

MIX

Exploring the
Frontiers of 3-D Sound

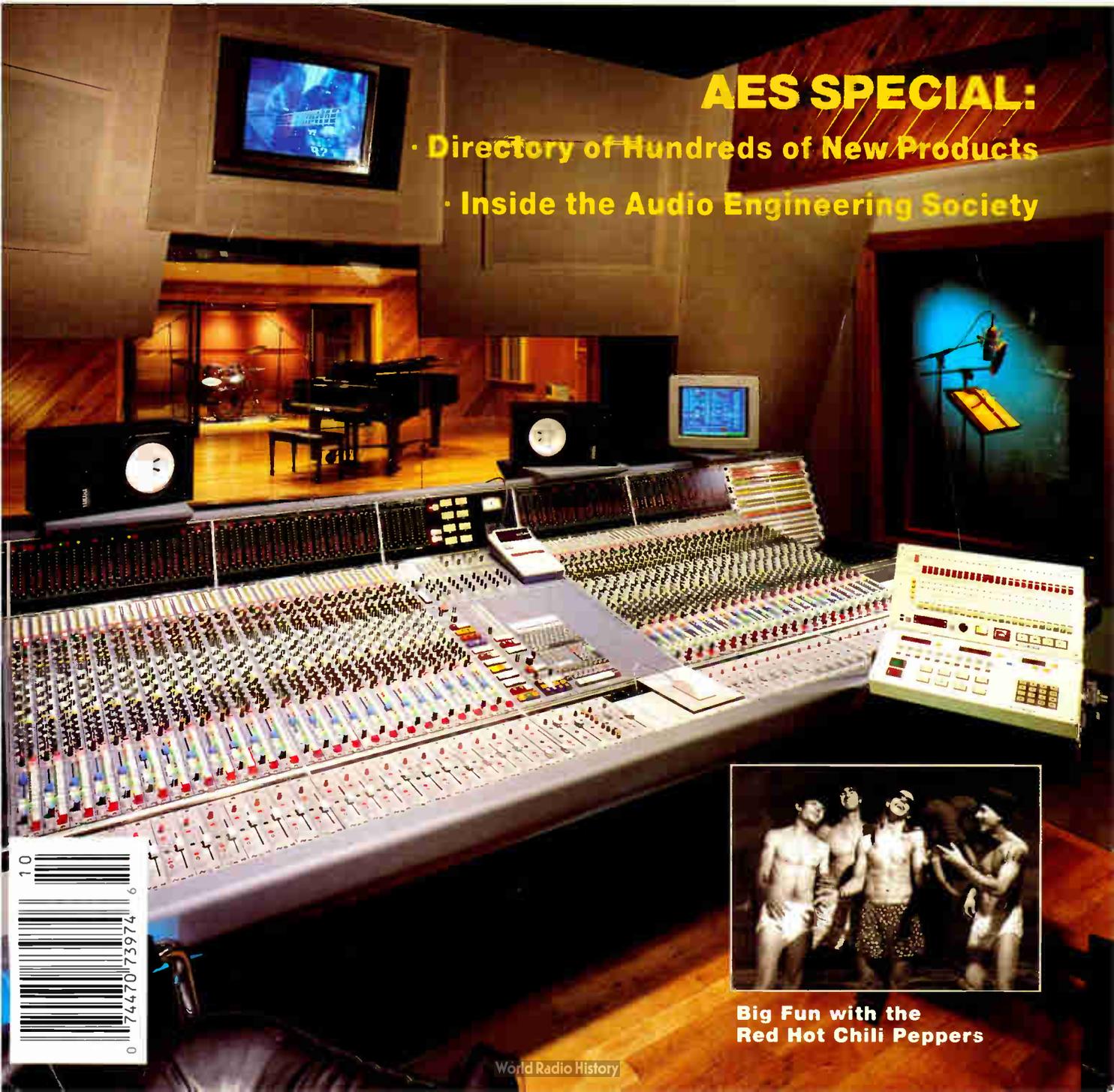
New Workstations for
Project Studios

PROFESSIONAL RECORDING · SOUND AND MUSIC PRODUCTION

AES SPECIAL:

· Directory of Hundreds of New Products

· Inside the Audio Engineering Society



Big Fun with the
Red Hot Chili Peppers



AudioFile Plus Points...

New

1. **16 outputs** for the increased creative flexibility and larger storage you need for mixing stereo source material—and *without* increasing the size of the current AudioFile PLUS. The most compact hard disk editing system on the market stays that way. Delivering *now*.
2. With over 85 systems installed in the past 5 years—working and earning their way in major post houses throughout the U.S.—the AudioFile has established itself as the most reliable and efficient hard disk editing system available.
3. The fastest, most powerful hard disk editing system on the market is also a constantly evolving system, growing and changing to meet industry requirements . . . The system you invest in today makes money for you now, and 5 years from now.



And there's one more big point on the PLUS side. AMS technology, and the entire AMS line of products, is now backed by the strength of Siemens.

The new 16-output system is the first development to come to market from the AudioFile PLUS technology. Look for more in the near future.

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TEC
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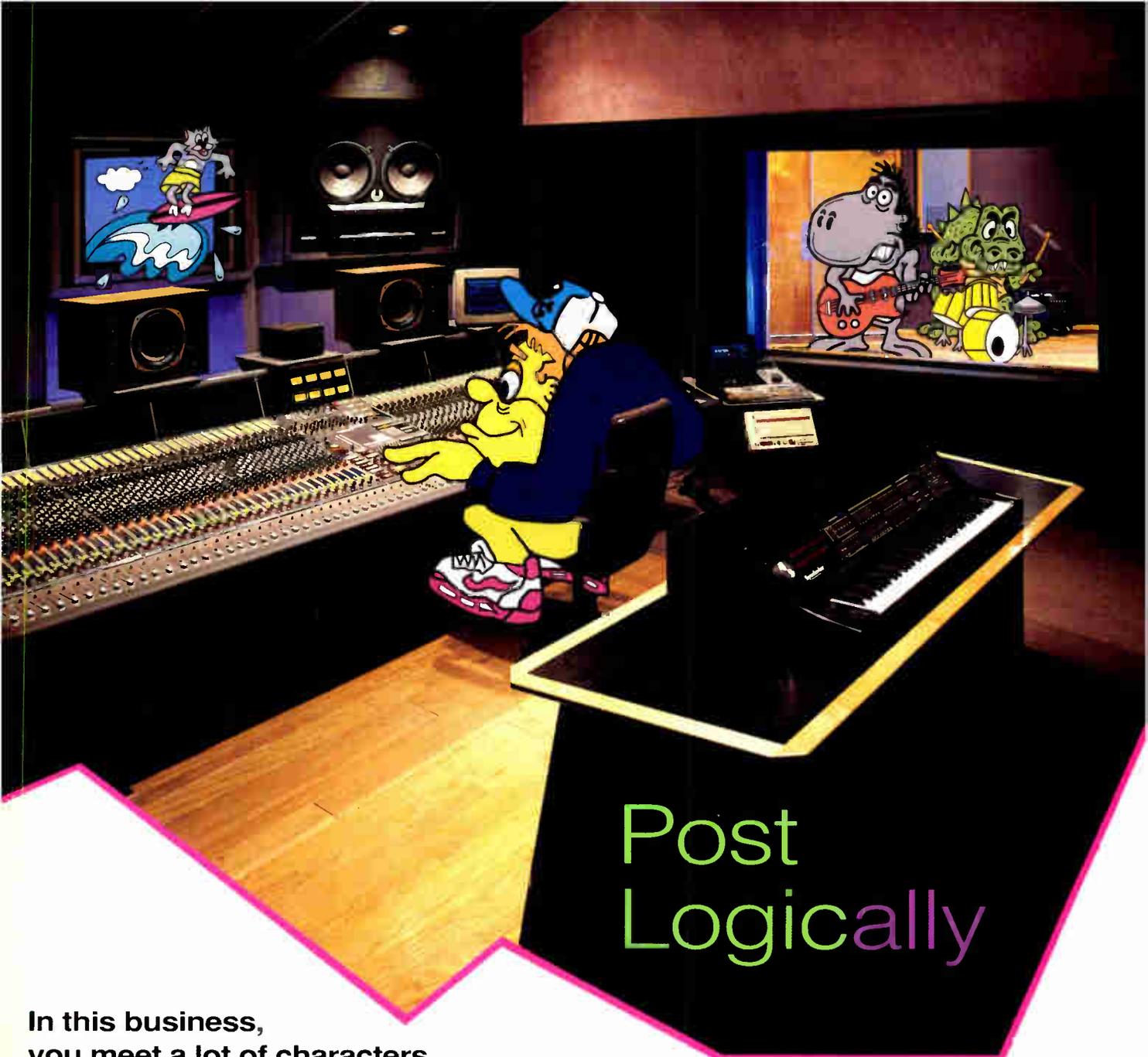
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TEC
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Post Logically

**In this business,
you meet a lot of characters.
Some animated, others less so.**

Post Logic's Studio B has seen a lot of them in the past few months . . . Studio B and the Neve VRP60 are booked around the clock, posting for the 4 major networks (on-air promos, series), film and home video projects, and for music recording dates.

The Neve VRP60 is a true multiformat console, with complete recall, capable of switching from video post operation to music recording—literally at the push of a button—

coupled with Flying Faders, the friendliest and most efficient automation system in the business.

In today's economic environment, you have to be ready to deal with whatever walks in the door—tracking, mixing, posting. So, apply a little Post Logic to the problem and use the one true multiformat console, the Neve VRP. It's the Post Logical solution, and it could work for you.

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TEC
TECHNICAL EDUCATION
1991
NOMINEE

Photo By Ed Freeman • Illustration By Jordan Boehman

MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

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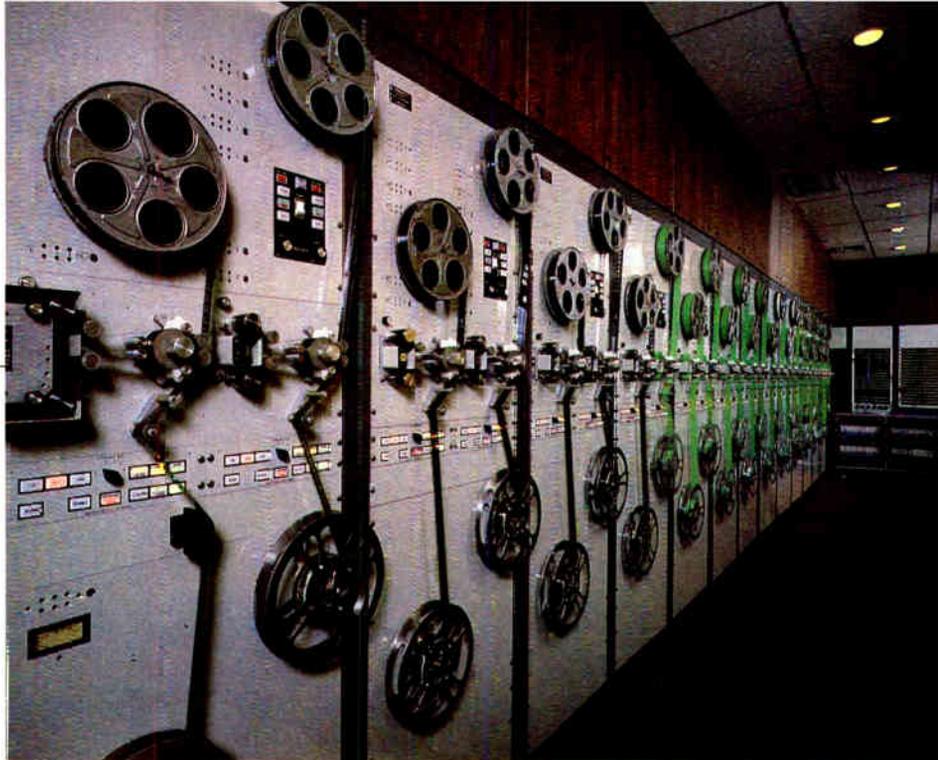
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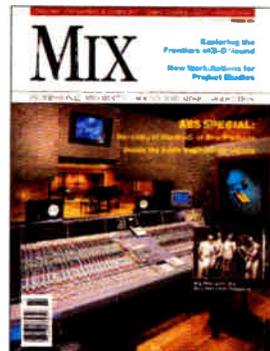
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DIRECTORY

211 New Products for 1992

COVER: Sound On Sound Recording, one of New York's best-kept secrets, recently upgraded to a Neve VR60 with Flying Faders and, at presstime, installed new Studer multitracks. The studio offers analog and digital recording, with extensive microphone and outboard equipment selections. Photo: Michael Parteno.



WORLD CLASS OF 48.



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Supermachines that deliver award-winning sound and attracts the top artists and the best

producers. **SUPERB SOUND** Team up with Studer's well earned international reputation for great sound, highest quality and outstanding reliability.  In the digital

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STUDER

ANALOG OR DIGITAL.

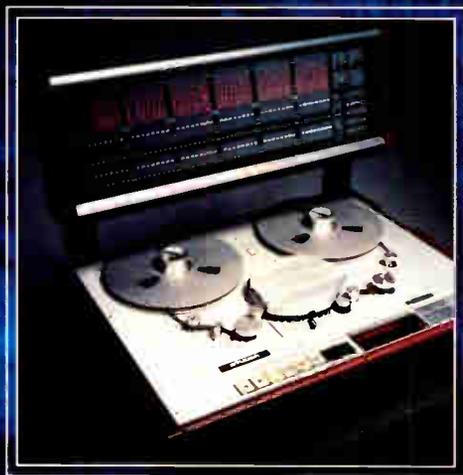
STUDER TECHNOLOGY GIVES YOU THE DECISIVE COMPETITIVE EDGE.

Take the digital multitrack market. Is it oversold with the 24- and 32-track variety? Probably.

With 48-track DASH now a reality, it doesn't take a rocket scientist to figure out that the 24- and the 32-track digital formats are now ordinary. And, if history repeats itself, you need the extraordinary, like Studer's D820-48, to attract the top artists and producers.

The D820-48 is all new, with powerful features including built-in synchronizer, variable crossfade times, 40 second RAM sound memory for track slipping, and digital ping pong. And they say it's the best sounding digital multitrack around.

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Or take the analog 24-track market (we're talking real professional studios) where 9 out of 10 major market studios are relying on Studer's great sound and unequalled reliability.

The flagship A820-24 with the optional built-in Dolby® SR (which includes SR auto alignment and switching) is the very best analog can offer, and the choice of most leading artists and producers who prefer analog over digital. And with dual machines, you get the flexibility of 48-track and 24-track.

Whatever your choice is, Studer will be there to give you the best value in equipment and in superior service. And, again, if history repeats itself, your Studer machines command the highest resale values. You get The Decisive Competitive Edge.

Call today to receive our color brochures and detailed product information.

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any of us consider the Audio Engineering Society convention a main monitoring device for the health and performance of the industry. Its product showcases, technical presentations and elbow-rubbing opportunities are unparalleled in gauging where we are and where we're going in pro audio. Certainly this year, with the world economy stalled in the recovery waiting area, the October event in New York City will be closely watched by industry leaders, market analysts and expectant studio owners alike.

Some questions are always in the air at such shows, such as: "Where can we find more business?" "Who makes the best inexpensive <fill in the blank>?" and "Who wants to buy my equipment/business/body?" Other questions are more directly related to the influences of the moment, all of which seem to pivot about the state of the economy.

In times of dicy finances, new technology is put under extraordinary scrutiny. To avoid the chance of investing in soon-to-be-obsolete products, many people will miss out on exceptional equipment and many manufacturers will suffer undue rejection. New technologies, such as spatial enhancement (3-D) audio devices, digital audio workstations and CD-Recorders, fight an uphill battle on the sales floor. While the majority of industry consumers may feel that these developments are inevitable, format and price sensitivity keep many potential buyers waiting just a little longer, until the day when "standards are worked out" or "prices come down."

Judging when to invest is strictly a personal business decision. Playing the waiting game might save money or procure gear with more compatibility, but it might also mean a missed opportunity—when everyone else on the block didn't already have one of the devices.

Playing it safe is not always the safe way to play. The studios that have made it big in this business have more often than not been the ones that took some chances early on, the ones that gambled on a new technology before the masses embraced it. While taking a lot of risk may be foolish, taking some risk is essential for a business to be successful.

As you browse through this issue and read up on the 400-plus new products being shown at AES, we hope you'll find some new ideas that add value to your operation. Take a chance.

Keep reading.



David Schwartz
Editor-in-Chief



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World Radio History

CURRENT

Tannoy/TGI Distributes Brüel & Kjaer

In August of this year, Tannoy/TGI North America announced that it is now the exclusive U.S. distributor of Brüel & Kjaer microphones and professional audio products. Founded in 1942 by Per Brüel and Viggo Kjaer, the Danish company has grown to 26 subsidiaries and over 3,000 employees worldwide, and is renowned for its precision microphones and high-quality electronic measurement gear. Distribution for the latter will continue to be handled by B&K's four U.S. offices, while microphones and pro audio products are covered under the TGI agreement.

"For the last three years, we've been looking at other lines to distribute, and we wanted a line that was very high-caliber in terms of worldwide image and prestige, such as Brüel & Kjaer," says TGI/Tannoy spokesman Bill Calma. "B&K was lacking a good rep and dealer structure, so what we had to offer was very appropriate to what they were looking for.

"The B&K product will also get Tannoy into a lot of markets that would have taken awhile to get into," Calma explains. "A lot of acousticians and consultants use B&K mics on a daily basis, and that's a market base we're interested in homing in on. We expect this will work out very well for both TGI and B&K."

Morten Stove, the former head of Brüel & Kjaer's pro audio branch in the U.S., has returned to B&K's headquarters near Copenhagen and will oversee export activities.

—George Petersen

GML To Distribute Focusrite, Music Mill Buys In

George Massenburg Labs Inc., of Van Nuys, Calif., signed an exclusive agreement, effective mid-August,

with Focusrite Engineering Ltd. to distribute the high-end Focusrite console to the North American market. By the end of August, the company had its first sale—a 64-input model to Music Mill of Nashville, scheduled for delivery by the end of November.

Now three facilities in the U.S.—Conway (Hollywood), Ocean Way (L.A.) and Music Mill—house the new breed of Focusrite, all manufactured following Phil Dudderidge's acquisition of the company in April 1989. Projected sales are 12 consoles a year, worldwide. "It's an extremely high-quality, high-end recording console, and you have to pay for it," says Cary Fischer, GML vice president. "You won't find these in living rooms or garages. It's a cash deal, which limits the market greatly, but that is a key selling point. The studio down the block can't get in. It's specifically aimed at those who need to, and can afford to, separate themselves from the commonality."

Industry insiders may have seen the move coming, since GML signed a September 1990 OEM agreement with Focusrite that called for the implementation of GML automation (full-switch reset and recall capability) into the Focusrite line. GML also has assisted in Focusrite installations in the UK. "It was a natural progression into representation," Fischer adds. "Both companies know each other so well."

TEC Awards Presenters

The Mix Foundation for Excellence in Audio announced a partial list of awards presenters for the seventh annual Technical Excellence & Creativity Awards, scheduled for the second night of AES, October 5, at New York's Grand Hyatt Hotel.

Les Paul will be on hand to introduce the newly created Les Paul

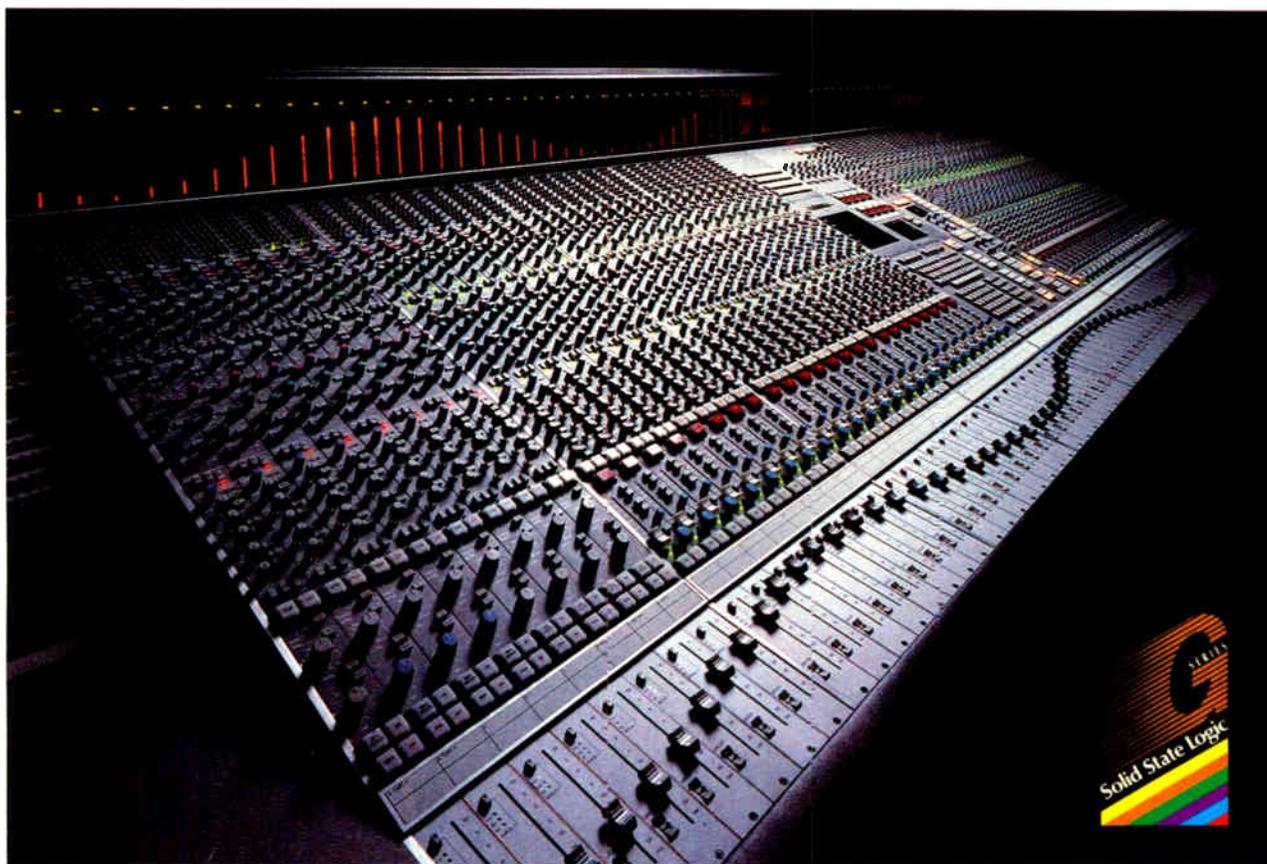
Award, honoring consistent excellence by facilities, companies and individuals. Other presenters include Russ Titleman, Nile Rodgers, Suzanne Ciani, Jon Lucien, Will Lee and Hugh Padgham. For more information, contact Karen Dunn at (510) 562-7519.

AES Notes

The big news this month in the audio community is the 91st AES convention, taking place October 4-8 at New York City's Hilton Hotel. More than 250 exhibitors are expected, and more than 140 technical papers (the most ever) will be presented. Les Paul is scheduled to be the featured speaker/entertainer at the Monday night AES Awards Banquet. Paul has been an AES member since the Society's inception in 1948.

Among the more interesting scheduled AES workshops is "Women in Audio 1991," to be held Monday, October 7, from 8:30 a.m. to 12 noon at the Hilton. It is open to all AES attendees; confirmed panelists include Shirley Kaye (SPARS executive director), Maxine Chrein (owner, Mastersound Astoria), Murray Allen (Universal Recording), Yvonne Turner (remixer, writer, producer), Judy Reeves (chief of maintenance, Axis Recording), Martin Polon (columnist, *Studio Sound*), Julie Perez (engineer, *Saturday Night Live*), and Craig Anderton (author/musician).

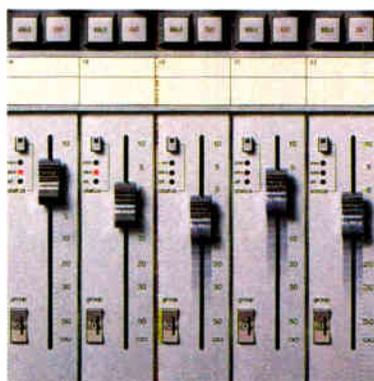
The Audio Engineering Society Standards Committee has implemented a computer data exchange to assist the circulation of documents within the committee, to the AES membership, and to the audio engineering community at large. Comments on draft standards may be submitted directly to the committee via the exchange, which also contains documents on AES policy, procedures, publications



Now the world's favourite recording console has added the ultimate moving fader system

THE SUCCESS of Solid State Logic's SL 400C Series console is legendary.

The system remains successful by growing alongside the creative individuals who use it. An example of this evolution was the introduction of G Series electronics, where new technology allowed subtle improvements to be made to the entire audio path. Now, SSL has changed the face of console automation by devising an automation system which combines the best features of both moving faders and VCAs.



Called **ULTIMATION™**, this unique dual automation system has been fully integrated with the G Series console. It reads existing G Series mix data, and its commands are immediately

familiar to all SSL users. The system's unique dual signal path circuitry allows the engineer to select operation – either as a full feature moving fader system, or as standard G Series automation. **Ultimation** even allows moving faders to perform SSL-style Trim updates without resorting to complex subgrouping software.

Today's G Series consoles, with **Ultimation**, take the art of recording one stage further. Together they set new standards, continuing in the innovative tradition of the world's most respected console system.

Solid State Logic

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The Top 500



Play the D4 with its onboard trigger inputs.

Alesis drum machines are famous for their sounds. The HR-16's natural acoustic drums are still the standard for transparent rhythm tracks. The punchy aggressive samples of the HR16:B redefine how to make rhythm tracks burn. The SR-16 is an instant hit with its sampled reverb and ambience techniques.

Now you can have all this and more with the new **Alesis D4 Drum Sound Module**. There's an incredible 500 sounds in all. Right at your fingertips.

The D4's sounds are unparalleled for their realism. For example, when you hit a D4 sound harder, the tone *and* pitch change just like a real drum, thanks to the D4's Enhanced Dynamic Articulation.TM Plus, stereo reverb and ambience are built into many of

the samples so you can keep your mind on the beat.

Using the D4 is a breeze with its large data entry knob and dedicated buttons for all major functions. There's even a touch-sensitive preview button and headphone output for instant gratification... and latenight drumset programming.

The D4's 21 user definable drumsets are accessible via MIDI or through the 12 onboard audio trigger inputs. You can even replace a wimpy drum sound on tape. Which you'll want to do if it didn't come from a D4. No rocket science here. Just pure honest incredible sound. The only reason to buy a drum sound module.

Everybody wants a hit. The D4 has 500 of them right now. At your Alesis dealer.



Play the D4 with MIDI software or hardware.

12 audio trigger-to-MIDI inputs are built in for drum triggers, pads, or tape.



