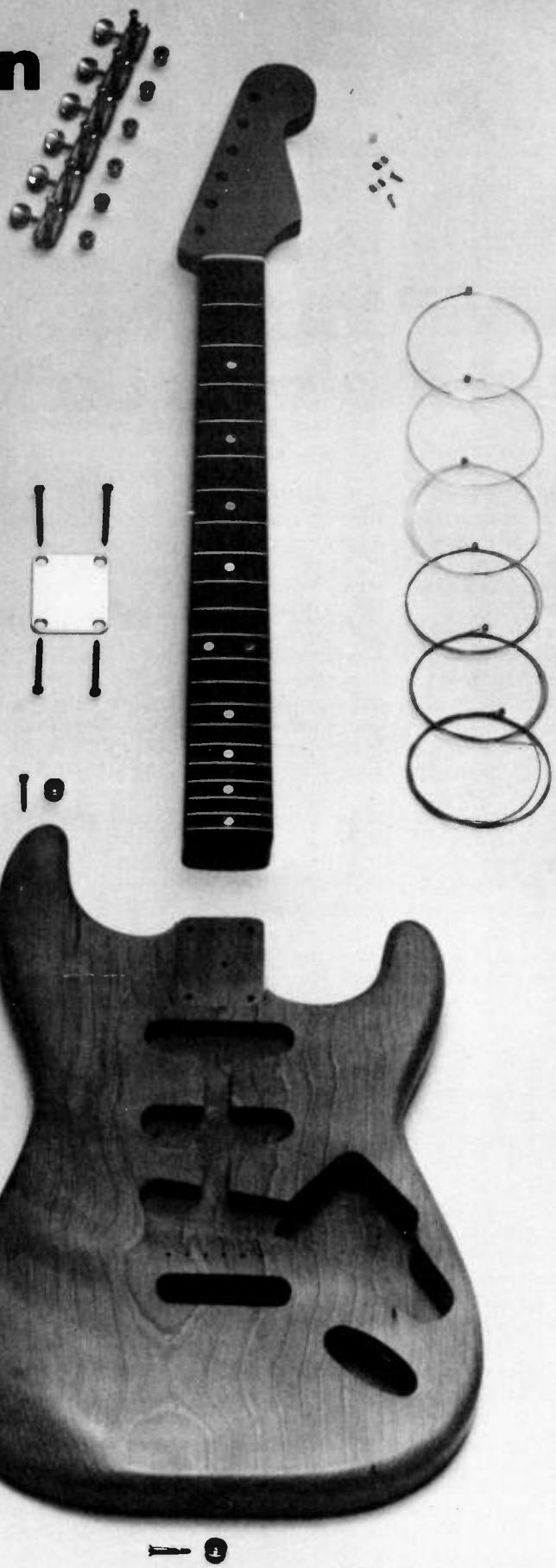

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On the Road

You started off as a regular roadie and the job evolved from there?

Right.

What is your basic job or funcion vis a vis Nielsen's guitars?

Just to keep them in good shape, basically. So that they're playable and sound good, so they sound the way Rick wants 'em to sound.

Do you re-string all of the guitars every night?

Some I do every night, some I do every two shows, some every three shows and so on. Depends on how often Rick uses them in the show.

Can you do most any repair work Rick might require on the road?

Yeah. I can do just about anything—the only thing I can't do is re-fretting the guitars. For stuff like that, I just send the guitars to Hamer in Chicago and they can do them for me. There are people in L.A. who can do it. So I just take it to them and they do it in a couple of days.

How about different weather conditions—like heat and humidity—when you're traveling across the country? Do the guitars catch hell?

It affects them to a point, but not real seriously. The major problem we have is a sharp increase or decrease in temperature over a real short period of time. Once the guitars are acclimated to a particular climate for a week or two it doesn't make that much difference, but a real sharp change can knock the tuning off or, if it's really extreme, you can get "checking."

Are the guitars shipped separately or with the rest of the equipment?

With the rest of the equipment.

What kind of cases do you use?

I like to use the big "trunk" type of case with four different slots in it and foam rubber around the whole thing. Inside that, we'll use the regular soft-shell cases instead of the single flight cases 'cause they're so bulky. It's a more efficient way of moving them around.

What kind of strings does Rick use? How many do you buy at a time and where do you buy them?

Fender F-150's. I buy about six or seven dozen sets at a time. There's a certain music store in Madison where we get 'em.

How about the picks which he gives away so generously?

We get them made at a company in New York (D'Andrea Mfg., Syosset NY Ed.). They're white mediums with a picture of Rick on one side and Cheap Trick on the other. I buy about 200 gross at a time—just for Rick.

With that many guitars on the road, especially "old & rare" models, is theft a problem?

You always have to have a lockable tuning room and you get the only key. That's the first thing you find out about when you walk into a hall—the most important thing is find out *early* in the day. If they're pretty much under lock and key, it's hard for people to get access to them.

Does Rick ever carry guitars with him?

He takes some on the bus with him when they're playin' sometimes. He brings them by himself for himself, independent of the ones I handle.

What's the "best" part and the hardest part of your job?

Seein' the world for free is the best part. Too many guitars can be a headache sometimes.

What's the average amount you have "out" for Rick when traveling?

I take 19 out for Rick every show, but I have more with me. There's a total of 33 on the road. He can't fit 'em *all* into one set.

Does he absolutely have *to use a certain guitar for certain tunes?*

He doesn't absolutely have to. He usually does because it's a lot easier on me, for one thing. If I know he wants X guitar for a certain song. But he changes 'em around.

Rick has been known to throw guitars up and over the amplifiers at certain parts of the show. Are you the one on the other end?

Yeah. (laughter) Sometimes I have to catch up to three a night.

You just sit back there and catch them bare-handed?

Yeah, it's kinda like playin' baseball.

What do you do when Cheap Trick is off the road.

Not very much. As little as possible.

There are no regular repair stops for the guitars when you're off?

No, not really. Just once in a while when the frets are worn and the guitars need re-fretting. If a guitar doesn't play properly then it's time to get it fixed. You do it whenever they need it, not at a particular time.

Rick has an eclectic collection, to say the least, that includes Les Pauls, Fender Strats and Hamer "Explorers." Which ones are the easiest or hardest to work with?

The Les Pauls are the easiest. The Strats are pretty easy. The Explorers aren't *too* bad, but I don't want to say which one's are the worst. Let's just say that the Les Pauls are the easiest to maintain.

Are there other guitar technicians in the Cheap Trick crew?

Yeah, Buddy Miller. He takes care of Tom's basses and Robin's guitars.

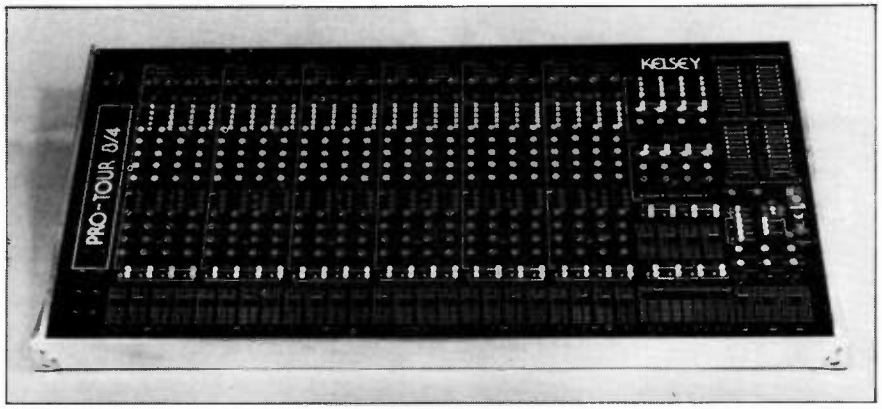
What kind of guitars does Zander use?

He's got two Rckenbackers and a Hamer.

Jean-Charles Costa

On the Road

NewProducts



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Kelser puts 8 into 4

Recently introduced by Dallas Music Industries, the Kelsey Pro-Tour 8/4 Series Mixer offers a variety of features including zoom automation, gain status indication, multi-buss mixing, complete patching facilities, eight peak-level arrays, quiet operation and ease of handling. Equally at home on the road or in the studio, the Kelsey 8/4 series has an expandable format from 8 to 48 input channels in multiples of 4. The input channels may be simultaneously mixed down to 8, 4, 2 and 1 outputs with 4 separate sub-mixes for effects or monitors.

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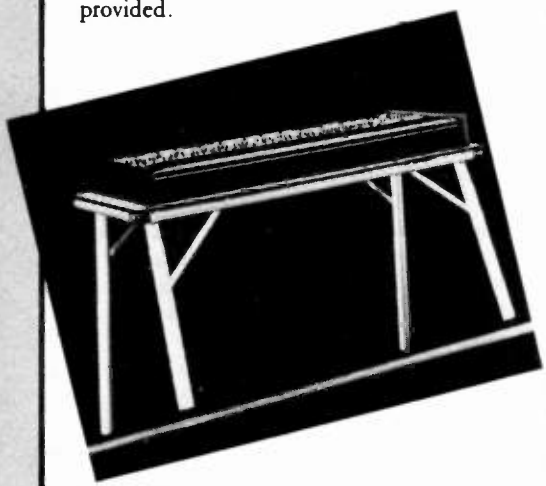
Ultimate Support System's "Versa-Table" is said to "perfect" support for mixing boards, projectors, lighting controls, keyboards and sound equipment. It has independently adjustable legs (seven height settings on each leg) and the absence of long braces allows the Versa-Table to straddle a row of seats in an auditorium, sit squarely on uneven ground and provide the user with a smooth, tiltable surface. The table top measures 22" x 44" and can support up to 260 lbs. The table weighs only 13 lbs. and can be set-up in less than a minute. A waterproof nylon tote bag and carrying handle are also provided.



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White's Signal Analyzer

To support their two new "one-sixth" active equalizers—the model 4240 and the model 4310—introduced at the recent A.E.S. convention, White Instruments has announced it is in full production of the new System 200 Signal Analyzer. This unit features interchangeable filter sets, total software dependent microprocessor control, RT-60, eight non-volatile memories and dual mode display.

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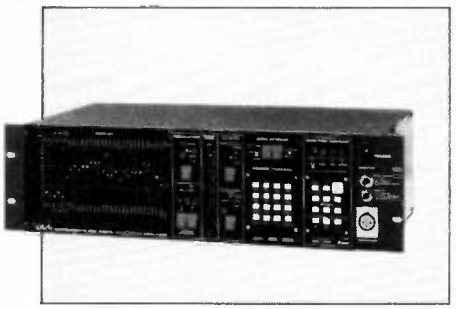

QSC A 42 Power Amplifier

QSC Audio Products recently introduced a series of six new power amplifiers featuring balanced inputs with dual XLR connectors, light weight and compact size, "extreme" ruggedness, DC and sub-audio output protection, a "highly effective" cooling system and dual power supplies. Per channel powers are 80, 125 and 200 watts at 8 ohms and 120,000 and 325 watts at 4 ohms with the power rated at 0.1% THD and 0.05% IM distortion 20-20kHz.

The unusually small and light configurations are made possible by the aforementioned cooling system which utilizes flow-through ventilation, a light-weight high-turbulance heat sink structure, direct-mounted power transistors and a thermally activated two-speed fan. Calibrated gain controls and mono-bridging switches are standard and the A 42 model also features QSC's PowerLimit control which enables the operator to prevent clipping and adjust the output power of each channel to protect delicate loads. The A 42 also features LED level displays, distortion indicators and PowerLimit indicators. Dimensions of the A 42 are 5¼" tall, 19" and 10¼" deep and the weight is 33½ lbs.

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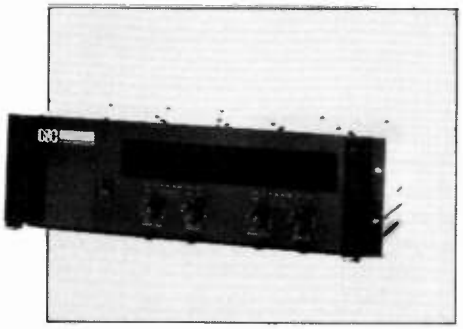

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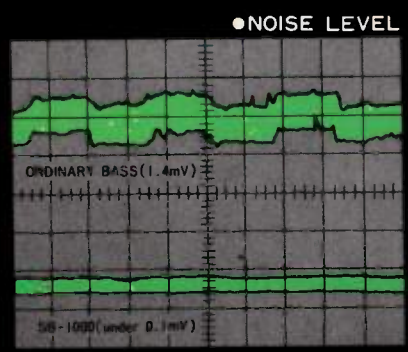

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The name Picato is now known throughout the world as a leading make of strings, manufactured and distributed by a British company, General Music Strings. In this highly competitive market they have built up a reputation for producing strings of the finest quality.

From a small factory on the Treforest Industrial Estate, just outside Cardiff in South Wales, GMS exports strings of almost every description to some 80 countries. As string makers for more than half a century the company is well equipped to maintain its position as a leading international manufacturer.

It is a family business with a history which stretches back to Austria prior to the outbreak of World War II. String manufacturer Mr. Michael Stein and family left their native Vienna to settle in Britain and set up GMS on the Treforest estate in 1939. Today the family tradition is being carried on by his son, chairman and managing director Mr. Alfred Stein.

Sales Director Dave Martin

Sales Director Dick Roberts

Although much is made of the fact that among the stars who endorse Picato are electric guitarists of the calibre of Ritchie Blackmore and Peter Frampton, one of the company's main strengths is the wide variety of strings it produces. From violins through to harps, all are a speciality and GMS even make drum snares.

The two men who have been taking the name Picato to the far flung corners of the earth are Sales Directors Dave Martin and Dick Thomas. On tours across America, Europe and into the Far East they have been opening up new markets for GMS.

Dave and Dick have been involved in the music business in one way or another for most of their lives. It was 22 years ago when Dave took his first job in one of London's West End music stores, and his knowledge of the trade is immense. Dick was the bass player in a well known British band of the Sixties, Sounds Incorporated.

Working as a team they cover thousands of miles every year, talking to musicians and building up new contacts. Says Dave: "I've been with the company for eight years and in that time I've been around the world three times. You've got to have people traveling more or less full-time and it's not just a question of calling on distributors. It's important to meet musicians and visit music shops. You have to look at strings as you would an instrument and not just as an accessory line."

No matter how powerful their sales drive across the continents of the world, they would be hard pressed to keep Picato in the forefront if it were not for the back up provided by the factory. This large international operation has evolved over the years into a tightly knit and efficient chain, with GMS manufacturing, packaging and distributing their products from the same base.

The machines which seemingly by magic spin either the gut, nylon or wire used in the production of their vast range of strings, were actually made by the company's own engineers. All the strings are hand worked on the machines to the special type and gauge required. GMS also use a limited number of automatic machines which allow for continuous 24-hour production. On the factory floor, the strings pass through the various stages of production, undergoing selective quality tests before they are finally deemed to be up to standard.

As Dave commented: "The secret behind the success of our electric guitar strings, is the fact that we use a very magnetic wire which is especially responsive. They have a very distinctive sound of their own. I can distinguish the sound of a Picato string from any other."

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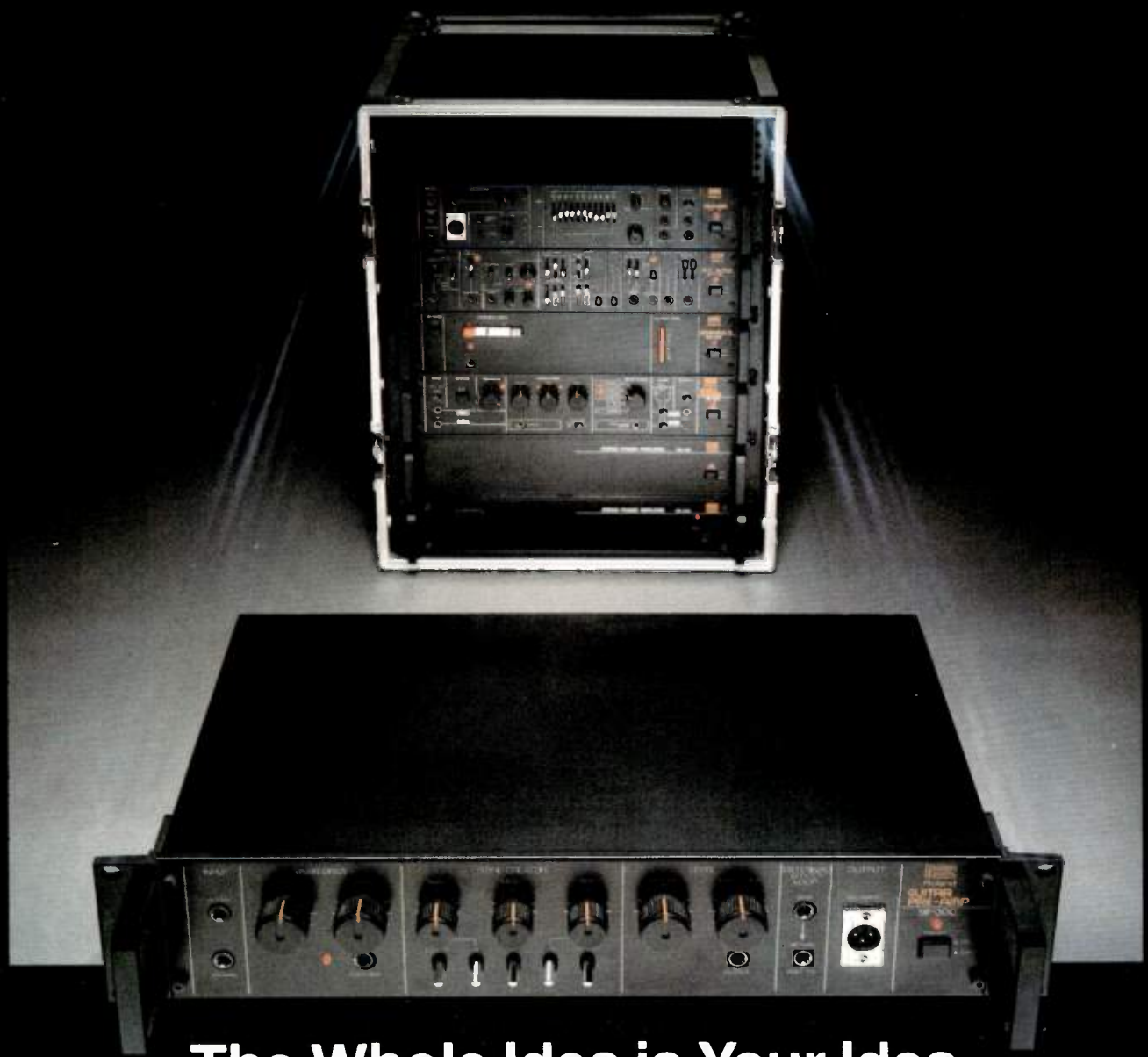

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To really show you our stuff, Ibanez dealers are now featuring a select group of acoustics that should please every taste. These guitars are our choice of what we feel are the best values in our wide line.

So take your hands and ears down to your participating Ibanez dealer today and see what we mean. See how easy it is to step ahead to a fine acoustic — Ibanez.

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The Studio ST-50 and Artist AR-50 rock straight ahead and steady with fast playing maple necks that are solidly built into the body for stability and sustain. The ST-50 has a solid mahogany body and two sweet singing Super 70 humbuckers. The AR-50 has a carved maple top and a pair of scorching V-2 humbuckers.

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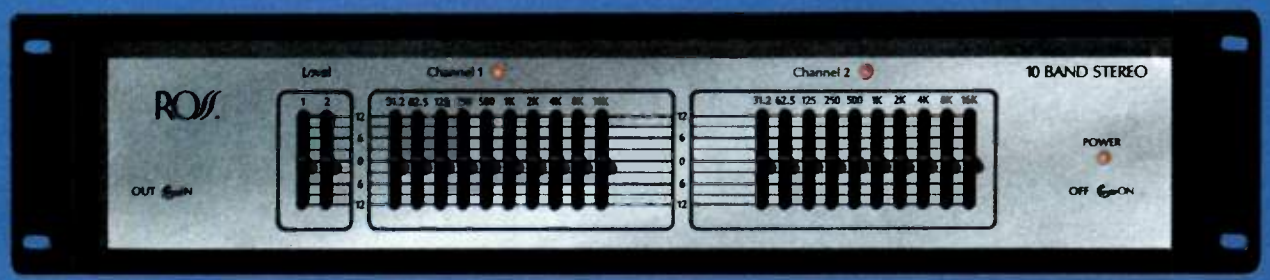

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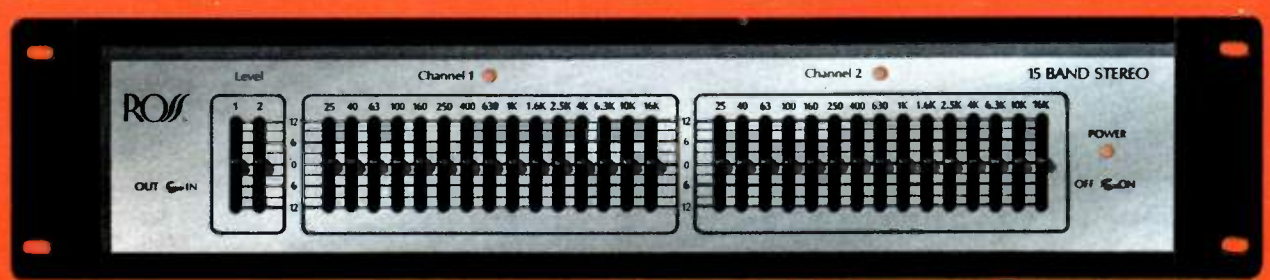

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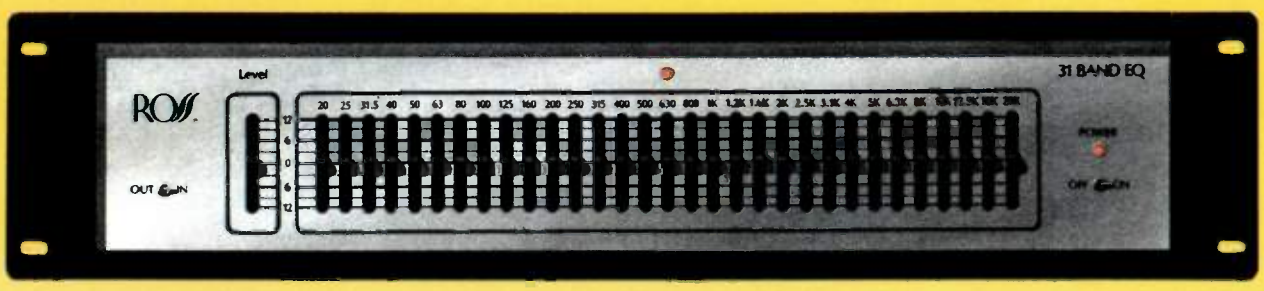


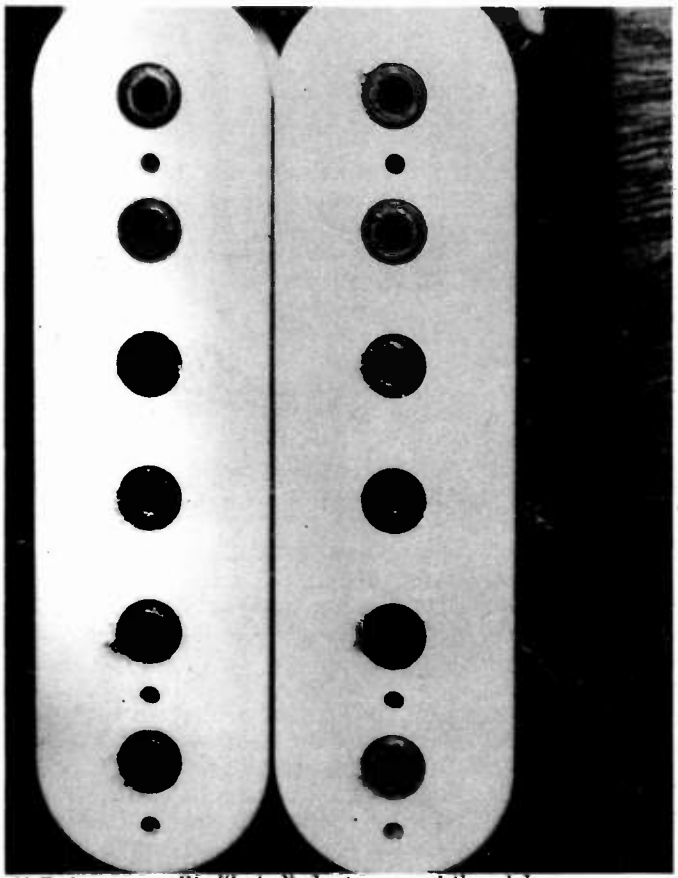
$299.95

Stephen discusses magnetic fuzz and how to get rid of it.

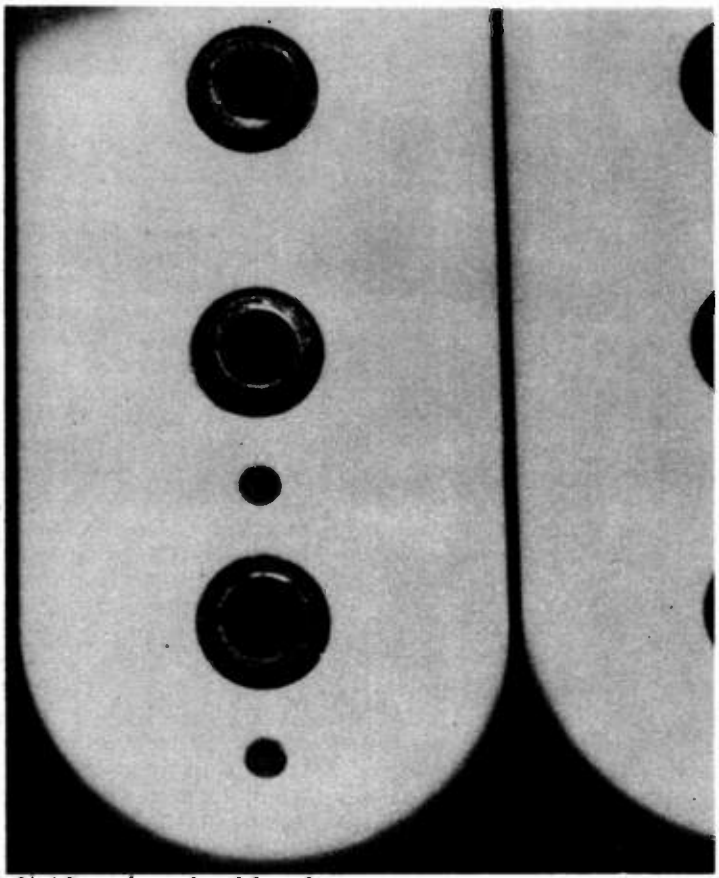
If you are planning to buy some better/different pickups for your guitar or bass, it can be rather difficult to decide whether one company's "Blue Suzzie" is the same as another company's "Laid-back Eric" and whether either of these is better than a third company's "Super x-27 mark 4". As far as I can see, almost everyone claims that their super high-output pickup is better than other super high-output pickups, and most of them can produce pictures with squiggly lines to prove it! On the same principles, there are several "vintage" pickups available from different makers, under different names, and while the ones I have tried are all good and useful pickups, none of them sound exactly like any one of three genuine "patent applied for" Gibson pickups which I use for reference. This does not seem unreasonable, since none of my original "patent applied for" Gibson pickups sounds exactly like either of the other two.

Now if this is confusing for me, it must be several shades worse for the poor fellow who knows what sound he wants, but doesn't really want to buy 20 pickups, to be sure of getting two which are right for him. It would be foolish of me to attempt to grade pickups and announce which are the 'best': for a start, there is no arbitrary *"best"*. There is no international standard method of measuring pickups, and any manufacturer whose pickups I placed low on the scale of desirability would be free to prove me "wrong" by using a different grading system which happens to favor the characteristics of his own products. In any case, if there were such a thing as a "best" pickup for any particular job, nothing stays secret for very long, and most other manufacturers would soon start making the same thing. It is possible that some pickup companies are making more-or-less the same product in certain cases

At least part of the assessment of pickups must be subjective. As I have a profound distrust of committees, this means I would have to express an opinion on various pickups, based on my own dreams, my own prejudices, and my own musical upbringing. Although this is useful additional information, it is not a sensible basis for a comparative review of accessory guitar pickups. We could easily



1) Before: metallic "hairs" cluster round the pickup



2) After: cleaned and fuzz-free

spend the next 10 years arguing the relative merits of competing pickups, setting one professional expert against another, and employing more and more complex measuring techniques. While this might be fun for me, it would be of little use to you. We would merely replace conflicting advertising claims with conflicting experts and conflicting sets of numbers. Net progress for our readers' enlightenment about pickups — approximately zero!

For example, there is one group of vintage-type humbuckers, one group of high-output humbuckers, one group of "Strat"-type pickups, and so on. Some companies give you more comprehensive wiring diagrams than others. Some pickups are supplied with hardware included in the price: others are not.

This will not tell you which is the best pickup in each group, but it should enable you to make up a short-list of a few units which seem most suitable for your own needs. If you have very specific requirements, you may even be able to pinpoint exactly the most suitable pickup *for you*. Alternatively, you may conclude that you already have the most suitable pickup(s) for your own circumstances, and save yourself some wasted time and money.

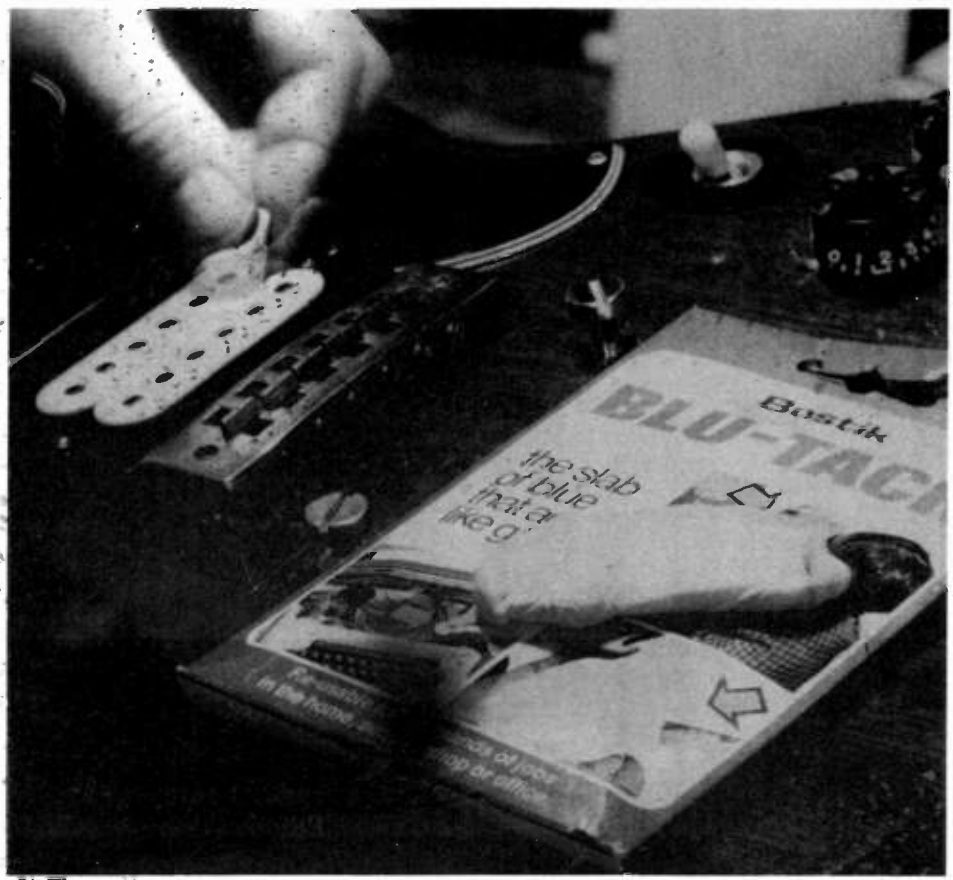
Meanwhile, there is something you can do which costs practically nothing, is unlikely to do any harm, and may improve the sound of a pickup which has had a few years' use and doesn't seem to be quite as good as it used to be.

Photo 1 shows such a pickup. Instead of changing it, I took a close look at it, and saw that it was covered with a sort of magnetic fuzz, attracted and held by the field from the pickup. This is fairly common on old guitars, but it is usually mixed with dust and greasy debris, and difficult to photograph clearly. On this occasion, the metallic hairs were still bright and clean and relatively easy to photograph.

I have found that one can often improve the sound of a pickup in this state by carefully removing all the fuzz. It is sometimes possible to see sections of this fuzz vibrating in sympathy with the guitar string. As this is likely to affect the distribution of the magnetic field within the pickup, it is not surprising that it can also affect the electrical output of the pickup, causing a muddy sound.

Although the contamination in photo 1 looks rather dramatic, it is usually less easy to see, and it is always difficult to remove. I used to use adhesive tape, but one day made the chance discovery that an adhesive putty sold in the UK as "Bostik Blu-Tack" did the job much more efficiently. In photo 3 you will see the phantom hand pressing a lump of Blu-Tack onto the pickup. If the putty is then peeled off gently, most of the contamination will come off with it, and can be kneaded into the center of the lump, thus exposing a fresh, clean, adhesive surface. The lump of putty can be formed into different shapes, for cleaning the less accessible parts of the pickup, and it is usually possible to leave the pickup and surround fixed in place on the guitar body. Photo 2 shows the same pickup after cleaning. The rest of the Blu-Tack may be used for a variety of purposes, some of which are listed on the back of the packet. It is good for fastening plans and charts to a fairly smooth wall.

STEPHEN DELFT



3) The putty process

A Stately Home Of English Recording
THE MANOR

Set deep in the heart of the Oxfordshire countryside of England, it's hard to decide if the Manor studio complex is an attraction to musicians because of it's beautiful setting or because of it's ultimate sophistication. One thing is certain, however, it all leads to a unique recording experience.

Originally Shipton Manor House, it was turned into a studio by Virgin Records boss Richard Branson some seven years ago and was completely rebuilt by Westlake Audio in 1975. The Manor has become one of Europe's premier studios.

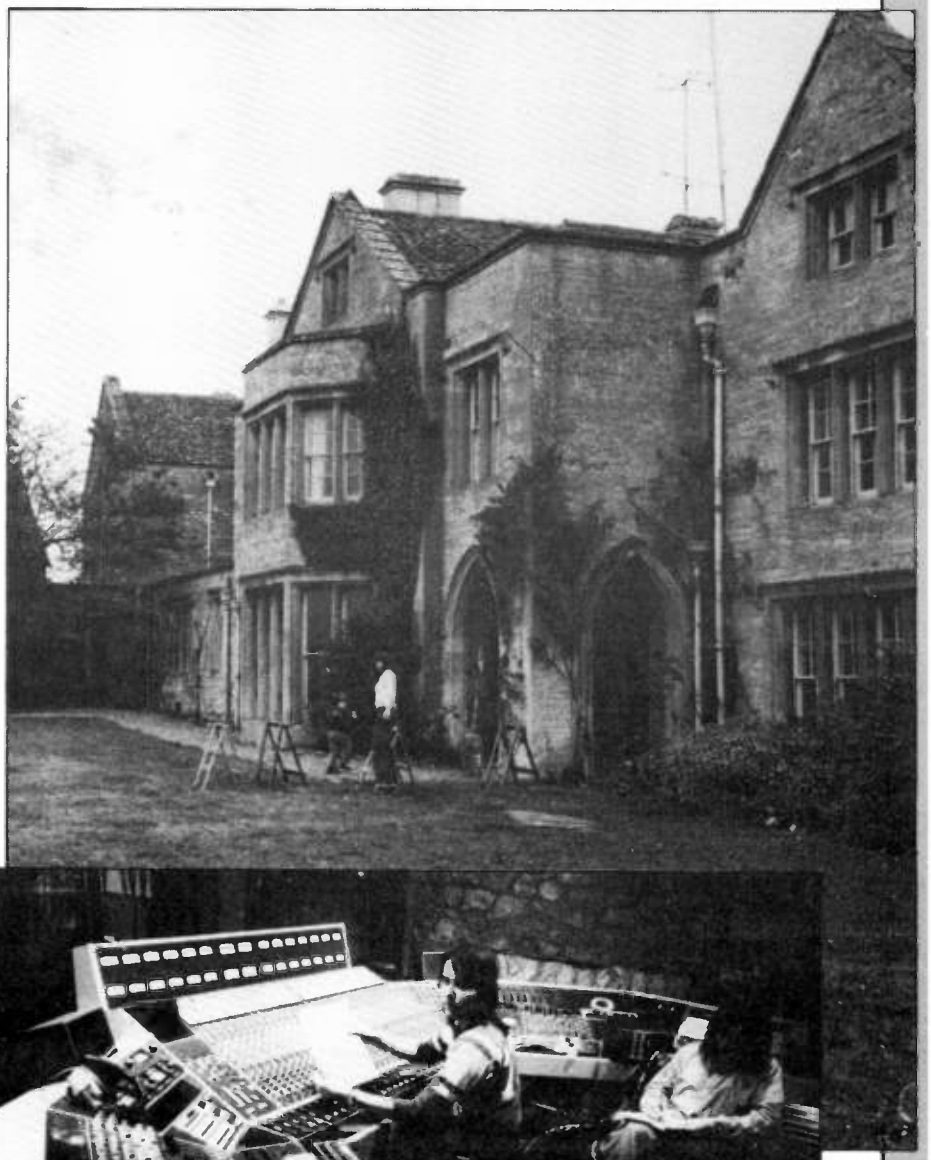
It is much more than just four walls where musicians come together to record, to most people working at The Manor is an event, which is why the studios are booked by the week rather than by the hour.

On the technical side, care has been taken to equip the studios with the best and most up-to-date hardware available. Westlake Audio installed 24-track facilities and a magnificent 32-channel mixing console which incorporates 32 inputs, four quad outputs and the API/Allison computerized mixing down system at a cost of $80,000.

Westlake Audio also designed the furnishings, speakers, monitor amplifiers, the shape of the control room and the actual placement of the mixing desks. Thanks to this close attention to detail, an "active trap" system has been set up which makes the use of large screens for individual instruments unnecessary and thus creates a more open studio atmosphere.

All the tape machines are Ampex, and only last year a new $50,000 MM1200 was installed. In addition to the 24-track, there are two AG440C four-track machines, a two-track AG440C and a four-track AG300. All machines are fitted with vari-speed and there are 32 channels of Dolby noise reduction as well as four channels of DBX available. Mikes include all the top names such as Neumann, AKG, Beyer, Shure and Calrec while there is a Bosendorfer grand piano and a Lowery organ complete with Leslie always on hand.

The Manor is best used for group work because it is both difficult and expensive to have session musicians to come down to Oxford from London. However, such is the excellent reputation of the studio, that tapes have been made at the Manor and then been taken to London for overdubbing of additional instruments.



THE STUDIO

The atmosphere of a studio is every bit as important as the technical hardware, and most musicians will agree that recording is one of the most demanding aspects of the profession — this is where The Manor scores heavily.

Apart from being set in 50 acres of beautiful Oxfordshire countryside it has its own swimming pool, tennis courts, go-kart track, eight comfortable bedrooms, billard room and a resident staff and chef to cater for every taste. The atmospher is completely different to that of a London studio, and if anything has proved too much for some customers who have spent so much time relaxing that their recording has had to be rushed.

A few of the people who have used The Manor are Queen, David Essex, Van Morrison and Kiki Dee.

Of course, acts come in all shapes and sizes with a variety of requirements and if a band can't make it to The Manor, then The Manor will go to them via the Manor Mobiles.

One has a Helios desk, 40 input channels all with equalization, two 24-track machines and 60 mikes while the other has a Neve desk, 24 input channels, six channel sub-mixer and a 24-track machine. Both trucks carry stereo machines and reverb facilities and have had on-location experience of recording an exceptionally wide range of music.

When recording a live concert, the mobiles usually make use of the PA mikes with split leads since the quality of stage mikes and studio mikes is very close these days.

The recording mix is completely separate from the PA mix and, since the groups are playing on an open stage and not enclosed by walls as in a studio, a good sound is easily obtained provided the venue has workable acoustics to begin with. After the recording of a concert, the tapes are handed over to the client who can mix them at the studio of his own choice. The mobiles are used extensively in Europe, especialy France and Germany and users include Be Bop Deluxe and David Bedford's Odyssey.

Inevitably, the facilities The Manor offers do not come cheaply and it will cost you about $1600 for 24 hour use of the studio which includes accommodation and meals. Mixing costs and the final master tape are included inthe fee and there are no evening or weekend surcharges. The Manor Mobiles cost roughly half that of the Oxford studio.

However, those who feel these costs are extravagent would do well to consider the Westlake Audio guarantee of an acoustic characteristic in the control room that is vitually flat (within 0.5dB) between 30Hz and 18kHz.

Few professional keyboards stack up to the ARP Omni-2.

There are scores of keyboards available to the professional musician. But only a handful have earned a reputation for great sound, ease of play, and reliable performance. The ARP Omni-2 is one of these classic musical instruments.

It's the sound.

First and foremost, the ARP Omni-2 possesses a tremendously satisfying *sound*. Authentic strings, punchy brass chorus, realistic harpsichord, and a variety of polyphonic keyboard effects can be layered one atop another to produce a rich and full accompaniment to virtually any musical style—jazz, disco, country, rock, and more.

ARP's patented filters, oscillators and chorus phaser deliver the kind of dramatic realism that imitators promise yet fail to deliver. Built-in waveform enhancement and complete envelope generator give you all the control you need for backup string lines, horn accents, and polyphonic synthesizer sounds including clavichord, pipe organ, and electronic piano.

It's human engineering.

Playing the Omni-2 is as gratifying as hearing the Omni-2. All functions are located in logical order, with electronically activated viola, violin, cello and bass voices on the right side, variable synthesizer controls on the left side, and volume and mix controls conveniently located in the middle. LED status indicators let you know which functions are in use, even on a darkened stage. Optional foot pedals and switches control filtering, volume, and sustain. And stereo outputs provide discrete separation, allowing you to produce strings on one side, piano on the other, and bass in the middle.

It's proven reliability.

Over the past four years, literally thousands of professional musicians have been playing the ARP Omni-2, night after night, session after session. Because in addition to great sound and clean design, the Omni-2 is built to take the abuse of frequent travel. Electronically-tested circuit boards, computer-grade connector cables, and industrial-rated components keep the Omni-2 running at maximum performance. A rugged steel frame protects the Omni from accidental drops and rough handling, and the added weight keeps the keyboard steady and playable when stacked with other instruments.

It's time for you to play an Omni-2.

See, play and listen to an ARP Omni-2 at your nearest certified ARP Dealer. Find out for yourself why the ARP Omni-2 is worth the difference.

ARP Omni-2. It's the sound. And a whole lot more.

ARP

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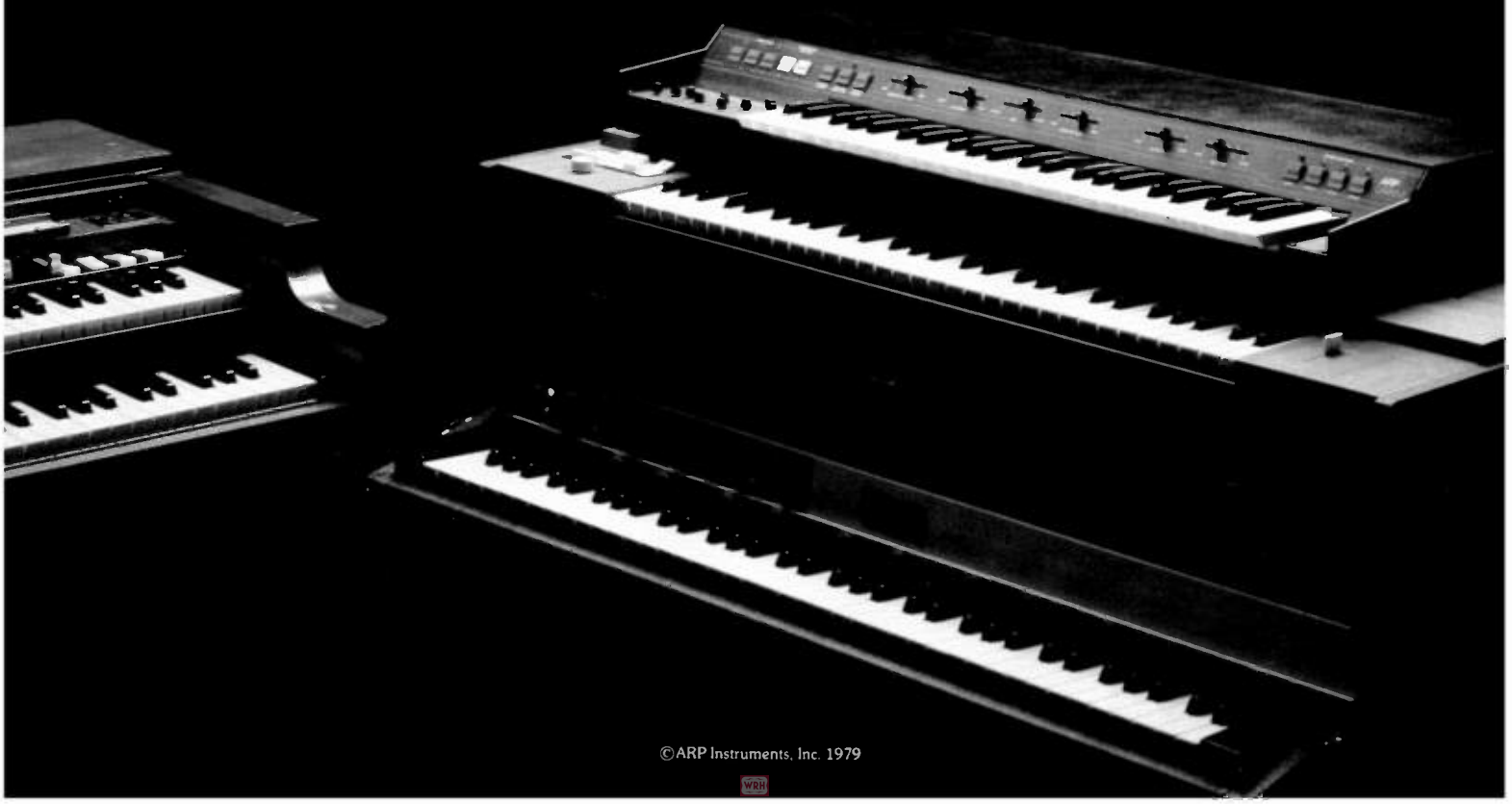
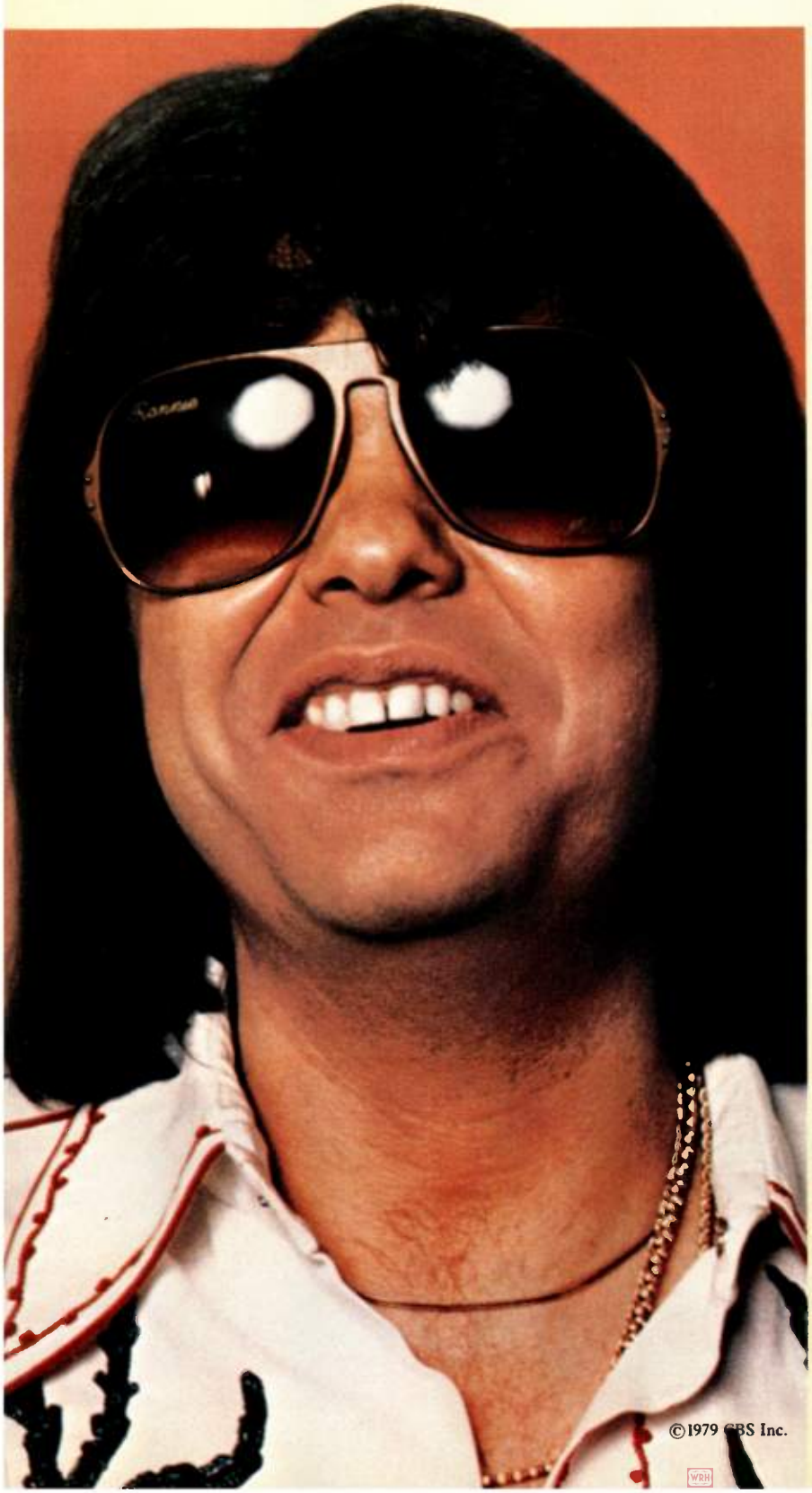


Ronnie Milsap. He's taken the Rhodes into brand-new country.