ALESIS THE TOP 500 DRUM SOUNDS

THIS WEEK	LAST WEEK	WKS ON CHART	TITLE ARTIST	DRUM PRODUCTION	THIS WEEK	LAST WEEK	WKS ON CHART	TITLE ARTIST	
1	2	208	HONEST SNARE HR-16	ALL WOOD-BRASS RIM	302	NEW ▶		RAW HIDE BRAND NEW D4	CUSTOM SN
2	NEW ▶		STUDIO TOM BRAND NEW D4	16" MAPLE TOM w/VERB	303	450	52	HI ROOM TOM HR-16	10" MAPLE
3	NEW ▶		BIG "O" BRAND NEW D4	DOUBLE HEAD KICK w/VERB	304	NEW ▶		WET HALF BRAND NEW D4	HALF OPEN HA
4	5	52	RIM SHOT ROOM SR-16	BRASS PICCOLO w/VERB	305	327	52	RIM 2 CENTER SR-16	ARTIC
5	10	156	BIG FOOT HR-16:B	SINGLE HEAD 26" MAPLE	306	123	208	DOUBLE HEAD	DOUBLE HEAD KIC
6	NEW ▶		SLAM BRAND NEW D4	POWER TOM w/VERB	307	223	151		
7	23	156	COMBO SNARE HR-16:B	PICCOLO PLUS WOOD	308	401	5		
8	NEW ▶		BIG BALLAD BRAND NEW D4	WOOD SNARE w/BIG VERB	309	NEW			
9	NEW ▶		FAT CITY BRAND NEW D4	SUPER FAT SNARE	310	175	1		
				ARTICULATED HI HAT	311	NEW			
					312	211			



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LOGIC 2

The first all-digital, large format console in North America.

A completely digital audio console integrated with a familiar analog-style control surface for music recording, TV and film post production. Logic 2 from AMS.

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- *Multilayer In-Line operation.* Each channel strip controls 4 completely independent mono or stereo signal paths. 27 faders can control up to 108 fully equipped stereo channels, 63 up to 252. Logic 2 is a very large desk with a very small footprint.
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eight of these (of course that's eight if you say they *are* Golden Ears, or 16 if you say they *have* Golden Ears). Bruce Swedien is one. That leaves seven others. You know who you are.

Of course, most pretenders for the title fall somewhere between these two extremes. This is quite obvious, but if I didn't put it in here *Mix* would get letters. They would give them to me to answer. I wouldn't, and then the letter-writers would think I'm a bad guy.

One of the real problems with the existence of the Golden Ears status is that once someone has gotten the label, others tend to listen to them. They listen to their work and their ideas. While this is great if the Golden Speaker happens to be good, it is a disaster if they happen to be one of the incompetent fakes.

There is so much voodoo—smoke and mirrors, snake oil and myth—involved in *any* science that is treated as an art, that when you combine this with the real art of producing, engineering or mixing, it is no wonder that it has all become a bit confused. The Emperor's Clothes phenomenon is certainly alive and well in our industry.

Hey, boys and girls, here's an amusing little story (only the names have been omitted in order to protect the guilty, thereby minimizing legal fees for *Mix*):

A couple of years ago I found myself in a major L.A. recording studio, in the presence of one of the mega-Golden Ears of our time (or so I had heard for years). I was demonstrating a *very* expensive digital reverb/DSP/EQ device with a 15kHz bandwidth.

Now this particular Golden Ear happened to have a serious 20k hangup (not all that rare, and often quite a reasonable approach). Upon hearing that the device I had brought was limited to 15k, he basically told me not to even bother showing it, because he could not possibly use anything that didn't go out to 20kHz.

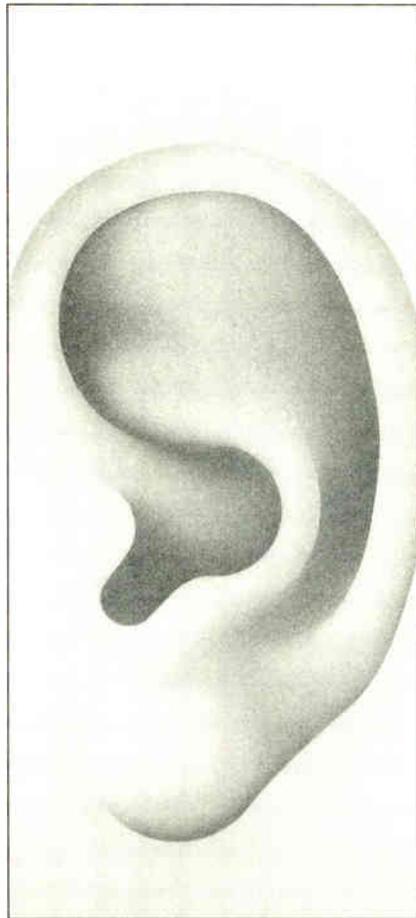
It seems that I am one of those guys cursed with a digital temper. It has two states: on and off. I stay pretty mellow through all kinds of garbage. That is, until the threshold is hit, then I go high, zero changes to one, and—basically—the universe explodes. Low blood sugar, maybe.

Well, this guy was taking me very close to the shift point, so I thought I would try a little experiment to see if I

could avoid generating another discontinuity in the space-time continuum.

This particular device I had brought has a nice front panel display that can accept any text that you want to put there. I built a 15kHz digital filter (which compounded the 15kHz anti-aliasing filters already in the audio path) and labeled that program "20kHz Bypass." I then built a straight-wire bypass (I guess it went to 80kHz, or so) and named it "15kHz filter."

After generating incentive by claiming that he could *not*, in fact, hear the difference between 15 and 20 kHz,



I showed the victim how to switch between these two programs and sat back to let him play.

He did. After about ten or 15 A/B switches he proudly announced that he was absolutely right; he could clearly hear the difference, and that as he had said before, he could not tolerate the 15kHz limitation.

Satisfied and deeply amused, I departed a wiser and calmer guy. Now, I *do* know some people who can reliably hear the difference between 15 and 20 kHz, but not many, and *this* "Golden Ear" certainly was not one of

them. He turned out to be another victim of ECFRS, or Emperor's Clothes Frequency Response Syndrome. His eyes saw the numbers, and his ears couldn't hear the difference—so the eyes have it.

It is true that this test was a bit cruel. But I had strong suspicions that he had no idea what he was talking about, and people *listen* to him!

By the way, I never told him that I had done this. He is finding out now, as you are, by reading this column. Our lawyers are ready; operators are standing by.

On a more constructive note, I have a theory about ECFRS that seems to support this test. I think that in over 90% of the cases where people are complaining that they can hear the difference between 20 and 18, 16, or even 15 kHz, they are actually hearing the phase shift of the filters! *That*, almost anyone can hear.

I have learned from FIR experiments in the last few years that about half of what people think they are hearing as EQ is the associated phase shift. In other words, if you give someone 3 dB of boost on a third octave EQ, at say, 400Hz (or the same with IIR digital modeling), they will generally require 6 dB or more of third octave 400Hz boost in an FIR model before they tell you it is the same amount of EQ! This is because properly executed, zero-coefficient, FIR digital EQ has *no* phase shift.

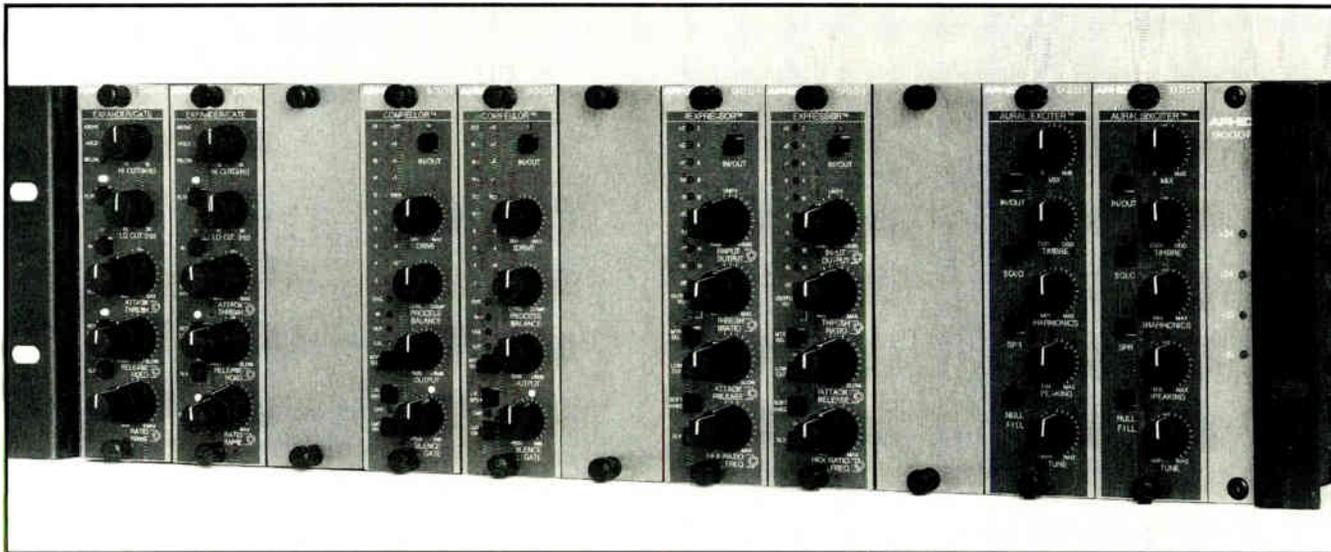
This is not too surprising, since most of these people have heard phase shift automatically along with every single bit of EQ that they have applied for their entire lives. Well, those days are gone, and you now have the choice of EQ *with or without* phase shift.

There are a lot of other new rules (and new freedoms) that apply to the new digital world opening before us. Much of what were once considered the laws of physics and electronics were in fact only limitations of analog audio. We are no longer bound to those laws. Let me do that again: *We are no longer bound to those laws*. It is time for all of us to stop one more time and take a look around. A little educational updating is good for the soul.

I guess a few of these Golden Ears had better get wise to this. ■

Stephen St. Croix is currently involved in an exhaustive study of phase shift in the sound of crashing waves on hot summer days.

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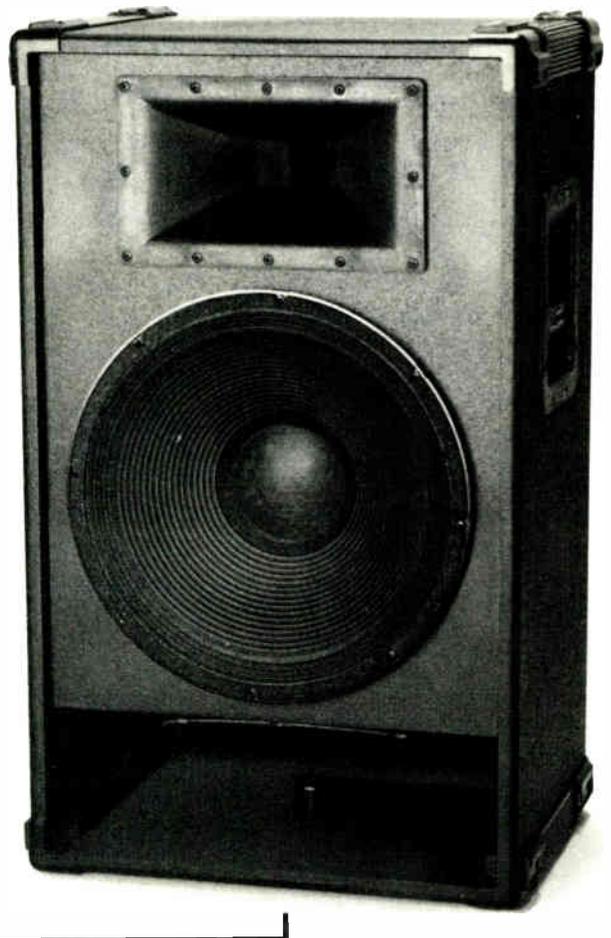
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by Ken C. Pohlmann

ENGINEERS: OVERWORKED AND UNDERPAID

To Whom It May Concern: As you might know, I am a regular contributor to *Mix*. In fact, my columns have appeared in every issue since August 1982. Virtually all of these articles have dealt with developing technical issues and the way they affect the music recording industry. I rarely focus on more human matters. Frankly, I don't feel very comfortable discussing people problems, perhaps because they are so much more difficult to solve than technical ones. However, over the past year or so, I have become increasingly troubled by a particular issue and feel compelled to share my concerns with you.

The problem is the salaries of recording engineers. As you know, the role of the recording engineer is critical in our business. Yet historically these professionals often have been confronted by less than professional compensation and attitudes. Traditionally, recording engineers work their way up through apprentice positions, and somehow never seem to lose the junior status that accompanied their working education. Whereas other professionals gradually take on the trappings of their higher rank, recording engineers generally do not. No matter how successful they become, they are perceived as blue-collar (more literally, no-collar) workers.

Perhaps it is the fault of the job itself. Engineers have always been regarded as hands-on, can-do people who eschew satin jackets and fancy cars. They are more concerned with practical things and seem most content when their machines, and the session, are running smoothly. The world over, they are roll-up-their-sleeves, not-afraid-to-get-their-hands-dirty, no-

bullshit kinds of people. They are techies who seem to thrive mostly on the pride they take in their work. Certainly, without question, the element of pride is paramount in their profession; I have never seen a harder-working, more devoted bunch of men and women.

The problem is that things like hard

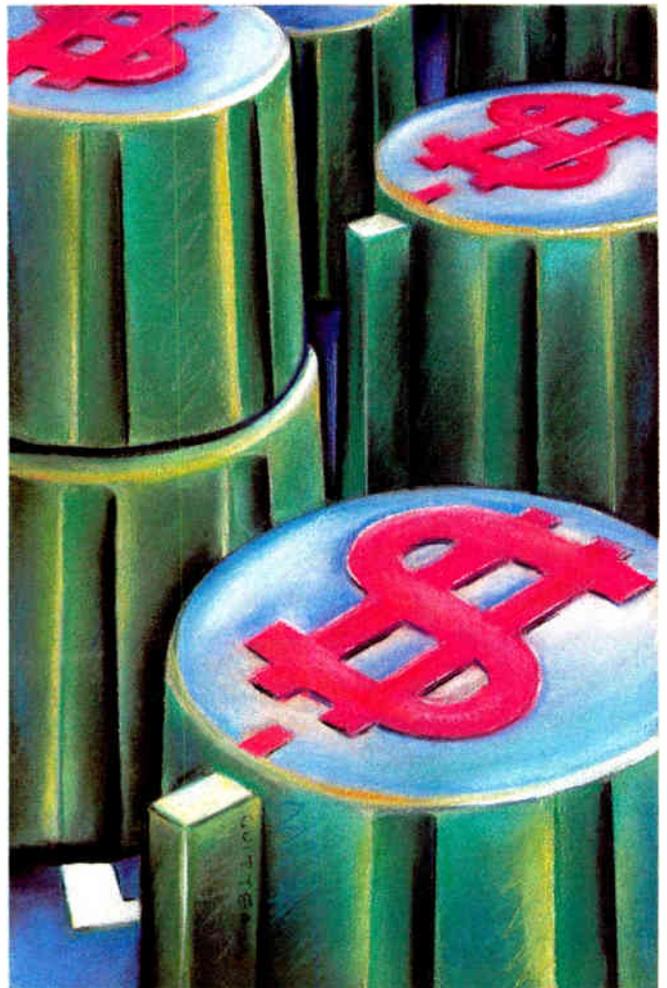


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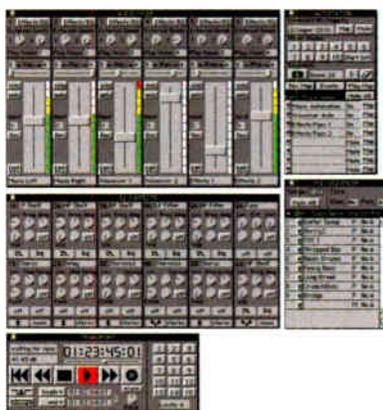
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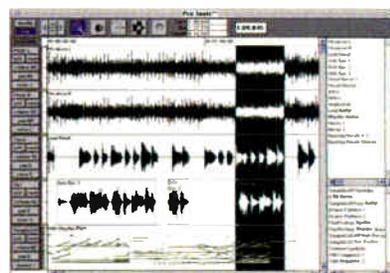
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World Radio History



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work and pride do not pay the rent, do not pay the kid's hospital bill, do not pay for old age and retirement. The idea of a recording engineer, a person who could solder wires and twist knobs, and didn't give a damn about things like fringe benefits, was born in the 1930s and '40s and hasn't changed much since. But today's America is far different. It's an America where houses are increasingly beyond the reach of the middle class, where a week's stay in the hospital can drain away a life's savings. It's an America where skilled professionals need a professional's wage.

Unfortunately, recording engineers aren't paid very much. Sure, a handful of particularly skilled and lucky recording engineers get points on platinum albums. But most work long hours and receive relatively little pay. It seems unfair, doesn't it, when a band works 90 hours a week for four months with the expectation of making \$10 million, and the recording engineer working beside them as a partner in the venture expects to pay his rent.

In the last *Mix* survey of U.S. audio production facilities, the annual salary

for an assistant engineer was \$16,128, and for a recording engineer \$27,852. Those aren't starting salaries, but average salaries. Interesting numbers, considering, for example, that the average price of a California house is over \$190,000. Whereas other professionals receive medical and dental care, pension plans and other fringe benefits that effectively add another 25% to the value of their base pay, recording engineers generally do not—that makes their salaries even less competitive.

It is common to say that a retired recording engineer has burned out, and left the business for another profession. In fact, the idea of burn-out is really just a euphemism for their disgust at the low pay, poor benefits, long hours, and lack of respect they have been given. Recording engineers don't burn out, they take their skills to another profession that values them more highly, where they can make a better living, and be treated as professionals. The resulting churn in the industry, the need to continually feed newcomers into low-paying entry level positions, while losing experienced veterans, represents an incalculable annual loss to the recording industry.

I suppose you can argue that much

of the music business works that way, with 5% of the people getting 95% of the money. It's survival of the fittest, with everyone getting their fair shot at the big time. Besides, there's no shortage of people trying to get into the music business. For every recording engineer slaving over a console, there are a hundred more waiting in line for the job: "If a recording engineer can't take the heat, he should get out of the kitchen."

That's all true. And I'm certain there will never be a shortage of people waiting to fill the positions, no matter how low the salary. But will those people be the kinds of employees you'd want to hire? Will they have the training, experience and intelligence to do a good job? If you are using a million-dollar studio to record a billion-dollar artist, would you want a recording engineer who is perfectly happy to work for minimum wage?

Salaries for recording engineers are simply not competitive. College graduates in other engineering fields can expect to start at \$35,000—making much more than they would make even after spending years as a recording engineer. Faced with that low wage, and lack of health care and

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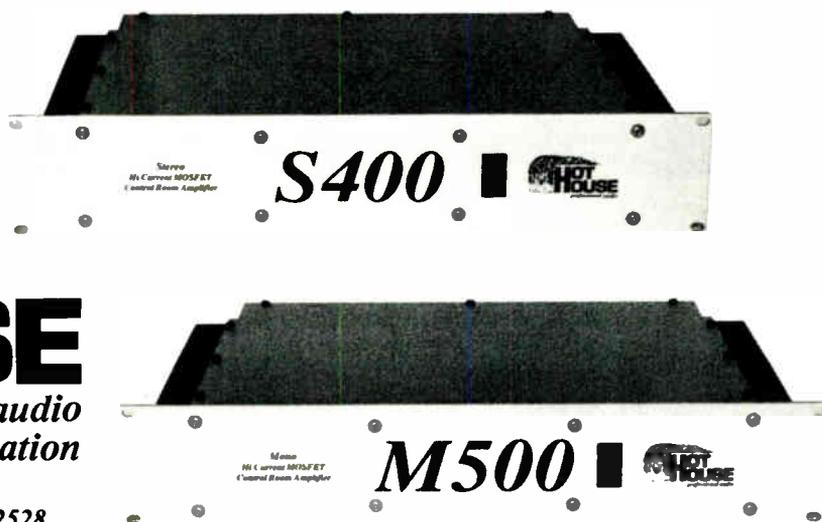
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pension plan, the best and brightest, no matter how much they may want to work in the industry, are choosing not to. I've been on a college faculty for almost 15 years, in close contact with the aspirations and realities of graduating students, and the trend is unmistakable to me. The music industry is increasingly failing to attract the top graduates. Although their heart lies with Motown, they accept an offer from Motorola.

Is that a problem? You bet it is. Our industry isn't dominant because of better equipment (Japan has more

DASH multitracks than the U.S.), and it isn't dominant because most record labels are American (most are foreign-owned). It dominates because of the quality of the people in the industry; they are smarter and more creative in music production than anywhere else. But as the music industry's wages become less and less competitive with other domestic industries, the quality of our industry's performance must fall in relation to foreign music recording industries. And as many other American industries have learned—it's not nearly as much fun being second, or third-rate. In time, the studios in Los Angeles could become as embattled as

the automotive factories in Detroit.

I don't like to paint a negative picture, but facts are facts. As with any contemporary industry, our music recording industry will increasingly compete on a global basis. Everyone will have the same studios, the same equipment and even the same education; and the work will migrate to the country with the best people, turning out the best product. Likewise, the consumer's entertainment and recreation dollars will go to the best product; if music recordings can't compete with film, video games or whatever, our industry's in serious trouble. No matter how you slice it, the industry with the smartest, most creative people will always have the edge. Conversely, an industry with less-talented personnel will face decline.

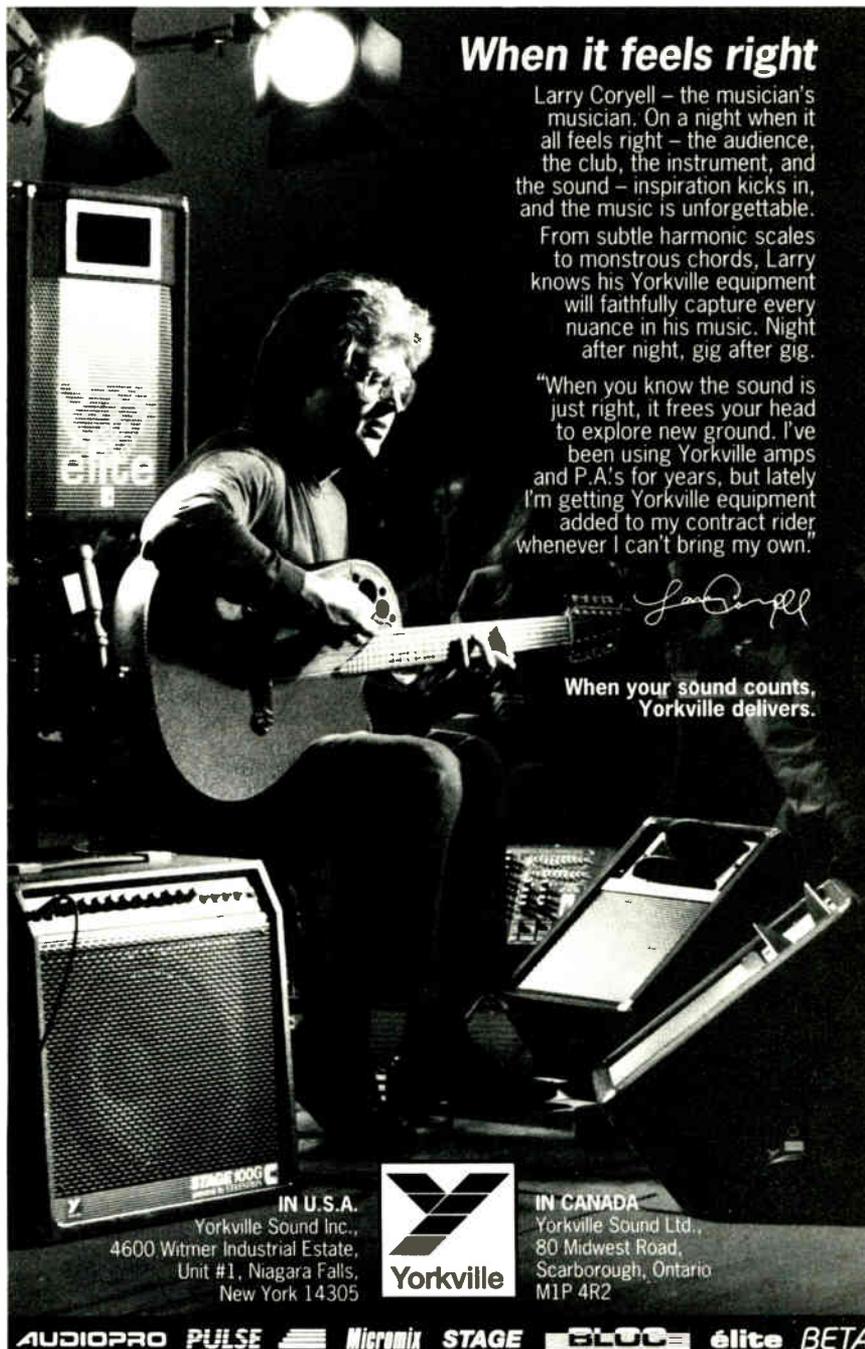
We're all in this together, and every one of us can help. Educators—be honest with your students; encourage the bright ones, and discourage the others. Studios—set up health care and pension plans for your people. Record labels—let's see you plough some of those big profits back into scholarships, and work out more equitable ways of sharing music profits with the entire team who created them. Manufacturers—you don't have to be shy either. Engineers—talk about the problem, organize, get political, recognize that your clout cuts through all the electronic media and entertainment industries, and that's real power if you care enough to exercise it.

As far as I'm concerned, the American music recording industry is the best in the world. With a little conscientious thought, we can easily maintain that leadership. But if we get complacent, we can easily lose it, just as so many other American industries have. Let's work together to ensure that the brightest and most creative people are attracted to our industry, and that their efforts in maintaining our industry's pre-eminence are rewarded with the respect they deserve.

Sincerely,

Ken C. Pohlmann

Ken Pohlmann is a professor of music and director of the Music Engineering programs at the University of Miami. He was voted a Fellowship in the Audio Engineering Society for his work as an educator and author.



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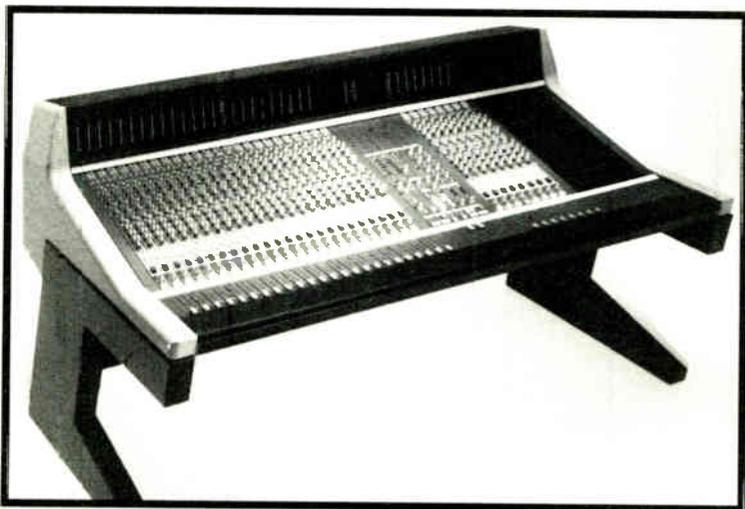
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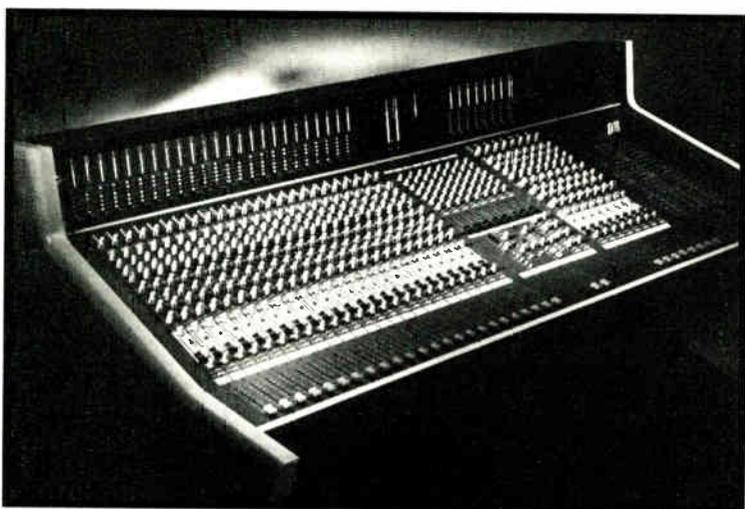
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World Radio History

by Mel Lambert

THE AUDIO ENGINEERING SOCIETY

A GLIMPSE BEHIND THE SCENES

A

s a household name throughout our industry, the Audio Engineering Society should need no introduction for most *Mix* readers. The various international conventions and conferences receive regular coverage throughout this and other magazines. Many of us are also members of this prominent society, which now serves the needs of some 10,700 audio professionals around the world.