Were you blazing a trail as a country musician playing the Rhodes?

At first, maybe. But today, things are different than even five years ago. The Rhodes is definitely part of country. It brings a lot of musical styles together. And country performers who spend so much time on the road have more reliability with a Rhodes. There's a new modular action, for example, for more stability.

Your own roots are more than country, aren't they?

Well, in the Smokey Mountains, all we heard was bluegrass, gospel, country. But I studied classical piano eight years and started out playing country, rock and rhythm 'n blues. Now, I'm on the road maybe 250 days a year playing my own style.

And your Rhodes holds up?

My Suitcase 88 is better than anything I've ever had. At airports it's dropped, thrown, even stepped on, but it's always in tune. I love that piano because I love what I do. And how many folks can say that?

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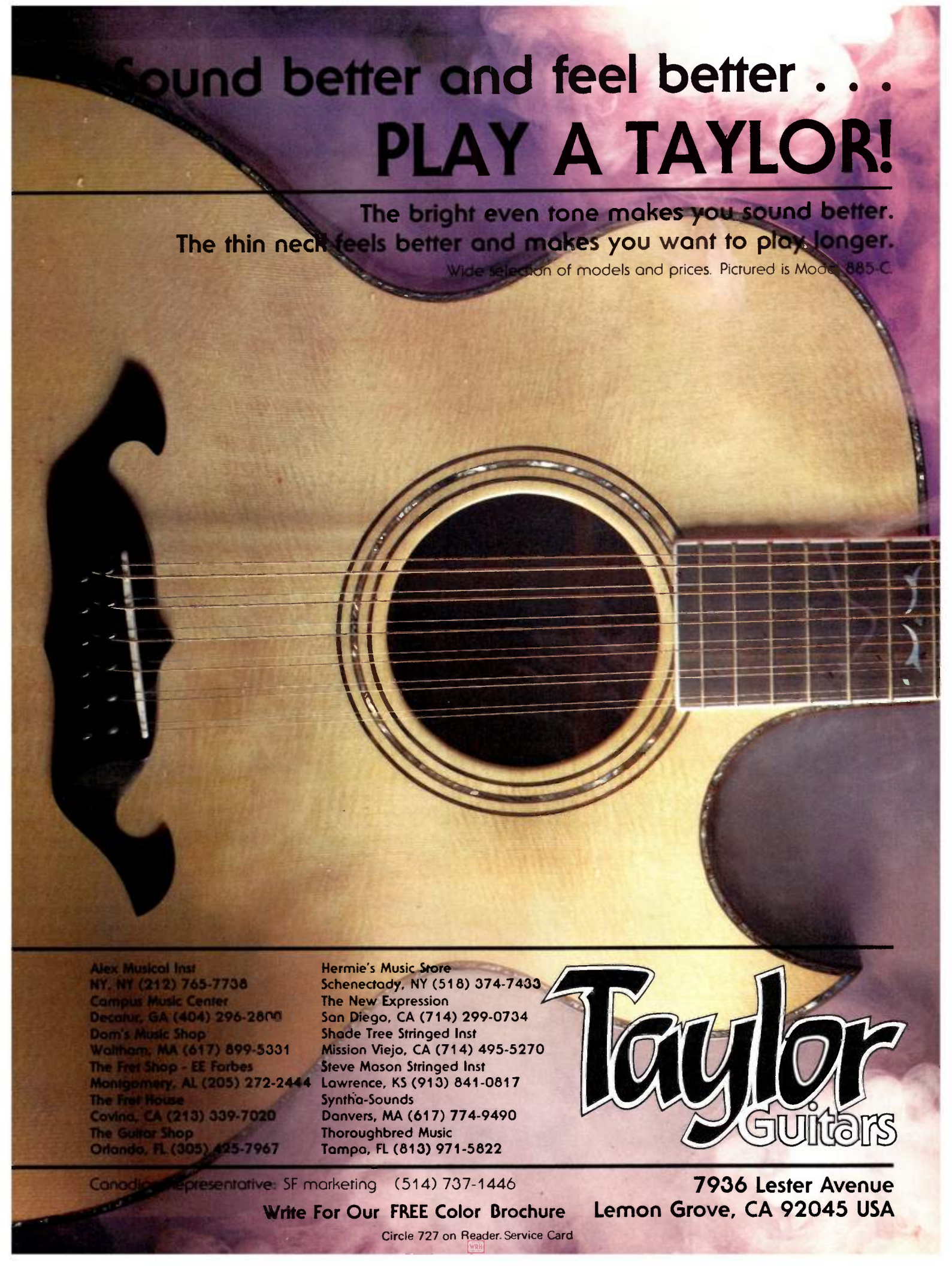
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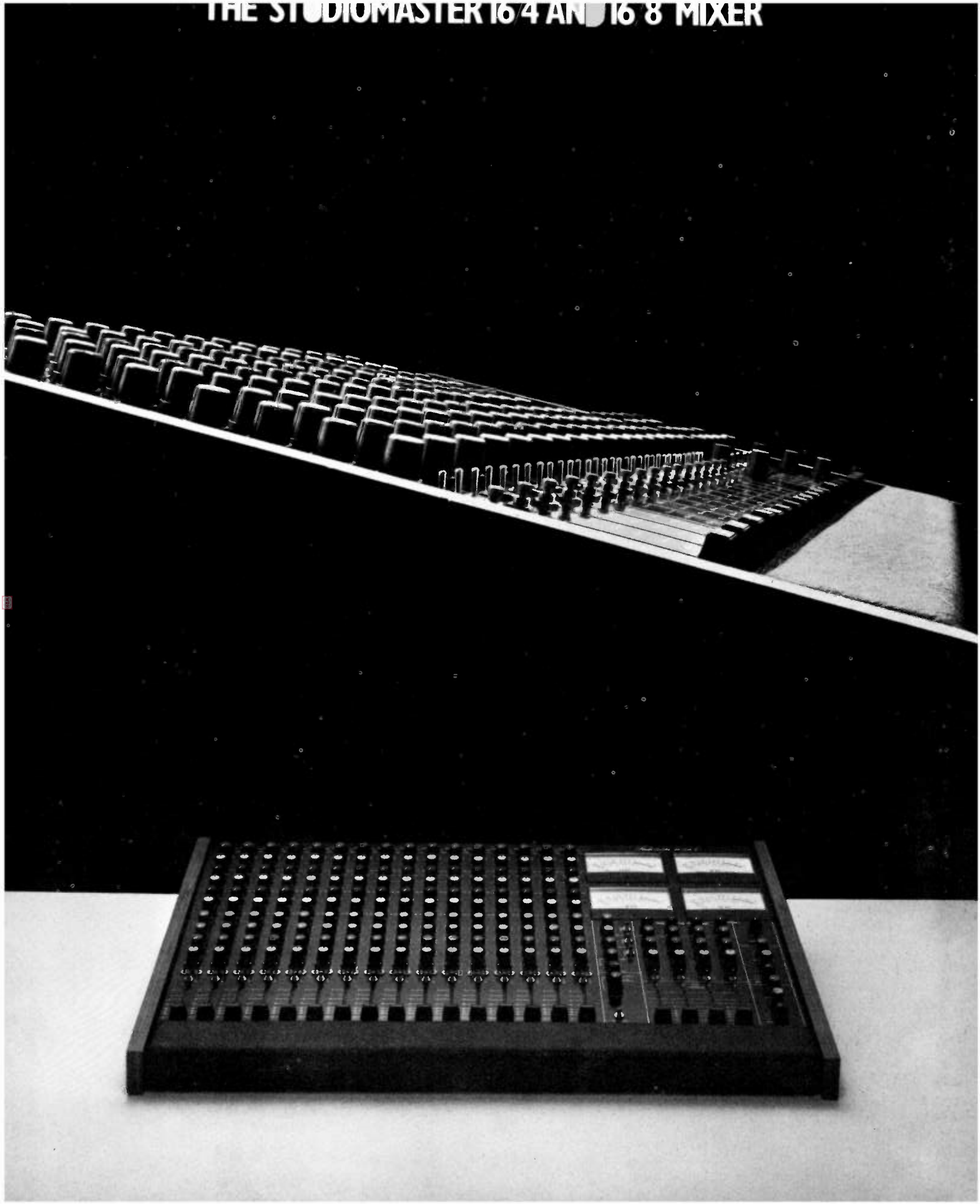
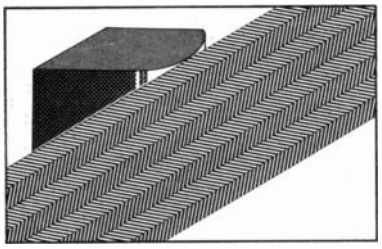
THE STUDIOMASTER 16 4 AND 16 8 MIXER



STUDIOMASTER 16/4 AND 16/8 GUIDE TO MULTI-TRACK RECORDING

THE MULTI TRACK PRINCIPLE

Recording with a four or eight channel tape recorder is like recording with four or eight separate tape recorders working in perfect synchronisation. In the modern multi-channel recorder the recording tape is divided into separate tracks and these can be recorded, played back and re-recorded in perfect synchronisation. The system allows the engineer to record one instrument (or group of instruments) onto one track and then record extra instruments or vocals on each of the other tracks so that during recording the performers can listen to any previously recorded track. On playback each track remains separate and the volume of each track can be individually adjusted (or altered with tone controls etc.) until a satisfactory "mix" is achieved.



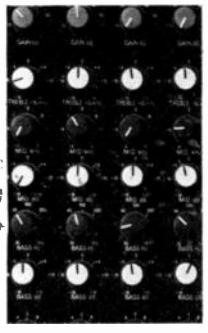
HOW THE STUDIOMASTER 16/4 AND 16/8 WORK

Studiomaster Mixers are designed to match any multi-channel tape machine. Input is easily achieved and procedure for the 16/8 is identical to the 16/4. The input socket for each channel is on the back panel. The mixer accepts professional Cannon-type plugs. Studiomaster mixers accept almost any type of low impedance input signal and on every channel two controls allow the engineer to match the input level to the mixer circuit. A rotary gain control allows signals to be increased and a small switch introduces a —30dB "pad" which allows even the highest of signals to be controlled. Additionally a tiny red "LED" lamp will light if too much signal is being fed into the mixer.

EQUALISATION

The mixer allows engineers to shape and modify the sound they are recording. Sounds that start off only mediocre can be considerably improved by "equalisation" and the Studiomaster 16/4 and 16/8 desks offer "parametric" equalisation to provide the ultimate sound control.

"Equalisation" is a term that developed when engineers used to have to equalise for poor room acoustics. Today the term is generally accepted as meaning sophisticated tone control and the Studiomaster desks offer five rotary controls on each channel with both the mid-range and bass controls allowing the engineer to select at which frequency point he wishes to cut or boost the sound.

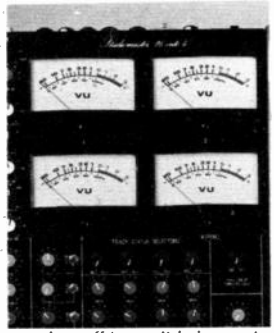


EFFECTS AND INPUT ROUTING

As the incoming signal passes through the input stage where the incoming level is controlled and through the equalisation stage where the sound is shaped, the signal arrives at the section of the channel where it may be sent "off line" to receive special effects like "echo" or "reverb." When sent to an echo machine the signal returns to the mixer at the main output section (as explained later).

The engineer may select to send only part of the signal for echo and allow the signal to continue through the channel. At this stage he may send the signal back to the performer to hear via the "foldback" control. This graphically titled control allows the engineer to "mix" the sound being fed back to the musician. After this passing through the foldback stage the signal arrives in the "routing" department At this point the engineer may choose to "place" the signal in a particular position of a stereo image. This is more usually done on a "mix down" and on initial recording the signal is often recorded onto an individual track which is later positioned for stereo. At this stage the engineer selects which output channel in the mixer the signal will take. This means that he can decide at this stage where he wants the signal to appear on the tape. A clever little button called the "Pre Fade Monitor" button is also provided at this stage. During recording this button can be extremely useful. Pushing this button and selecting PFM monitoring allows him to hear the individual channel and engineers frequently check recording or a mix by using each channel's PFM button in turn to ensure that the signal information is as it should be. Below each input channel is the slide fader. This control governs the volume of each independent channel in relation to the others and the output from this fader is sent to the output section of the mixer.

MONITORING AND THE OUTPUT SECTION



The engineer can monitor both his performance and the performance of the mixer visually and aurally. Four or eight VU meters are provided depending which mixer is used) and these may be switched to indicate the output levels of the synch/playback returns from the tape machine.

In the first mode the meters, show the comparative levels of the four or eight output channels and in the second they indicate precisely what is coming off tape. It is important that the meters in the mixer and the tape machine are aligned and this subject is covered elsewhere in this brochure.

TRACK STATUS

The large output section gathers up all the information arriving from each separate input channel and allows the engineer

to "interface" the mixer with the tape machine. In this section the output level of the four or eight output channels is determined by group faders. Each one of these controls the overall volume of the signals routed to that channel on the input channels. Also in this section are track status selectors which allow this section either to send the signals to the tape machine or to accept them back for re-mixing. When recorded signals are sent back to the Studiomaster desk for re-mixing the four or eight group faders act as volume controls for each separate recorded track. By mixing these the final balance is reached and the slide faders fitted to input channels 1 and 2 convert to provide a pair of stereo faders controlling the final "mixed" stereo signal being sent out to make the master recording.

On a re-mix further equalisation is sometimes required and an incoming signal for one track (or more) is routed back onto conventional input channels to allow equalisation or effects injection to take place before the signal is routed back to a group fader.

The output section of a Studiomaster mixer also makes a separate monitor mix possible. Engineers usually want to hear an acceptable "mix" of sounds as they go along and to save routing all signals back for proper re-mixing this section allows signals to be mixed for monitoring purposes only. Thus it is possible to listen to one particular mix whilst recording a very different mix.

EXPANDABILITY

Despite their affordable price, Studiomaster mixers have been designed to meet every professional recording requirement and to EXPAND as the need arises. Special "add on" channel modules are available and using these a standard 16/4 or 16/8 can grow three input channels at a time. The Studiomaster grows with you!

A SESSION WITH THE STUDIOMASTER 16/4 OR 16/8

LINING UP THE EQUIPMENT

Before any recording can start it's necessary to ensure all the equipment is lined up. The mixer meters must be aligned with the tape machine meters. To obtain good recording results it is important to record at the right level. Too little will allow tape hiss to come through, too much will cause distortion.

Turn off the monitor send and the foldback send (this is to protect your speakers, headphones and ears!)

Set the track status switches to 'record' and the monitor channel selectors to L.O. (line out).

Switch on the oscillator and set the group L.O. faders so that the meters read 0 VU. (This is approximately the working position for the group L.O. faders).

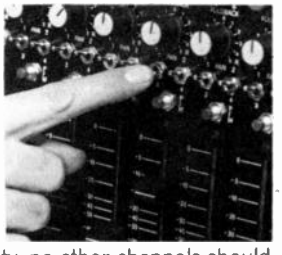
Switch the recorder to record and adjust the record level controls so that the meters on the recorder read to the recommended level.

With the recorder rewound to playback the previously recorded tone, set the monitor channel selectors to L.I. (line in). Adjust the playback level controls so the meters on the desk read 0 VU again.

To line up the stereo (remix) machine the procedure is the same except the track status switches on groups 1 and 2 must be switched to 'remix.'

RECORDING THE FIRST TRACK

The first track to be recorded is often a rhythm track, with perhaps three separate signals to be equalised and mixed into one for recording onto a single track.



The first step will be to use the appropriate switches on each channel to route the three signals into one group. At this stage the pan-pots should be left central and for clarity and safety, no other channels should be routed to any group unless for a specific reason. The track status switches should be set to 'record' and the group faders to their nominal level.

The signal should now be connected with the monitor by setting monitor channel 1 to L.O. The monitor send control on that channel should be set to 7 and the monitor master level control can be regulated to a convenient volume.

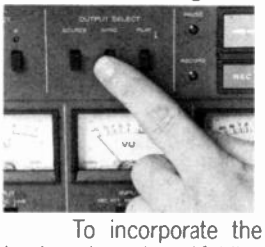
Now the main monitor switch can be set to PFM, and the signal level on each channel can be read by depressing its individual PFM button which will connect its signal to meter 4. Watching this meter, the gain on each channel can be adjusted to the correct level by the input gain controls.

Having balanced the signals within the group, you can set the overall level on the L.O. fader, and start recording.

As the recording proceeds, foldback signals may be sent either from the L.O. mix via the foldback control on the monitor channel, or, for a different mix from the foldback sends on each of the input channels. The monitor level controls may be adjusted at any time, or any channel checked on the PFM system, without disturbing the recording. The channel faders provide control over the balance and the group L.O. fader may be regarded as the recording level control.

RECORDING A SECOND TRACK

The first track completed, a second track may involve a mix of six drum mikes. Before beginning, it is best to turn off the routing switches used during the first recording to avoid any problems due to channels being left open.



The channels to be mixed should be routed to group two, connected to the monitor by setting monitor channel 2 to L.O, and with the monitor send and master level controls adjusted appropriately, the mix is made using PFM for checking as before.

To incorporate the previously recorded track into the loudspeaker mix and foldback, set Monitor channel I to L.I.

The tape machine should be set to synchronize the playing back of track 1 with the recording of track 2. The L.O. level can now be adjusted and recording can proceed.

You may want to assess track 2 independently of track 1. This is done by panning monitor channel one to the left, and channel two to the right. Or the new material may be played louder than previously recorded material.

Tracks are added by repeating the procedures using further groups. The choice of which instruments or voices to

place on each track is up to the individual. It is possible to record on two or more tracks at once; some producers favour the more spontaneous 'feel' this can give.

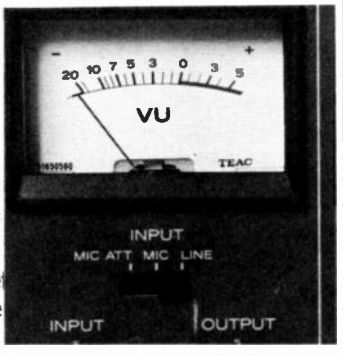
ROUTING FOR ECHO OR EFFECT

Echo, reverb, and other effects may be added either during the recording of each track by routing the echo to the appropriate group, or during the re-mix. If you decide on the latter (after all, you may need less echo than you think and once it's added you can't take it away) the level can still be tried out on the monitors at the earlier stage, without being routed to the recording machine.

MIXING

You now have four or eight complete tracks on your tape, expertly recorded by skilful use of your Studiomaster. The final stage is to remix them for a stereo programme.

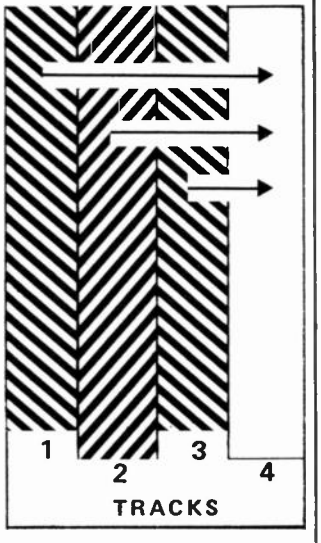
First, all track status switches should be set to 'remix'. This done, the tape machine is set to 'play' (as distinct from the 'sync' mode) so that the four tracks from the recorder appear on mic channels 1–4 (or 8). These mic channels are routed so that they can be panned across groups 1 and 2, and mixed down in the usual way. Now the monitors are set to 'L.O.' with channel 1 panned le rewinding, the playback may be channels to L.I.



If necessary, fresh material can be introduced into the stereo programme at the remix stage, the extra channel(s) being mixed down in the usual way.