Few of us are familiar, however, with the large and varied amount of work that goes on behind the scenes at the Society's New York headquarters, and in the many Working Groups, Technical and Standards Committee meetings that take place regularly throughout the world. As we gather this month in the Big Apple for what promises to be one of the most dynamic AES convention for many years, I thought it would be useful to examine the Society's changing role within the consumer and pro audio industries, and its basic operating philosophy.

Founded in March 1948 during a meeting of 150 kindred spirits at what was then RCA Victor Studios in New York, the Audio Engineering Society certainly has come a long way in 43 years.

Defining the Society's primary role, AES president Marshall Buck notes that "the AES strives to provide what I like

to refer to as a 'common ground'—one that allows equipment designers to talk with one another, and users to communicate their needs with the designer. These two complementary roles have established a valuable synergy, and one that provides feedback not only at the regular conventions, but also at section meetings and within the pages of the *AES Journal*.

"The AES has developed a series of standards and test procedures for analog and digital interconnection,"

he continues, "which allow competitors to adopt technology for the betterment of the industry as a whole. And at the upcoming New York convention, for example, we have organized a workshop session on 'Perceptual Coding' [for digital data reduction] that will allow participants to more accurately identify the role being played by such technologies, and the sonic differences between different design approaches."

The two major conventions held each year—a U.S. show that currently alternates between New York and Los Angeles in the fall, and a European gathering each spring—result from a great deal of activity coordinated by the convention chairs and their staff. In addition to the invited technical papers, workshops and commercial exhibition, these conventions also in-

The primary goal of the AES is to provide common ground for all of its members to meet and discuss issues.

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clude regular meetings of the various Technical and Standards Committees and Working Groups.

According to Roger Furness, chairman of the Convention Policy Committee, "This competition for space, time and visibility brings its own problems. My committee has been trying to balance such requirements, and also try to hear the views of those involved. During the last year we have been closely communicating with the Exhibitor Advisory Councils to discuss our respective, and mutual, problems and desires. And we are attempting to make the conventions even more attractive to the attendee."

These Exhibitor Advisory Councils, although not part of the AES, are a recent attempt to ensure that exhibiting companies have adequate space and resources to demonstrate their wares. Each of the two councils—one U.S.-based, chaired by Paul Gallo of PSN Publications, and the other in Europe, chaired by Chris Honibone of Sony Broadcast—comprise nine members elected by the regular AES exhibitors. The councils each meet four times a year, usually during a major trade

What the Future Holds:

*A commentary by
AES president-elect Roger
Furness*

"Now is both an exciting and bewildering time to be in the audio business. New products and formats seem to appear almost daily. While these developments may be very tantalizing, for someone trying to purchase equipment, or to keep up technically, it can be a nightmare.

"I look forward to rallying the resources of the AES to encourage more discussion on these and other topics, in the *AES Journal*, at conventions and conferences, and at section meetings—leading, where appropriate, to the setting of appropriate standards.

"This is not a solo job, however; it needs a team effort. I welcome any input that helps to take the AES and the audio industry more strongly through the '90s."

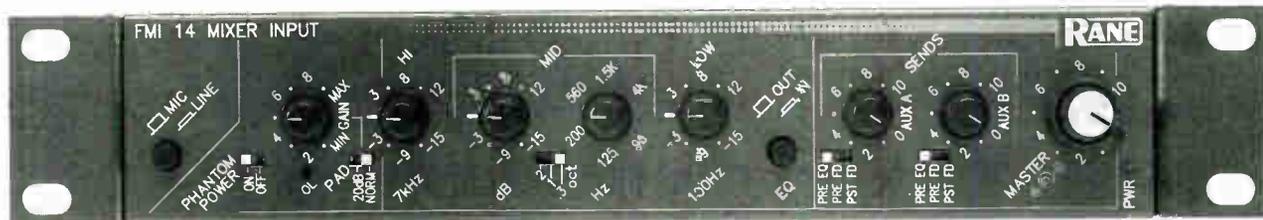
show, to develop feedback for the AES regarding suitability of exhibition venues. The chairpersons of both the U.S. and European Councils are also members of Roger Furness' Convention Policy Committee. Furness also attends—in an entirely advisory and liaison role—meetings of the two Advisory Councils.

"Because there is no easy way for the AES to discuss exhibition policy directly with every exhibitor," Furness comments, "the councils are vital to maintaining an active dialog between the Society and convention exhibitors. Now these companies have a cohesive voice, and the Society can respond to their needs. So far, our discussions have worked out very well indeed."

In his role as chairman of the Convention Policy Committee, Furness offers that the Society's current policy of alternating conventions on East and West Coasts has represented the best format. "The European Advisory Council has shown a high preference for locating the convention in more 'accessible cities.' During the Paris convention in March, we conducted a survey of exhibitors for their reaction to such a policy.

"We are also liaising with SMPTE

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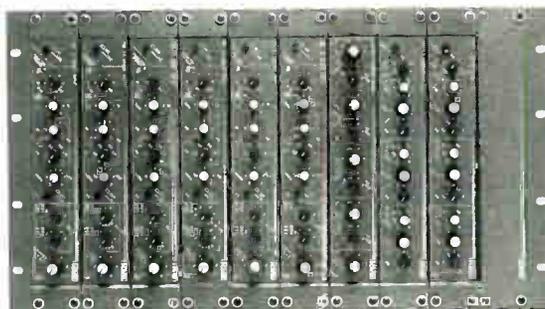


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[Society of Motion Picture & Television Engineers]," he continues, "whose annual conventions are held in the fall—often within days or weeks of our own convention—but on the opposite coast. To avoid potential conflicts for exhibitors and attendees alike, the AES needs to ensure that the dates of our respective conventions do not clash. We have also discussed the possibility of holding a joint AES/SMPTE show."

Despite the current recession, AES executive director Donald Plunkett reports that the upcoming 91st con-

vention in New York looks to be the most successful. In addition to a full program of technical papers, organized by Convention Committee chairman Jerry Bruck, Plunkett reports, "The exhibition space was completely sold out by the end of July. The European convention in Paris—held during the recent Gulf Crisis—was also a sell-out, with around 6,300 attendees. From our standpoint at least, attendance is showing little impact from the recession."

Plunkett foresees two complementary roles for the Society: that it has a responsibility to help its membership fulfill their day-to-day needs; and that

it should anticipate the needs of those members. "I stay up to date with developments in the audio industry through the trade magazines and my contacts throughout the business," Plunkett explains. "In this way, we can spotlight areas that need specific attention from our various committees."

"For example, back in 1982 we began to identify that sound reinforcement was going to develop dramatically during the decade," he continues, "and we began to address its needs through conventions and conferences. Two primary areas in which the Society's attentions are currently focused are quality home audio and video entertainment, and the film/video industry. With audio-for-video playing an increasingly important role for consumers and professionals, we are making sure that it receives adequate attention through the Society's regular activities."

Plunkett also identifies one other important area he would like the AES to pursue. "Hearing loss due to high listening levels—both at events and from personal listening via headsets—poses a future health hazard," he warns. "The Society could benefit from spending some time with the committees already in existence to help develop not necessarily standards, but recommended safe sound levels. During the early '80s, the Society conducted hearing-loss tests at the L.A. conventions. Even then the problem was becoming apparent with its young members and convention attendees. Studying hearing loss is worthy of all of our support."

In addition to the regular U.S. and European conventions, the AES also organizes various technical conferences throughout the year. "These conferences allow the Society to address specific subject areas," explains Marshall Buck. "The conventions and associated exhibitions, on the other hand, cover a far broader range of topics, and are intended to fulfill the informational needs of a larger section of our membership." Ideas for potential conference themes come from the AES Governors, regional vice presidents and other members of the Society's executive branch.

"We also organize regional conventions throughout the year, so that international sections can focus attention on specific topic areas," Buck continues. "In early July, Japan hosted a regional conference in Tokyo with

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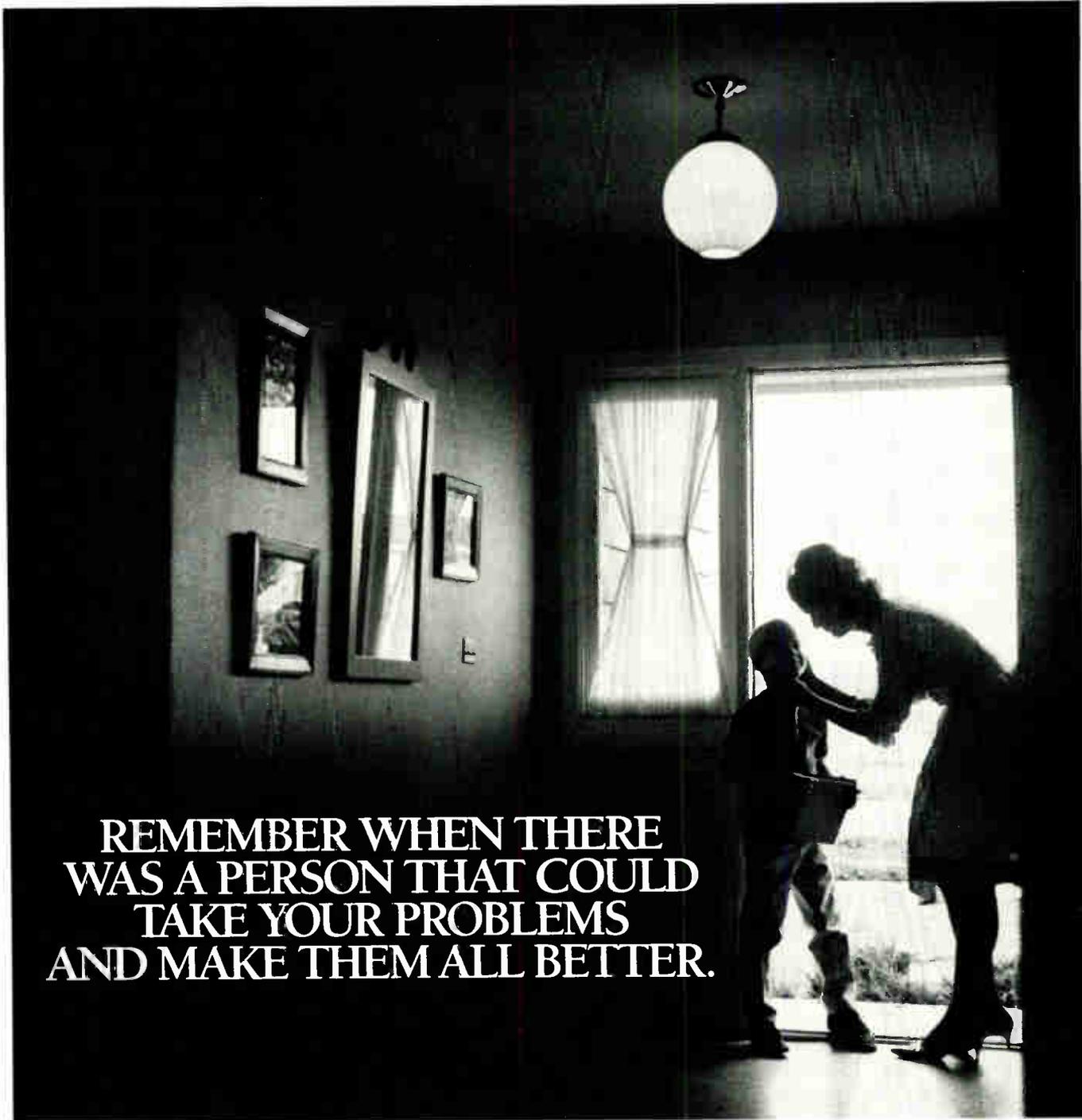
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Sound With Vision

the theme 'Audio Technologies for the '90s,' which included a well-attended workshop that discussed the 'Present and Future of Digital Audio Workstations.' During August, Australia held a convention in Melbourne with the theme 'Audio Automation: Future Directions,' while September saw the 10th International AES Conference, 'Images of Audio,' in London, England. It certainly has been a busy—and productive—season for the Society!"

But conventions and conferences are just one aspect of the Society's ac-

tivities. Of equal importance is the work done by the many Technical and Standards Committees. "Just about anyone can propose that the Society consider developing a standard," offers Daniel Queen, chairman of the AES Technical Council, "including members, manufacturers and users of audio hardware. Once a need is determined, the Standards Committee will convene a Working Group meeting at one of our conventions.

"During the New York convention, for example, several new Working Groups will be meeting," Queen continues, "including one that will focus on

Forensic Audio, and another on Fiber-Optic Applications. Yet another Study Group will be looking at Multichannel Formats for analog and digital audio. If there is an agreed-upon need for further work in the selected areas, a permanent Working Group will be formed, and they will begin to generate in-progress documents for the *Journal*."

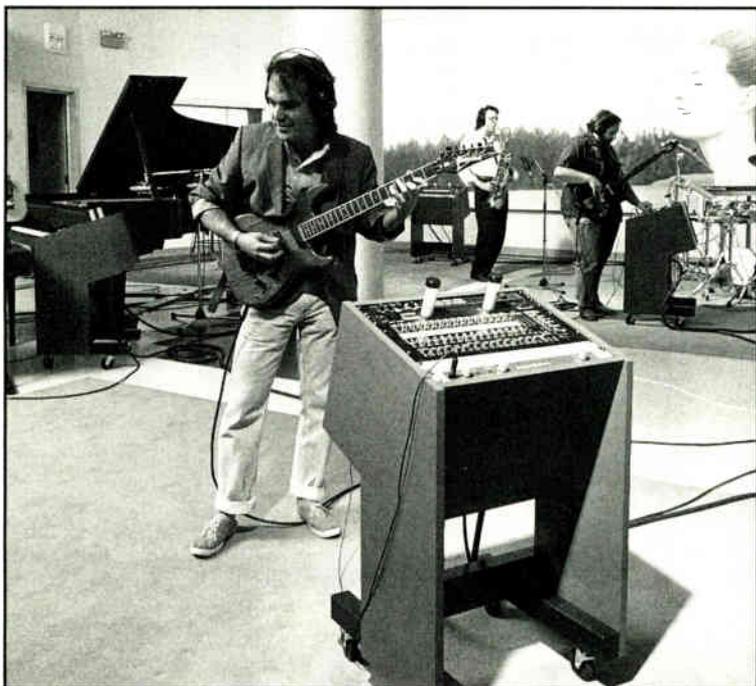
Once they have been published within the *Journal*, an AES Standard must be reviewed every five years. At that point the standard can be reaffirmed, revised or withdrawn. This year sees the revision of one important standard, "AES3-1985: AES Recommended Practice for Digital Audio Engineering—Serial Transmission Format for Linearly Represented Digital Audio Data." In fact, the AES Subcommittee on Digital Audio, chaired by Bart Locanthi, currently supports active Working Groups that are considering measurement techniques, synchronization, digital interfacing, labels and ancillary data, and perceptual encoders.

"The entire procedure is just coming into its own," Queen concludes. "The Society has seen a doubling in its number of Working Groups during the past year—the total is now 27 active committees—and we have no fewer than 34 standards documents in preparation or review. It should also be stressed that the AES is an international organization; the Society is working to establish closer liaison with the IEC [International Electrotechnical Commission] and the CCIR, plus SMPTE and the Acoustical Society of America. In the field of audio, we think that the AES has a viable voice to offer in the development of truly international audio standards and practices."

Regarding its future directions, president Marshall Buck feels that "the AES should continue to rely on its membership to generate ideas; the Society is a forum in which we can develop new standards and discuss new technologies to suit the needs of professional users. I would like to see the membership continue to grow, and for the Society to focus on creating local activities." ■

Drawing upon over 15 years of active involvement with professional audio on both sides of the Atlantic, Mel Lambert now heads up Media&Marketing, a consulting and marketing service for pro audio firms and facilities.

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SATISFACTION

BY
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Hear the buzz about *virtual reality*? If it didn't go in one ear and out the other, then you know it represents an exciting new technology, a fledgling human/computer interface that will enhance many aspects of our lives.

In virtual reality, people wear special gloves and goggles that let them enter and interact with computer-generated environments. Federal governments from Scotland to Japan are eagle-eyeing the technology's progress. Medical scientists are using it to treat disease and train surgeons. The military uses it to train pilots how to fly and fight without heading into real skies or inflicting real injuries. Corporations want it to manage massive amounts of data. Hollywood's about to release the first feature film about it.

But, what does it have to do with *Mix*?

Virtual reality involves the senses. It lets people see and move

objects within computer-based worlds. Years will pass before the technology is as consumer-friendly as Nintendo, Walkman and Macintosh, because graphics and video still require substantial disk space and powerful computer engines to achieve anything close to "reality."

But there is one area of VR that's close to completion and affordability: the part that involves our sense of hearing. Audio-savvy researchers have been working overtime to bring multidimensional sound capabilities to virtual-world developers. The resulting technology will wind up in systems developed for space exploration, industrial engineering, medical research and education—but it's going through basic training in the recording industry.

3-D R&D

Research in "three-dimensional" sound is a time-honored practice. Since the late 1800s, scientists have experimented with binaural dummy-head recording. Yet binaural never caught on in modern music. The Holophonics system invented by Hugo Zuccarelli achieved notoriety in the '80s, but you had to listen on headphones to experience its effect. (Zuccarelli is involved in lawsuits regarding Holophonics; its last major appearance was on Michael Jackson's *Bad*. Meanwhile, Zuccarelli has updated Holophonics to achieve speaker playback.)

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put the thrill back in 3-D. By supplementing binaural recording with transaural processing—which mimics our auditory system's response to sound—we can manipulate phase info to eliminate crosstalk at our ears, so we can hear multidimensional or "super-stereo" sound from loudspeakers. We also can place sounds in horizontal *and* vertical fields.

The term "3-D" can mean binaural recording, surround sound processing or environmental simulation. The last two—as applied by Ambisonics and in systems by Dolby, Lexicon and Carver—require decoders and four or more speakers. But we're using it here to describe systems that pump spatially enhanced sound into two channels for playback on garden-variety, two-speaker stereos. Some use dummy heads (Spherical Sound, Virtual Audio); others electronically imitate the auditory system (B.A.S.E., QSound, RSS). Most require sitting in a sweet spot to get the full 3-D effect; all aim to impart more sonic depth and clarity than "2-D" no matter where you sit.

Some engineers and producers use 3-D systems to simply expand the stereo soundstage. Some conjure up wild effects so sounds seem to swirl around the room or emanate from behind instruments, or from above, below or



PHOTO: JAY BLAKESBERG

phasing, flanging and delay, which have been heard before. This gave a depth to things that I'd *never* heard before."

Others are wary their first time out. Bob Margouleff says, "We're all into our old patterns. I view any new box that takes me out of that pattern with tremendous suspicion—until I get into it and figure out what it does."

B.A.S.E. SYSTEM

Margouleff is no longer suspicious of B.A.S.E. (Bedini Audio Spatial Envi-

Virtual Audio's Chris Currell, Oliver DiCicco of Mobius Music and vocalist Connie Champagne, whose first release on Heyday Records is in 3-D sound.

ronment) processing. "The difference between normal mixing and B.A.S.E. mixing is similar to the difference between regular television and high-definition TV," he says. Sold by Gamma Electronics, the rack-mount system doesn't offer precise, discrete sound localization, but it *does* aim to produce

realistic, 3-D ambience with controllable center-image localization. And it doesn't require sitting in the sweet spot.

Since the system debuted in 1989, dozens of artists have released albums enhanced by B.A.S.E. (It's used in many movie soundtracks, too.) The \$3,000 system can "move" the center position in a stereo mix anywhere from 250 simulated feet away to zero proximity to the listener, placing any component in the mix anywhere within a 180-degree arc.

Margouleff—whose production of Stevie Wonder's classic "Living For The



◀ **Suzanne Ciani and Peter Kelsey working with the RSS system at Skyline Studios, New York City.**

City" enjoyed new life in the soundtrack of Spike Lee's *Jungle Fever*—uses B.A.S.E. on all of his projects; most recently, the Rippingtons' GRP album *Curves Ahead* and Fungo Mungo's *Humongous*, due out this month on Island.

Margouleff calls B.A.S.E. "mild" in its approach to spreading perspective, saying, "It does refine and define the imagery. When I use B.A.S.E. in mixing, I get stuff happening on the outside edges of the speakers, going from the speakers to the [outside] wall, not just in between them. You use it to enhance the illusion of space and depth, width and height, especially on stereo samples and electronic sounds, or re-

beside the listener's head. The main goal is to enhance overall presence and accuracy.

"I was like a kid in a candy store," says Francis Buckley of his first QSound experience when mixing Wilson Phillips' album at Garden Rake in L.A. "There's only so much you can do with

ronment) processing. "The difference between normal mixing and B.A.S.E. mixing is similar to the difference between regular television and high-definition TV," he says. Sold by Gamma Electronics, the rack-mount system doesn't offer precise, discrete sound localization, but it *does* aim to produce

verb returns. The B.A.S.E. processor and other 3-D systems essentially give us another knob on the console to mess around with."

MYERS 3-D AUDIO

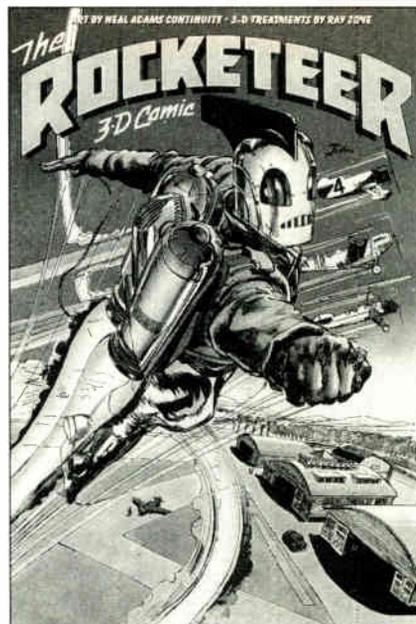
Developed originally for NASA's flight training programs, Myers 3-D Audio System emulates the human auditory system and incorporates dummy-head recording. Pete Myers, an inventor based in San Jose, Calif., received a U.S. patent for his system in 1989. Myers uses 3-D Audio only on his own projects. Last November his company, PM Productions, distributed "Earacle

Spherical Sound produced the binaural audio cassette that accompanied Disney's "Rocketeer 3-D Comic."

Worker: CD-3-D"—a demo disc containing two effects-laden songs performed and recorded by Myers with 3-D Audio, "using the spatial choreography of the sound positions around the listener to enhance the harmonic motion of the music."

Q SOUND

QSound hit the music market last November when Sire/Warner Bros. re-



leased Madonna's *Immaculate Collection*. Fifteen hit tunes had been remixed with QSound. Then came Sting's QSound-enhanced *Soul Cages* on A&M. Robbie Robertson, Stevie Nicks, Luther Vandross, Winger and Janet Jackson followed.

The QSound box interfaces to the recording system during mixdown via console bus assignments. A QSound technician comes with every system; after consulting with the engineer, the "Q-tech" presets static positions in a 180-degree arc for image positioning. Joysticks allow movement of audio in the dynamic channels all around the soundstage. Speakers are required; QSound effects don't come across on headphones.

QSound is marketed by Archer Communications (Calgary, Alberta, and Santa Monica, Calif.). Some of the finest ears belong to Archer's board of directors, including Shelly Yakus, Bob Clearmountain and Bob Ezrin. With 12 QSound units now in operation, Archer plans to have 50 by year's end. The new QSound system is smaller and has fewer glitches than the one used on Madonna's tracks. QSound once processed the entire mix; the system in use at presstime accommodates individual tracks via ten inputs (8 static, 2 continuous panning). Unlike its predecessor, it has no time delay. The most current revision (slated for release as this is written, in August 1991) offers dynamic panning and 16 inputs (8 static, 6 dynamic, 2 switchable).

QSound's pricing structure went through changes, too. First there was a licensing arrangement; record companies paid Archer royalties (a per-

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The Mixing Lab / Garden Grove, CA
Thom Roy, Studio Manager (standing). Dave Jahnsen, Mixing Engineer (sitting).



centage of the QSound release's net retail sales). That prevented some artists from using QSound. Now the system is available for rent for a simple \$1,000/day fee.

ROLAND RSS

Introduced last year, RSS (Roland Sound Space) is an "integrated processing system for enhancing the stereo image and localizing sound sources beyond speaker boundaries," according to Roland's Pro Audio/Video Group. The system is seeing heavy action in TV audio applications in Great Britain and has been installed in L.A.'s acclaimed Larrabee Studios.

The \$44,500 system—which simulates dummy-head recording—is designed to allow dynamic, precise sound localization within a 360-degree horizontal soundfield (in increments of three degrees), with full control over the sound's height/elevation. A circle of LEDs on the system's remote controller indicates degrees of movement; the engineer can use it in the recording or mixdown process to localize mono or stereo tracks and outboard effects. One reason engineers and producers like RSS is that it lets them spontaneously,

in real time, achieve localization in up to 48 channels. Bruce Swedien says, "I credit Roland for coming up with a viable system that really works in real time." The RSS effect is distinguishable on both speakers and headphones.

SPHERICAL SOUND

Ken Callait formed Spherical Sound (Calabasas, Calif.) in 1986, following a stint marketing Holophonics. A lot of kids are familiar with Spherical—Disney's "Rocketeer 3-D Comic" is sold with an audio cassette described as "so stratospheric, you'll feel completely surrounded by the action! The sounds are so real, so fresh and so intense—just say, we warned you!"

Callait, who produced and engineered Fleetwood Mac through the band's wonder years, decided to build a 3-D "workhorse that could record explosions or subtle sounds, and work on speakers as well as headphones." Spherical's first gig with its custom dummy head was Pink Floyd's *Momentary Lapse of Reason*. Other credits include albums by Lionel Richie and Michael Jackson, the new Diana Ross album engineered by Frank Wolf at Conway Studios, and a track from the

most recent Yes album, engineered by Eddy Offord at Cherokee. The Spherical Sound system is also used by entertainment-system manufacturers Sony, Sega and Disney.

Callait also developed a matrix, a 6-input box with ten positions for locating individual tracks during mixdown. "It's much more direct-accessed information, and that seems to reach the listener's ears more consistently," he says. "It does require a sweet spot, but even without it there's more clarity and separation." Spherical offers the box for hourly or daily rental (\$800-\$1,000/day; more if the head is included). The company plans to build 1,000 boxes in the next 12-18 months, to sell for about \$6,000 apiece. They are developing a 3-D sound chip for use in games and environment-simulation systems—a chip, Callait says, that could install easily in keyboards or consoles.