STILL MORE MULTI TRACK TRICKS

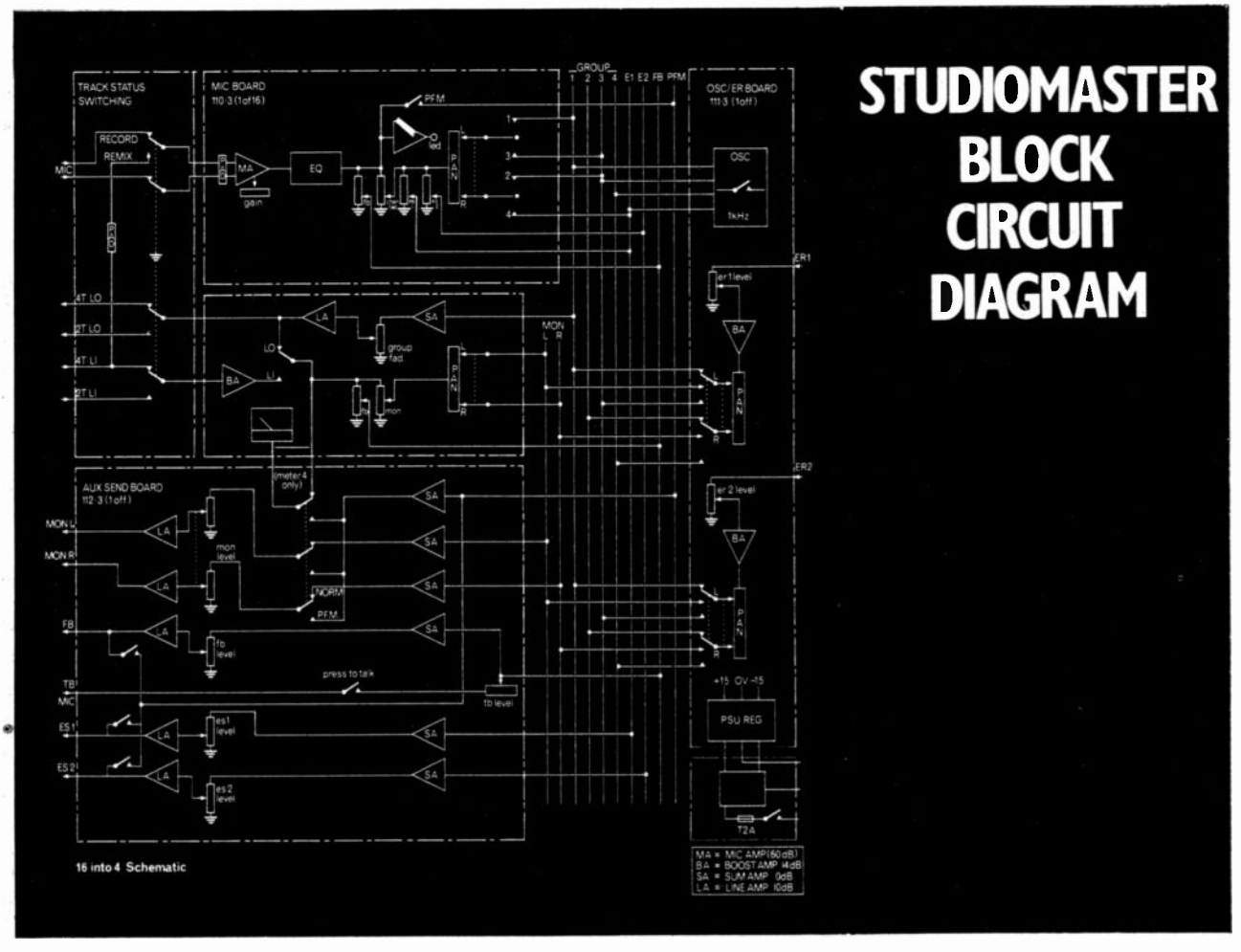
You may feel the need to mix more basic tracks than the four or eight available on your tape recorder. This may be done by recording tracks 1, 2 and 3 in the usual way, and then setting track status switches 1, 2 and 3 to 'Remix' while leaving 4 on 'record'. Tracks 1 2 and 3 are thus routed to their respective mic channels, and these in turn can be routed to group 4 for recording on track 4. This mix should be monitored with monitor channel 4 set to L.O.



On the tape recorder, tracks 1, 2 and 3 should be set to 'play' (it is unnecessary to use the 'sync' setting) and track 4 to record. The result will be a mono recording on track 4 of tracks 1, 2 and 3. You will therefore be left with the first three tracks to record again. Precisely the same principle applies to an eight-track tape machine.

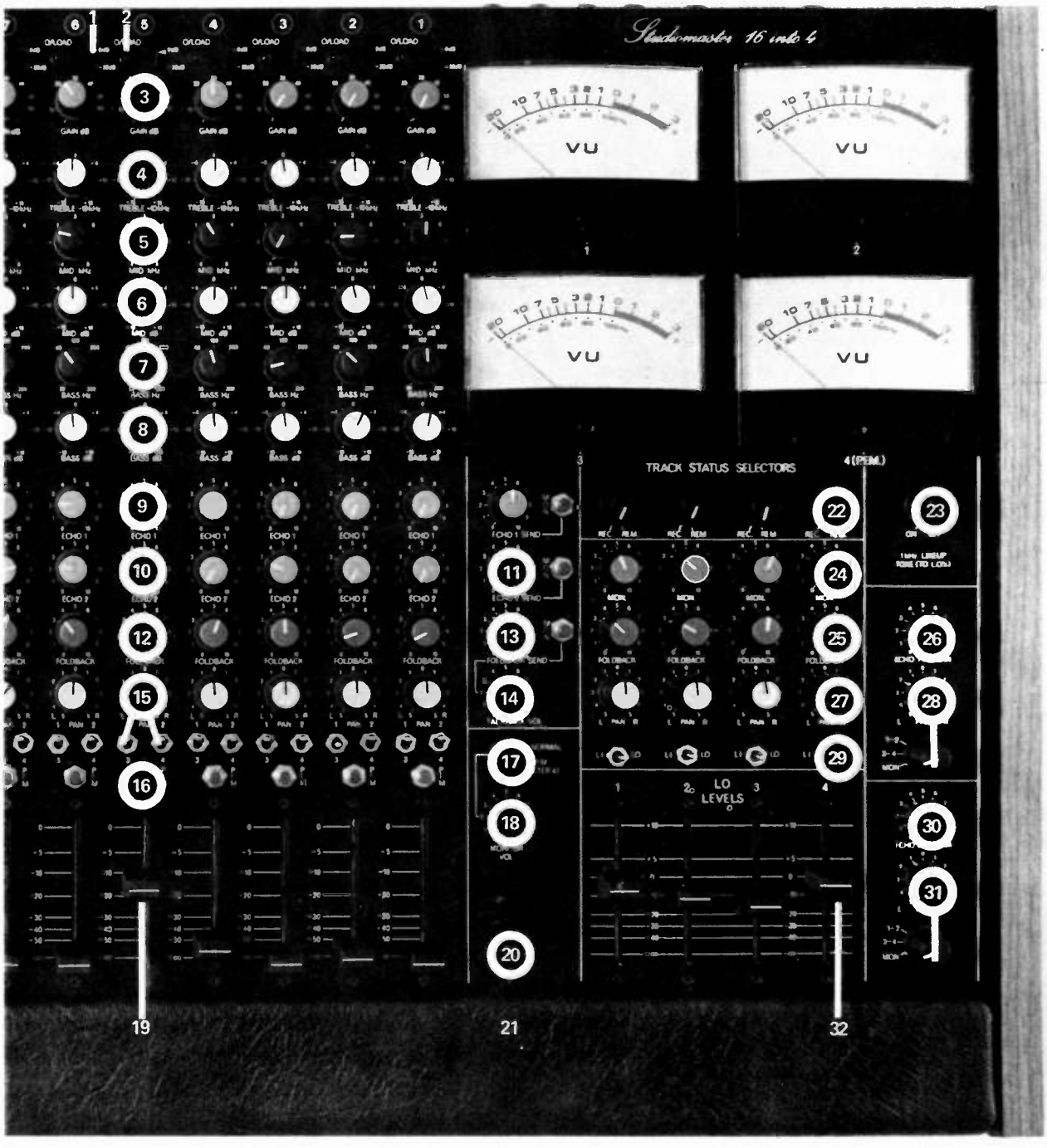
If still more tracks are required, two of these three can be recorded and then mixed down along with the first mix on to the fourth track, so that three further tracks are available. Obviously, each time a playback signal is remixed and re-recorded, there is loss of quality. The engineer must use his judgement as to what is tolerable.

STUDIOMASTER BLOCK CIRCUIT DIAGRAM



16 into 4 Schematic

CONTROL LAYOUT STUDIOMASTER 16/4



1. 30dB input pad.
2. Overload led (fires 4dB below clipping).
3. Input gain control.
4. Treble ±16dB shelving at 10 khz.
5. Mid frequency control. 400Hz – 8kHz.
6. Mid ±16dB.
7. Bass frequency control, 30Hz – 300Hz.
8. Bass ±16dB shelving.
9. Echo 1 (postfade) send.
10. Echo 1 master + Echo 2 master.
11. Echo 2 (postfade) send.
12. Foldback master (+mon button to PFM buss).
13. Foldback (prefade) send.
14. Talkback volume control.
15. Panpot + routing switches.
16. PFM (prefade monitor) button.
17. Switch selects monitor mix or PFM buss to loudspeakers.
18. Loudspeaker (monitor) volume control.
19. Channel fader.
20. Talkback (talk to foldback) button.
21. Padded armrest.
22. Switches route tape track ready to record or remix.
23. Lineup osc. switch slates 1kHz to all groups.
24. Send to monitor (loudspeaker) mix.
25. Send to foldback.
26. Echo 1 return level control.
27. Pans send to monitor across loudspeaker mix.
28. Echo 1 return pan + routing.
29. Switch selects monitor channel to LO (group) or LI (tape).
30. Echo 2 return level control.
31. Echo 2 return pan + routing.
32. Group (LO level) fader.

THE STUDIOMASTER 16/4 16/8 TECHNICAL SPECIFICATIONS

Inputs
Electronically balanced with active gain control, switched 30dB pad on input.

Maximum gain	+60dB
Minimum gain	−15dB
Headroom	+20dBm
Input Impedance	>5k Ohms
Optimum source impedance for microphones	=200 Ohms

Equalisation
Treble ±16dB at 10kHz
Mid ±16dB at 400Hz to 8kHz continuously variable
Bass ±16dB at 30Hz to 300Hz continuously variable

All outputs have 10dB gain after their respective output level controls.
Output impedance <10 Ohms
Minimum terminating impedance is 600 Ohms with the exception of Foldback output when the minimum terminating impedance is 8 Ohms.
Maximum output level +20dBm.

Line Inputs
Line inputs are preset for an input of −10dBm.
They may be very simply modified for an input of +4dBm.

Meters 0 VU = +4dBm

The following applies from a microphone input to a line input with EQ flat.

1kHz distortion at +4dBm	<.015%
1kHz distortion at +20dBm	<.015%
Maximum gain throughout mixer	+70dB
Maximum input level before clipping	+35dBm
Equivalent input noise (200 Ohms input resistor, 16.7kHz 6dB/Octave filter giving 20kHz noise bandwidth)	<−125dBm
Signal to noise ratio with line output fader down	−90dB
Line Output fader nominal, channel faders down	−88dB
One microphone channel at 40dB gain	−84dB
Four microphone channels at 40dB gain	−80dB
Sixteen microphone channels at 40dB gain	−72dB

Multicores
The standard 16/4 mixer has facilities for two twelve way mic multicores by way of two multicore sockets on the back of the desk. A 150' twelve channel multicore (twelve balanced pairs) is available on a multicore drum (made of hard wearing ABS plastic) with a detachable stage box with twelve switchcraft D3F numbered 1-12. Similar multicores are available for the 16/8.

Flight Cases
Flight cases for both the 16/4 and 16/8 are available as optional extras.

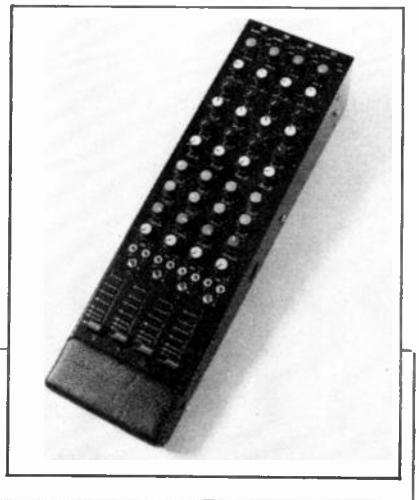
EXPANDER MODULES

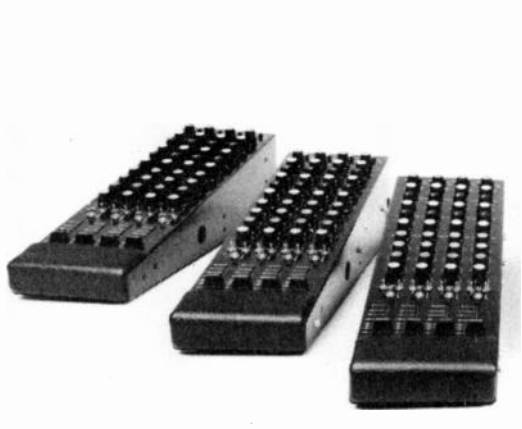
It is a general rule of recording that the more sound sources you can mike separately, the more control you have over the final product. None the less, many musicians prefer to start with only a few mikes, wisely bearing in mind that without high quality (and therefore expensive) microphones the best recording equipment is wasted.

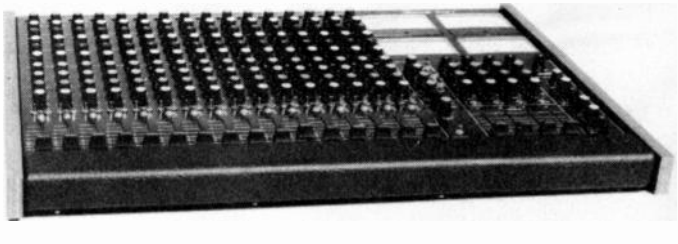
RSD have therefore constructed the 16/4 and 16/8 mixers as basic units capable of accepting expander modules of four mike channels each, so that you can expand your mixer at need up to a maximum of 20 channels. If you expect to need still more input capability, you can request a special modification when buying your Studiomaster, which alters its power supply to handle 8 channels over and above this maximum.

Finished in a style identical to that of similar functions on the original desk, the input expander modules are extremely simple to fit. Just remove the wood panel on the side of the desk, bolt your expander module in its place, and replace the wood panel on the outer edge of the module. All electrical connections are simply made without complex wiring.

So remember, if ever you want to expand your ideas, your Studiomaster is ready when you are.



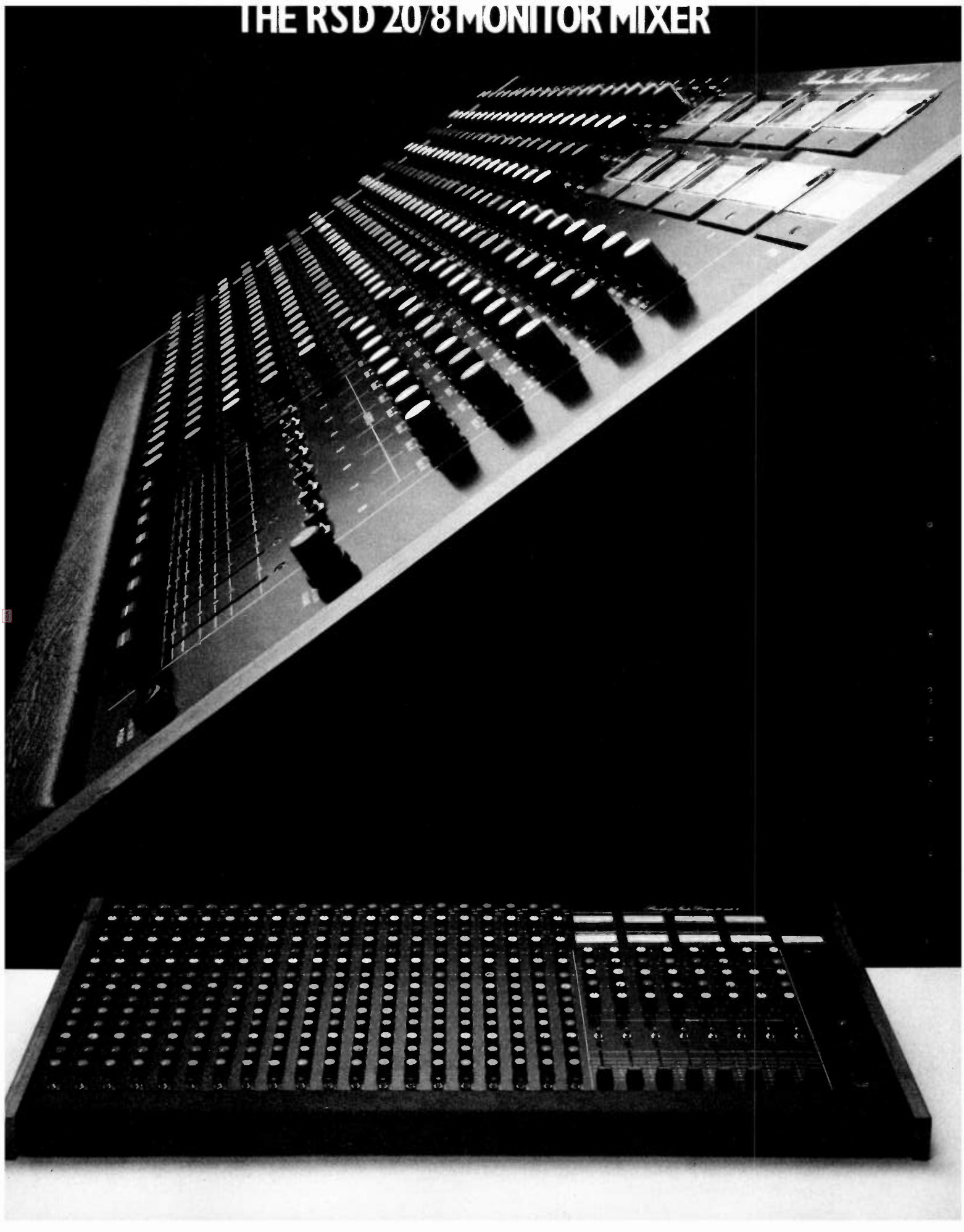




STUDIOMASTER

Circle 776 on Reader Service Card

THE RSD 20/8 MONITOR MIXER



USING THE RSD 20/8 MONITOR MIXER

CONCEPT

The RSD 20/8 is a mixer designed especially for providing on stage monitor mixing. Almost every band member requires a different mix these days and the 20/8 is capable of delivering eight different mixes.

The monitor mixer accepts 20 separate inputs (usually taken in parallel with the main P.A. mixer) and each of these separate inputs may be routed to as many of the eight output channels as required with individual gain controls for all eight outputs provided on each input channel. The result is that the incoming signal may appear at any chosen level in any of the eight separate mixes leaving the board. This system allows total 'on stage' monitoring control and from a side stage position a sound engineer can effect the various monitoring changes that are necessary during the development of most performances.

INPUT

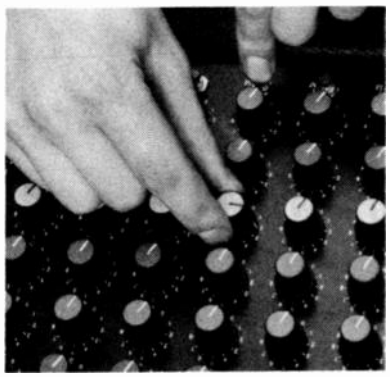
The input stage of each input channel is flexible enough to take both mike and 'line' input. A 30db 'pad' allows the engineer to reduce sensitivity for tape machine and similar incoming signals. A rotary gain control allows optimum gain level to be selected and an LED warning lamp indicates overload condition.

EQUALISATION

Parametric equalisation controls are provided with two frequency control selectors and the gain controls. At this stage the incoming signal in each channel can be adjusted to present the required sound in the mixes. Parametric equalisation allows the engineer to select the precise frequency at which he wishes to cut or boost.

ROUTING

After gain control and equalisation the signal on each channel arrives at rotary controls which route it to all or any of the eight output channels. This is the stage at which the individual monitor mixes are created. If the bass player's monitor is number one 'out' channel and he wants to hear more of the drummer than anyone else the channels with the drum signals coming in are set to high volume on the pots routing the signal to output channel one. Perhaps the keyboard player doesn't want to hear so much drums and the gain controls routing the drum signal to his channel are backed off and so on.



This section is the heart of the RSD 20/8 stage monitor mixer.

PFM

When all the monitor mixes are made it's often quite hard to hear what's going on on one incoming channel. Often it's hard to tell whether the signal is getting through. For this reason RSD have provided a 'Pre-Fade Monitor' button on each input channel. This allows the engineer to hit the button, select PFM monitoring, mute all other channels and instantly hear what's going through that channel. Often the monitor engineer will listen to several channels at once in this way adjusting the e.q. or gain controls.

OUTPUT

After each of the 20 incoming channels have been routed in the desired degree to each of the eight output channels the job comes of grouping and controlling the signals for output.

Because the needs of monitoring mixing are so precise all eight output channels are provided with their own parametric equalisers. Understanding that monitor mixes are often done in badly lit stage wings, RSD have carefully selected different colour control groupings for each channel to minimise the likelihood of mistaken adjustment.

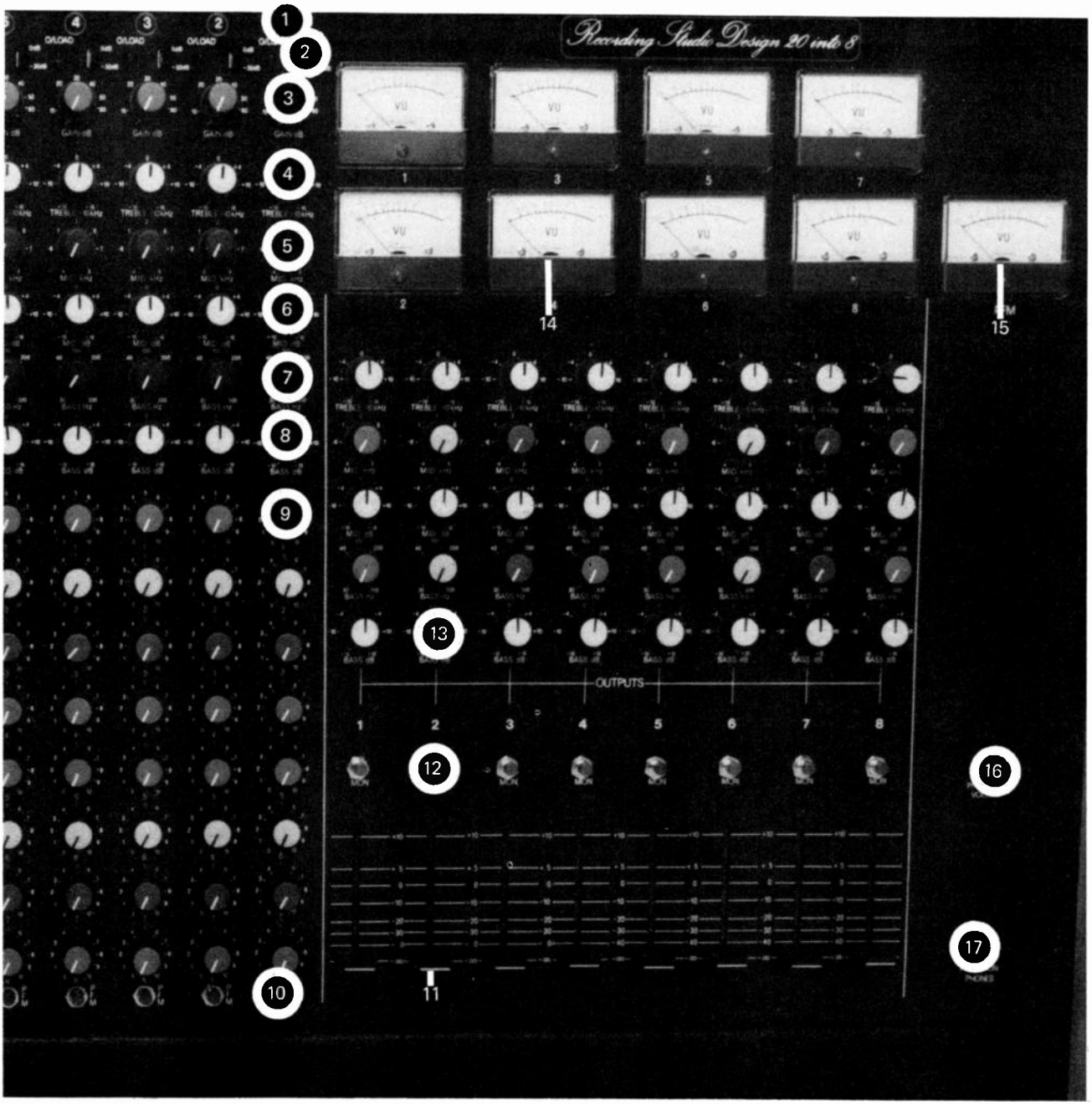
The engineer can select almost any frequency he chooses to cut or boost on each output channel and can thus effect very significant tone alterations. This control section is extremely useful in minimising feedback, the ever present problem in monitoring.

Meters are provided to all eight output channels and slide faders govern the exact signal level sent to the monitor amps. An extra VU meter is provided for checking the levels of individual channels or groups when necessary.

CONNECTIONS

MIC Inputs are D3F or equivalent wired Pin 1 - Earth, Pin 2 in phase, Pin 3 out phase.
Line Outputs are mono jack sockets.
Line Inputs are mono jack sockets.
Monitor Outputs are 2 x D3M wired Pin 1 – Earth, Pin 3 – Signal for connection to power amplifiers, or a stereo headphone socket for direct monitoring via 600 ohm headphones.
Mains Input is via a European 3 pin socket protected by a 2 Amp fuse.

CONTROL LAYOUT OF 20/8 MONITOR MIXER



1. Input is via Cannon-type plugs or optional multi-core.
2. 'Pad' control cuts incoming signal by 30dB to accept line input.
3. Rotary control for adjusting input gain.
4. Treble control offering cut or boost of 16dB shelving around 10kHz.
5. Mid frequency selector. This control selects at which mid-frequency cut or boost shall be made.
6. Mid frequency control. Offers 16dB cut or boost at mid-frequency has been selected.
7. Bass frequency selector. This control selects at which mid-frequency cut or boost shall be made.
8. Bass frequency control. Offers 16dB cut or boost at bass frequency selected.
9. Eight separate rotary gain controls send channel signal to output faders. Incoming signal may be mixed into any or all of the eight output groups at this section.
10. PFM button allows the channel to be monitored individually.
11. Main output faders. Eight of these control eight separate mono mixes to drive eight separate foldback systems.
12. PFM button allows monitoring of individual output channel.
13. Full equalisation on each output channel is provided as on each input channel.
14. VU meters for each output channel.
15. PFM meter for metering channels individually.
16. PFM/Monitor output volume control.
17. Headphone socket.

RECORDING STUDIO DESIGN

Circle 776 on Reader Service Card

THE ART OF MONITOR MIXING

In the early days of stage mixing there were many disasters and many good bands split up because of their appalling adaption to the mixer. The reason was usually poor monitoring.

Good P.A. mixing demands that the members of a band control their back line sound to allow the 'out front' engineer to get the right balance in the main P.A. rig. If the musicians insisted on maintaining the 'pre-mixer' back line levels of the 400 watt stack days the sound swim that would have occurred in front of the stage would have ruined any P.A. mix. So the lads turned down and in doing so ruined the internal balance of the band. Having turned down they desperately needed to hear a representative sample of the sound and this is where a skilled monitor engineer and a totally flexible monitor mixing console were required.

RSD have built precisely this sort of mixer in the RSD 20/8. In most band line-ups, eight separate monitor speakers are more than adequate and the engineer has to understand the monitoring requirements of every musician. Usually the bass player will want an overall mix with extra drums, particularly snare or bass drum, the singer will want the complete rhythm section with lower solo instruments and the keyboard player will want to hear alternative lead lines above the mix. Every musician has a different idea about where his own instrument should figure in the mix coming out of his monitor and the RSD 20/8 is one of the few consoles available that has been designed to allow the engineer to satisfy every whim.

Despite lower backline levels musicians on stage still want to hear as much monitor sound as possible. There's always the problem of allowing for an audience when undertaking a sound check in an empty hall and engineers can usually expect to push up the output faders a fair bit after the crowds have arrived and acted as acoustic absorption material.

One of the main problems is that individual monitor mixes may change for different numbers and whilst this may be necessary it is not desirable for easy mixing. Equalisation can often save level changes and as the evening wears on and high frequency perception starts to slip (both in performers and audience) the wise engineer will increase top end e.q. without making the normal gain compensation.

Feedback is the constant bugbear of all monitor engineers. The proximity of monitors to microphones ensures this and despite the smoother frequency response provided by most amplifiers these days feedback is usually reached on most monitors before the correct audible level is reached. At this point the output e.q. section on each output channel of the RSD 20/8 proves extremely useful. A few moments will allow the engineer to 'search' for the troublesome frequency point with the parametric e.q.'s and back off enough to allow a few more dB's of gain to be made. This type of e.q. has done more than any other technological development to help bands hear themselves properly on stage!

The good monitor man will work hand in hand with the sound engineer controlling the main P.A. mix. It may be said that whilst the band and the audience rely on the P.A. mixer for successful projection it is equally true that the band relies totally upon their monitor mixer for their quality of performance. Let a band hear what they're doing and you'll have a happy band. Deny them it and you might as well go home.

TECHNICAL SPECIFICATIONS

Inputs
Electronically balanced with active gain control, switched 30dB pad on input.

Maximum gain	+60dB
Minimum gain	-15dB
Headroom	+20dBm
Input Impedance	>5k Ohms
Optimum source impedance for microphones	200 Ohms

Equalisation
Treble ± 16dB at 10kHz
Mid ± 16dB at 400Hz to 8kHz continuously variable
Bass ± 16dB at 30Hz to 300Hz continuously variable

Outputs
All outputs have 10dB gain after their respective output level controls.
Output impedance < 10 Ohms
Minimum terminating impedance is 600 Ohms with the exception of Foldback output when the minimum terminating impedance is 8 Ohms.
Maximum output level +20dBm.

Meters
0 VU = +4dBm

Line Inputs
Line inputs are preset for an input of -10dBm.
They may be very simply modified for an input of +4dBm.

The following applies from a microphone input to a line output with EQ flat.

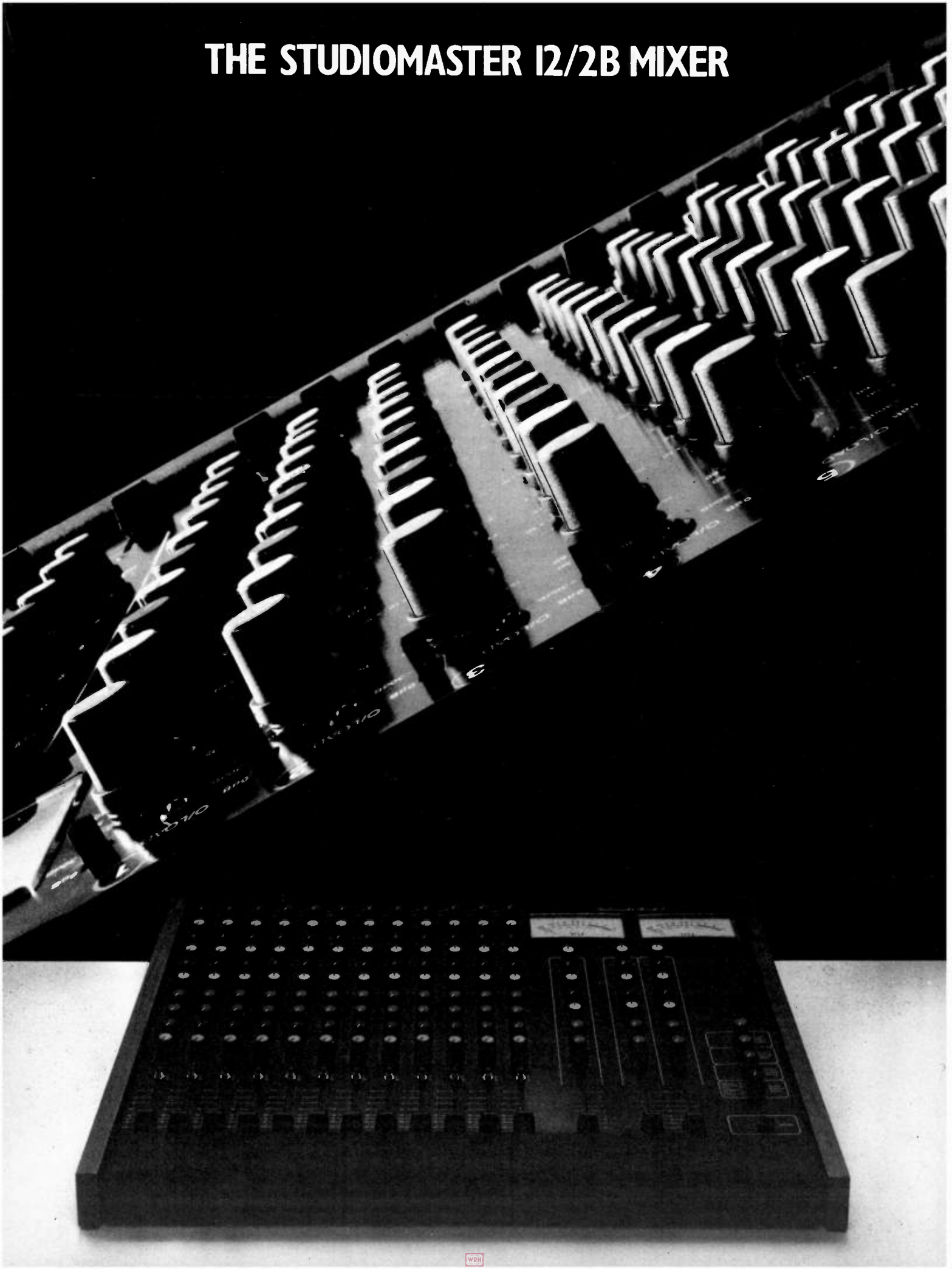
1kHz distortion at +4dBm	<.015%
1kHz distortion at +20dBm	<.015%
Maximum gain throughout mixer	+70dB
Maximum input level before clipping	+35dBm
Equivalent input noise (200 Ohms input resistor, 16.7kHz 6dB/Octave filter giving 20kHz noise bandwidth)	<-125dBm
Signal to noise ratio with line output fader down	-90dB
Line Output fader nominal, channel faders down	-88dB
One microphone channel at 40dB gain	-84dB
Four microphone channels at 40dB gain	-80dB
Sixteen microphone channels at 40dB gain	-72dB

Expander Modules
Expander modules are available as optional extras for the RSD 20/8. Each expander module provides a further four input channels.

Multicores
A low cost multicore system is available for this mixer, utilising 25 pin connectors and 25 way cable with an overall screen.

Flight Cases
Flight cases made in both fibre covered ply and aluminium are available for this mixer with heavy duty corners and catches.

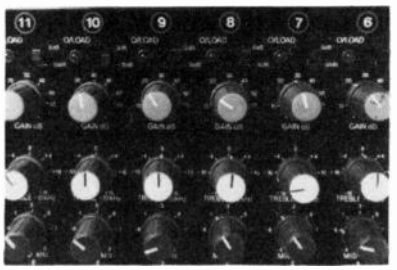
THE STUDIOMASTER 12/2B MIXER



HOW THE STUDIOMASTER 12/2B MIXER WORKS

INPUTS

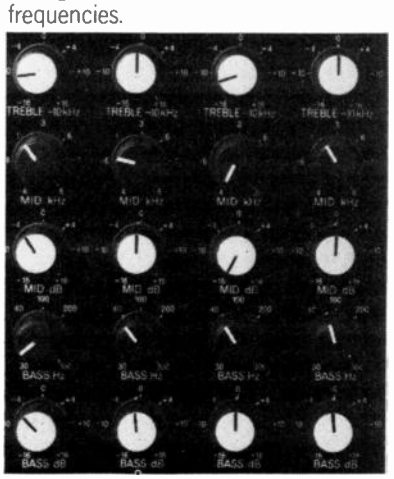
The inputs on the 12/2B are D3F-type and are via professional Cannon-type sockets or by the multicore connector available as an option. They accept low impedance (Lo-Z) balanced line microphones of the type favoured by sound engineers. This system will give a signal unaffected by the length of the mike cables, and will minimize crosstalk and electrical interference.



For versatility, the 12/2B also features pad switching which should be used with any high-output mikes or other equipment needing to be mixed. This reduces gain by 30dB, a very adequate buffer against any signal likely to be fed in. In general, gain is regulated by means of the gain control selector. The correct level may be gauged by using the PFM button to connect the relevant channel with the meter (the gain control then being adjusted to produce 0 VU modulation). It can also be estimated by observing the LED overload light, since the correct signal is the maximum possible before overload and the 'clipping' distortion overload produces.

EQUALISATION

Equalisation is the name given to a sophisticated system of tone control whereby a musical tone is manipulated or 'equalised' by adjustment of the signal strength at several of its component frequencies.

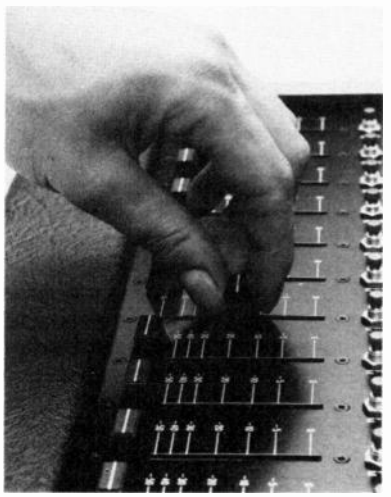


In the 12/2B, this means an impressive 16dB of cut or boost on treble (at 10kHz, shelving), mid (at any frequency between 400Hz and 8kHz) and bass (at any frequency between 30Hz and 300Hz). 16dB is far more than you will usually need, but it is as well to have 'headroom.'

As well as equalisation on each input channel, the 12/2B also has full equalisation both on the output stage and on the foldback master output. The former is invaluable for quick adjustment to the prevailing acoustics of a particular venue, since the acoustics of an empty hall in which the soundcheck is conducted may be markedly different from those of the same hall with a full auditorium. Foldback equalisation means effective control of the on-stage monitor sound and is especially valuable in achieving useful levels without feedback.

MIXING

The heart of a mixer's function is to balance input signals and create from them two (in the case of a stereo unit like the 12/2B) composite signals for recording or amplification.



In the 12/2B this is done with the equalized signals, by using the pan selectors. The strength of each channel signal (and thus the contribution it makes to the total sound) should be adjusted on the appropriate fader at this stage, as the total effect is assessed on the monitors. The creation of the 'stereo image' by means of the pan controls is probably the most important part of regulating your sound to your exact requirements and a certain amount of skill is necessary in assessing what you hear as you adjust the signals by reference to the monitors. Once you get it right, however, you will see just how much the potential of your band can be increased by the Studiomaster.

EFFECTS PATCHING

Each channel has two separate 'Echo Send' controls which route signals to mono jack sockets for connection with external processors. The amount of echo being used can be gauged by setting the monitor selector to the relevant echo channel. Overall level control is by the two Echo Master (Send) regulators.

The echo sends are 'post fade': that is, the signal being processed for the effect has already been adjusted to output level so whatever the channel fader setting, the echo will always be recorded or amplified in the proportion set up by reference to the monitor output. The 12/2B is also equipped for echo to be added to the stage monitor sound via the foldback system.

VOLUME CONTROL

Volume control is introduced at two stages; on each individual channel to achieve a correct mixing balance, and on the two L.O. channels to give a master fade on the output. All the volume controls on the 12/2B are sliding faders for ease and accuracy, and are calibrated in dB.

The two master faders will usually be used to double as recording level controls or P.A. volume controls, the P.A. amplifier volumes having been preset.

The main outputs, like the foldback outputs, are D3M-type and are wired Pin-1, Earth, Pin-2, inphase, and Pin-3, outphase. They may be used in an unbalanced mode simply by leaving one of the signal pins disconnected.

For recording uses, mono jack sockets are provided giving a 'tape out' signal of −10dB (for a main output signal of +4dB). A stereo jack socket is provided for headphones.

THE STUDIOMASTER 12/2B MIXER OPERATION

FEEDBACK

An efficient monitoring system should be regarded as essential for any performance, since musicians cannot give of their best unless they know not roughly, but exactly the sound they are putting out.

On the 12/2B the foldback send on each channel provides a signal unaffected by the channel faders (i.e. pre-fade) which is routed through the foldback master send to the on-stage monitor units. As already noted, this signal passes through a full equalisation system.

The mixer also has Pre-Fade Monitor (PFM) buttons which will connect any channel with the monitors whenever desired, without affecting the working status of the desk.

CONNECTIONS

Mic inputs are D3F or equivalent and are wired Pin-1 – Earth, Pin-2 – inphase, Pin-3 – outphase.

Main outputs and foldback are D3M or equivalent and are wired. Pin 1 – Earth, Pin 2 – inphase, Pin 3 – outphase. (They may be used in the unbalanced mode merely by leaving one of the signal pins disconnected). Echo sends and returns are via mono jack sockets.

The tape out sockets are mono jack sockets and provide a signal level of 10dBm (for a main output signal level of +4dBm) for tape recording purposes.

Headphone output is a stereo jack socket. Mains input is via a European 3 pin plug and is protected by a 2 amp fuse.

MULTCORE WIRING

The mixer is equipped with a 25-pin connector to enable it to be used with the multicore and stage-box available as extras.

The standard multicore is 150' long and is supplied on a cable drum made of hard wearing ABS-plastic. The detachable stage box is fitted with 12 D3F (or equivalent) connectors numbered 1-12.

This wiring applies to both mixer and stage box, the order of the wiring of the different coloured cores in the cable does not matter as long as Pin 1 is the screen and the wire connected to a certain pin at one end is connected to the same pin at the other end.

MIXING-HINTS AND TIPS

EQUIPMENT

If you have the right mixer, try to make sure your other equipment does it credit. Microphone quality is very important. Most musicians take ample care in choosing amplifiers and speakers, but small things are also worthy of attention. A faulty cable with no replacement handy can ruin a performance as effectively as a short in the amplifier circuitry. Proper maintainance of all equipment is a 'must'.

MIXING

A mixer like the Studiomaster 12/2B is a very sophisticated tool which needs to be handled with a certain sophistication. The sound engineer should be just that, and not anyone who happens not to be otherwise occupied during the gig.

In a unit with comprehensive facilities like the 12/2B, a little restraint may be demanded. A common fault is to use a facility like 16dB Eq rather heavily – just because it's there. For instance, to overdo the bass on the bass drum boom (resulting in low frequency feedback) or the presence when you're trying to get vocals to cut through by adjusting the mixer instead of tackling the problem at source.

WORKING WITH DRUMS

Mixing drums is perhaps the most difficult of the sound engineers tasks. A common fault is to take each mike channel individually, adjust it to the desired pitch, turn it down, and go on to the next. Since however each mike can pick up the sound of all the drums, this method will not yield the best results. The preferred system is to turn all the sliders full on, and adjust each channel down to the required level. Normally, the rule is loudest last, so a possible sequence is bass, floor toms, upper toms, cymbals, and finally snare.

WORKING WITH GUITARS

The rule here is – don't fight the back line. Many engineers with small bands will attempt to pan the guitar to one side or the other, and fail because the back line is contributing too much to the sound. In this situation, vocals are the only part that can really be panned. In the same way, the engineer should not try to alter the guitar sound from the back line amplification. The guitarist chooses his own sound and the engineer should try to copy it.

WORKING WITH VOCALS

Mixing vocals is not difficult, providing the vocalist knows what he is doing. If his microphone technique is such that with one breath he's overloading the system and with the next he can't be heard, the wise engineer does not try to correct this in the mixer. He has a quiet word in the vocalist's ear about matters like bass lift, microphone distances, and so on. When mixing vocals the clearest sound will result if microphones not currently in use are turned down.

WORKING WITH EFFECTS

Many experienced engineers would advise that effects are used discreetly, although it is of course a matter of personal choice. What is not a question of taste is the load sent into the echo or effect unit. It is not uncommon for this to be too great, resulting in considerable distortion caused, for example, by over-driven echo. This can take time to trace to its source. Watch the meters!

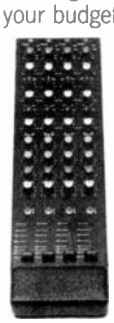
MOVING ON

The last job an engineer should do at a gig is to set everything to flat – so that at the next gig and the next sound-check, he starts with a clean slate. Because halls have such different acoustic properties, there is no advantage in leaving the desk set, after a performance at which the sound was very successful.

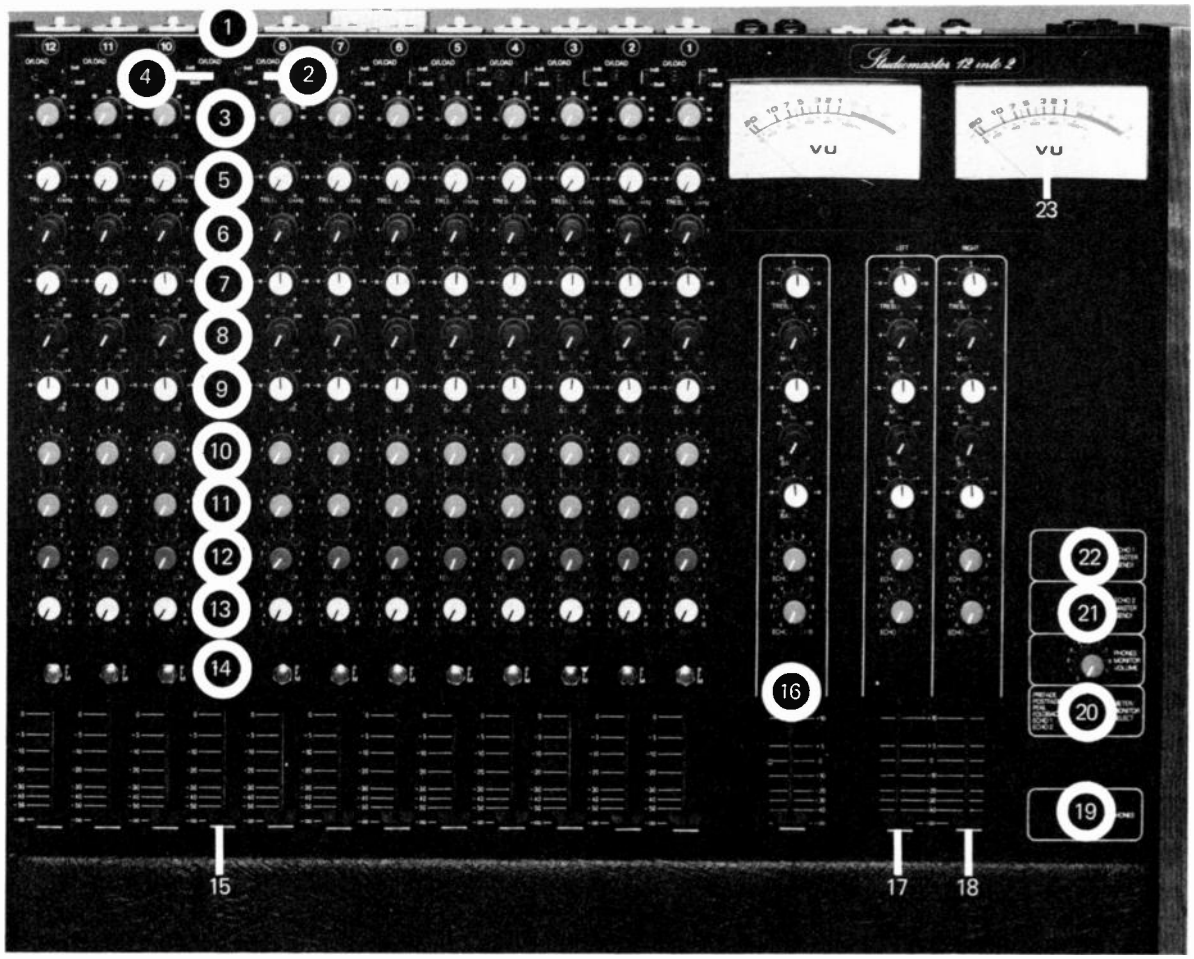
EXPANDER MODULES

The Studiomaster 12/2 mixer grows with your requirement and your budget. 'Add on' modules providing four input channels at a time are available and this means that your mixer is always ready to grow.

The 'bolt on' modules connect instantly into the existing mixer circuit without the need for any complex solder joints.