VIRTUAL AUDIO

As Spherical Sound, RSS, QSound and similar systems localize sound, they will find applications in flight simulations, theme parks and video games—virtual reality applications. The most well-funded company working today

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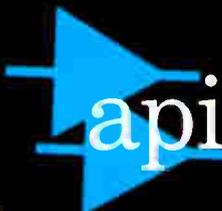
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to provide virtual reality with realistic sounds is Virtual Audio Systems, the brainchild of musician Christopher Currell.

Currell spent three years recording and performing as a Synclavier artist with Michael Jackson. Then, funded by Japanese investors, Currell developed Virtual Audio, a system heralded for its clarity, imagery enhancement and lack of sweet-spot requirement. The first album recorded with Virtual Audio is

La Strada, featuring vocalist Connie Champagne on the independent label Heyday Records, based in San Francisco. It's the debut in a series of Heyday projects that will use Virtual Audio. Heyday purchased a Virtual Audio system and rents it out for about \$300/day.

Virtual Audio uses the award-winning Aachen dummy head designed by Germany's Head Acoustics. Currell worked with Head to refine the system for Virtual Audio. Now he's said to be working with Japanese corporations on a \$500 million deal to apply his research in varied areas. He also plans to develop a 3-D sound recording chip.

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3-D OR NOT 3-D: WHEN TO USE IT

"In music production, we have a tendency to cerebralize the music and remove its street value and spontaneity," says Bruce Swedien. "But those are a big share of what music's all about. That's where this psychoacoustics stuff comes in." The venerable engineer has been working at Record One and Larrabee North on Michael Jackson's new album (due next month). He co-produced four tunes and engineered eight others.

"I use RSS as a tool on individual sound sources to enhance the width and space of the soundfield," Swedien says. "I use it on reverb returns for certain sources and increase the dimensional space of the reverb. The more complex the sound, the more effective the system."

A "funky dance number" called "Jam," which Swedien co-wrote, opens with the sound of breaking glass and a talking voice. "It came alive when I put the RSS on it. It is so dramatic," he says. "Sometimes these effects are difficult to contain; you can have this thing working great one day and the next day it's gone. If everyone goes 'Wow!' when they first hear [an RSS-enhanced sound], I print the psychoacoustics on the track during the recording process."

Mixdown is where QSound sees action. Producer Bob Ezrin (Pink Floyd, Rod Stewart, Peter Gabriel) applied it on Julian Lennon's album *Help Yourself*, engineered by James Guthrie at Burbank's The Enterprise recording studios. Ezrin says QSound "makes my stage wider and deeper. I can bring the lip of my stage right to the listener's nose. You no longer think of things as being right, left or center—now there's upstage, downstage, front, back. That's why I did background

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vocals on Julian's album in four tracks, instead of two, and sometimes six, to create a horseshoe effect."

QSound and RSS seem to prefer certain frequencies. "I think it depends on how things are EQ'd and how percussive they are," observes Keith Cohen. Cohen remixed Paula Abdul's *Spellbound* at Larrabee West, the studio that rebuilt its SSL console to easily accommodate QSound. "It worked well on percussive things," he adds. "Both QSound and RSS tend to color the sound a bit, because they deal with phase."

Cohen found QSound "definitely useful for effects. On some tracks it was nice to put the percussion out to the side so it jumped out of the speaker. It was nice to have certain effects go around your head. It's like another piece of outboard gear once you get used to it."

Working in 3-D requires a new approach to pre-production. "It's important to plan how you want an effect to appear when the final mix is done," Ezrin notes. "For a gunshot on Julian's album, I planned three tracks, with percussion on one and ricochets on two. The percussion occurs in the front and the ricochet flies past the listener, then flies forward."

Before Suzanne Ciani started mixing her sixth album, she decided "where everything would be spatially, because you have to keep it all balanced." The noted electronic musician used RSS on *Hotel Luna* (Private Music), recorded by Peter Kelsey at Skyline Studios in Topanga, Calif. She used RSS differently in every piece. "In one, 'Mare-mosso,' I had fun in the section where you're lost at sea, tossed by waves and wind. It was a perfect opportunity to go wild with motion."

Ciani found it easiest to localize a sound if nothing in the same frequency band competed with it; however, "The important thing is that the movement is in time with the music. Motion is rhythm," she explains. Since RSS is MIDI-controllable, Ciani used a Macintosh-based sequencer to control placement of sounds in sync with the rhythm.

While mixing, Ciani recorded the RSS moves into the Mac. In a piece called "Rain," using the computer to control the placement of raindrops allowed four moves every second. Ciani adds, "I was using 48 tracks, lots of detail and subtle sounds. My goal is to have it appear simple and direct and have a place for all those colors—it's



Photo courtesy of BMC Studios

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Engineer Keith Cohen remixed Paula Abdul's *Spellbound* at Larrabee West, working with QSound to "put the percussion out to the side."

important they're not all on top of each other."

Likewise, Francis Buckley points to QSound's assistance in "clearing out the center image." He engineered SBK's release of *Wilson Phillips*, produced by Glen Ballard. Ballard chose to remix the singles "You're In Love" and "The Dream Is Still Alive" with QSound. Buckley notes, "Through the course of 'You're In Love,' you hear 19 vocal tracks, which is a crowded center image to deal with. QSound gave me a much larger canvas to paint my picture on." Because of the way Buckley mixed the two live cuts on the "B" side, if you sit in the sweet spot, it sounds like you're sitting in the middle of a live audience with Wilson Phillips onstage.

A similar approach was taken with Virtual Audio to record *La Strada* at San Francisco's Mobius Music. "My idea was to work from a fixed perspective of a listener sitting on the apron of a



stage, watching the group," says Oliver DiCicco, an engineer and producer who is known for his work with Michael Hedges, Modern Mandolin Quartet and other Windham Hill artists. "It's subtle, but it definitely comes across, even if you're not in a center spot," he says. Working with engineer Jane Scolieri, he used the Virtual Audio head to record acoustic guitar, acoustic bass and drums (played in the studio) together.

"Rather than turning up mics, you change the placement of musicians," DiCicco explains. "All overdubbing is through the head. Basically, we super-impose images of the room. You can get into wild things where you change perspective, but I went for natural, consistent imaging. It has a sense of air, depth, height and detail that I've never been able to achieve with regular mics."

The system localizes sound, so any movement of a performer translates into movement in the stereo image. "That's why I ended up cutting vocals in the iso booth," DiCicco notes. "The fact that it works so well on speakers is key. I've done lots of acoustic recording, and this is the first time I got something that really sounds like it sounds live. It's exciting. It's like someone gave you a Ferrari to drive instead of your Ford Escort."

Acclaimed engineer Keith Cohen also brings up cars to voice a gripe against using 3-D systems: "It's hard to perceive [the effect] over the radio. The ideal spot to listen in the car is the middle of the back seat, and who drives from there?"



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WILL 3-D KILL THE RADIO STAR?

Last spring QSound was front-page news in the trade paper *Radio World* under the headline, "QSound Mix Affects Mono." Some broadcasters complained that singles by Madonna and Wilson Phillips exhibited mono-compatibility problems when broadcast. They attacked the process itself rather than recordings said to "flip out of phase" and "lack midrange." The music industry's response brought attention to the need for engineers to thoroughly check mixes in mono. Archer responded by releasing QSound software that "limits the mixing engineer from jeopardizing acceptable mono compatibility." The new system includes a signal to warn engineers about potential mono problems.

"The broadcasters were most upset about the intro to a Madonna song," Bob Ezrin notes. "The synth *did* disappear in mono—but it wasn't in QSound, it was a plain stereo synth with a stereo effect! You have to make sure that things you think are juicy and wonderful won't disappear in mono. For Julian's release, we did 'folded in' mixes. We brought our stereo and

Q-mix slightly into the center, so in mono it didn't disappear. It doesn't have the discrete motion, but you don't get that out of a car radio. Besides, you only get stereo within 15 or 20 miles of the transmitter. Outside that range, your radio starts to compensate and blend the signal to mono. If you don't account for that when you make records, you don't account for our most important promotional device."

When Wilson Phillips' chart-topping "You're In Love" experienced mono problems, Francis Buckley corrected the situation by creating a new vocal mix "with non-Q and the original album track, and sent it to radio stations for their mono mixes," he explains. "When I use QSound again, for whatever's going to radio, I'll do a non-QSound mix."

WILL 3-D BE AS COMMON AS CD?

Through better audio quality and new ways of manipulating sound, 3-D could truly enhance the audience experience, thus boosting the record industry. But will it follow the path of quadrophonic sound? Or is it here to stay?

"Oh yes!" says Swedien, "I really think it's here to stay. We're just seeing the beginning. I got a call the other day from [a major manufacturer] about getting into this field, and we talked about some really interesting ideas."

Everyone we contacted agreed. Buckley says it's the next big thing. "There's nothing [for consumers] to buy; they throw it on the system and get this great sound. Also, if we put two 48-track machines together, we get so many tracks, but still have the same size canvas. If we're going to get more tracks, we need a place to put them."

Although Margouloff believes B.A.S.E. "will be as ubiquitous as the Eventide DDL or Lexicon 480L," it is not going to turn the world upside-down. "How we position [the sounds] can help, but none of this stuff is going to make or break a record. It's the artist or the song that makes or breaks the record." ■

Linda Jacobson lives in San Francisco, where she writes about audio, video and interactive technologies and the people who use them. Her company, Wordswork, provides tech writing and publishing services.



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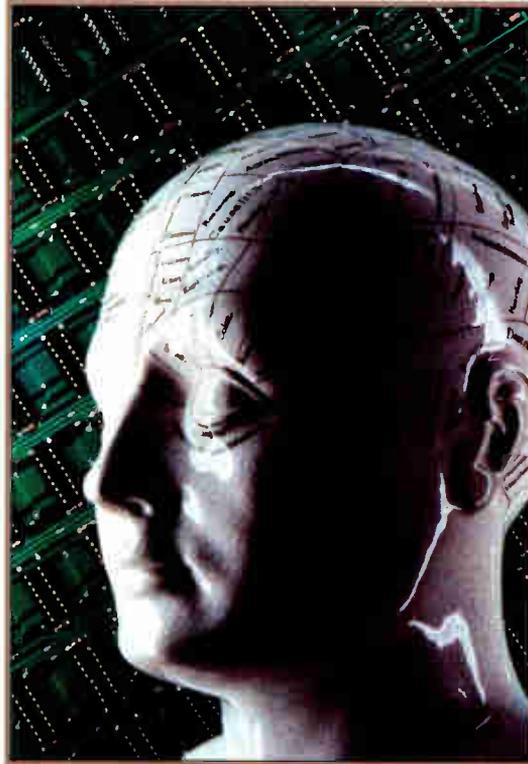
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DON'T EVEN THINK ABOUT IT



If things have been a bit fuzzy lately, there might be a good reason. If you've noticed a slight trembling of the hands or other anomaly as you constantly switch back and forth between devising a musical part and patching it to the proper place, read on.

For years, there was a definite delineation of tasks in a recording studio: An engineer ran the console and monitored the technology, a musician created parts and a producer directed the efforts of both. Granted, that's a simplistic breakdown since creative tasks are shared to a considerable degree by engineers in achieving sounds, and mechanical/motor tasks are performed by musicians in setting up gear. But, it's basically an accurate

representation of the allotment of chores in a standard session.

Project studios have changed this, to a larger degree than the artist and personal studios before them. In a project studio environment, all the above tasks get performed by the same brain. And that gets pretty complicated. No, we don't have some MIDI version of Epstein-Barr syndrome here—some contemporary techno-malady we can call our own just yet. But it's interesting to note that what goes on in a typical project studio session is pushing the cranial capacity to the max. And that doing this kind of session is more analogous to flying an airplane or being a short-order cook than recording music in the traditional sense.

BY DAN DALEY

Bridging The Great Divide

The brain is divided into two similar hemispheres. If you don't believe this, check and see if water goes down the drain in different directions in each of them. Seriously though, these hemispheres get assigned different types of tasks. The right hemisphere generally controls visual and spatial information; the left hemisphere handles abstract thought, stringing together information and language. They're joined by the corpus callosum, a thick strand of neurofibers

specialized tasking required for project studio operations resides in the left hemisphere in most people. Musicians tend to be left-brain dominant, music being analogous to a language. Right brain functions can become "packeted" functions, doled out on command from the left brain when needed. For instance, if the left brain perceives a sound that doesn't fit the aesthetic model it likes, the preprogrammed reaction of the right brain would begin a logical search for the source of the problem (i.e., check for phase coher-

LEFT BRAIN / RIGHT BRAIN PHYSIONOMICS

that—during a project studio session, when creativity and technology operation are intensely combined—starts to look like the George Washington Bridge on a Friday afternoon in August.

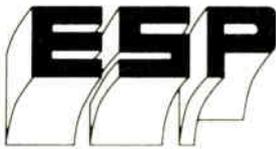
The result, says Dr. William H. Calvin, a Seattle-based neurophysiologist and author of *The Throwing Madonna: Essays On The Brain*, is a bottleneck of information between the hemispheres. This brings us to the good news/bad news portion of this essay. The bad news is that speed of operation—that is, the rate at which information passes between hemispheres through the corpus callosum—is dictated by the amount of nerve fiber contained within it. And nerve fiber essentially starts going to the physiological equivalent of magnetic heaven from the minute we're born and continues to disappear with age. Calvin says that in primate studies, chimps start off with about 200 million fibers and lose about 70% of them by six months of age, about the equivalent of a 2-year-old human.

The good news, however, is that much of the

ency, too hot a signal, not enough signal, etc.).

As I said earlier, as to where the purely mechanical ends and the creative begins is a fuzzy area and can't be quantified, especially since it occurs on a second-by-second basis under these circumstances. What is happening, though, is that the brain is constantly shifting between these types of tasks and, in some cases, between hemispheres as well. Calvin's verbal representations of that phenomenon, used increasingly by other neurophysiologists as well, are computer analogies. "There are a lot of precision tasks that are being attempted simultaneously," Calvin notes, "like pitch and volume. These tasks eat up the limited amount of workspace that's available, which could be going to other tasks. It's similar to multitasking in computer operations; it takes awhile to integrate various functions to operate together."

This is all transparent stuff, of course. You haven't got a clue that it's going on; otherwise you'd never get past selecting an input. Nonetheless, Calvin says, brain multitasking is a function of intelligence level,



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which operates on a conscious level. The ability to multitask is a higher brain function and a learned one, but only humans have it: the more intelligent the human, the better the result. For instance, when mature chimps are asked to bring two objects across the room, they usually only pick one and bring it, whereas a two-year-old child rather quickly learns to bring both upon request. And it just gets better from there. "It's all a function of language," according to Calvin.

Interfaces

What happens when too many different types of tasks are attempted simultaneously? Overload. Like trying to think in English and Japanese at the same time. While a lot of the actions associated with recording to tape or disk in the project studio become rote macro-functions, the constant introduction of variables upon them ("Maybe I want tape distortion on the guitar part this time") dilutes some of that benefit. The brain (and particularly the higher functions) will continue to evolve to accommodate this. But many clients are finicky and can't wait 30 or 40 millennia for this to occur naturally, so Calvin points to the manufacturers of interfaces as the point in the loop best addressed.

"A lot of how well the brain can process and handle information depends upon the user interface," he continues. "Can you reduce function monitoring down to the point where you can read it like a gas gauge? How much can you simplify it yet still get it to monitor complicated functions? That's exactly what's been done with major aircraft monitoring systems. As the systems get more complex, the user interfaces have to get simpler in order to let the brain deal with all the additional information."

Precision is the first aspect to suffer under these circumstances. Pretty soon you find yourself—God forbid—using the preprogrammed fills from the drum machine's demo chip. Short of eating a life-lengthening, high-fiber diet and trying to wait out evolutionary changes, studio operators should be aware when their brains are working close to the red line and take a break a bit more often. ■

Dan Daley is Mix's East Coast editor. This month's topic presented so many possibilities for punchlines that he overloaded.



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He went on about its easy

made that particular record in any other way."

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it's there. That's when you know a machine is good."

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halfway through the session. It completely eliminated the need for another slave. Which made overdubbing much, much easier."

And, he had a few words about its user-friendly design.

He also mentioned its 48

tracks. "When I was recording Phil Collin's *Another Day in Paradise*, I got ahold of a 3348

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But for now, we'll let Hugh have the last one: "Phenomenal."



SONY

Many sound professionals use the word "insidious" to describe the hazard of high sound pressure levels. This is because there is a massive gray area between temporary threshold shift and permanent hearing damage. High noise levels can damage the fine inner ear structure, the nerve endings that respond to sound. Steve Otto, research audiologist for the House Ear Institute of Los Angeles, says, "One of the first signs of temporary hearing loss due to noise exposure is ringing in the ears. In many cases, the ears will recover and the ringing will go away after a period of time. But with repeated exposure, recovery is less and less, until there is none at all."

THE EAR

Guidelines for noise exposure levels in the workplace have been in existence since the Occupational Safety and Health Administration (OSHA) developed recommended sound level criteria based on research done in the 1940s by Dr. Aram Glorig of the House Ear Institute. Music professionals, however, have rarely embraced these guidelines because of their lack of specific attention to the complexities of music monitoring.

Is it feasible to create sound level guidelines for the variety of critical situations in which music professionals find themselves? Or will sound level remain under the control of the individual in a value judgment of the situation? Certainly the topic of sound level and hearing vulnerability generates more questions than answers.

Studio Engineers

The studio sound engineer is in a particularly vulnerable position for hearing damage. Frequently working long hours while exposed to high monitor levels in a confined space takes its toll on many, whether they are willing to admit it or not.

Is the sound engineer doomed to damage, or is it possible to hear everything that needs to be heard without overexposure? Engineer/producer George Massenburg, whose credits include Linda Ronstadt, Little Feat

**by David Schwartz
and
Penny Riker Jacob**

and Earth Wind & Fire, handles sound differently, depending on the phase of the recording project. "During the recording phase, you're often dealing

A
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Thing
to
Waste



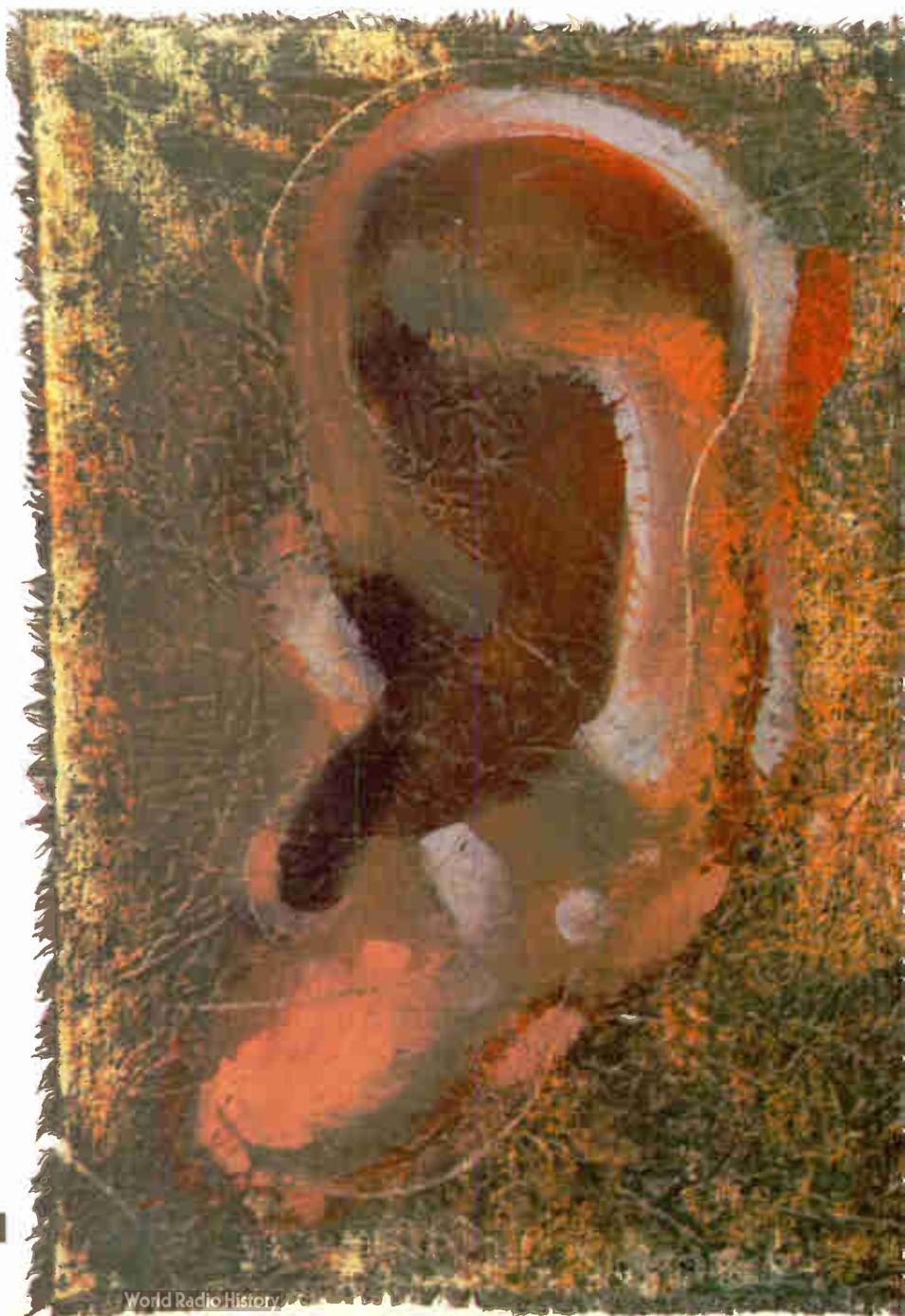
with rhythm track musicians, and there are certainly times when you monitor rather loudly at their request,” Massenburg says. “However, you prefer not to do so for a long time. For the 12- and 16-hour overdub sessions, I tend to monitor well below 95dB SPL. For that occasion when a producer and musician and even I need to be greased a little bit, I run the level up. During the mixing phase, I monitor predominantly below 65dB SPL! I occasionally run the level up just to see what the feel of the low end is and to see what details might be revealed.”

When do engineers resort to earplugs? Fred Catero, a 30-year studio veteran whose many album credits include Santana, Chicago, Herbie Hancock and Blood Sweat & Tears, says, “When clients want to monitor extremely loudly, I first try to reason with them. Some, however, are already hard of hearing, which compounds the problem. They can’t hear because they have ear damage, so they turn the sound even louder, which does even more damage. In that case, I put my plugs in and play as loudly as they want or need. When they go back into the studio, I turn everything back down to my normal soft working level.

“My responsibility to my clients is to give them what they need and want,” Catero explains. “I also have a responsibility to share my knowledge about sound with them in a creative and informational way. I try to explain the pitfalls and dangers of loud sound, and hope that they respect me enough to listen and act on the things that may save their hearing.”

Catero also warns that headphone listening is not necessarily the way to avoid hearing damage. “Headphones at the same sound level as speakers are more dangerous. Sound from a speaker has to travel through space to reach the ear. Transient energy is dissipated in this process. Headphones are almost directly coupled to the ear and afford no protection of this kind.

Is the sound engineer doomed to damage, or is it possible to hear everything that needs to be heard without overexposure?



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World Radio History

"The bad thing about transients is that they generally consist of only a few cycles," Catero says. "In order for the ear to recognize a molecular pressure wave as a sound, it must receive at least 20 of these vibrations, otherwise it hears nothing. Since most transients last less than 20 vibrations, they enter our ears and go by unnoticed, but they do their damage nonetheless."

What about digital sound? A stir was created several years ago by a Dr. Diamond, who observed some musculature dysfunction in test patients listening to digitally recorded music. While little has come to light in recent years to support his observations, certain phenomena should be considered, according to Catero. "Digital sound does pose a greater danger than ana-

log. The dynamic range of digital is greater than that experienced in analog tape recording. This allows those transient spikes picked up by close-miking to be reproduced into our ears, causing a potential hazard."

The Live Sound Engineer

Today's average sound system for a major touring rock artist generates sound levels that can average 110 dB within the audience area, with peaks nearing 120 dB. And, of course, it is not unusual to find fans of loud rock eagerly huddled in front of main speakers blasting them with up to 125dBA pressure levels.

This poses a dilemma for the live sound engineer, who wants to please the audience, the artist, stay on the right

side of the law enforcement authorities and protect everyone's ears in the process.

"There is a sound level threshold below which a live rock 'n' roll concert becomes less exciting," says Bruce Jackson, live sound designer for Bruce Springsteen concerts. "If you look toward the distant seats and see little participation, you can almost guarantee the sound is not loud enough, or lacks the 'sparkle' of the good seats. It becomes a problem when unrealistic local ordinances restrict us from being able to provide adequate sound to the back of the house."

Though an artist's fans frequently can't get enough of their music, the sound engineer is responsible to all in attendance. David Scheirman has been a live sound mixer for the past 20 years and has toured with Linda Ronstadt, Glenn Frey, Sheena Easton and Jimmy Buffett. Scheirman maintains a strong concern regarding high sound levels. "I keep a handful of cheap, throwaway foam earplugs to offer to those persons who might need them—gray-haired men, moms with babies, etc. I usually tell ushers who are working the audience to make sure that their building manager makes such ear plugs available.

"But, realistically," Scheirman adds, "the way I personally deal with the issue is to not ever work on the really loud hard rock or heavy metal projects. I am just not interested in being exposed to super-high levels, and don't want to be involved in subjecting audiences to it. I make my living with my hearing, and I want to keep it for a long, long time. I've worked professionally for more than 15 years, and by carefully choosing my work projects and the type of audio environments that I'm exposed to, I've safeguarded it so far."

"One of the hardest things to accomplish in small, club-size venues with touring systems is positioning speakers where they aren't blasting away at the front few rows," says Lee Brenkman, sound reinforcement engineer of 23 years, 15 of those as technical director of San Francisco's Great American Music Hall. "Of course, in clubs the direct sound from the stage *without* reinforcement is sometimes already over the top."

Artists who are knowledgeable about their support equipment and know what they want musically make life easier for the sound engineer. According to Brenkman, "Generally, the best musicians are secure enough in

ness campaign, targeted at educating teens on hearing preservation.

Commenting on the dizzying pace at which audio systems have developed and the integration of these mega-SPL advances into live performance and playback systems, Baxter testified: "Technology, in and of itself, is neither beneficial nor harmful—it's in the application. This is where education and awareness programs become the important factors. We must teach our children and young people about the auditory sense. We teach them about vision. We tell them not to look at the sun or it will damage their eyes. By the same token, we do not outlaw welding and power tools—we teach those who use them to wear eye protection.

"Because hearing is less understood," Baxter explained, "and the loss and injury to this sense usually manifests itself in a more subtle and long-term manner, people pay less attention to its preservation. We live in an age where technology develops exponentially, while our human knowledge develops arithmetically. We need to learn as much as we can about the subject of hearing, how it can be damaged and how it can be protected through situational awareness and the use of ear protection and common sense—and pass this on to our youth. We teach our kids to keep their hands off the hot stove and look both ways before crossing the street. Let's do the same with their hearing."