CONTROL LAYOUT OF THE 12/2 B



1. Input to each channel is via Cannon-type connectors or optional multi-core. Accepts balanced line low-impedance mike or line.
2. Special 'pad' switch reduces gain by 30dB to allow line inputs to be accepted.
3. Input gain control allows input level to be adjusted.
4. Led indicates if input signal is overloading.
5. Treble control provides 16dB cut or boost at 10kHz with a shelving response.
6. Mid-frequency selection control. This control selects the frequency to be adjusted in the mid frequency band.
7. Mid control boosts or cuts mid frequency selected by 16dB.
8. Bass frequency selector. This control selects the frequency to be adjusted in the bass frequency range.
9. Bass control boosts or cuts bass frequency selected by up to 16dB.
10. and **11.** Echo sends providing two separate mono mixes from the mike channels for treatment by external echo or reverb devices. The sends are post fade so that as the amount of the channel's signal appearing in the final stereo mix is varied by the channel fader the degree of echo or reverb applied will stay in proportion.
12. Foldback control. Provides mono mix for foldback purposes.
13. Pan-pot. This control allows the engineer to 'place' the signal in any position in the stereo mix.
14. PFM Button. This Pre Fade Monitor button allows the engineer to hear and meter the channel individually.
15. Main fader to control channel volume.
16. Foldback master output equipped with complete eq section similar to the input channels.
17. and **18.** Main left and right output faders.
19. Headphone socket. Capable of driving both 600 ohm and 8 ohm headphones.
20. Monitor select switch selects the signal to be monitored.
21. and **22.** Echo master controls govern output level to echo or reverb devices.
23. VU meters scaled so that 0Vu = +4dBm.

TECHNICAL SPECIFICATIONS

Equalisation

Treble	±16dB at 10kHz
Mid	±16dB at 400Hz to 8kHz continuously variable
Bass	±16dB at 30Hz to 300Hz continuously variable

Outputs– (Echo outputs unbalanced mode only)

Gain after fader (unbalanced mode)	10dB
Maximum Output level (unbalanced mode)	+20dBm
Gain after fader (balanced mode)	16dB
Maximum output level (balanced mode)	+26dBm
Output impedance	<10 Ohms
Vu Meters	0 Vu = +4dBm
Overall frequency response +0·2dB 20Hz to 20kHz	
Distortion 1kHz + 20dBm	<0·15%

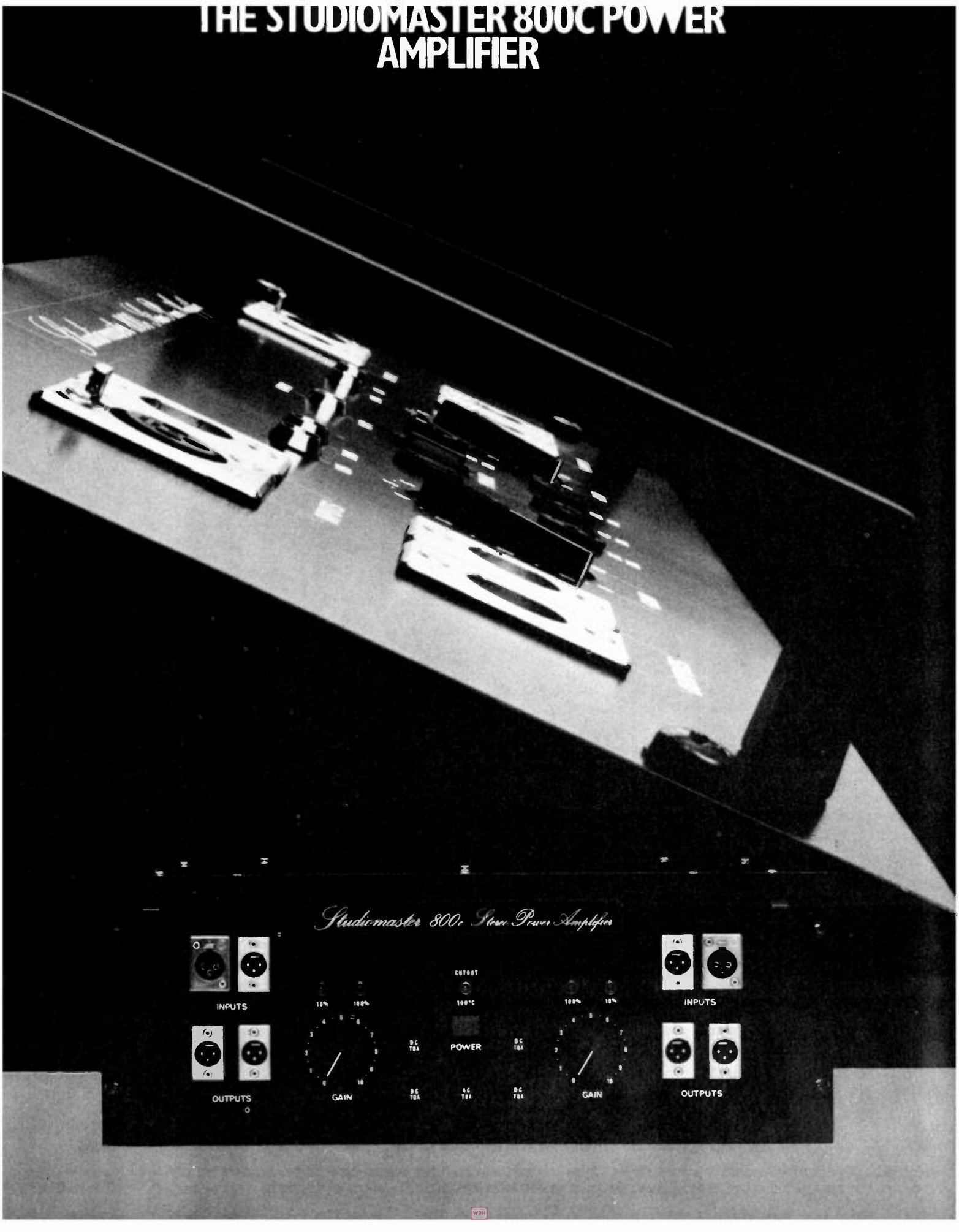
Inputs – Electronically balanced, active gain control optimum microphone impedance – 200 Ohms

Maximum Gain	+60dB
Minimum Gain	-15dB
Hence total gain range	75dB
Input impedance	6k Ohms
Equivalent Input Noise	-125dBm

(Unweighted, 16·7kHz 6dB oct filter giving effective 20kHz bandwidth, 200 Ohms input resistor)

STUDIOMASTER

THE STUDIOMASTER 800C POWER AMPLIFIER



THE STUDIOMASTER 800C POWER AMPLIFIER

The Studiomaster 800C is a rugged professional power amplifier capable of delivering two channels of 400 watts into four ohms.

The amplifier is designed to be rack mounted (it will function free standing) and all connections are via XLR plugs.

PROTECTION CIRCUITS

1. Instantaneous protection circuits protect the amplifier output stages from short circuits and inappropriate load conditions. The amplifier is cooled by two back panel mounted high efficiency fans. Warm air exhaust is via slots in the side panels.

2. Each channel has individual thermal cutouts to remove power from the amplifier if the temperature of either heatsink exceeds 100°C. An L.E.D. on the front panel indicates the event. These cutouts reset automatically when temperature falls to a safe level.

3. There are separate fuses for each DC rail for each half of the amplifier and an AC mains fuse, all rated at 8 Amp, slow blow.

4. In the unlikely event of a fault occurring that causes a DC condition on the amplifier output, a relay disconnects the speaker load from the amplifier after approximately 1 second.

FRONT PANEL INDICATORS

1. Illuminating mains switch

2. Yellow L.E.D. indicates thermal cutout has operated.

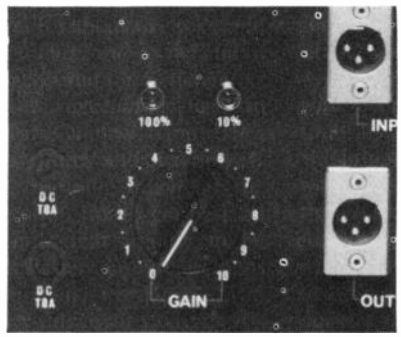
3. Green L.E.D.'s on each channel indicate an output of approximately 10% of full power.

4. Red L.E.D.'s on each channel indicate:–

   a) Instantaneous clipping of amplifier (100% output)

   b) Short circuit on output or any condition that causes operation of protection circuits.

   c) Any fault condition that causes loss of feed back in the amplifier and/or isolation of the speaker load by operation of the output relay.



CONTROLS

1. Illuminating mains switch.

2. Input attenuator (gain) controls for each channel recessed into front panel.

CONNECTIONS

1. A male and female XLR type input connector wired in parallel on each channel.

PIN 1 EARTH
PIN 3 SIGNAL

These input connectors facilitate linking of amplifiers with standard male to female links.

2. Two male XLR type output connectors wired in parallel for each channel:–

PIN 1 EARTH
PIN 2 SIGNAL

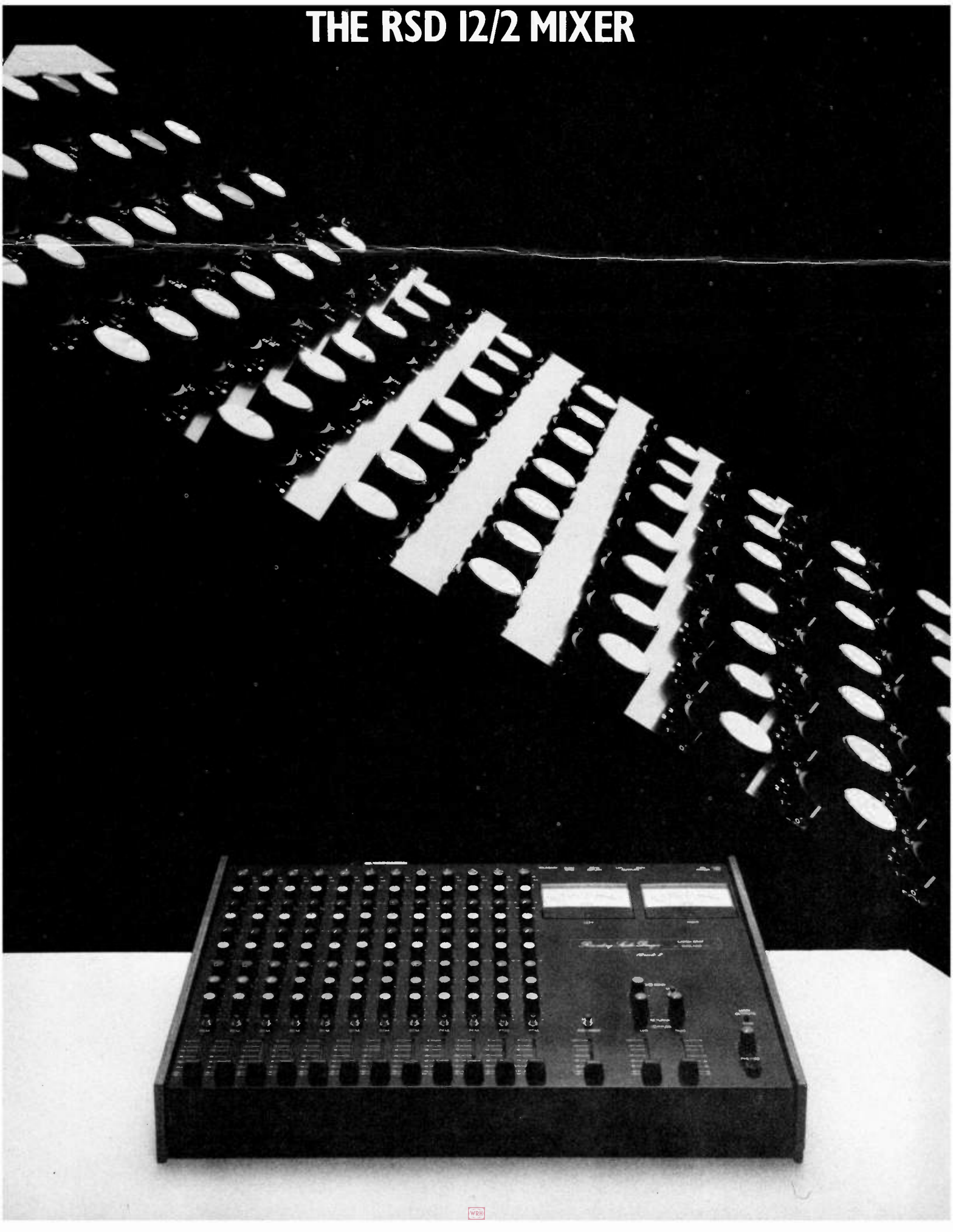
TECHNICAL SPECIFICATIONS

RMS Power O/P Per Channel at 1kHz	>225W Into 8 Ohms
RMS Power O/P Per Channel at 1kHz	>400W Into 4 Ohms
RMS Power O/P Per Channel at 1kHz	>600W Into 2 Ohms
THD at 1kHz at full power prior to clipping	< .005% At 8 Ohms
THD at 1kHz at full power prior to clipping	< .007% At 4 Ohms
THD at 1kHz at full power prior to clipping	< .01% At 2 Ohms
Input Impedance	>10K Ohms
Input Sensitivity	1.25 Volts RMS for Full Power into 8 Ohms
Frequency Response	+0 -3dB 5Hz to 30kHz
Signal to Noise Ratio	>100dB Ref. Full Power into 8 Ohms
Slew Rate	>15V/μS Into 8 Ohms
Fully Stable into	8 Ohms + 2μF

STUDIOMASTER

Circle 776 on Reader Service Card

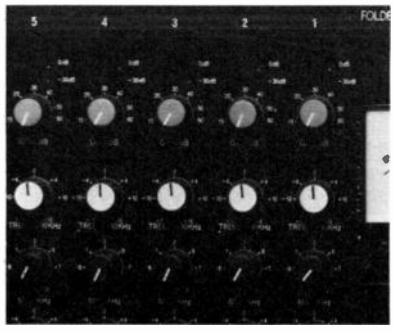
THE RSD 12/2 MIXER



HOW THE RSD 12/2 MIXER WORKS

INPUT

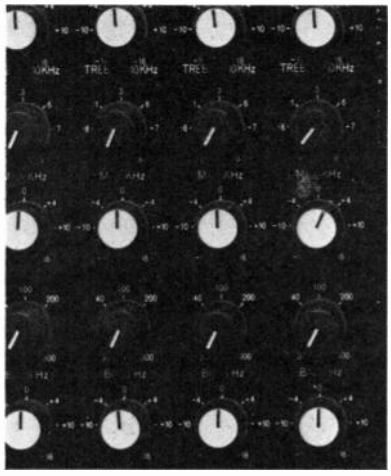
The 12/2 has 12 D3F-type inputs, with a capacity for further 4-input modules to be added on. The sockets are Cannon-type with multicore connection as an optional extra. Low impedance balanced line microphones (for rejection of unwanted crosstalk and interference and for correct operation with long lines) should be used. If microphones or other equipment with unusually high output are used, the 30dB 'pad' should be selected.



After plugging in the microphones, turn up the rotary 'input gain' control, press the 'PFM' button at the bottom of each channel and select PFM monitoring. This routes the incoming signal to the VU meters. When the signal is registering on the meter, adjust the control until the peaks hit around 0VU. If the needle is considerably in excess of 0 switch in the 30dB 'Pad' and turn up the gain control. This allows high input sources like tape machines to be fed into the mixer. When the needle is averaging around 0VU the input level is correctly set.

EQUALISATION

Equalisation is the name given to a sophisticated system of tone control whereby a musical tone is manipulated or 'equalised' by adjustment of the signal strength at several of its component frequencies.

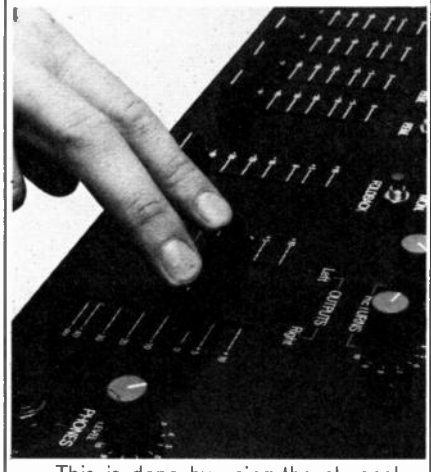


In the 12/2, this means an impressive 16dB of cut or boost on treble (at 10kHz, shelving) mid (at any frequency between 400Hz and 8kHz) and bass (at any frequency between 30Hz and 300Hz). 16dB is far more than you will usually need, but it is as well to have 'headroom.'

When you have used the bass, mid, and treble controls in conjunction with the monitors (route signals there by means of the PFM buttons) you are ready for the mixing stage.

MIXING

A mixer's function is to balance various input signals and create from them two (in the case of a stereo unit like the 12/2) composite signals for recording or amplification.



This is done by using the channel volume sliders in conjunction with the pan selectors. First, set the pan knobs central, and use the appropriate volume fader to regulate the contribution each channel makes to the total sound. This sound is assessed using the PFM button on the main outputs. This done, the stereo stage can be created by panning each channel either left or right to the desired degree. At this stage, some re-adjustment of the volume sliders may be required to give the exact effect you want.

EFFECTS PATCHING

Each channel has a separate 'echo send' control which routes the desired proportion of the signal to the echo send output, for connection to an external effects unit. The total 'send' is regulated by a master control with its own monitor button.

The echo send is 'post fade', meaning that however you adjust the channel faders, the echo will always stay in proportion. Echo return is through a D3F input: it has its own level control, and may also be used for stereo tape relay, special effects, etc.

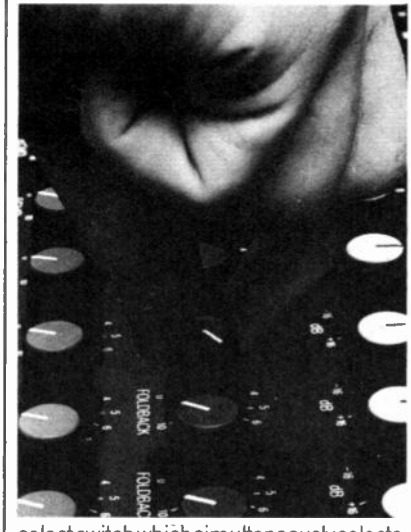
OUTPUT

The main outputs are D3M or equivalent wired: Pin-1, Earth, Pin-3, Signal. The level is controlled by two master faders.

A stereo jack socket is provided for use with headphones.

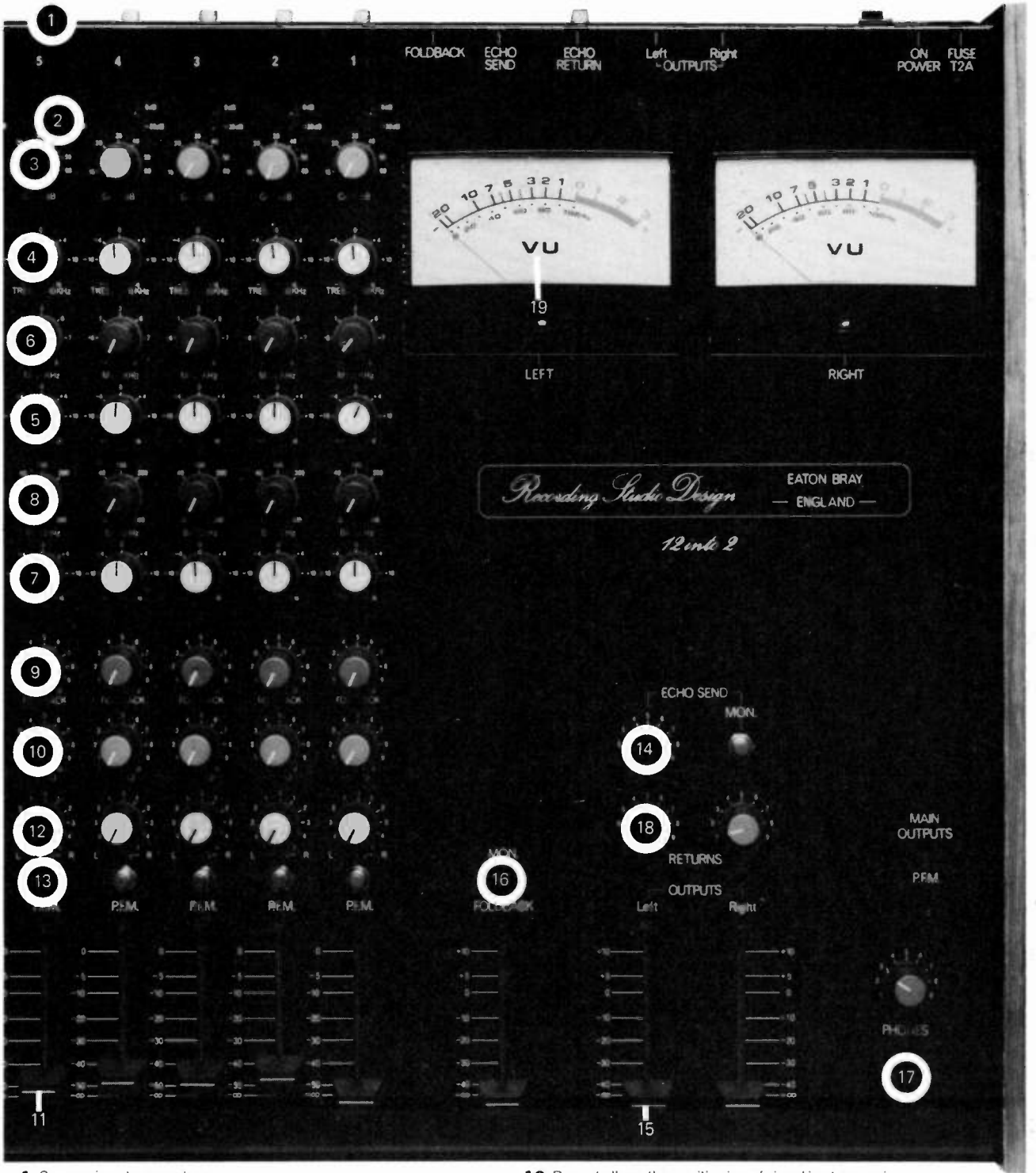
FOLDBACK/MONITORING

Monitoring on individual channels has already been dealt with. The 12/2 also has a foldback sends which provide a mono mix (controlled by its own level fader) for use with on-stage monitoring equipment. In addition there is a monitor



select switch which simultaneously selects headphones and meters either to the PFM system or to the main outputs pre-fade. This means that the levels can be read at the 'mixing point' and adjusted there to ensure balanced levels at all stages of the desk.

CONTROL LAYOUT OF THE RSD 12/2 MIXER



1. Cannon input connectors.
2. Input 'pad' switch reduced gain by 30dB.
3. Input gain control.
4. Treble control provides 16dB of cut or boost at 10kHz.
5. Mid-control provides 16dB cut or boost at any frequency between 400Hz and 8kHz.
6. Mid frequency selector.
7. Bass control provides 16dB of cut or boost at any frequency between 30Hz and 300Hz.
8. Bass frequency selector control.
9. Foldback send for foldback volume control.
10. Echo send providing a mono mix after fader to drive external echo or reverb device.
11. Main level control fader for channel.
12. Panpot allows the positioning of signal in stereo mix.
13. Pre Fade Monitor button allows engineer to listen individually to any channel independent of overall mix. Also allows channel to be monitored on VU meters.
14. The echo send master control and the foldback master control. Rotary control governs echo with a button for monitoring and slide fader governs foldback with button for monitoring.
15. Main output slide faders, left and right.
16. Monitor select switch simultaneously selects headphones and meters either to the PFM system or to the main outputs prefade.
17. Headphone output socket.
18. Echo return controls (separate for left and right).
19. VU meters calibrated to read 0Vu = 0dBm.

EQUALISATION - HOW TO GET THE BEST OUT OF YOUR RSD 12/2

CHANNEL EQUALISATION

Having achieved the general sound balance you want, the next step is to create the exact tone required from each channel. Tone equalisation can often add to the 'definition' of your music by skillful emphasis and panning techniques, separating tones of different frequencies and panning tones of the same frequency in different directions, when you wish them to be distinct. However to assess the total effect you must monitor the final (total) signal.

In the case of the 12/2, equalisation is the balancing achieved by the use of five tone controls, which accentuate or diminish selected frequencies throughout the range covered by the input signals, and thereby after the final tone. Having parametric equaliser simply means a more even, overall control than can be achieved when controlling the signal at only two or three frequencies. Parametric equalisation offers the engineer the opportunity to cut or boost almost any frequency.

THE FINAL SOUND

Having equalised the channels individually, mix the signals and listen to the sound as a whole. Probably the sound is not what you had hoped for, so, back to the mixing board, and make further adjustments on individual frequency controls until the balance is spot on. If all this is done at sound-check stage, however, it is as well to remember that further fine adjustments may need to be made when the audience are in their places, since the full hall will have different sound characteristics from an empty one.

FEEDBACK

The RSD 12/2 can be used to counter feedback but adjusting the appropriate equalisation controls. Since feedback often occurs at only one frequency, there is an obvious advantage in a system that enables just that frequency to be cut, rather than the entire channel volume. Used correctly, such feedback control can result in an effective sound gain of several decibels (as much as 50%) although it should be born in mind that you are altering the overall tone to achieve this.

RSD 12/2 TECHNICAL SPECIFICATIONS

Inputs
Electronically balanced input
Active gain control
30dB Input pad
Max gain (Pad Out) + 60dB
Min gain (Pad In) —15dB
Headroom 20dB
Input Impedance – Greater than 6Kohms
Equivalent Input Noise – Less than —122dBM typically —125dBM
(Unweighted, 20kHz bandwidth, input loadec with 200ohms)

Eq –
Treble ±16dB at 10kHz
Mid ±16dB at 400Hz to 8kHz
Bass ±16dB at 30Hz to 300Hz

CH Sends
Foldback Prefade
Echo Postfade
Main Stereo Program via fader, pan pot
PFM (Pre Fade Monitor) Button

Outputs
Foldback Master, Gain 10dB
Echo Master, gain 10dB
Left & Right Master, gain 10dB
Max Output + 20dBM
Overall frequency response, +0-2dB, 20Hz to 20kHz
Residual Output Noise —70dBM
(Unweighted, O/P Faders at 0, CH Faders down 20kHz Bandwidth
Gain after output faders +10dB
Hence maximum mixer gain (Eq Flat) +70dB
Echo return gain +10dB
V.U. Meters 0 VU = 0dBM
Input Impedance 10Kohms
Power supply regulated and protected 110/120v or 220/240v AC; 20VA.

Multicores
An optional multi-core cable, with stage box easy connection of the RSD12/2.

Flight Cases
For road protection a specially designed flight case is available for the RSD12/2.

Expander Modules
The RSD 12/2 mixer grows with your requirements and your budget. 'Add on' modules providing four input channels at a time are available and this means that your mixer is always ready to grow.

The 'bolt on' modules connect instantly into the existing mixer circuit with simple wiring connections.

RECORDING STUDIO DESIGN

THE RSD 800B POWER AMPLIFIER

THE RSD 800B STEREO POWER AMPLIFIER

ABOUT THE RSD 800B POWER AMP

The RSD 800B Stereo Power Amplifier is constructed to meet the most exacting standards of professional stage use. RSD sets out to make an instrument with main features of exceptionally high power combined with a signal-to-noise ratio and distortion level suitable for any application, and with a reliability which is always associated with RSD and Studiomaster products. The end result is a power audio unit second to none. The panel layout is simple, dominated by two extra-large illuminated VU meters, and the casing is designed for compatibility with standard international rack mounting, for maximum convenience.

Measuring 19" x 12" x 7" this model is, like many great performers, unostentatious off stage: relatively light, convenient to handle, easy to transport. But just plug everything in and touch that illuminated power switch, and you're in command of a sound capable of picking the auditorium up and shaking it. Or of putting the nuances of your music across in a way you have never known before. Like many possessors of real strength, the RSD 800b can also afford to be tender.

The Damping Factor is better than 500:1 at 20 Hz. (Copy B)

PROTECTION CIRCUITS

As long as stage equipment receives rough handling, and as long as the completely foolproof design has not been invented, protective circuits are vital to a power amplifier. RSD have built such circuits into all stages of the 800b. This includes full short circuit protection, a thermal sensing cut-out which protects the unit from overheating whatever the reason, and positive and negative 8 amp rail fuses on each channel. The mains input is also fitted with 8 amp fuse protection and overall cooling is by a 250v boxer fan fitted at the rear.

The 800B is stable with all reactive loads.

CONNECTIONS

The mains input is by European 3-pin connector with push-button illuminated on/off switch.

The audio input is by Switchcraft D3F on each channel with a mono/stereo switch for paralleling inputs if desired.

The outputs are via two D3M sockets wired in parallel on each channel.

The peak catching, illuminated meters are equipped with a VU scale in the usual way.

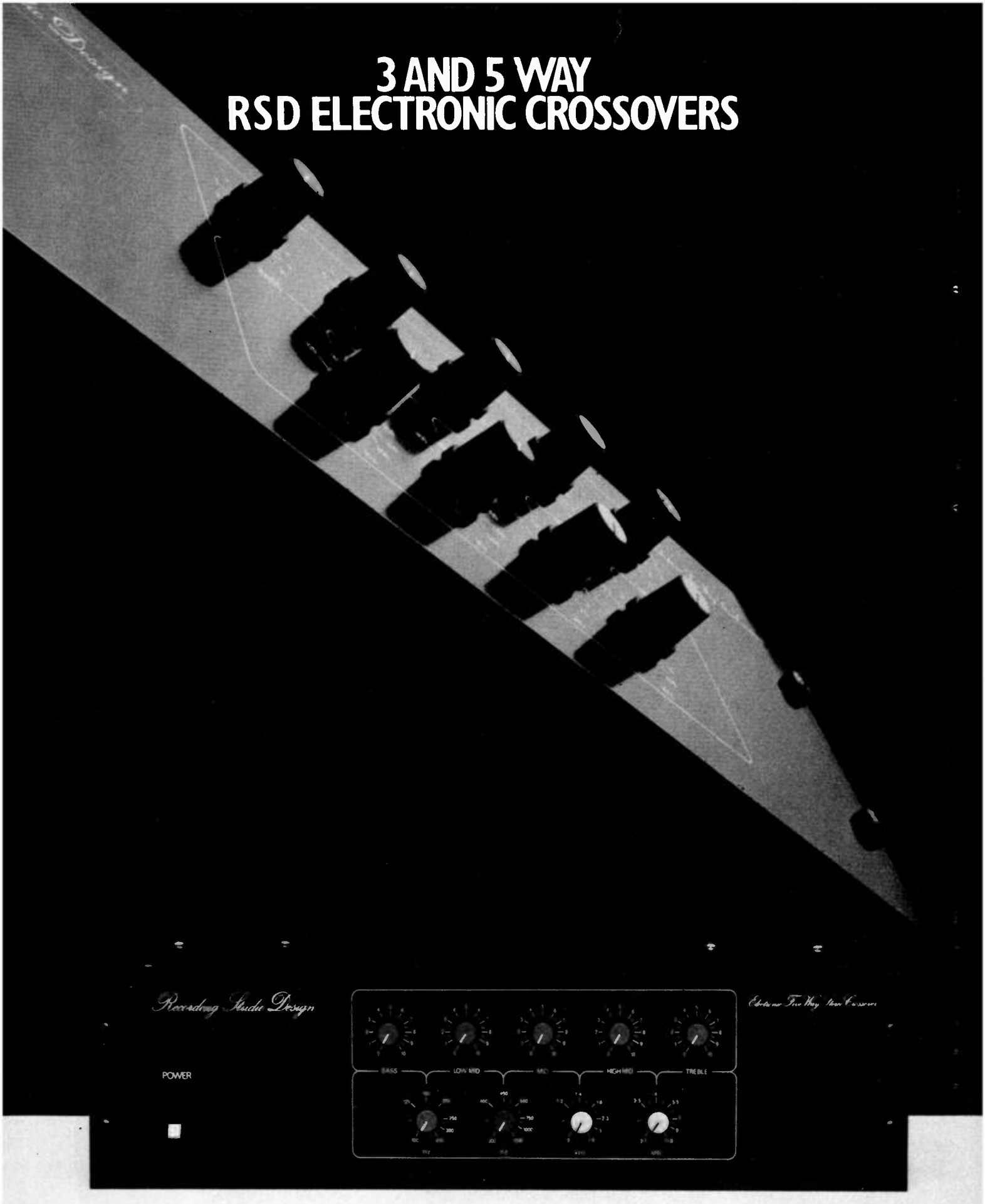
The casing is finished in mar-resistant matt black enamel on the front panel, and with white and pale green silk screening elsewhere.

TECHNICAL SPECIFICATIONS

RMS Power output per channel at 1kHz	greater than 120 watts into 16 ohms
RMS Power output per channel at 1kHz	greater than 220 watts into 8 ohms
RMS Power output per channel at 1kHz	greater than 340 watts into 4 ohms
RMS Power output per channel at 1kHz	greater than 480 watts into 2 ohms
THD at 1kHz at full power prior to clipping	better than < 0.25%
Sensitivity	1.25v RMS for 200 watts into 8 ohms
Input impedance	47kOhms
Frequency response	5Hz to 30kHz
Signal-to-Noise Ratio at DC-20kHz	better than 100dB below 200 watts into 8 ohms
Damping factor	better than 500:1 at 20H

RECORDING STUDIO DESIGN

3 AND 5 WAY
RSD ELECTRONIC CROSSOVERS



RSD ELECTRONIC CROSSOVERS STEREO 3 AND 5 WAY

The RSD Electronic Crossovers are available in 3-way or 5-way versions to suit differing needs. It is designed as a quality professional audio unit and employs active circuitry to give maximum scope in frequency selection.

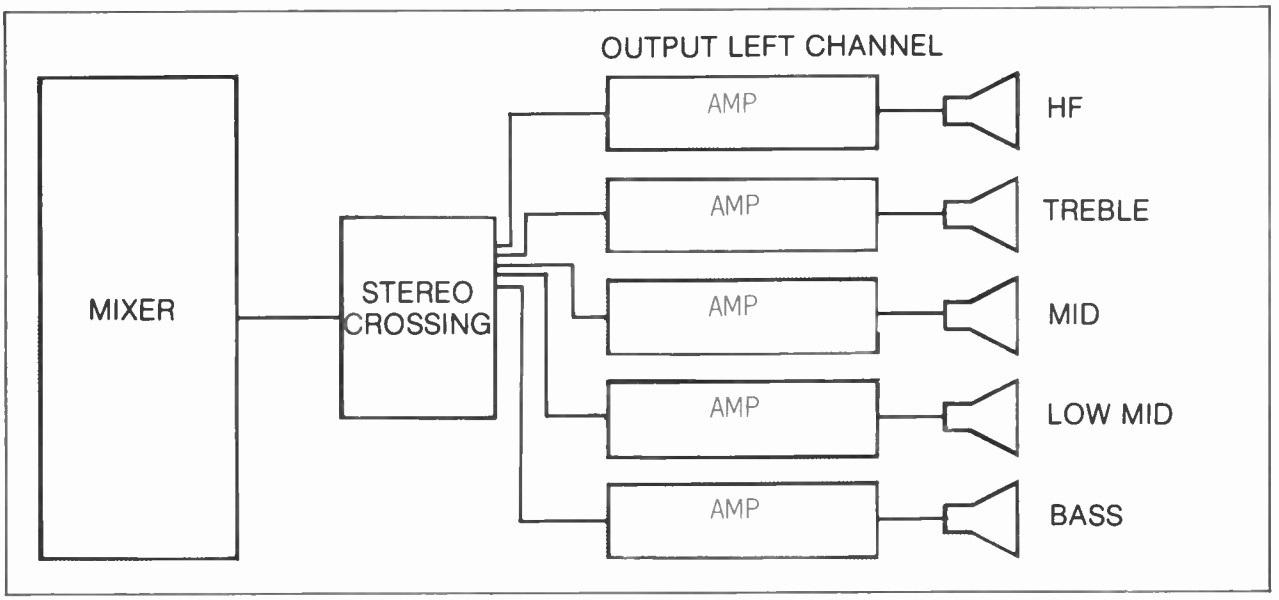
On the 3-way unit, the crossover frequency between the Bass and Middle outputs is continuously variable between 200Hz and 800Hz. Between the middle and the treble outputs, crossover frequency will adjust between 800Hz and 3.2kHz.

Separate gain controls are used on each channel, for fine adjustment on the balance.

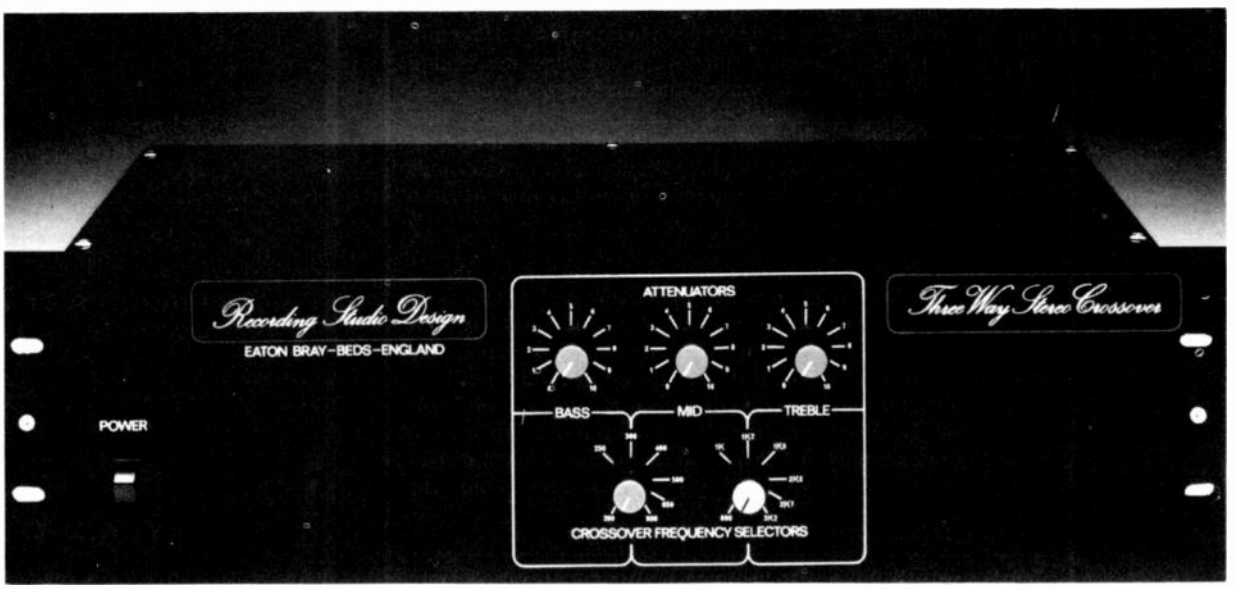
On the 5-way crossover signals from the mixer or other source are split into five frequencies. This allows each frequency band to be amplified at different levels and reproduced by transducers designed to hand specific frequency ranges.

Once again, independent input gain controls are provided, and on the back of the crossover there is a 25-way connector for compatibility with a multicore system.

5 WAY CROSSOVER IN ACTION



By using a 5-way or even a 3-way electronic crossover, the correct equipment for every frequency range can be selected, using lower power amps and higher frequency drivers as the signal frequency gets higher.



RECORDING STUDIO DESIGN

THE STUDIOMASTER 400C POWER AMPLIFIER

ABOUT THE STUDIOMASTER 400C

With the 400C, Studiomaster have designed a tough and reliable stereo power amplifier delivering 200 watts per channel into 4 ohms. It is intended for all P.A. applications in professional and semi-pro performances, and can be used either rack-mounted or free-standing. All connections are via XLR plugs.

METERING

Two metering systems are offered as options on the 400C. Users may choose either VU meters or an 'LED' metering 'chain'. Fast attack and slow decay characteristics in both systems aids monitoring of peak signal levels.

PROTECTION CIRCUITS

Studiomaster safety is second only to Studiomaster sound. Well aware of the kind of life most amplifiers lead with a small band, we have aimed to produce equipment which not only minimises the chances of a fault developing, but has circuitry which safeguards the amplifier and the users if anything should go wrong.

There are also instantaneous protection circuits which protect the output stages from short circuits and inappropriate load conditions. In the unlikely event of a fault occurring which produces a DC condition on the amplifier output, relay disconnects the speaker load from the amplifier after approximately 1 second. There is an 8 amp mains fuse, and also an 8 amp slow blow fuse on each DC rail.

The amp has an individual thermal cutout to remove power from the amplifier if that heatsink exceeds 100°C in temperature. These cutouts reset automatically when the temperature falls to a safe level. A yellow neon indicates when the thermal cutout is operating.

CONNECTIONS

Connection is via a female XLR-type input connector wired (Pin-1, Earth, Pin-3, Signal). Two male XLR-type output connectors are wired in parallel for each channel (Pin-1, Earth, Pin-2, Signal).

TECHNICAL SPECIFICATIONS

RMS Power Output Per Channel at 1kHz	greater than 112 watts into 8 Ohms
RMS Power Output Per Channel at 1kHz	greater than 200 watts into 4 Ohms
RMS Power Output Per Channel at 1kHz	greater than 300 watts into 2 Ohms
THD at 1kHz at full power prior to clipping	< .005% At 8 Ohms
THD at 1kHz at full power prior to clipping	< .007% At 4 Ohms
THD at 1kHz at full power prior to clipping	< .01% At 2 Ohms
Input Impedance	> 10K Ohms
Input Sensitivity	1.25 Volts RMS for Full Power into 8 Ohms
Frequency Response	+0 -3dB 5Hz to 30kHz
Signal to Noise Ratio	> 100dB Ref. Full Power into 8 Ohms
Slew Rate	> 15V/µS Into 8 Ohms
Fully Stable into	8 Ohms + 2µF

STUDIOMASTER

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RECORDING WORLD

San Franciso

Total automation has finally come to the Automatt with the installation of a Trident TSM 40 x 24 desk in Studio A. **Pearl Harbor and the Explosions** (Warner Bros.) will be the first to put it to use, with producer David Kahne and engineer Jim Gaines behind the board. In Studio B, **James Lee Stanley** is busy putting together an independent project... Wally Heider Studios has been guesting the mondo bizarro **Tubes** who are mixing a concert tape slated for an album release and a TV soundtrack. **Narada Michael Walden** has been cutting a single at the studios and the newest artist on Rolling Stone Records, **Jim Carroll** (with his band **Amsterdam**), has been working on his first LP. The **Ball-Taylor Band** has also been in for some work... Over at the Record Plant, **The Jefferson Starship** is putting the final touches on their latest as is Motown artist **Rick James**... At Fantasy's studios **Bill Summer** is in cutting "On Sunshine," and disco star **Sylvester** is laying down the tracks for a double album, "Living Proof." Fantasy also just finished the mix on a live double album of the Bread and Roses acoustic folk festival held in 1977... John Altman's studios have been hosting **Judy Collins'** sister **Holly Near**, who is working on "Holly Near on tour for a nuclear free future"... Different Fur Studios has had **Messiah, Magic, Huey Louis and his American Express, Jack Cassidy's SVT, Joe Richards** and the multi-media San Francisco Experience... Bear West Studios has been hosting the **Tasmanian Devils** and **Dirty Legs**... Over at Tewksbury Studios the **Readymades**, the **Mutants**, the **Runz** (producer **Eddie Money**), **Sudden Fun, Jennifer Miro**, the **Charmers** and the **Psychotic Pineapples** have been busy at the 24-track facility... At Hun Sound, **Maria Muldaur, Sammy Hagar, Attitudes** (featuring ex-Santana bassist **David Brown**), **Nick Gravenites** and C&W artist **Chris Hawk** have been rehearsing and recording at the studios... And, out in Mill Valley at Tres Virgo Studios, **Cinders, Stranger, Leapers** and **Times Five** have been putting in time.

Nashville

The most exciting single project that I've heard of lately is the just-finished **George Jones** album of the "with friends" ilk that was cut at the legendary Columbia Studio B, which has changed very little (at least visually) from the halcyon days of the late Fifties, early Sixties when it and the now "little" RCA studio were the only two rooms in town to make a record in. I'm not sure who's on the Jones album, but I heard a duet with **Willie Nelson** that could alone justify the album, which will be a strong reminder to a similar venture last year centered around **Ernest Tubb**... **Gene Watson** has finished his new album at the Jack Clement Studios with Russ Reeder producing, they also took tiime out to cut a session on veteran **Lee Ofman** that has generated a lot of enthusiasm. Also finishing an album at Clement is **Don Williams**, who will be touring this winter with **Dave and Sugar** as support and who has just renewed his contract with MCA. Meanwhile **Saundra Steele** just cut her first album at the studio for EMI America. Saundra came to EMI's attention through a demo she did for Picalic Productions which became **Crystal Gayle's** "Half the Way." Of course, "Half the Way" is on the album but none of the other songs have been released. Additional activity at Clement includes **Paul Ott's** follow-up to his John Wayne tribute record and the first gospel venture for Mutual Management (Frank Fara and Patty Parker); the act is **Steve Gray and Jubilation**, a ten-member group —eight of whom are in the same family ...Soaring on the updraft from the truly uplifting "Dreams Never Die," **Bill Anderson** and producer Buddy Killen have been in and out of SoundShop a great deal lately with a new album being the deliberate goal, between sessions at the same studio are **Conrad Pierce, Buddy Emmons** and **Lobo.**

New York

The impressive **Steve Forbert** has been mixing his latest recorded work at Columbia's studio where **Al DiMeola** has been self-producing his latest effort. Also at the CBS enclave has been **Cissy Houston**, the **Spinners, Charanga** and jazz pianist **Bill Evans**, while over at the company's 30th Street studios **Frank Sinatra** has been putting together a three record set... Mixing and overdubbing, the **Fifth Dimension** has been polishing its work at the Sound Ideas Studios where **Helen O'Connell** and **Quinella** have also been putting in time... The indefatigable **Britt**

On The Record

Scott E. Kutina
Joanne Huttner
Bill Littleton

RECORDING WORLD

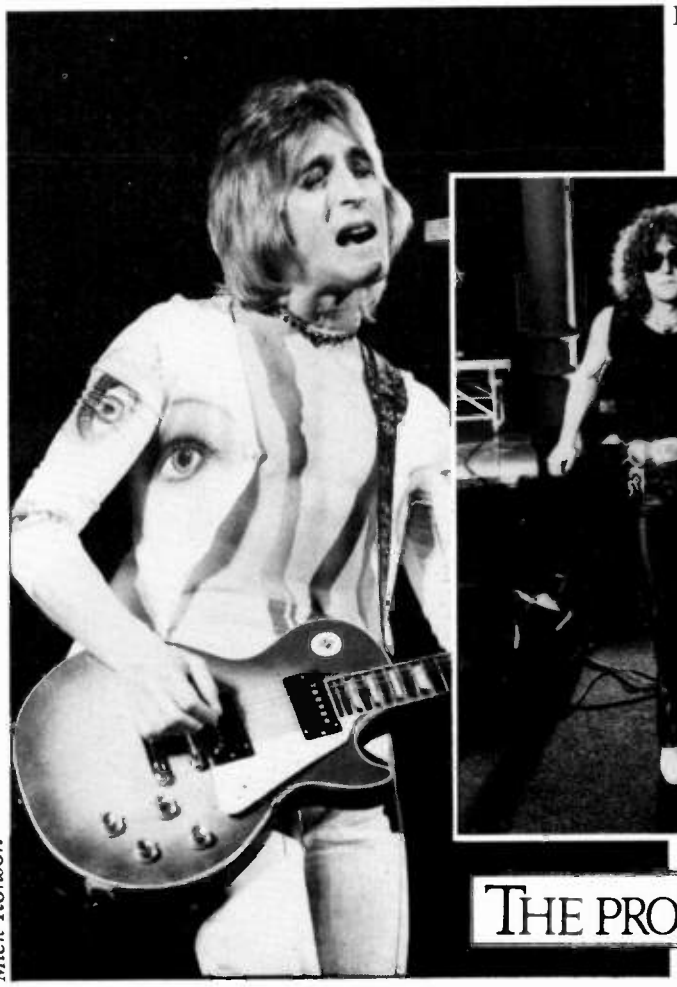
Ekland is working out at Mediasound where **Richie Havens** has found a home to work on his newest. Also at the ever-popular studios are **Rex Smith, Dan Hartman** and die-hards **Aerosmith**...Things have quieted down a bit at Electric Lady studios as they continue to host some of the best jazz and pop artists such as **Earl Klugh** and **Masuai**—a jazz guitarist from Japan...Rounding out the New York recording scene is **Slave,** who is doing final mixes over at the Atlantic Recording studios.