—George Petersen

A HEARING ON HEARING: Congress Starts Listening

On Monday, July 22, the Select Committee on Children, Youth and Families held a congressional hearing to explore the causes of noise-induced hearing loss, with a focus on the use/abuse of personal stereos and a look at education and hearing protection programs for children and teenagers. "Whether it's power lawn mowers or power tools, the world is a noisy place and getting noisier," explained committee chairwoman, Colorado Representative Pat Schroeder. "It's up to us to educate our kids and ourselves on how noise induces hearing loss."

While testimony was provided by a variety of expert witnesses (such as Dr. James Snow, director of the National Institute on Deafness; Dr. Paul Kilney, director of Audiology and Electrophysiology at the University of Michigan Medical Center; and William Clark from the Central Institute for the Deaf), perhaps the most impassioned plea came from noted producer/musician Jeff Baxter. Best known for his blazing guitar work with Steely Dan and the Doobie Brothers, Baxter also takes time from his hectic studio schedule to serve as a spokesman for the House Ear Institute's "Hearing Is Priceless" public aware-

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their abilities that they don't need to cripple themselves with the volume of their own instrument. The musicians and engineers most at risk are usually the ones most in love with the concept of 'louder is always better.' Far too many sound reinforcement people think in terms more suited to military combat or professional football situations."

Performing Musicians

Stage musicians walk a minefield of sound pressure. "Musicians need to hear over the roar returning to the stage from the acoustics of the venue, the screaming audience and from competing instruments," Jackson explains. "This jumbled sound tends to be muddled and bassy, so the solution is usually to make their personal monitor speakers louder and go for a sound that cuts through the background roar. This usually involves an edge in the 1.5 to 5 kHz range. Very loud sound in this range seems to cause the biggest hearing threshold shift, which, as the musician gets older, takes longer to return to normal.

"These monitors are often louder in one ear than the other, and, in time, that ear starts to lose its ability to bounce back," Jackson says. "The threshold shift starts to become permanent. It's centered around the 3.5 kHz area first and affects one ear more than the other. The result is usually to demand even louder monitors, compounding the problem."

"Bass players must be taught not to stand too close to the drummer's cymbals," adds Scheiman. "Drummers must be made aware of the type of lifelong hearing losses caused by playing at rock concert levels for a living, night after night. They are only a few inches away from ear-damaging percussive effects that only drummers are in control of."

"It seems that any band just starting to play live shows after spending weeks in the studio recording and mixing will show evidence of high frequency roll-off due to long hours of headphone use and high mixdown levels. In these situations," says Brenkman, "house and monitor consoles almost always show boost at or above 7 kHz on nearly every channel. Drummers who 'need' high levels of kick drum, snare, etc. in their monitors seem to require ever-increasing level as they lose sensitivity at the key frequencies. The net result is usually that the drum monitor becomes so loud that

everyone else onstage needs more volume."

"In 1974, when I first joined the Doobie Brothers," says guitarist/producer Jeff Baxter, "it was nuts onstage—Marshall city. So I convinced the guys to set up with the guitar amplifiers in front of us, rather than behind. It was guitar amp, vocal monitor, bass amp, vocal monitor, guitar amp, vocal monitor, with the drums coming out of the sidefills. We were able to eliminate all of the amplified instruments coming through the vocal microphones.

"By setting up this way, we found that the only guy you were going to blast out was going to be yourself," he adds. "And since you had such direct access to it, the whole level onstage came way down. Not only that, but every place we played, we could generate the same acoustic environment."

Baxter has protected his ears over the years, admittedly without realizing it at first. "A long time ago, when I first started playing onstage, I could never get the kind of monitor mix I wanted. So I started wearing headphones and listening to the house mix, with all the cool effects on the vocals. I wanted to

—CONTINUED ON PAGE 116

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REFLECTING ON STUDIO ACOUSTICS: PETER D'ANTONIO

BY LARRY TODD



For many years, it seemed that the gospel of studio design was to capture every piece of sound in the control room and control it, whether the sound was headed for the tape or the Helmholtz resonator. Stray sound was the enemy. And too often the result was a dead acoustical environment.

Then talk started about creating

more ambience in the studio—not just electronically. After all, if the great music performance spaces were generally regarded as owing to their room's diffusion and reflection

properties, why not bring acoustical character into the studio and control room? And to complicate the issue, how does this equate to accuracy in



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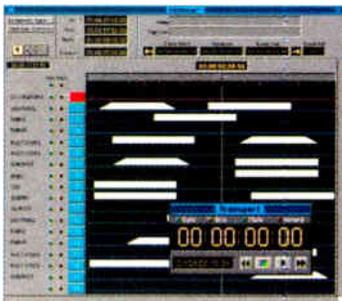


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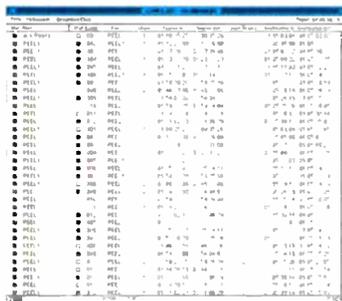
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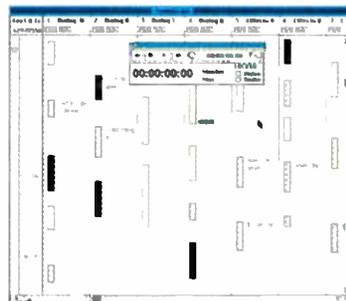
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with a very creative assortment of curved, angled, irregularly shaped, sound-diffusing surfaces, ranging from egg cartons to polycylindrical columns.

Mix: What was the response to the new design?

D'Antonio: We observed a definite improvement. I was not honestly convinced, however, that this was the ultimate solution. After serious contemplation, we concluded that the basic scientific premises that initially attracted me to the approach were valid, but the implementation was flawed. At that time Time Delay Spectrometry, embodied in the Techron TEF®

quency response.

Mix: You say the implementation was flawed. What was wrong with it?

D'Antonio: Both the live end and the dead end were not accomplishing what was intended. In retrospect, it is clear that the bandwidth and efficiency of the acoustical materials used to form the live and dead end were insufficient. The design required a strategic application of broad-bandwidth sound absorption in the front and broad-bandwidth, wide-angle sound diffusion in the rear.

We attacked the live end first by a scientific evaluation of surfaces that



Recently, other companies, such as Systems Development Group, have begun to develop products to control reflected sound in studios. Shown here is its new ART Diffusor, as installed in Audiomaster, Bethesda, Maryland.

analyzer, was just gaining popularity. In fact, the ETC Energy-Time Curve, which has become a staple in most acousticians' diets, was not even available. It was very educational and convincing to see the comb-filtering caused by the combination of an early reflection with the direct sound of the loudspeaker. I often sympathized with speaker manufacturers who did significant research in establishing a flat free-field response, only to have that same speaker auditioned in a room with significant, very early reflections, which severely corrupted the fre-

could scatter sound, or more correctly, as is widely understood today, diffuse sound. Various surfaces ranging from egg crates to polycylindrical columns were used to varying degrees of success in the rear of these rooms by designers. As often happens in life, one draws on the resources at their disposal in time of need. I don't want to be overly philosophical here, but this is a perfect example of the importance of a basic broad-based education. A literature search pointed us to the mathematical number theory research of German scientist Manfred Schroeder,

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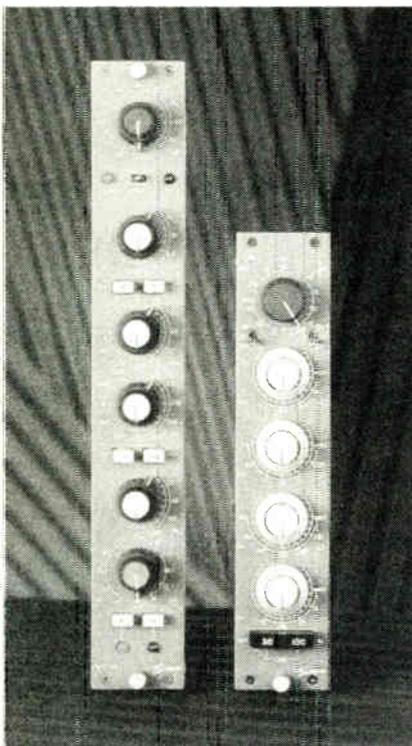
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who was director of acoustics and speech research at Bell Labs, as well as professor of physics at the University of Göttingen. His work was directly applicable to our research in control room design, by offering the possibility of a wall treatment that could provide the broad-bandwidth, wide-angle sound diffusion we were looking for.

At this time my collaboration with mathematician Dr. John Konnert allowed us to simulate and evaluate the performance of these new patented Reflection Phase Gratings—RPG™ as they are mathematically referred to. The RPG consists of a periodic grouping of a series of wells of equal width, but different depths, separated by thin dividers. The depths are based on mathematical number theory sequences. A diffusor based on the quadratic residue depth sequence is called a QRD® Diffusor. Since the RPGs are periodic, they scatter sound much the same way that crystalline materials scatter X-rays, electrons or neutrons. We began by constructing sound diffusing panels based on the primitive root and quadratic residue number theory sequences.

In addition to computer modeling, the performance of these new sound diffusors, we could test their actual performance using the TEF analyzer. To do so, we had to develop a procedure, which we called the boundary measurement technique, and the software for the TEF analyzer. The next part—a very difficult one—was to find a space large enough to permit the measurements. We needed a very large indoor reverberant space; outdoor measurements proved very difficult because of wind and thermal gradients. The first measurements were made at the Capital Centre, home of the Washington Capitals hockey franchise, and a stop on the rock circuit. Later we graduated to Stage H [134 ft. x 90 ft. x 31 ft.] at the Kaufman Astoria Studios in New York, thanks to my late friend Charles Bilello.

Mix: When did you make the move from studio operator/experimenter to professional designer/acoustician?

D'Antonio: I incorporated RPG Diffusor Systems™ in 1983 to develop innovative acoustical materials and designs for critical listening and performance environments. We presented the first research and results at the AES in New York in 1983. At that meeting I met Bob Todrank, who used the diffusors in the first commercial installation, for the Oak Ridge Boys. In ad-

dition, I met Don and Carolyn Davis, who invited RPG to make a presentation at a Syn-Aud-Con seminar sponsored by Russ Berger, a talented designer who has been a supporter and friend ever since. I will be ever grateful for the guts of these early studio designers who put their necks on the line for us.

Mix: When did your theories of control room acoustics come into focus?

D'Antonio: In 1984 we published the first mathematical description of a way to fully implement the front of the room. Interestingly, while this area was initially called the "dead" end, our research and computer simulations using the Kirchhoff diffraction theory indicated that reflection control could be obtained with completely reflective surfaces, such as glass, as long as the wall and ceiling surfaces were splayed away from the listening position, thereby reflecting or redirecting the sound to the rear diffusors. This can be seen at several studios, including Real World Studios in Bath. Speakers were flush-mounted to minimize the speaker boundary interference and to shift any frequency domain notching upward in frequency to allow control with porous absorption. Since the front of the room no longer needed to feel acoustically "dead," we referred to this temporal and spatial reflection free region as a reflection free zone (RFZ™), and the rear as the reflection phase grating (RPG) zone.

When the RFZ is configured using large surfaces for low-frequency directivity, it is possible to create a listening environment that is selectively anechoic over a time period approximately two times the distance between the mixing position and the rear wall. It is very easy to observe and verify this initial signal delay (ISD) with instrumentation that allows time response measurements, like the TEF analyzer.

The spatial aspect of the RFZ allows console operators and producers wider mobility, while still being able to audition similar spectral and spatial information. This amounts to a wider sweet spot. More detailed analysis suggested that the application of four to six inches of porous absorption on top of the splayed speaker boundaries improves the reflection suppression of these surfaces. Consequently, application of porous absorption at specular reflecting positions on walls and ceiling is useful. Use of a mirror to locate those positions on the walls and ceiling

—CONTINUED ON PAGE 75

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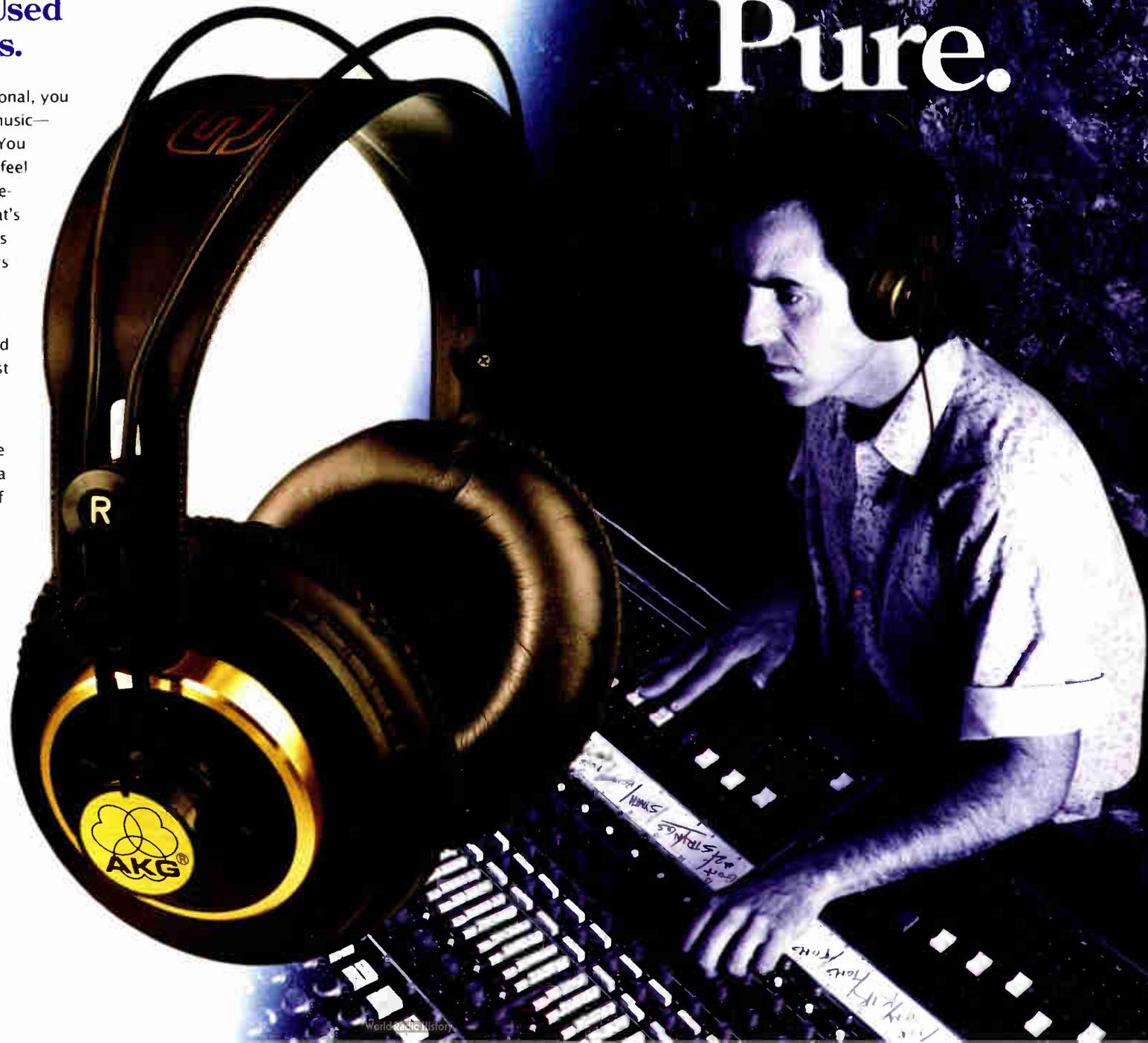
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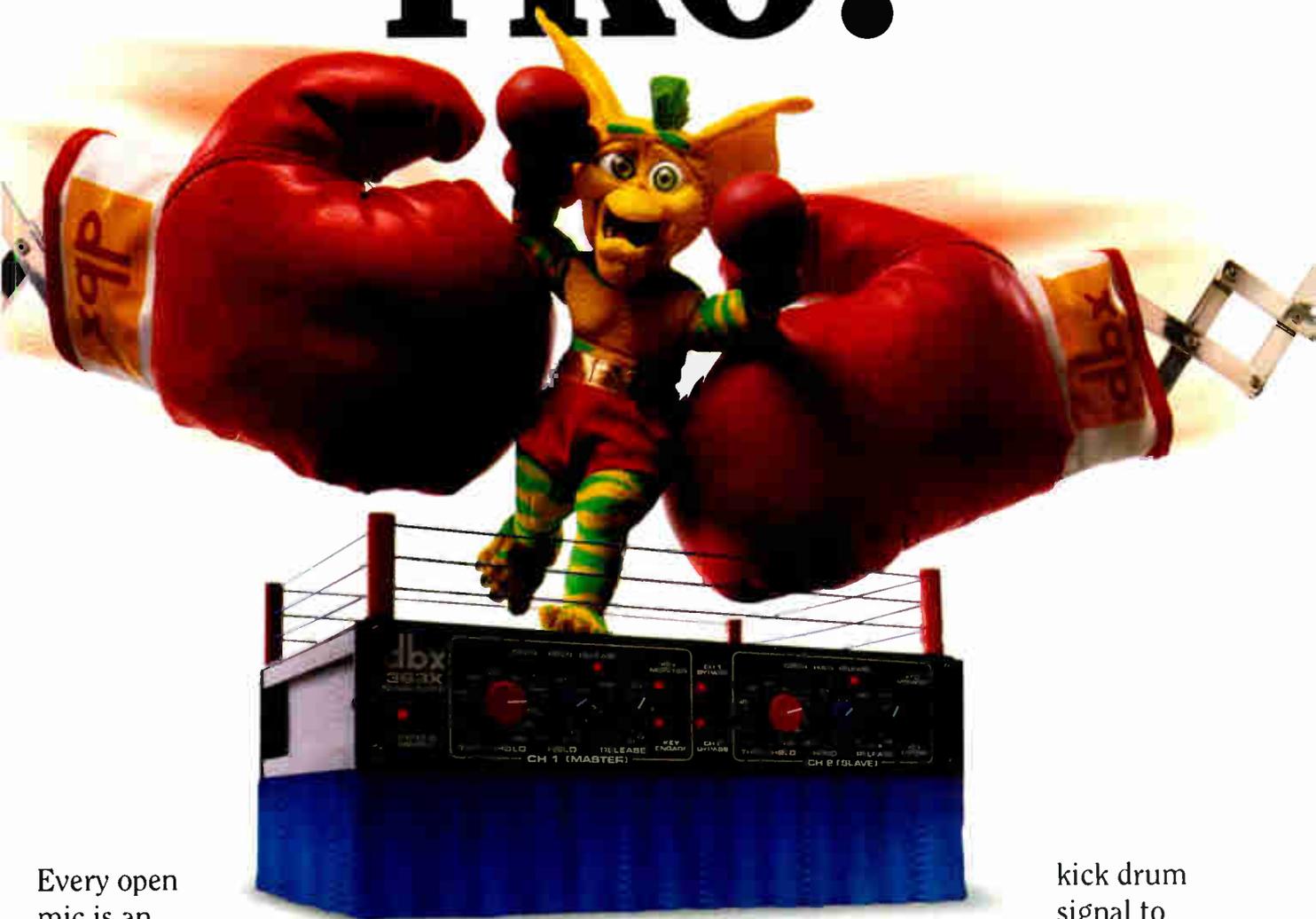
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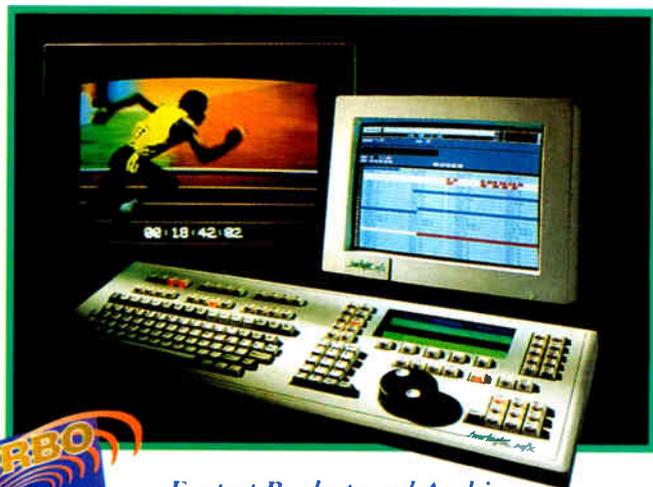
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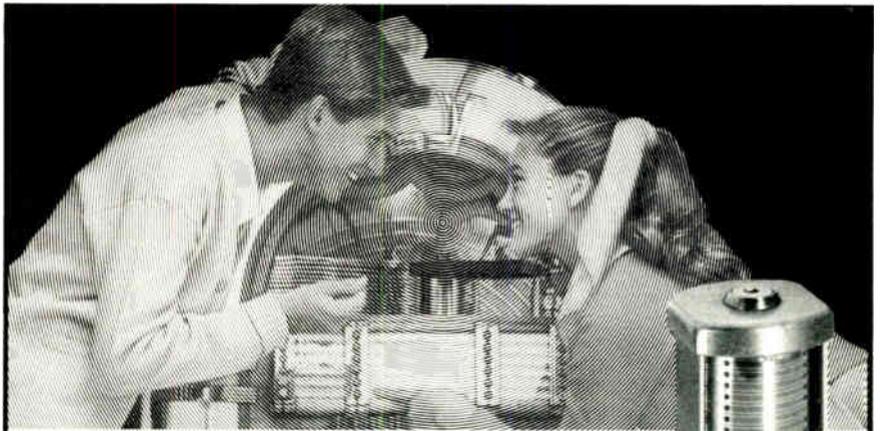
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—FROM PAGE 70, DIFFUSION

(where one would see a reflection of the loudspeakers) can be useful in identifying where absorption should be applied. This usually amounts to applying a 4-foot-high band of broad-bandwidth porous absorption along side walls, essentially at speaker height, and extending to the arm rest of the mixing console. Ceiling application between speakers and the listening position is also suggested. Always place porous absorption away from a boundary surface to increase the low-frequency absorption coefficient to at least 0.8 at 100 Hz. Because absorption as well as reflection and diffusion are important, RPG patented the first absorption phase grating, called the Abbfusor,[®] which both absorbed and dif-fused sound effectively down to 100 Hz. **Mix:** As you were tweaking the acoustics in the control room, how did this relate to the music performance in the studio?

D'Antonio: As the control rooms advanced to become a very accurate acoustic microscope, engineers and producers started hearing the sound of the studio, and it was not always very appealing. The noise threshold of digital recording was also unveiling acoustical problems with the recording room. At Underground Sound, we were also experiencing a dramatic improvement in the studio's sound when diffusors were used. The studio was very small, so to suppress the nearby walls and ceiling/floor reflections and provide a "live," open sound, we developed a microphone technique that used a figure-8 microphone and a cluster of QRD Diffusors. The figure-8 microphone was placed between the performer and the diffusor array. The microphone picked up the direct sound and, after a variable time delay determined by the placement of the diffusors, the diffuse sound. When combined with artificial reverberation, we had an unbelievable sound from a small room. Application quickly spread to the drum kit to help with the "Grand Canyon" tom tom sound that was emerging.

We were delighted with this, because we could easily improve the sound of the studio with the same technology we had developed for the control room, and studio applications grew dramatically. To add to the usefulness of diffusion and abffusion on the walls and on the ceiling, we developed a three-sided variable acoustics



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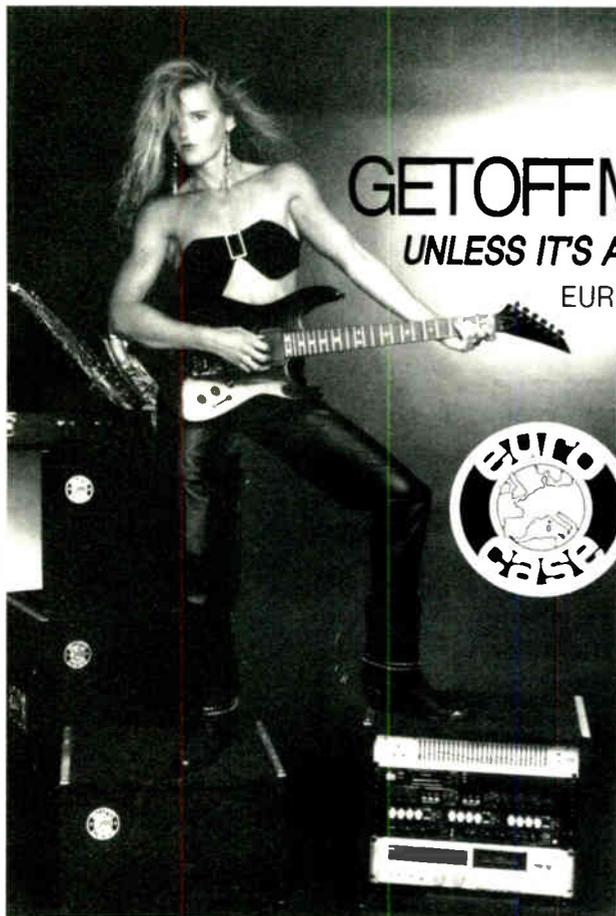
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module, called a Triffusor.[®]The Triffusor consists of a rotatable triangular column containing a diffusive, absorptive and reflective side. When units are clustered adjacent to one another on the studio floor or flush-mounted into a wall, you can easily configure a variable acoustics wall.

Mix: Where has the diffusion concept led to today in your studio acoustical research?

D'Antonio: We were very interested in taking diffusion to the limit. Because the frequency bandwidth of the QRD Diffusor is determined principally by the depth of the deepest well (which determines the low-frequency limit) and the well width (which determines the upper limit), practical fabrication constraints on depth and surface detail proved a limitation for a single diffusing element covering the full audio spectrum. To overcome this restriction, we combined the fields of number theory and fractal geometry and developed a patented new surface, called a Diffractal,[®] which nests a high-frequency diffusor into a low-frequency diffusor. Each diffusor covers a different frequency range, much like a multiway loudspeaker. The full-spectrum bandwidth and crossover points are completely calculable. The high-frequency diffusors are placed on the wells of a stiff and massive low-frequency diffusor.