Los Angeles

Sunset Sound continues to cop a major share of the "stars" around L.A. with **England Dan & John Ford Coley** putting in time at the studio. Also making use of the rooms are A&M's **Pablo Cruise, Toto** and **Booker T. Larry Farrow** has also stopped in to cut a disco Christmas LP and **Scott Shelly** is in for PDQ...Over at Larabee Sound **Holly Pennfield** and **Bijou** (a French rock & roll band) have been making use of the excellent facilities... A&M Recording Studios are rocking to the disco sounds of the **Village People** who are in for the Casablanca label. The marvelous British singer/songwriter **Joan Armatrading** is also putting down tracks at the studio as is **Spinetta**...At Cherokee Studios **Boz Scaggs** is recording a long-awaited album while **Eric Carmen** and **Paul Nicholas** are both being produced by the prolific Harry Maslin...Capitol Recording Studios continues to mix up its talent lineup hosting **America** and, on the other end of the spectrum, **Burt Bacharach**—**Tavares, Triumvirat** and **Bob Welch** are also in...**Chuck Mangione** is working on the final mixes for his latest at the Westlake Studios. Also on hand are the **Ozark Mountain Daredevils** as well as **Foxes, Spark** and **Foxy**...At Gold Star new-wavers **Zilch** are putting something together for the Hot Lunch label and rock & rollers the **Relievers** are working out for Rocket Records...At Filmways/Heider Recording **Jerry Lee Lewis** is still working on his newest effort while the studio's mobile unit recently recorded a **James Taylor** concert out in Ohio. Final mixing is being done of the **Little Feat** album and Heider's mobile also managed to make it to New York's CBGB's where it was used to record **Patti Smith** for the King Biscuit Flower Hour...**Off Broadway** is laying down tracks for Atlantic at the Record Plant where **Trillion** is also putting together an album.

HUNTER/RONSON
A Producing Team

By Steve Weitzman



Ian Hunter

Mick Ronson

THE PRODUCERS

The Ian Hunter-Mick Ronson partnership, which has flourished for several years now and recently peaked creatively with the release of Ian Hunter's brilliant *You're Never Alone With A Schizophrenic* (which Ronson co-produced, arranged, played guitar and sang on), is a relationship that defies all rock & roll logic. After all, how can two guitar players who work so close even decide how far to crank up their amps let alone produce, record and hit the road for a 70 date tour together—which is where they are right now—without one wanting to tip over a stack of Marshalls on the other at some point?

Simple, says Ian Hunter. "He's a lead guitar player and I play rhythm. That way there's no friction. Also, he's a good bloke."

Ian Hunter has good reason for his affection for Mick Ronson. Ronson, who had previously been with David Bowie's Spiders, rescued Hunter from the dying remains of Mott the Hoople which he had been trying to revive as well. In 1974, when Hunter finally left Mott in the hands of bassist Overent Watts and company, it was a definite low point in his life. Ronson, subsequently, helped pull things together.

"I wasn't feeling too good at the time," Hunter remembers, "and he said, 'You should do something straight away. Get out of the house a little.' " What they did was begin work on Hunter's first solo album, simply titled *Ian Hunter*. The transformation was immediate. The album, loaded with good songs and smart arrangements opens with a bouncy, two-chord guitar refrain and a cheery, cockney "...Allo" from Hunter. Ian Hunter is reborn. Other than temporary diversions like Mick Ronson joining Bob Dylan's Rolling Thunder Review for a tour and Hunter producing Generation X's second LP, they've been a team almost ever since.

Both Hunter and Ronson—at different times—received their earliest on-the-job production training from David Bowie. They've since gone on to produce all their own solo albums (Hunter has three, Ronson two) as well as producing various other artists the last couple years. Hunter encountered Bowie when Bowie produced Mott's *All The Young Dudes* in 1972. Ronson worked with Bowie on Lou Reed's *Transformer* Lp after having done some arranging on Bowie's *Hunky Dory* and *Ziggy Stardust* while with the Spiders.

What Hunter got out of working with Bowie, he says, was an appreciation of "the chances he would take. There is a standard," he explains, "a certain *level* I think you have to be on to be successful, and Mott at that time wasn't on that level. We just figured if we were going to get somewhere, we had to up the level of quality."

All The Young Dudes was just that and Mott the Hoople joined the big leagues. After Bowie showed them the way, they produced their own follow-up, *Mott* (which included the single "All The Way From Memphis"). As Ian Hunter tells it, it was not entirely by choice.

"There was nobody else around to do it at the time," he says. "We had this kid called 'Madswitcher' Harris (an engineer) and we did about three tracks—we were in agonies of indecision—and Roxy Music was in the same studio. They came down and said, 'It's *fine*. Do it.' And we did. And it was the biggest album we ever did."

Hunter, who along with Ronson recently produced Ellen Foley's first record, remembers Mott's first producer. "Guy Stevens had been our producer in name," he states, "but we used to do it more or less ourselves. Guy would leap about the studio providing the energy, which is really important, but he didn't know how to twist knobs or anything. We had to learn how to do that."

He chose not to learn how to work a control board in all its intricacy, however, and has relied on a select few engineers over the years to handle that chore. "I don't really think it's that important," he says. "In fact, I think it's a good idea not to know that much about it. Instead, we spend a lot of time with our ears, saying, 'Do this, do that. This ain't right, etc.' "

Certain Ian Hunter tracks utilize subtle studio effects, like the phased vocal on "3,000 Miles From Here" on his first solo album and the slightly phased cymbal on "When The Daylight Comes" from *Schizophrenic*. Who makes those kinds of decisions, he or the engineer? "What I usually say," Hunter explains, "is, 'Do something.' With the Ellen Foley album and my last album, we worked with two good engineers and I'd just turn around and say, 'Do something,' and they'd seem to understand. And they'd run through a few things and in the end you'd come up with the best one.

"Like on 'Cleveland Rocks' *(Schizophrenic)*, Ronson was sitting there and I said, 'It's fucking horrible! We gotta do it different.' And we fucked around and all of a sudden it started sounding good." Regarding that track, Ronson would later say, "We did 'Cleveland Rocks' in kind of a strange way. We decided to put the synthesizer on first and the drums on last. That was one of the new songs we 'put together' in the studio. The album was mostly done live."

When questioned further on the way they make records, Ian Hunter simply says, "It's really trial and error. We don't work like Chinn and Chapman. We don't go in with a pre-conceived idea at all. That's part of the fun of it. See, we're not really producers *per se*. Like with the Foley record, we just walk in and its a group—we just play. We can't just sit back and tell people to do things. It seems to work better that way."

The one time he walked in with an outline and a recipe was for *All American Alien Boy*, the second Hunter solo album. "I *had* to," he says with regret, "because I was doing everything and it was just too much. And it sounds like a formula album to me. That's one of the things that upset me about it."

That album included such heavy session players as Cornell Dupree, David Sanborn, Chris Stainton, Aynsley Dunbar, Jaco Pastorius as well as Queen on background vocals. Ian ordered up quite a band for this one. And that was the problem. "The one thing I never accounted for," he says now, "was actually walking into the studio and having to control that wealth of talent. That got me real weird for a couple of days and I had not thought about it. I just figured I was gonna walk in and do it. All of a sudden, I'm sitting there and there's Jaco and Sanborn and Aynsley and Cornell and they're waiting for me to say 'Go!' It got real strange."

How does he view producing others as opposed to making another Ian Hunter album? "I'd say it's about the same. You get involved in their career. You share in the responsibility."

"We've got hundreds of tapes here that we've been listening to," he adds. As for what they're looking for: "We just want to hear something we like."

Hunter enjoys the company of a second producer on projects. "You always dread that one part," he says, "where you're up against the wall and you don't know how you're going to get through it. It takes the heat off. We have a lot more fun when we co-produce. We just bounce it back and forth and it seems to work real good."

What does he look for in a studio? "The size of the place—it has to be big. The ambience is really important. And an engineer you feel is compatible. In the case of my album, we had Bob Clearmountain. He's very, very conscientious. Another guy we use is Harvey Goldberg at Media."

Regarding equipment preferences Hunter says, "I tend to prefer Neve boards. They always sound good to me."

Are there certain ways he likes to record his voice for maximum effect?

"Yeah. It's changing now. I used to always slow the tape half a tone to brighten it up. I used to think my voice was pretty dull. And also, I couldn't reach the notes a lot of the time (laughs). I used to write in these stupid keys (more laughter). Now we just fuck with the mikes."

Based on *You're Never Alone With A Schizophrenic*, Ian Hunter's vocals have improved immensely over previous efforts. He's also learned how to set them off against the right instrumentation. "The Outsider" pairs his voice to an echoey piano and a distant synthesizer and the effect is remarkable. And "Ships," a haunting ballad, uses a sparse bass, stark drumming and a floating chorus and is equally dramatic. Bowie and Springsteen come to mind as experts at this tactic. Hunter, in fact, used Springsteen's band (Roy Bittan on keyboards, drummer Max Weinberg and bassist Gary Tallent) on *Schizophrenic*, another reason the record is a powerhouse. It was recorded at the Power Plant, a huge studio where Springsteen is currently recording. Had he ever seen the E Street Band perform?

"I didn't know them," Hunter admits. "I'd never seen that band. My manager suggested them to me and they worked out great. They're such nice people as well. Springsteen must be real special to have a band like that."

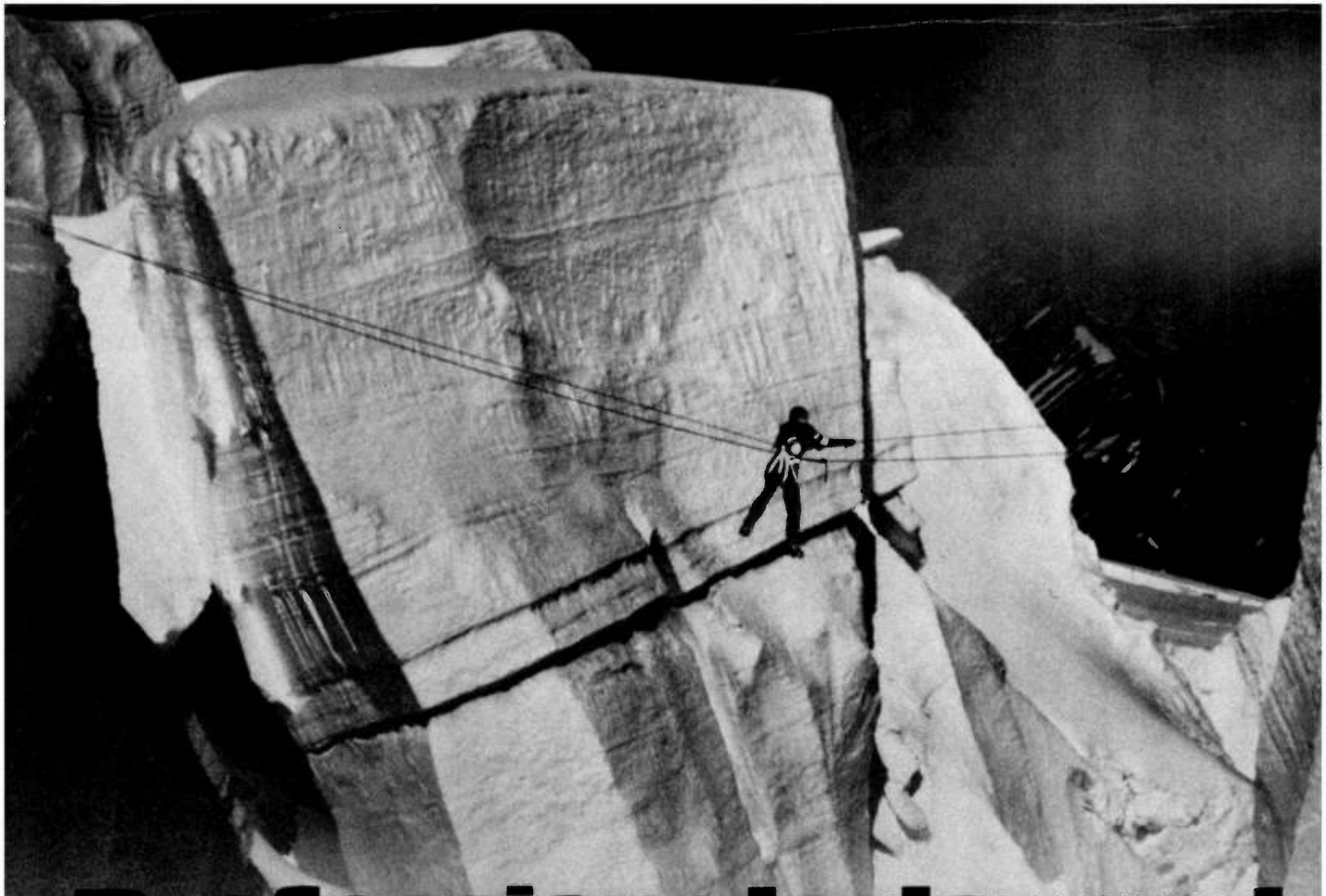
He was able to catch a Springsteen show, however, just before Bruce went into the studio. His reaction? "Phew," he says. "They were *great*. *He* was fabulous. I was very, very impressed and I'm not easily impressed at all. I'm a bit of an old bitch in fact, always slaggin' everybody off (laughs)."

Looking back on *Schizophrenic* as it heads up the charts, he now says, "It came out slightly better than I thought it would—for the first time ever in my life. I don't look back with regrets and about now is when you start that."

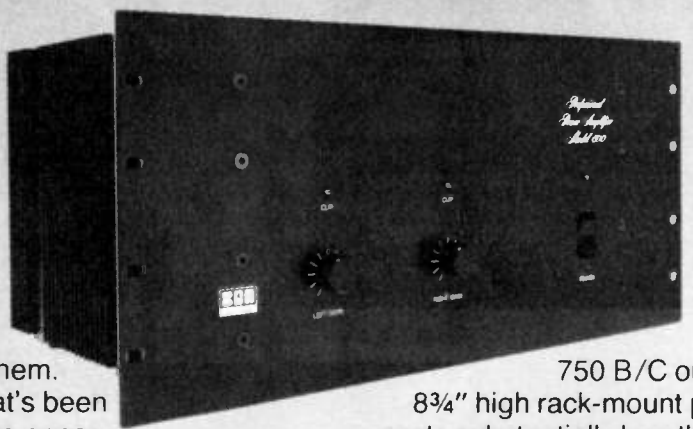
Mick Ronson has no regrets either concerning his playing on the record. His riveting guitar solo on "The Outsider"—a perfect example of a solo where every note makes sense—sounds like he wrote the melody out note for note. "It does sound like it was planned," Ronson says with obvious pride, "but it wasn't. To tell you the truth about that one," he adds, "we recorded that song a couple of months before it was on Ian's album and I used the same solo that I had improvised then this time around. It was such a good solo, I didn't see any point in changing it. So it didn't just come out when it was Ian's album, but it did before."

Mick Ronson's preference for spontaneity and working by feel in producing and recording, and his lack of pretension are evident when he is queried about his own particular set-up. Witness:

What kind of guitar effects do you use



Professionals depend on their equipment.



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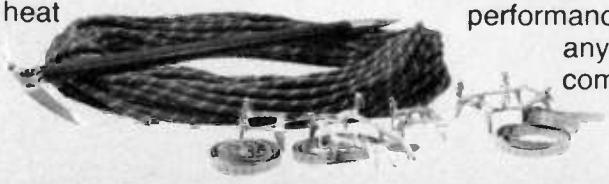

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in the studio?

"I don't really use any effects..."

How do you like to record your guitar?

"I dunno. I just plug it in and play."

Do you favor any particular equipment?

"Nah. I plug it into anything, really."

Anything?

"Well, I don't play that loud in the studio. Sometimes it *sounds* loud. I may play through a Fender Twin amp or a Music Man. I don't play it through anything bigger than that though."

Are you still using the same gold Les Paul?

"Well, the head fell off it. It's being repaired at the moment. On Ian's record I used a Fender Strat all the way through and I didn't use the Gibson at all. There wasn't a Gibson around so I used a Strat. That's another thing—I usually play any guitar that's around, too. A Fender man gave me the Stratocaster so I used it. It sounded great on Ian's record. Onstage, I'd like to be able to get more into the Stratocaster but I don't really know how to set guitars up that well with the action and I find the Les Paul is easier to play onstage."

Was that just a Wa-Wa on the guitar part at the end of "Bastard?"

"Yeah. Just a Wa-Wa. I don't mind using a Wa-Wa pedal. Just because nobody else is using them (laughs)..."

What other pedals do you use?

"I just use a distortion booster. I don't use anything else. I can never be bothered to plug 'em all in. I've got other pedals I'd kind of like to get into using, but not just for the sake of using them."

Mick Ronson has been reported to have said that touring with the Rolling Thunder Review completely turned his head around concerning guitar playing. Is that true?

"Yeah," he emphasizes. "Definitely. It taught me you really didn't have to overdo it to get your point across in music. It just depends on how you put it forward. Try and listen to the song and play for the song and treat it that way. I always did kind of listen for the song and think about the way it should be approached but I never realized that's the way I thought until I played with them. Playing with those guys, you don't play *nuthin'*, yet it sounds great. And it feels great when you're playing it. And you don't even have to be good. All you have to do is be aware of what's going on. It taught me to be a good listener more than anything else. Also, at the time I first played with Bob, I really didn't know what to do. I was lost. But they were real good about it. They just let me kind of *be*. That's when I started learning about not telling everybody what to do. Just let 'em be. Let 'em show their own personality. I think what makes a record work is a combination of personalities."

Ronson has used that philosophy in producing Roger McGuinn's *Cardiff Rose*, two English bands—the Real Kids and Dead Fingers Talk, and most recently, David Johansen. His objective with Johansen was "to make it as simple as possible and have the band play that way allowing more freedom for David's voice. And I think he sings great on it. David never used to be able to sing at all as far as hitting notes was concerned. He had a big problem. But he's finally become a singer and he's going to be a good singer. He's real convincing." Ronson will be doing Johansen's next album as well.

In the studio, Ronson likes "a good fast engineer. I like to get the music down and let's go," he says. "I also like an engineer who can put it in balance to what you want to hear. I like to hear what everybody's playing all at once because, for example, I can't tell what the bass sounds like until I hear it with the guitars. Or drums with the pianos and guitars." As with Hunter, he also likes a big room. "A big room is obviously better because there's just more room and you can really get cramped sometimes."

Also, as with Ian Hunter, Ronson has no interest in the board. "That's why you pick a good engineer," he says. "Especially one that's fast so you don't have to worry about all that stuff. And for mixing, basically, all we do is listen to it and say like, 'Oh, that sounds good mate.' And that's that."

Mick Ronson can certainly make a difficult endeavor like recording or producing sound simple. Maybe that's the reason the new Ian Hunter album is a commercial and critical success. Could it be he's found the answer?

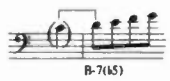
"It definitely feels better doing it that way," he offers. "Once you're confident in yourself and know what your capabilities are, you know what you can do in a studio. I feel like I can just walk into a studio and cut a record. I don't even think about it anymore. You just go in and rip it off. 'Cause the other way is real hard work. You sit there sweating over what's right or whether it's good enough. All that does is stop you from putting out what you're supposed to be putting out. And that shouldn't be."

On Bass

Continued from page 13

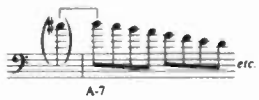
The next bar has two chord changes in it, $B^{-7(b5)}$ (BCDEFGAB) and E^7 (which in this case we will call the notes E, F sharp, G sharp, A, B, C sharp, D, E, just like a regular Mixolydian Scale).

By treating the two changes diatonically, we see that, in order to have a smooth step-wise connection, the first available note to start the line in $B^{-7(b65)}$ is D.

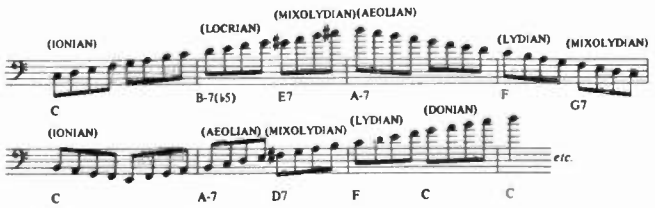


The second half of the bar is an E^7. To keep the line diatonic and moving step-wise, the first available note to start the line in E^7 is G sharp.

The next bar is A^{-7}. Once more, treating it diatronically, and keeping the step-wise motion, the starting note for A^{-7} is D, but since we've run out of frets, we'll not begin to descend on the bass.



Get the idea? Here is what one chorus of "Yesterday" looks like with the step-wise diatonic concept I've been talking about.



My usages of the modes, by the way, are not to be taken as absolute. There are other scales and modes that can be used in this example. This one merely gives you a good working understanding of how to think of connecting your lines smoothly and harmonically correctly.

The good thing about this exercise is the 60 million ways you can use it. If you start the exercise on an A, for example, instead of a C, you will come upon the different step-wise possibilities when you get to the next chord changes. In fact, by using the Ionian (Diatonic) scale as your first scale, you have seven different starting notes, C, D, E, F, G, A and B. There are rhythmic displacement possibilities, alternate chord possibilities, etc. I'll get into those more in the next column.

Meanwhile, with all the tunes there are in the world, I would say that every bass player has his homework cut out for him (me too, because I still practice this stuff). By involving yourselves in new and different ideas on your bass, you will create new and exciting musics for yourselves, which is what we all want to do — what we need to do. Good luck! If you have any questions, please write me at International Musician and Recording World, 1500 Broadway, 19th Floor, New York, N.Y. 10034, and I'll try to answer them either in person or through the column.

On Drums

Continued from page 11

that there is no "kick-back" when the drum is struck, because most of the sound is projecting out of the front of the drum only. However, this is offset by the fact that all the sound is shooting straight out the front to where the eager audience lies in wait. Obviously, the degree of projection depends on how you set up. The tom-toms really need to be angled to some extent so that the open end is facing the front, together with the bass drum.

Again, take care with the dampening. Single heads will generally have less tone, they produce more of a flat sound and, without the front head on the bass drum, it will have lost its deep, rich tone. The only way to make up for this is to dampen the playing head. This will also thicken up the sound as well as reducing the "boom." So far, I have talked only of single and double-headed drums which, being of traditional design, tend not to project too well in a large hall unmiked.

Projection is where the newer, revolutionary drums like North and Staccato really come into their own. They project so well and, because of their shape, you can set them how you like — which is great if you do not like playing on tom-toms set at an angle. This also applies to sound reflectors like the Ludwig design or the Remo type. Another important factor for projection is the type of shell used, whether it be glass fibre, Plexiglass, wood, metal or even recycled paper — each of these materials has different qualities concerning the projection of sound. Also, different types of wood, different thicknesses of shells, types of head used and different ways of tuning affect the degree of sound projection.

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