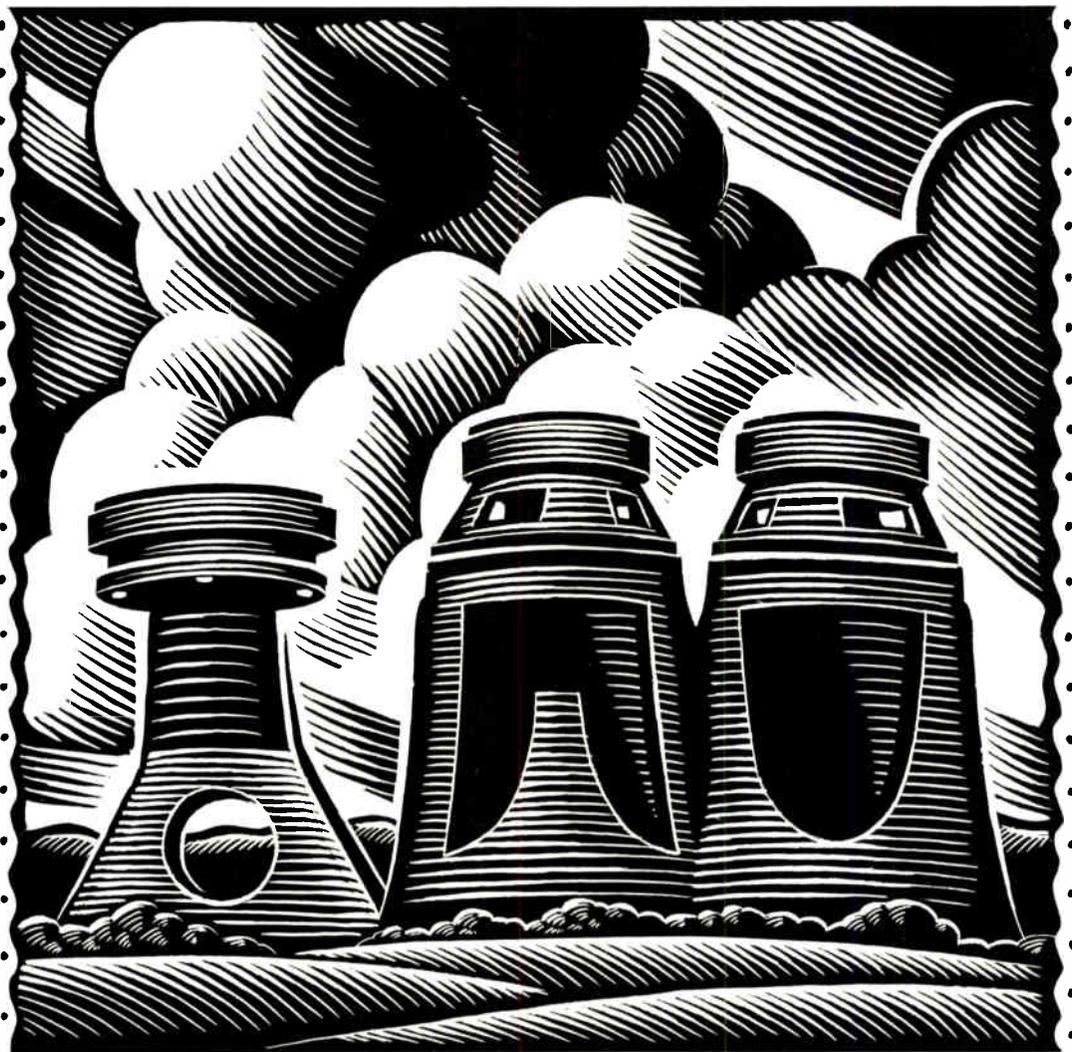
Mix: Can you elaborate a little on the relationship between fractals and studio acoustics?

D'Antonio: Fractals can be understood by considering the numerous natural phenomena like coastlines and clouds, which exhibit a macroscopic property or shape, which is repeated microscopically at progressively smaller and smaller scales. At each level of magnification we find a scaled replica of the original. For example, a line that approximates a mile of coastline from an aerial view looks very much like a foot of coastline viewed on earth. A boulder looks very much like a rock, which looks a lot like a pebble, which looks a lot like a grain of sand, depending on your view. These scaled replicas are self-similar; that is, they differ only in scale. These complex surfaces that are made up of coexisting, nested, self-similar, scaled replicas are fractals. A fractal looks the same at any magnification. There is no simple definition of a fractal, a term that was coined by Benoit B. Mandelbrot, but all attempts at a simple definition incor-

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porate the idea that the whole is made up of parts similar to the whole. The invariance to scaling, or self-similarity, of the Diffractal is apparent when you realize that the small high-frequency diffusors are scaled, self-similar replicas of the larger low-frequency diffusor.

Mix: What is this technology leading toward in the near future?

D'Antonio: Application of this new technology in critical listening spaces has led to the development of products for performance. RPG Diffusor Systems did extensive research to determine what combination of diffusing and reflecting surfaces provides the best environment for musicians to perform. This research took us into the symphonic community. The research involved evaluating musicians' preferences to various acoustical surroundings with acoustical test measurements in concert hall environs. Research at the Cleveland Institute of Music and various performance venues led to the development of a new-generation performance shell called VAMPS™. The variable-acoustics, modular-performance shell optimizes performance acoustics, while also allowing variability and portability. VAMPS is finding application in churches, schools, performing arts facilities and, literally, anywhere there is music performance.

Another area of research has resulted in a patented, concrete building block that provides diffusion as well as Helmholtz, low-frequency absorption. These blocks are called DiffusorBlox® and can be used to build walls acoustically. DiffusorBlox offer promise for studio construction, schools, worship spaces, highway barriers and arenas.

With respect to future acoustical research, I have been asked to chair the AES committee on "Characterization of Acoustical Materials." Our goal is to establish a new measurement standard that identifies the directional—as opposed to random-incidence—scattering properties of all commonly used absorbing, reflecting and diffusing materials for the music industry. We will be developing hardware and software to automate this time-consuming procedure. These data are non-existent in our industry, but are essential for the advancement of acoustical design and computer modeling of acoustic spaces. ■

Larry Todd, a freelance audiophile and studio bound, owns a small but eclectic media production station in the cozy 'burh of Walnut Creek, Calif.



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LIMITLESS
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by Paul Potyen



THE ROLLOUT OF CD-I

PHILIPS TAKES IT TO THE STREETS

A lot of eyebrows were raised at the 1986 Microsoft CD-ROM Conference when Philips Electronics announced its intention of developing a standard for Compact Disc Interactive (CD-I). It was a bold move for the consumer electronics giant, which by that time was already reaping the benefits of world acceptance of the CD-Audio standard it developed (together with Sony) in the early '80s.

The magnitude of Philips' task implicit in proposing CD-I was borne out by Gerald Calabrese, vice president of marketing and sales for Interactive Media Systems at Philips: "In most cases we sold Bibles. In this case we must sell the religion." As revolutionary as CD-Audio technology was, it was designed to deliver music—a product familiar to the consumer market. Not so with CD-I. Yet, if anyone is positioned to take on the challenge of multimedia for the masses, it is Philips. The company is capable of developing a CD-I player, it owns PolyGram

Records and PolyGram Pictures, and it has created American Interactive Media (AIM) in order to develop interactive software titles for its hardware. And then there is the experience Philips gained from developing the compact disc, "the fastest growing technology in the history of the world."

Now, five years after its initial announcement, Philips is preparing to introduce CD-I to the world. On the eve of the scheduled October CD-I launch, I spoke with Calabrese and Bernard Luskin, president of AIM in Los Angeles, about how we, as professionals as well as consumers, might benefit from this new technology.

AIM: Helping to Create the Religion

Bernard Luskin's background in computer science, psychology and education make him uniquely qualified to assess the direction and impact of CD-I. Founding president of California's Orange Coast Community College and

former president of Orange Coast College, he later served as a member of the Science Education Committee of the National Science Foundation before coming to AIM. Luskin recalls, "We started the company on a napkin on January 27, 1986, in a pizza restaurant in Washington, D.C."

Many who heard about the '86 Microsoft Conference announcement have since been left with the impression that the launch of CD-I was plagued with delays. But Luskin is quick to dispute that point. "Actually, most of the delays are mythology. From our point of view, it's coming out

at the pace that we anticipated, even though there were over-expectations on the part of others. It took from January 1986 until March 1987 to develop a set of standards. During that year we met with everybody we knew in the software community, to get their input as far as important features.

Chip Shots

Digidesign Pro Tools System

I recently had an opportunity to see a demo of Digidesign's new Pro Tools system, and it looks like a winner. This multitrack (4 to 16 channels) digital audio production system incorporates all the best features of the popular Sound Tools system, plus MIDI sequencing and a u t o m a t e d digital mixing on the Macintosh II platform. Scheduled to ship in September, the 4-channel version of Pro Tools has a price tag of \$5,995, and the company will offer substantial rebates for those Sound Tools owners who wish to trade in their existing system. In addition, Digidesign will offer rebates to owners of competing hard disk recording systems! Stay tuned for more details. Digidesign, Menlo Park, CA: (415) 688-0600.

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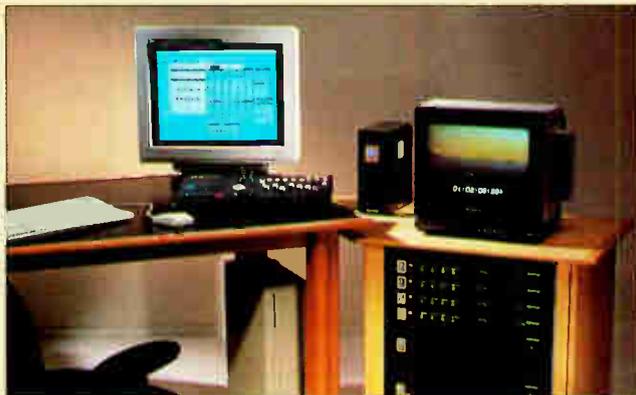
Steinberg Jones Cubase Audio

Steinberg Jones announced Cubase Audio, a Macintosh-based software program that integrates its Cubase MIDI sequencer with recording and playback of digital audio using Digidesign's Sound Tools and Audiomedia hardware. The program is expected to ship by the end of the year, with a suggested retail price of \$995. Steinberg Jones, Northridge, CA, (818) 993-4091.

Circle #251 on Reader Service Card

JL Cooper Electronics Sync•Link™

JL Cooper Electronics introduced Sync•Link™, a half-rack unit that combines a Macintosh MIDI interface with a SMPTE and "smart" FSK synchronizer for syncing MIDI sequencers, drum machines and



hard disk recorders to video or audio tape. It reads and generates all SMPTE time code formats, as well as "smart" FSK sync, and supports MIDI Time Code, DTL and MIDI clock with song position pointer. It is compatible with all Mac MIDI



sequencers. Sync•Link is priced at \$199.50. JL Cooper, Marina del Rey, CA, (213) 306-4131.

Circle #252 on Reader Service Card

Micropolis Corporation 1624

Micropolis Corporation introduced the first 760MB disk drive in the 5.25-inch, half-height form factor.

The Model 1624 features 660 MB of formatted storage, 15ms average seek time and low acoustic noise. The drive, which can be used with either PCs or Macs, comes with a five-year warranty and retails for \$1,795. Micropolis Corp., Chatsworth, CA, (818) 718-5121.

Circle #253 on Reader Service Card

Intervision Software MIDI Track Log

Intervision Software announced availability of MIDI Track Log, a Macintosh HyperCard stack that provides an inventory of all keyboards, sound modules, controllers and instruments used in creating and arranging a song. It organizes patches, cable and channel assignments, track comments, and produces centralized, updatable track reports for each song, sequence or recorded cue. Suggested retail price is \$39.95. Intervision Software, Garden Grove, CA, (714) 534-6278.

Circle #254 on Reader Service Card

SunRize Industries Studio 16

Studio 16 is a software package for the Amiga 2000/3000 from SunRize Industries that is bundled with either the AD1012 12-bit sampler card (scheduled to ship in September) or the AD1016 16-bit

sampler card (tentative availability by the end of the year). The hardware/software combination allows digital recording and editing on the Amiga. List price of the Studio 16 AD1016 is anticipated to be around \$2,000. SunRize Industries, Campbell, CA, (408) 374-1962.

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Call us or see your local dealer for more information. Current users can upgrade to version 1.3 through Opcode Systems.

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THE BYTE BEAT

"Now, you can't make a player until you know what to make," Luskin continues. "So it wasn't until the final spec was completed that we could manufacture the first prototype. That took from March 1987 to September 1988. In the meantime, we met with Smithsonian, Time/Life, Children's Television Workshop, Britannica and others where we had announced product development deals. We started to develop the designs for titles.

"You couldn't put an authoring system together until you had a player," Luskin notes. "You have to play through a player to a television set to take what is in the player out and put it on a disc so you can bring it around and play it on another player. Basically, that's the production path. We started doing that in September 1988. We had to make the drivers that would link up different computers to the players, so you could have a workstation. We started on the Mac track, which was in place by February 1989. Today there are multiple pathways—Suns and IBM PCs, as well as Macs."

With an authoring system in place, production began on CD-I software at



PHOTO RAINBOW PHOTOGRAPHY

Bernie Luskin, president of AIM, Los Angeles, believes the primary obstacle to overcome as CD-I moves toward retail shelves is finding people with the appropriate skills.

AIM in February 1989. As of July 1991, 127 titles were in development and production, covering a broad range of areas, including an interactive version of *Alice in Wonderland*. ABC Sports

Golf (complete with motion picture-quality graphics simulating live action play at Palm Springs); and interactive music CDs featuring Louis Armstrong, Luciano Pavarotti and Mozart. AIM will have more than 50 of these ready by launch time. Cost of the discs will vary from \$15.95 to \$59.95.

(CD-I-ready discs from other companies are already on the market. You can just listen to the music on a normal CD player, but if you play it on a CD-I player that's plugged into a TV set, you get the video as well.)

The creation and organization of the different media types found on CD-I would seem to be one of its great challenges from a production standpoint. From the outset, Luskin had to determine what kinds of people to bring together to make that process an efficient one. Do you have people who specialize in audio, graphics, software programming, etc.? Or do you try to get people with an awareness of all these diverse technologies? Luskin claims that the primary obstacle to overcome as CD-I moves toward retail shelves is finding people with the appropriate skills.

The issue goes right to the heart of the fact that a new industry is being

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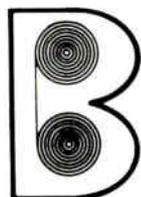
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born here—the optical publishing industry. Luskin explains: “Traditionally, computer companies have been strong in code and weak in audio and images. The laserdisc companies that we were associated with were strong in imaging and audio but knew very little about software engineering. The print publishers had text-based stuff and didn't know how to do anything but database-oriented applications. We have gradually welded together a new breed of individual with the component skills to deal with mixed media in an interactive fashion—in the context of a new psychology of software. You have a new industry in terms of people who have the skills; a new technology with new capability in the mass market; and the development of the new architecture: use of the psychology of software design.”

The assembly of talent to accomplish this at AIM has not happened overnight. “Over the years, one by one, they found us, we found them,” says Luskin. “We've grown a lot of our own, investing very heavily in the people who showed the potential.” The Los Angeles studio employs about 70 people, and AIM supplements that workforce with co-production ventures with over 40 independent producers all over the country.

Luskin adds that some of the producers who are migrating to CD-I are coming from the CD-ROM area, where a database reference-oriented approach is more common. “With the development of CD-ROM-XA (eXtended Architecture), there have been some other media functions, and that only mitigates in favor of CD-I, because everything always rises to the higher concept. The CD-ROM community, the print publishing community, the audio community, the motion picture community—they all have a fringe, which is coming together in CD-I. CD-ROM is a subset of CD-I. If you want to make a CD-ROM disc that plays on a CD-I player, you can do that. CD-ROM has no standard. It's kind of a guerilla technology. CD-I is a much more highly perfected, strategically positioned technology.”

Luskin is convinced that CD-I offers a great opportunity for music producers. “You make money with music by exploitation of rights. Not only is the audio an important right, but the visual aspect is there as well. Simple profit

motive is going to open up new vistas for producers and artists in the area of music. You can do anything on CD-I that you can do on television or on tape—and more. You're looking at a new generation of music publishing.

“Music sales are fairly predictable in the sense of the mass market,” he continues. “You know how many 18- and 19-year-old kids there are, so you can predict percentages of sales. The audio market is fixed: You can't expand it. But if you add a visual dimension to it, you may be able to do that. And once you expand the market, you expand the profitability. There are all sorts of opportunities for producers to create new things.”

The audio skills required to produce an interactive compact disc are the same as with conventional CDs. “In addition, anybody who can do MTV can do CD-I,” adds Luskin. “While software expertise is a critical component, most newcomers are going to work with people who are already involved in CD-I. There are a lot of companies that are beginning to do music-based CD-I products. We'll offer technical support to any company that wants to produce CD-I, provided we have a distribution deal with them.”

Luskin sums it up this way: “People are not yet aware of the phenomenal globalization taking place here. This thing is launching on three continents almost simultaneously. [The fall launch in the U.S. will be followed by a spring launch in Europe.] It used to take a generation for that kind of thing to happen. This is the birth of super-desktop—interactive media—publishing for the mass market.”

The Hardware Side

The other half of Philips' CD-I equation is the Philips CDI910 player, which will retail for \$1,400. It includes a thumbstick remote control designed to fit in one hand, allowing accurate movement to any point on the TV screen. The unit will play CD-Digital-Audio discs in both 3-inch and 5-inch formats, as well as CD+Graphics discs, Kodak's proprietary Photo CD discs and CD-ROM-XA “bridge” discs. Either an RF or a Super VHS connector is used to interface with the television. Full-screen, full-motion video will be supported at 24, 25 and 30 fps. It will be sold via Philips' normal distribution channels of consumer electronics CD players, television sets, VCRs and the

like.

Gerald Calabrese, a 19-year veteran in marketing and sales at Philips, anticipates the business will grow at roughly the same rate as compact disc. "There are similarities between the products, in terms of price point and market potential," he says.

What made CD-Audio so successful is that it was—and is—a world standard. Prototype players have been shown by many of the Japanese manufacturers in conferences in New York, London and Tokyo. Calabrese says, "In order to fuel the development of software and give the consumer a high confidence level in the standard for this new product, the licensing arrangements are important. The licensing procedures being followed are identical in CD-I as with CD-Audio.

"We're not dealing with a new technology; we're dealing with an evolution of a technology," he adds. "The consumer is already familiar with the compact disc. In less than ten years it has penetrated into 30% of the U.S. consumer market. [About 30 million U.S. households.] We have to communicate the benefits of this new technology, so our marketing thrust is a combination of elements that will enable us to do that effectively—public relations and advertising, demonstrations, kiosks, demonstration discs."

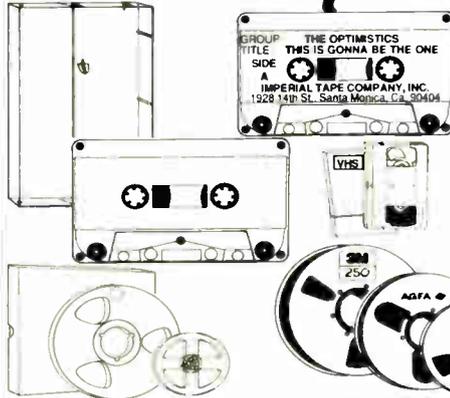
Subsequent to the October debut of CD-I players and titles, Sony, Panasonic, Pioneer, Yamaha, Sharp, Sanyo/Fisher, Tandy and several other companies are expected to introduce their own CD-I players. And on the software side, Philips recently announced that it has granted Nintendo Co., Ltd. a license to develop and market video games on CD format. The games will be CD-I and CD-ROM-XA compatible.

Luskin is somewhat less circumspect about predicting sales than Calabrese. "I'd like to see sales of CD-I titles in the many tens of thousands in the next year. It's hard for me to estimate," Luskin adds. "The software sales are predicated to a great extent on the number of players, and the first step is to create an installed base. All I can really tell you is that this is brought to you by the same group that introduced the compact disc. The modeling has been taken from that for the compact disc."

Which seems to have worked out fairly well. ■

Paul Potyten is a Mix associate editor.

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SYNCHRONIZATION SURVIVAL GUIDE

By Mark Miller

As synchronization equipment has become more available, its usage has become no less mysterious. As we all know from experience, mysterious technology tends to bring with it hours of agony and frustration. I'd like to try to demystify the black art of synchronization and offer some general rules for minimizing that agony and frustration. But first, the following concepts should be clarified:

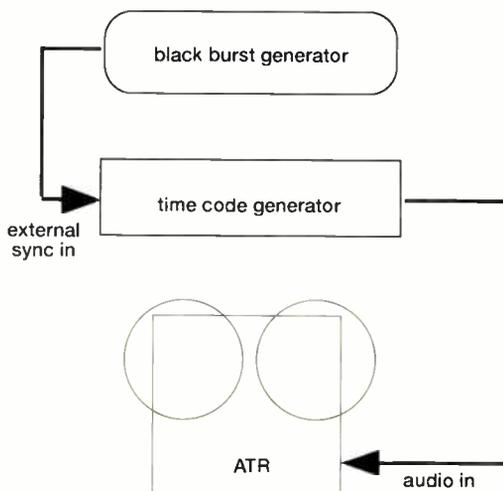
What is a "time base?"

What is "black burst," and how is it different from time code?

What does it mean to "resolve" a transport?

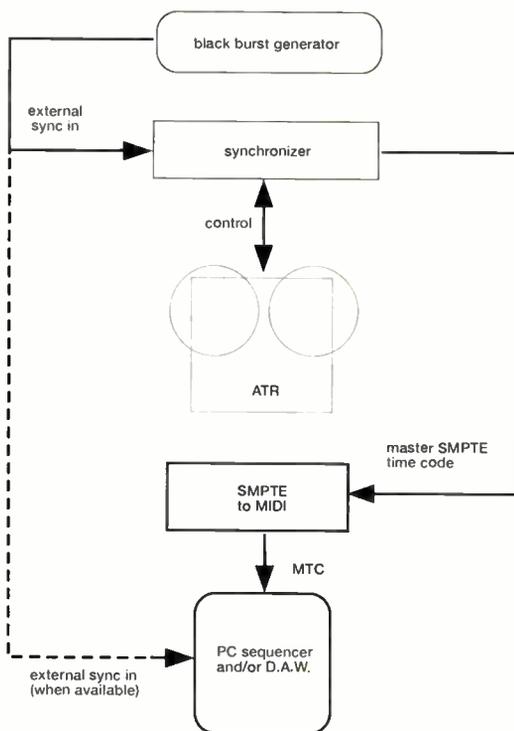
If you have recently added synchronization equipment to your studio, you have probably asked at least one of these questions. If you have encountered synchronization problems, an explanation of these concepts will probably help solve your problem.

Many people have been introduced to SMPTE and MIDI Time Code through synchronizing a MIDI sequencer with a tape machine. While the experience gained through using sequencers can



Stripping an Audio Tape Recorder
Note: It is best to stripe tape using the ATR's internal oscillator

Typical synchronization solutions for audio only



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serve as a good introduction to synchronization, it tends to leave the user with a somewhat incomplete understanding of the underlying technology.

Current advances in personal computer technology are now allowing the same people to create highly sophisticated production environments that integrate analog tape machines, MIDI sequencers and hard disk-based digital audio workstations. These systems tend to grow in an organic and often haphazard fashion. Pieces are added as the technology becomes available and as the budget allows. Each added component brings new levels of complexity and new problems.

I call this type of approach to building a complex system the "outside-in"

**The quality
and reliability of
a synchronization
system is
determined by
the integrity and
the signal path of
the time code.**

approach; it's one in which the system evolves from a core—let's say an 8-track tape machine and a MIDI sequencer. Over time, the kinks are worked out and the basic system tends to come to equilibrium. Each time new components are added, problems appear. Since the core system has been working fine, the problems are usually attributed to the addition. Often, with the assistance of the manufacturer, the new, larger system can be coerced into a new, albeit more fragile, equilibrium. Sometimes it can't.

To further complicate this failure, the new piece of equipment and the old system may work fine when tested on their own. Now things get ugly. The owner generally comes to the conclusion that the new piece of equipment is screwing up the whole system and becomes increasingly upset with the new product. When confronted with an unhappy customer, the manufacturer becomes increasingly defensive. Their equipment works fine in isolation, so there must be some problem in some other part of the system. "But the rest of the system works fine on its

FRAME RATES

Much of the time, you won't have the luxury of striping your own master code. Rather, you will receive a tape with code already on it. Determining the frame rate of that code can be complicated. If you are working in Europe, no problem: You will always get 25 fps ND (frames per second non-drop). If you are working in the United States or Japan, you have three possibilities: 30 fps ND, 29.97 fps ND or 29.97 fps DF (frames per second drop-frame).

TimeLine's Gerry Block describes the difference between the frame rates: "Although, originally, time code for black-and-white TV had a 30Hz frame rate, when RCA invented the color TV standard the frame rate was reduced to 29.97. This allowed both color encoding and compatibility with black-and-white televisions in use, but caused time code to count slightly slower than real time (for every hour of real time, it's 108 frames short).

"For those who wanted to correct this problem and have the time code show true running time," Block explains, "a new time code counting method was developed, drop frame (29.97 fps DF), which skips certain numbers in the counting sequence (108 per hour) to show real time. The method is consistent with real time, with a minimal error at any given point. This 'solution' has had the direct effect of confusing generations of sound and video engineers...and causing general chaos."

Lately, I've encountered much confusion among the ranks between 29.97 fps ND and 30 fps ND. Both types of code contain the same set of numbers moving at different rates. Because the numbers "look" the same, both types can often be read by a device that has been set to look for the other type. For many synchronized devices, this mismatched code will have the effect of deteriorating the operating conditions by appearing as bad code. For other devices it can prove fatal.

To further complicate matters, there are some semantic differences that crop up when the video world and the audio world meet. Black-and-white video machines have all but disappeared from the profes-

—CONTINUED ON PAGE 93

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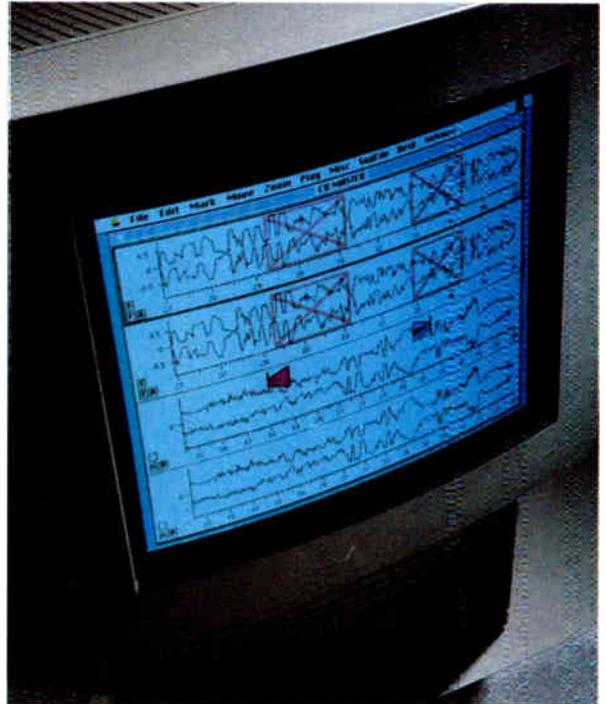


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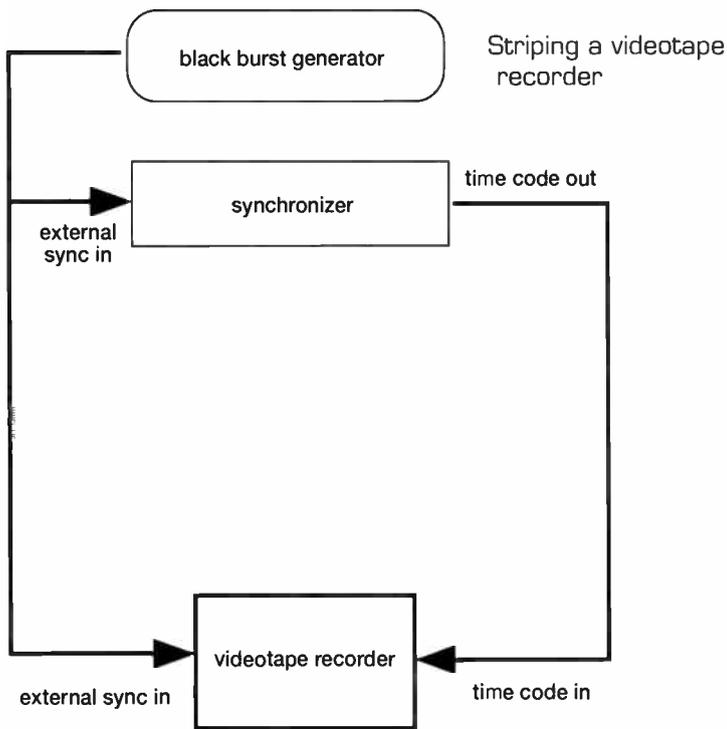
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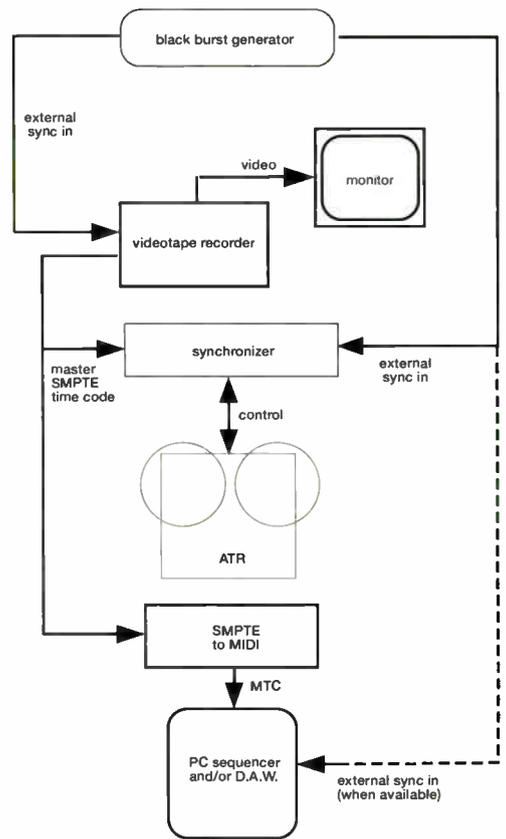
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Typical synchronization solutions for audio-for-video



Generic synchronization system with VTR as master

own..." and so it goes. In most cases, both parties are partially right. This requires switching to an "inside-out" troubleshooting orientation, where one looks at specific problems as symptoms of more fundamental system-level problems. Such chronic synchronization problems are often solved by understanding one of the fundamentals of system design: the principle of tolerances.

Product Design Tolerances

Pieces of equipment are rarely released by manufacturers until they are convinced (at least to some degree) that the equipment works *as it is supposed to*. The trouble is that product testing is a finite process. Software-based products, in particular, tend to be so complex and open-ended that it becomes impossible to test every conceivable set of conditions. Therefore, basic functionality is usually established under ideal conditions. Then the conditions are deteriorated until the product breaks. After performing acceptably in some reasonable number of in-between situations, the product is considered to be functional and it is released. But every piece of equipment has a tolerance level or breaking point.

The negative impact on a product's image caused by publishing this type of information tends to prevent that information from ever reaching the consumer. The buyer needs to understand that as the conditions under which they run their system move further and further away from ideal, the performance of even the best equipment will degrade until it eventually breaks down.

To further complicate matters, each individual component in a system will have its own unique way of responding to non-ideal conditions. In the worst case, two components in a system may respond oppositely to the same type of error, thereby doubling the impact on the system's performance. The collective tolerance levels of each component will contribute to a system's own narrower tolerance level.

In a synchronization system, tolerance levels are measured by the system's ability to handle "bad" time code. The quality of time code is based upon its accuracy against real time. In other words, time code can be considered "good" if the number of frames that pass in one second of real time equals the number of frames in the frame rate. The further off these two numbers are, the worse the time code

is. (If you need more basic information about time code, read "Synchronization and Machine Control," by Gerry Block, *Mix*, April 1991, or *The Time Code Handbook* from Cipher Digital.)

The companion article, "In Search of the Unified Time Base" (*Mix*, April 1991) gives an example of how MIDI sequences, digital audio workstations and tape machines all respond to "bad" time code. Even under synchronizer control, analog tape machines will always have some wow and flutter. DAWs will either have trouble chasing into the middle of a piece, or will lose some signal quality by varying pitch and duration through sample rate conversion. MIDI sequencers can change the location and duration of note ons and offs but can never follow the changes in pitch. Each system responds to "bad" time code in different, and usually irreconcilable, ways.

The quality and reliability of a synchronization system that incorporates more than one of the above elements is determined by the integrity and the signal path of the time code. In other words, the quality of the time code that reaches the outer edges of the system needs to be compared to the system's overall tolerance to determine if it will

be able to operate successfully. So where are the "screws" that we can tighten to guarantee successful performance?

The Video Solution

Fortunately, this problem has already been solved for us in the video world. Unlike analog audio, video signals are composed of discrete frames of information. Each video frame begins with information that defines the leading edge of that frame. That is followed by some additional sync information and, finally, the picture. When you record video from one VTR to another, it is necessary that the incoming frames line

up correctly with the frames of tape onto which they are being recorded. Failure to do this would result in black lines rolling across the recorded tape. The recording VTR, however, has the ability to resolve its tape speed to the incoming video signal. In other words, the recording VTR regulates the speed at which it moves tape based on the speed information contained in the incoming video signal. (The purpose of resolving a tape machine is to get that machine to run at exactly the same speed as it ran when the information was recorded on it.) This method works fine until we want to edit between multiple playback VTRs onto

the same record VTR. If all of the playback VTRs are running at their own speed, there will inevitably be some visible gap in the resolution of the record VTR when you switch between sources.

This problem is solved by resolving all of the VTRs in an editing system to a single source, most commonly known as "black burst." Black burst generators form the heart of most professional video systems. Their main function is to guarantee that the leading-edge frame pulse of the time code generator lines up with the leading-edge frame pulse on video. They output an extremely stable clock frequency of 15,734.2657 Hz, a frequency often referred to as "house sync" or "house clock." All editing VTRs use this frequency to resolve the speed of their transports to one unified source. Under these conditions, black burst resolves all of the speed issues, and time code is used only to identify specific *locations*.

Time code generators can also use this frequency to ensure that the original code recorded on all of the VTRs is accurate. In both of these uses, black burst can be said to supply the "time base" or unifying clock for the entire system.

The Audio Dilemma

Unfortunately, not all audio transports or PC-based audio systems come equipped with inputs for black burst. In the absence of any *direct* referencing to black burst, synchronized audio equipment must rely more heavily on the actual time code it receives for both its *location* and *speed* reference. In such systems, one device is chosen to be the "master." When you run the master, it outputs time code to all of the other devices in the system. This is the master time code. All other devices are then "slaved" to this time code. In such systems, the master time code effectively supplies the time base for the system. The slaves never see the original time code, but only the time code output by the master. Therefore, it is the quality of the time code originally recorded by the master, *and* the master's ability to reproduce the code accurately, that determines the quality of the system's time base.

Here are some guidelines to help you generate "good" master time code:

1) If your master is a VTR, you can assure its performance by resolving it to black burst.

2) If you stripe your own code, re-

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—FROM PAGE 88, FRAME RATES

sional video world, taking their native time code rate, 30 fps ND, with them. Video people thus work in color and use 29.97 fps ND or 29.97 fps DF fairly exclusively. Audio-only types, on the other hand, have tended to use 30 fps ND for two reasons: First, without any actual video frames to deal with, 30 FPS ND seems like the least complicated format. Second, many software packages, SMPTE-to-MIDI converters and synchronizers use this rate as their default, strengthening the impression that it is, in fact, standard.

The two worlds collide when audio-oriented people receive videotapes from video-oriented people. Since true 30 FPS is rarely used in modern video editing, professional video people tend to call 29.97 fps ND and 29.97 Drop "30" and "30 Drop," respectively. When

receiving a tape from a video person, an audio person may be told that the frame rate is simply "30." Fortunately, sequencers are among the most forgiving pieces of equipment. They usually are able to read 29.97 fps ND—even when set to 30 fps ND—without any degradation in performance. The trouble starts when you add a DAW or a synchronizer to the system. Because these devices must perform calculations against the frame rate, this type of misinformation can be fatal.

The bottom line is this: If you receive a color videotape for a master, you can be 99% sure that the time code on it is either 29.97 fps ND or 29.97 fps DF, and you should configure your system accordingly. If you are striping the tape yourself and intend to interface at any point with color video, you should choose 29.97 fps ND.

—Mark Miller

solve your time code generator to black burst. It is best to stripe with the capstan in fixed position (using its own internal oscillator as the reference).

3) If you are receiving the tape from an outside source, resolving your master VTR to black burst is still the right way to go. Since the frequency used for black burst is standardized by the industry at large, you can feel secure that the tape you receive was created under compatible conditions to those under which you will play it back.

4) If your master is an analog tape machine, the situation is a bit more complicated. In fact, analog tape machines tend to be the least capable type of transport when it comes to providing consistent, stable master code. Analog tape machines will always have some degree of wow and flutter associated with them. Therefore, it is best not to use one as a master at all. Following is an alternate approach that will minimize the effects of the errors associated with analog tape transports on the rest of your system:

As explained previously, if you stripe your own code, you should resolve your time code generator to black burst. This will ensure that when you stripe, you are starting with accurate master code. Then you can resolve your analog tape machine to an accurate source of time code by using a synchronizer as the master.

Most synchronizers have a built-in time code generator. Not only can this be resolved to black burst, but it can be used as the master for your analog tape machine. Under this type of control, the analog tape transport will constantly be slewed (sped up and slowed down) to keep it as close as possible to the master code coming from the generator. While this type of control will prevent you from accumulating errors over time, it will not remove all of the inconsistency from the transport. To avoid spreading this remaining error to the rest of your system, the time code coming from the generator—not the tape machine—should be distributed around the system as the master code.

If you decide you need a black burst generator, don't be discouraged by the first prices you find. Broadcast-quality units can cost thousands of dollars. For this price, you get 24-hour-a-day, 365-day-a-year bulletproof performance, as well as a number of test patterns and reference signals that you don't necessarily need. Fortunately, you can get a simple, reliable black burst generator for \$300 to \$500 from Horita, Pacific Images, or any of the large video equipment manufacturers. ■

Formerly with Digidesign, Mark Miller is a freelance consultant, providing services in tapeless hard disk audio and synchronization systems.

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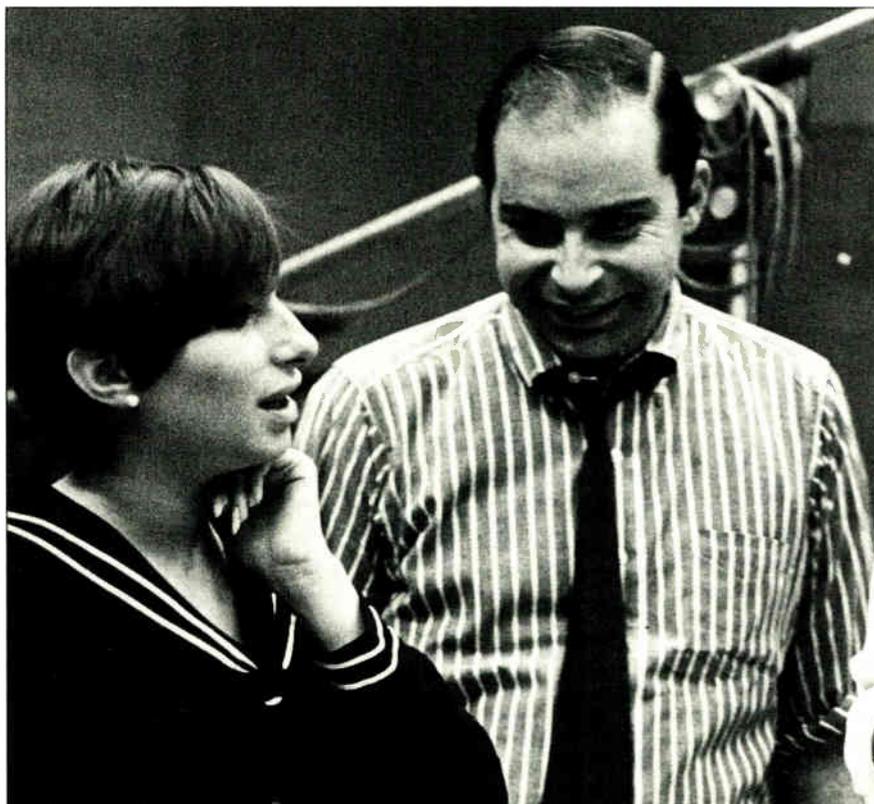
30 YEARS OF SINGERS, SHOWTUNES AND ALL THAT JAZZ

For the past three decades, Mike Berniker has been one of the most respected names in the community of record producers. Albums he's produced have been nominated for 20 Grammy Awards and won seven, including Album of the Year (*The Barbra Streisand Album*, 1963). So why don't we hear his name mentioned in the same breath with giants like Quincy Jones, George Martin and the two Phils (Ramone and Spector)?

Probably because through the years Berniker has chosen to toil in areas far removed from the rock and R&B mainstream where the biggest reputations and fortunes are made. Rather, he's built his distinguished career primarily by producing pop vocalists (Streisand, Eydie Gorme, Brenda Lee,

Perry Como), mainstream and Latin jazz artists (Ben Webster, Charlie Rouse, Paquito de Rivera), and Broadway show records (*Nine*, *Barnum*, *Dream Girls*, *Ma Rainey's Black Bottom*, *City of Angels*, all Grammy nominees or winners).

But those impressive credits only tell part of his story. At the beginning of his career, he produced the landmark live folk recording *We Shall Overcome* by Pete Seeger, and he supervised a successful jazz line for Epic. In the early '70s he left Columbia/Epic to head A&R for RCA, where he signed Hall & Oates, the then-unknown Michael Bolton, Aztec Two-Step and Dr. Buzzard's Original Savannah Band, which later metamorphosed into the popular Kid Creole & the Coconuts. By



Berniker with Barbra Streisand during a session for Barbra Streisand—Third Album at the CBS Studios in the mid-'60s.

PRODUCER'S DESK

1977 Berniker was back at CBS as an independent producer and consultant, and at that point he became involved in recording musicals and dramatic plays. An early supporter of digital recording, he produced two popular mid-'80s recordings that showcased the power of that medium, *Digital Broadway* and *Digital Christmas*.

Though he is now a senior member of the Sony/CBS production staff (as an independent, he also does projects for other labels), Berniker shows no signs of slowing down. Indeed, a quick glance at his credits over the past few years shows that he is busier than ever and still working successfully in the three stylistic areas outlined above.

In the pop arena he produced last fall's extraordinary Johnny Mathis disc, *In a Sentimental Mood*, which featured the veteran singer's interpretation of some of Duke Ellington's finest songs, along with new arrangements of six Ellington instrumentals. On the Broadway front he produced the Grammy-nominated album for *City of Dreams* and supervised the digital remastering of classic shows like

Oklahoma and *The King & I*. Berniker is also head of the Columbia Jazz Masterpiece reissue series, which is the most successful CD line of its kind (with releases of vintage discs by everyone from Louis Armstrong to Miles Davis to Dave Brubeck); and he is executive producer of Columbia's outstanding blues reissue series, which has been highlighted by the phenomenally successful two-CD set of Robert Johnson's complete recordings, as well as seminal blues works by Bessie Smith, Blind Boy Fuller and many others. The care with which these two series have been handled should serve as a model for all other labels.

Somewhere in the middle of all this activity, Berniker found time to produce a pair of charming discs called *Public Television's Greatest Hits* (theme music from top PBS series, from *Mystery* to *Monty Python's Flying Circus*) and a few other pet projects.

In the interview that follows, the indefatigable Berniker talks about the different stages of his colorful career.

How'd you get your start in the business?

I was very fortunate. In 1960 there was

an actual A&R producer's training program at Columbia Records. I'm amazed that nobody's thought of doing it since. People like Tom Sheppard, David Rubinson and myself were tested for various aptitudes and then given a crash course in how records were made. It was wonderful, because we not only learned the nuts and bolts of what records are—how they're manufactured and all—but we went into the studio and watched other producers at work, and in effect learned what to avoid, as well as what to do. It was a great training ground. Goddard Lieberson, who was the president of the company then, was very much for this program. If he saw talent, he took a personal interest in it. It was really a dream working for him because he was an A&R man himself, so your problems were his problems, and he cared so deeply about the music.

My first work was with Epic Records shortly after that. Interestingly enough, the first record I did was a jazz compilation—now here I am back doing that 30 years later!

I started a jazz series at Epic that featured people like Charlie Rouse,



I

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Bobby Hayes, Johnny Coles...I was trying to pick players I felt hadn't been given a fair shake, and we had sort of a house band that would play with these soloists. Columbia, of course, had Brubeck and Miles and Mingus and those types, and I didn't want to try to compete with them, so I went in a different direction. My tastes were pretty mainstream, I suppose you could say. Epic then was like Columbia's little brother, so there wasn't quite as much pressure on us. But we did pretty well anyway. My first record, *One Foot in the Gutter*, with Dave Bailey, was quite successful, actually.

Were you technology-oriented?

Not particularly. My interest was always, "How can the technology serve the music?" And I'm still that way. I don't pretend to know the fine details of the insides of machines. But I can talk to engineers about what I want in musical terms, and, of course, I do understand the technology to a degree.

How did the producer's function then compare with the A&R person's function in pop music? In other words, were you finding material for these

musicians, or were you primarily a recordist?

It was a pretty all-inclusive job. It was up to us to find songs for the singers we were working with—not that the artist did not sometimes have ideas, too. But the onus was upon us. The hits I had were songs I discovered working with publishers, and then convincing the artists to do them, working with the arrangers, and so on. I've always really enjoyed working with arrangers; it's one of the things I never get tired of, and I've worked with so many great ones through the years.

The A&R role now is very different from what it used to be, because a record producer was an A&R person; they were indistinguishable. It wasn't so much about *finding* talent as it was

working closely with people on the record company roster. So I was fortunate to be one of a battery of producers who were part of the A&R department. Most of us could read music, we *knew* music, and we knew our way around the studio. That's not neces-



PHOTO: MARTHA SMOKE ASSOCIATES-CAROL ROSEGG

At Clinton Recording Studios in New York, co-producers Mike Berniker (left) and Cy Coleman (seated, right) confer during the recording session for the cast album of the Broadway hit musical *City of Angels* (for which Mr. Coleman is also the composer). Randy Graff (center) won a Tony Award for her performance in the show.



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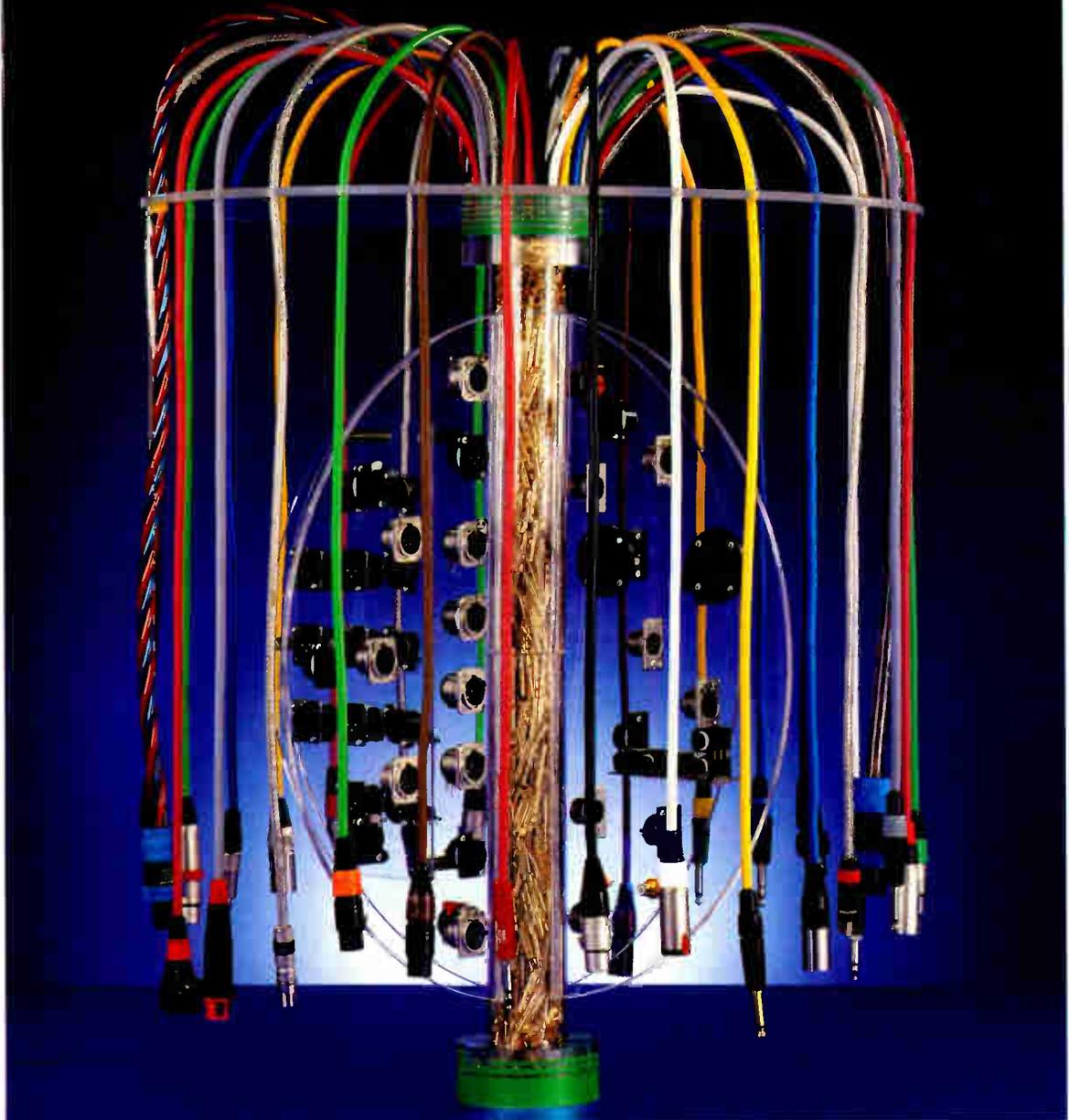
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sarily true of A&R anymore.

Did you use Columbia's studios exclusively back then?

Yes, but fortunately they were great studios. It made sense from a financial standpoint. We had 30th Street on Third Avenue, and we had 799 in the very building we worked in—there were two studios on the top floor. So you'd go right from your office to the studio.

30th Street has something of a legendary reputation. Is that something that was gained because of the people who recorded there or because of its sonic qualities?

Both. Its ambience was spectacular when in the right hands. If you knew what to do with it and understood how to work with the size of the ceilings and the various nooks and crannies, it was miraculous what you could get out of it. And, of course, some amazing music came out of there through the years.

You were working in pop and jazz when the Beatles came along. How did that whole thing affect you?

It changed my life radically. I was upset by it initially, because what it meant was a denial of the very thing I'd been doing all those years. In other words, when you've been doing something and been very successful with it, and then a new form appears and it completely takes over—the way Beatles music and that style did—it acts as something like a denial of what you've been doing. I felt that quite strongly, because I was so young when that happened: "Gee, *now* what do I do?" But I kept banging away, and I ended up doing fine.

Did the Beatles affect how records were made at your level?

Oh, definitely. I think the Beatles radically changed the way we looked at recording. The concept of layering was there before the Beatles, of course, but I think it was the combination of forces, both musically and technically within those records, that was staggering—the fact that there was layering and great performances. There were classical motifs interspersed with rock motifs. It was mind-blowing at the time, and it meant we had to change. We had a very conservative view of things as record producers before then. We went into the studio, we had a song

we believed in, and we cut it the best way we knew. The Beatles opened us up to a whole new world of possibilities; it was quite a shock. It also encouraged a new kind of producer. The producer slowly became part engineer, because the techniques that those records involved were comparatively sophisticated from an engineering standpoint, and they required more technological know-how to pull off.

How did you view the move from 4-to-8-track?

I thought it was tremendously exciting. I've always tried to keep up with what's happening technically. Anything that expands your possibilities as a producer has to be seen as a boon. It meant that, say, I could isolate the reeds section or horn section and have that much more control over individual elements.

At what point did you start working with Barbra Streisand?

From the very beginning—1962 or '63. We were both kids when we began. I'm very proud of those records, and I think one reason they were so successful, musically speaking, is that we were both young and trying to prove

ourselves. Those records have a lot of energy, but also there was a lot of care put into the choice of songs and the arrangements. I can't take too much credit for her success. She was so talented that she was going to make it no matter who produced her. But I do feel those records we made together were special. And obviously they had a big impact on my career.

On the types of projects you worked on in the '70s, did you find that budgets began to get bloated after a while?

Definitely. They're still bloated. I don't see any reason why, if you know what you're doing, you have to build large amounts of money into the budget in case you make mistakes. The producer says, "I don't want to go over the budget, so I'll make the budget large to begin with." And then, of course, that gives them the latitude to spend the whole budget. I take professional pride in doing things at a reasonable price. That's one reason I stay busy, I think.

In the early '70s you moved over to RCA for a while, didn't you?

Yes, I became head of A&R there, which meant that for a while I wasn't doing as much actual production

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by Mr. Bonzai

RED HOT CHILI PEPPERS

SOME LIKE IT HOTTER



Your intrepid lunchman has been invited to dine with the Red Hot Chili Peppers in a haunted mansion *cum* recording studio and bunkhouse high on a hill overlooking Laurel Canyon, the twisted pass that links Hollywood with the San Fernando Valley. The band is tracking the new album, *Blood Sugar Sex Magic*. I know the neighborhood—Frank Zappa had a legendary log cabin in the area back in the '60s. It's across from the demolished

of the skins, Hal Blaine, so I feel like I can hook right up with the juice that must be cooking in Peppers-land.

A photographer from *Rolling Stone* was snapping the Peppers on the veranda when I arrived. Chad was at the Forum for the basketball game, so the band asked their masseuse, Spike, if she would take off her T-shirt, hold an exotic wooden mask over her face, and stand in for the drummer. As twilight dimmed, I unhoisted my Nikon and

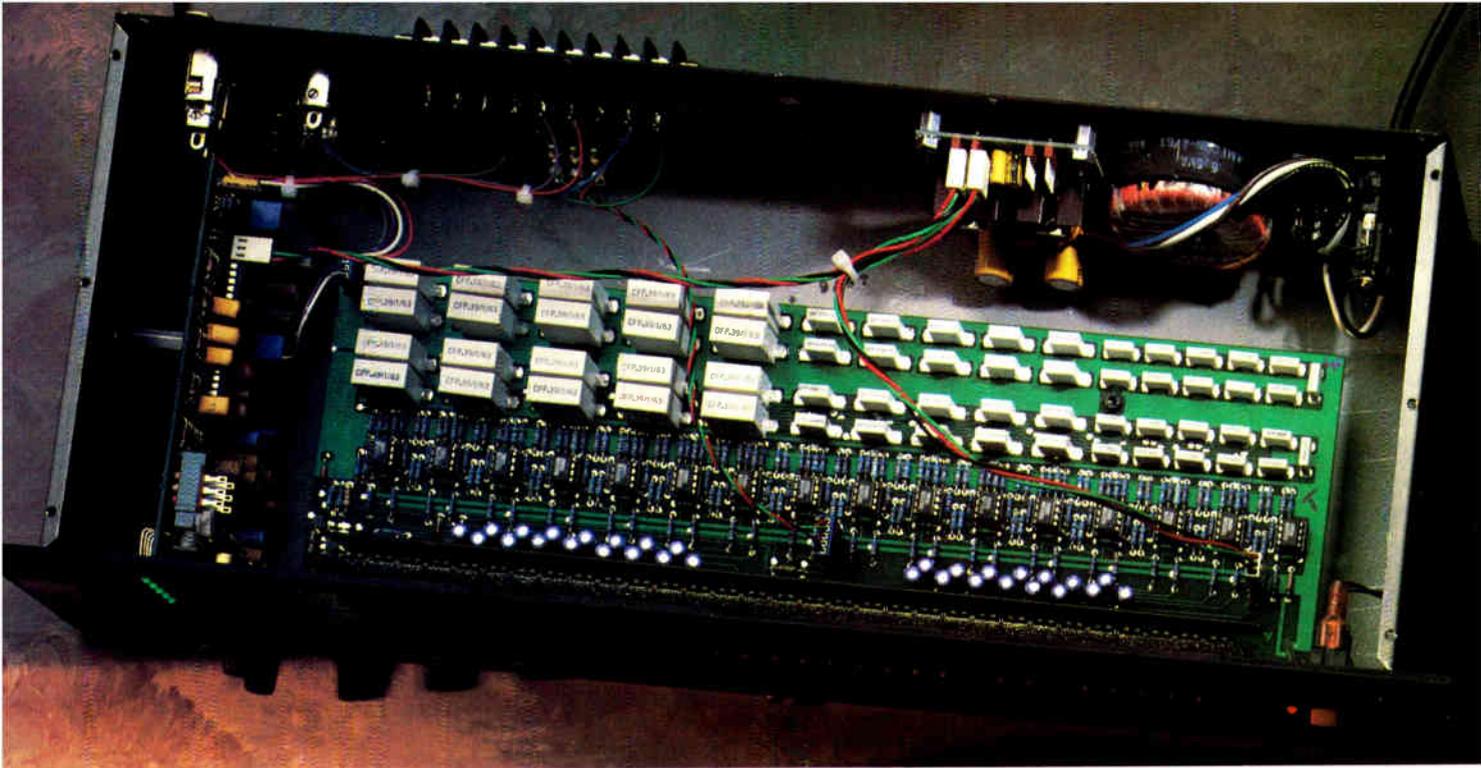


Houdini mansion. Sounds like *Nightmare on Elm Street*...my kind of movie. I accept any time is fine, even if it is the evening of the sixth game in the L.A. Lakers-Portland Trailblazers basketball playoff series.

I'm agog with the Peppers' power, a natural force of gutpunch funk rock that must be reckoned with. I like their "let it hang out" attitude. And I know the drummer, Chad Smith, from a couple of swank soirees with the king

shot some B&Ws for the record. *Rolling Stone* ended up running a close-up of lead vocalist Anthony Kiedis, bassman Flea, guitarist John Frusciante and producer Rick Rubin. We got everything, and the girl.

You'd probably like to hear some hair-raising, decadent, excessive anecdote now, but we just sat down and ate some home-cooked curry swordfish, plump little chickens, veggies and brown rice at a big banquet table in a



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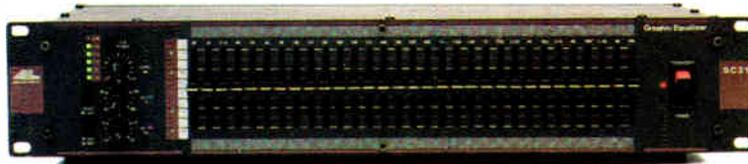
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huge Gothic dining room. But there was tension in the air. Something was amiss. Was it the ghosts? No, the basketball game!

Only a fool would persist in this interview folly. Besides, who could pass on a ticket to a Lakers game in the Chili Peppers living room? We adjourned, coffee was served, and the big game got under way. When the grace and power of the Lakers met the beauty and beast of the Blazers, the room

this was once a famous warehouse back in the 1920s?

Anthony: I think that the first time this place saw warehouse activity was when we arrived. Prior to that it had seen very little.

Bonzai: So you've given it the blessing. What about the supernatural happenings?

Flea: The truth is none of us has personally seen any ghosts, although we have felt their presence. We had some psychics come up, and they told us there were ghosts all over the place.



(L to R) Anthony, John, producer Rick Rubin, Spike, Flea.

started shaking.

Flea was pounding his motorcycle boot on the floor. Magic Johnson was afoot. When the final buzzer sounded, Flea charged out onto the balcony and howled at the moon. The hills echoed with the cry of a mighty funky Lakers fan!

I was hoping for a win, too. And can you imagine starting this conversation off if they'd lost? Luckily, our home team came through, and with that in mind, that's where this story begins.

Bonzai: So we're here at the Big House—that's what it's called?

Anthony: That's the name that was given to the house by a team of Canadian experts who came in and built the studio before we moved in. It's really a historic location in the Hollywood Hills—reminds me of ancient Hollywood ruins. We just call it The House.

Bonzai: Is there truth to the rumor that

But they ruined their credibility by trying to scare the shit out of us so that we would pay them to exorcise the place.

Bonzai: So you're just living with it...

Anthony: Yeah, we're totally comfortable with the idea of living with spirits. We never wanted to come in here and try to bully them out of their habitat. John even had an interesting audio experience with one of the ghosts...

John: I was lying down trying to go to sleep one night in the room outside where we were watching the Lakers tonight, and I realized the room had a spiritually sexual vibe. For some reason, I couldn't resist the temptation to masturbate, even though I hadn't thought of sex in days. Then I heard a woman having an orgasm—and it wasn't a woman staying in the house. I didn't see a ghost, I just heard one.

Bonzai: So, you're all set up here for living and recording, rather than going

out to a studio. How has that affected the creative process?

Anthony: This has been the greatest recording experience of our lives. There is no comparison between a studio and making a record in this house. With studios we associate a sterile environment—the impersonal, anal-retentive, tight-ass quality that studios have. Here, we have the most soulful house, living here and working here. We never have to leave except to go out and pick up some girls for the night. We have a chef who comes and cooks her brains out all day long. It's the greatest—I feel like I'm living with my brothers. We all have our own bedrooms, and we get up for breakfast together—fruit, grits, fakin' bacon. We'll read the paper, have a chat and then get down to making music.

By the time we start recording, we're happy, relaxed and surrounded by all this beauty around the house. We can express ourselves without the inhibitions of a negative environment affecting the way we perform.

Flea: Being able to hang out, be casual, wake up and roll tape is so beautiful. In the studio, you've got this feeling of "Okay, now we're rolling—this is it!" Working here just feels good—stimulating for our creativity. It's something we'll appreciate for the rest of our lives.

John: Because the outside world isn't interfering with our work, it's infinitely helpful. The outside world is always trying to mess with creative people in one way or another. It might come out of a clock, or a garbage can, or a toilet seat, or a billboard—but it's there. We're reminded of *Willy Wonka and The Chocolate Factory*, living in a world of pure imagination.

Bonzai: So why did you wait so long to do it this way?

Anthony: This is the first time we've had the luxury and the cash flow, and being with Warner Bros. is a whole different ball game. If you have an idea, they help make it happen. Before this it was a constant grovel.

Flea: The freedom of being able to think about music and nothing else.

John: I have my bedroom in the maid's quarters with all my acoustic guitars set up, and I record there.

Anthony: I do all my singing from my bedroom. I open my curtains and look outside at the flowers outside my window, the trees, a gazebo made from old pillars. I look out on the hills, sometimes I see the full moon rising as I do a vocal. I'm as relaxed as is humanly

possible.

Bonzai: Can you describe the new material coming from this working experience?

Anthony: For one thing, it's important to realize the essential difference between this record and the last one. For *Mother's Milk* we had scarcely been together as a band for a few short months before we set about the business of recording. It left us no time to write music and become a singular unit. We were thrust into a situation and had to make it or break it. I would say that we made it, but under the duress of being a newly born band with a new guitar player and a new drummer. It hadn't yet turned into the gelatin pumpkin yet. We were scattered bits trying to hang on to each

other.

Then we went on tour for two years, and after that it was like we shared the same foreskin. After the road, we had the time to write and get down to business, work it out in a rehearsal studio. After eight months we'd assembled 20 songs that we were in love with. When we arrived here, it was what we were all about, without rushing.

John: And each one of our styles has changed dramatically. Before, it was four styles that weren't necessarily made for each other. That created a certain excitement for the last record, but this one is much more fluid, multidimensional—the complete, well-rounded view of the band as a whole. We've grown for each other and with each other. It gives this record a much different feeling than any other band in

the world could make. So many bands are concerned with one individual musician being the showcase one. With us, that's not the case.

Flea: By playing together for such a long period of time now and paying attention to one another's emotions and what each has to say—there is so much more space in the music—it breathes. We've been able to cover many more emotional bases, with much more variety and depth to the material. Each of us is doing his part to complement the others. It's really wonderful—you gotta hear it, man.

Bonzai: Most people have a bad-boy image of you guys, but hanging around and watching you, it seems like there is such care for each other. It's like a commune.

Flea: We love each other, no matter what happens. Living here together

A STUDIO IS WHERE THE EQUIPMENT IS

The interference of ghosts notwithstanding, turning an old mansion into a recording environment was relatively simple for Steve Thomson, the Peppers' executive producer on the project. But then, Thomson is an old hand at this sort of thing—he formerly worked with the original master of the "studio on the move" concept, Daniel Lanois, helping set up studios for Peter Gabriel's *So* album (this was pre-*Real World*, of course) and U2's *Unforgettable Fire* LP, which was recorded in a castle. After that project, Thomson branched out on his own.

"There are so many places that sound great, but you can't access them unless you've got recording equipment," he says, explaining his philosophy. "So often, working in a special or unusual place is exactly what a band needs to push them in an interesting direction. And, of course, it's usually a lot of fun, too."

The Laurel Canyon mansion where the Chili Peppers recorded their new album with producer Rick Rubin and engineer Brendan O'Brien (of Black Crowes fame) was built in the 1920s and was once owned by the Wurlitzer family, which explains the giant pipe organ bellows coming up from the basement into the ballroom. A fire four

years ago did extensive damage to the home; in fact, Thomson says, "We were the first real occupants since then. Actually, it's still being worked on, but that was an advantage, because we could scuff up the floors and it didn't really matter since they're still unfinished."

The mansion's ballroom became the principal recording area—"It's a great live room with high ceilings," according to Thomson. And the control room was set up in an adjoining library. "It worked neatly," Thomson notes, "because there was a great, double French door entrance to the library, which was all wood and about 20 x 16. The ballroom has leaded windows all around overlooking Laurel Canyon. We set up a big drum riser, and we put up all sorts of baffles and curtains that I've collected through the years, along with a lot of Indian rugs that I carry around. It was very homey."

To further isolate the board from the main recording area, Thomson and company constructed a makeshift vocal booth from some old sliding glass patio doors, right in front of the board.

Drummer Chad Smith had drum kits set up in the marble dining room and the mansion's foyer, and the other players' bedrooms were also wired for sound, giving them all sorts of recording possibilities.

"Anthony could roll out of bed, take a leak, and start singing if he didn't feel like working in the ballroom," Thomson says. "He had a 57 and an SM7, and a U47 tube in his bedroom. John did a lot of acoustic tracks from his bedroom, which was at the other end of the house." The band even set up outside to record on a couple of occasions, so the audio team had to be ready for anything. "The band was really into using the house however they could," Thomson says. "They got *into* it, and I think the result is a record with a lot of energy; it sounds great."

Of the actual recording, Thomson says, "I have a lot of old Neve modules [he owns one of Abbey Road's old Neves], so usually we went directly from the mic into the Neve, maybe through a compressor, but often right to tape, and monitored back on an Amek console. When we put it up on the SSL at the Record Plant [where the album was mixed], it was *so* punchy, which is what we were after."

The emphasis throughout the project, Thomson says, "was to get as much down *live* as they could. They were trying to capture the moment, so that meant having everything in 'record' at all times. I think they pulled it off, too. I think everyone involved came away very happy with what we got."

—Blair Jackson

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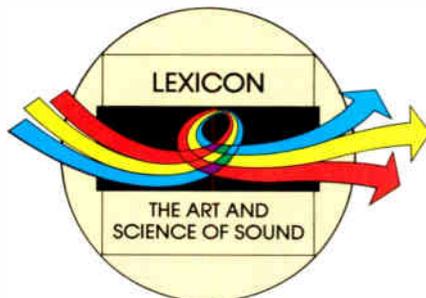
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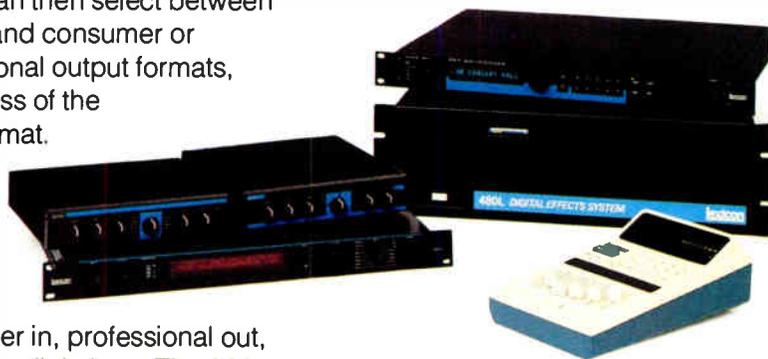
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Bonzai: Great service, too.

Anthony: The food is great, we're eating like bastards.

Bonzai: With the Lakers game, I thought we'd be poppin' some brewskis, and discovered there is no alcohol in the house. Who decided that?

Anthony: I don't think there was ever a conscious decision made. I do zero

alcohol consuming, but there were never any rules.

Flea: The last thing we want is anything to interfere with our work here. The Lakers game—seeing such a beautiful display of artistic expression is inspiration for making a record.

Bonzai: Can we talk about the famous socks?

Flea: It's an old, silly thing—but we're proud of everything we've ever done.

Anthony: We got this great idea of playing music with socks on our cocks. It seemed so perfect to get out there and rock out with a sock on your dick and have no worries or cares—the in-

tense, zany freedom of life. It was fun, and great for people to watch—four guys going crazy with socks on their dicks. It ended up being such a great idea that it was all people could focus on. Instead of saying, "Oh, those Red Hot Chili Peppers—they make music like I've never heard before, and they mean it!" they were saying "Oh, those are the guys with socks on their dicks." It was a distraction.

Bonzai: It served a purpose—it got their attention.

Anthony: It got their attention, but journalists are always looking to pigeonhole musicians into a little fashion quadrant, taking away from the depth and giving it a superficial label. What we are really doing is expressing the deepest love and musical compassion that we can muster up.

Bonzai: I bring it up because your *Abbey Road* cover take-off, with you guys walking nearly nude right where the Beatles walked, just cracks me up.

Flea: It's funny, sure it is, but everything besides the music is incidental.

Bonzai: Do the Beatles inspire you, or do they seem like ancient history to you?

Flea: To me, the Beatles sound as fresh today as a Butthole Surfers record.

Anthony: I don't think the Beatles inspire us any more than Sly Stone or Bob Marley.

John: Or Harpo Marx...

Anthony: Or Stevie Wonder, or Traci Lords, or the Hollywood Hills...

Flea: Or Robert DeNiro...

Anthony: Or the Lakers. It's all part of our life, and granted, the Beatles are one of the greatest bands to ever make records, and it's a shame that that type of earnest creativity has gone by the wayside for the most part. They knew how to cut loose without any boundaries; they did whatever they felt like doing. That's what they gave you, instead of trying to devise some sort of formula to get on MTV or something like that. They let it hang out naturally and freely, which is what we try to do. So many bands are trying so hard to make money for the record companies that it's stale stuff.

John: I think we feel a sense of kinship with the Beatles more than we look up to them as mentors. We would be doing what we are doing whether the Beatles had existed or not—well, maybe not...

Flea: The Beatles were an amazing band, but there are many other varieties of music that we are into.

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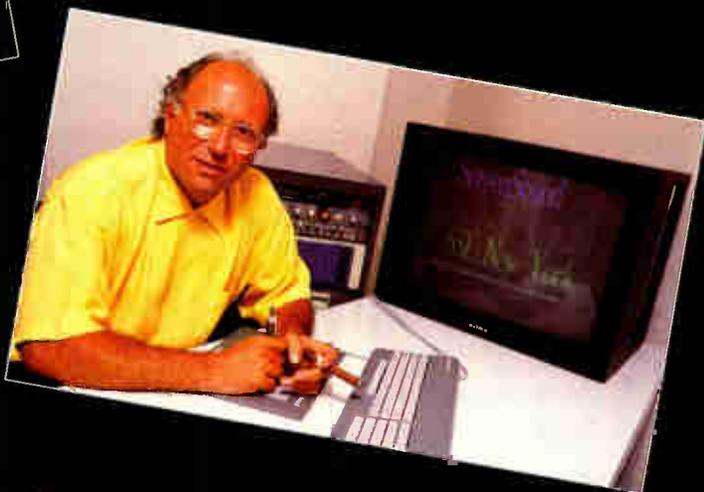


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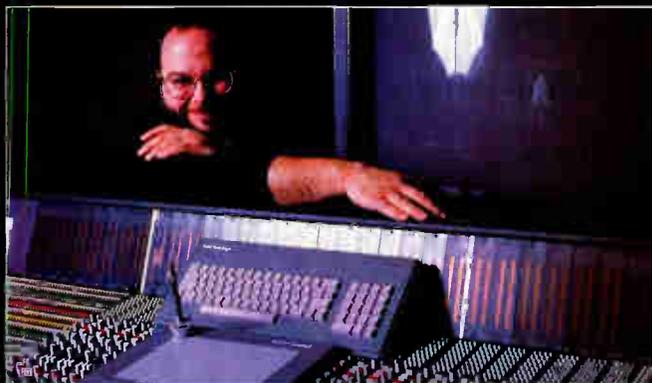
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Bonzai: Who is the most amazing artist you've worked with?

Anthony: George Clinton. We made a record with George, and he's one of the greatest human beings to ever make music.

Bonzai: As producer, what did he contribute?

Flea: It's hard for me to be objective about his working with us. But he's the man who's made dozens of amazing records that people don't know about. Too funky for white radio and too rock for black radio. Dealing with a guy who has that much artistic dimension and depth was completely inspirational.

Anthony: We've done some cover tunes, which isn't actually working with the artist, but we've worked with the music of Jimi Hendrix, Bob Dylan, Hank Williams, Sly Stone and Stevie Wonder—these are guys we appreciate.

Bonzai: What did you learn from Jimi Hendrix?

Anthony: He gave me all the lessons in coolness I will need for the rest of my life.

Bonzai: Do you know any interesting

music business tricks?

Anthony: This might help musicians in furthering their careers: We do this trick where Flea takes his nose and wedges it tightly up the anal passage of our record company president. He swivels his head from side to side until the president has been gratified. What this can do for your career is unbelievable.

Bonzai: And what a sacrifice by a

Chad: *When we had the psychics come into the house to check out the spiritual environment, they didn't even want to go into my room.*

member of the group!

Anthony: Let me see your list of questions... Here's a good one for Flea. Of all the animals in the kingdom, which would you most enjoy copulating with?

Flea: If I was going to have sex with any animal? The first one that comes to mind is a dolphin. But if an animal

really wanted to make love to me, it would probably be a monkey. I feel a lot of kinship with monkeys.

Anthony: Obviously, Flea's father felt the same way.

John: I'd like to get a hand job from an octopus.

Anthony: Not only are they intelligent, but they are very loving. If I had my choice, I'd probably do a lizard.

Flea: I can answer for Chad—he's got all these declawed gerbils in his bedroom...

Bonzai: How did the onset of puberty affect you?

Flea: It was amazing. I wanted to do it all the time.

John: When I was about ten, I used to stand in my second-story window and show my erection to the kids walking by. I can't believe I used to do it!

Anthony: I lost my virginity when I was 12 to an 18-year-old redhead from Oregon. It totally blew my mind. Here was this ideal feminine creature, soft and voluptuous—glowing womanhood in my bed. I've never been the same since then.

Bonzai: Sounds like you got a head start on the rest of us.

Anthony: Here's a good one. Since



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this is for *Mix* magazine, what makes a great producer?

Flea: Rick Rubin is an incredibly great producer. He keeps a balance between work and relaxing, maintains complete clarity and focus. He keeps his objectivity while we are completely caught up and so emotional. It might not be great for all bands, but we don't need that emotional push. We're just exploding and coming up with all kinds of stuff, and he helps us harness our energy. And he helps musically, making sure that every song is well-crafted. He's had a great track record with hit songs, but you really can't compare any other situation with this one. This project is really unto itself.

Anthony: Rick has encompassed all the things we need in a producer.

John: And he knows when to lie back on the couch and not say a word. As a result of his coolness, we've found the accurate, well-rounded colors of music that represent what this band is all about.

Flea: Some producers look at little things as they're going on, as opposed to getting the big picture of a song, or

an album. Rick's suggestions don't interfere with the emotional feel. The most important thing is the energy and the soul of the music.

Bonzai: This recording situation seems to be a return to more natural, simpler methods...

John: Rick and the band wanted that right off the bat. To us, no records have more character than the ones that were recorded in the '60s, the '70s, even back to the '40s. Those records have a vibe. Most of the music coming out today has none of those qualities. A lot of our music comes from the rawness of just going out and rocking. Rick and our engineer, Brendan "Bud" O'Brien, set up quickly, correctly, so that each song is an emotional...

Anthony: Kaleidoscope. Capturing us in motion.

Flea: John is playing some of the most incredible guitar I've ever heard in my life. Basically, everything is live, not pieced together. Nobody works like this anymore.

A few weeks later, I caught up with drummer Chad Smith...

Bonzai: So, the album is nearly done?

Chad: We're in the final stages, just finishing up the mix.

Bonzai: How come you didn't live at the House?

Chad: We all had our bedrooms picked out. And when we had the psychics come into the house to check out the spiritual environment, they didn't even want to go into my room. That's how spooked they were—negative energy or something. That was enough for me. I'm sure I could have picked another spot in the house, but the real reason is that I personally wanted to get away a little. When you're in the studio for ten or 12 hours, you want to clear your head. I would ride my motorcycle over Mulholland to my house, about a 20-minute ride, really nice. I liked getting away and coming back fresh. When you're doing the basic tracks, you're there every single minute of the day. I was there a lot, but I chose not to sleep there. That's the real reason, but I didn't like the spooks either.

Bonzai: The other guys didn't have any problems?

Chad: It seemed like we had good, peaceful spirits. We had some fun there.

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MIX

Bonzai: Did you get a different angle on the music in this home-style recording situation?

Chad: By all means—it was so relaxed, as opposed to the atmosphere of most recording studios. It gave the music real character. And we could record anywhere in the house. You don't need a specially designed, *exactomundo* environment. A room and mics, and you make the noise. I set up in two spots, playing most of the drums in the main ballroom, on a riser *a la* John Bonham. That was Rick Rubin's idea. And I did some of the tracks, "Power of Equality" and "Give It Away," in the solarium, which had marble walls and windows—a loud, explosive room. Those are straight-ahead bashing—really loud, with a bright snare.

Bonzai: Now in the mixing stage, can you hear a difference between the usual studio drum sound?

Chad: Not only the drums, but all the instruments sound very natural and raw. It sounds like we're playing together. We all track together, which has a lot to do with it, but there's no shit on the tracks, not a lot of modern technology, tweaks and reverbs. It's straight in your face, loud, raw—just like we played it. Simple, funky, with lots of room for the instruments and vocals to breathe on the tape.

Bonzai: Well, I've got a complete Chili Peppers collection, going back to the pre-Chad days. But the tracks I heard at the House sound a little different. I heard one song about nine minutes long.

Chad: "Sir Psycho Sexy," with the perverted lyrics—that's a nice one.

Bonzai: And there was a rather quiet tune, almost a ballad...

Chad: Quieter, yes, but I don't like the term "ballad." Acoustic, stripped-down tunes—"Breaking the Girl," "I Could've Lied" and "Soul to Squeeze." A bit of a departure for the band, really.

Bonzai: Is this going to surprise your audience?

Chad: Well, whoever those freaks are, they expect us to keep changing. There haven't been quiet tunes like these in the past. But there haven't been tunes like "Sir Psycho," either. There's a wider spectrum of music in general on this record.

Bonzai: Without sacrificing the balls you're known for?

Chad: Oh no, there's plenty of music with balls—there's a little bit of some-

thing for everyone. The critics might gripe, "Oh, the Chili Peppers doing an acoustic number," but who cares? That's how we felt when we wrote it, and that's the way it came out. Soulful and good, so it doesn't matter that we haven't done it before. We're open to anything, no pigeonholing.

Bonzai: When the songs are being written, do you all work together?

Chad: Yeah, but there's no one formula of songwriting. Flea might bring in a bass line, John brings a riff to rehearsal. We jam on it and come up with parts. Anthony will start doing something over the top of that. Everybody has input and everyone is involved.

Bonzai: I was impressed with the spirit of brotherhood.

Chad: Well, I joined in '88. Flea and Anthony have been together since high school, but they accepted John and me both musically and personally. Our ideas were equal to theirs. They're very fair, which isn't that common these days with all the money-grubbing. The band had a foundation, and they accepted us as full partners. That kind of feeling generates an equality, a four-headed monster. The sum is greater than the parts.

We've grown. For *Mother's Milk*, I had just joined, and it had a certain kind of cool energy, a freshness. But now, after touring and playing and writing, it has a *feeling*. We hang out together so much, unlike bands who just get together for work and never talk to each other. I don't see how people could make music that way. I think it would come across. There's a love and a respect for each other that comes out in our music. I just want to lay a nice foundation for these guys to paint their musical expressions on. That's my role and I know that, and I'm happy with that—it makes me feel good. I don't want to play fancy licks—"Wow, see how fast he can play!" I'd rather have someone say, "There's a really good groove." That's the ultimate compliment to me.

Bonzai: Are you all jacked up to take this show on the road?

Chad: When people come to see the Chili Peppers, they should be ready to have their faces peeled off by the hardest, bone-crunching, psychedelic sex-funk music that they've ever heard in their lives. Bigger and better and huger than ever! ■

Roving editor Mr. Bonzai refuses to reveal his sock size.

—FROM PAGE 64, THE EAR

hear it more like I did in the studio. This was okay for me, since I'm not really the runner-jumper kind of athletic rocker. I basically sit on my stool when I play.

"What I didn't realize until later on," Baxter concludes, "was that I was controlling my acoustic environment and able to control the levels of sounds that were going into my ears. So when I came offstage, my ears weren't ringing. I'm really lucky that I was protecting my hearing without even knowing it. I appreciate that now that I'm 43 and still making records, and able to hear things at normal listening levels."

Who Sets the Levels?

The performing artists, invoking the "Total Artistic Control of All Sound, Lighting and Production" clause in their rider, most often determine the prevailing sound level, except when overruled by venue managers or public authorities enforcing local noise ordinances. "If the band wants 140 dB in the second balcony," says Lee Brenkman, "that's what they get. This 'arms race' to be faster, flashier and louder on the part of some irresponsible performers threatens to bring the wrath of the law down on us all."

Scheirman also feels that too many musicians refuse to take the sound level hazard seriously. "They must be made to realize that ultimately they are in control of the sound level onstage, of the sound crew they hire, of the audience reactions to their efforts. I personally hope there never has to be [legal interference], but the concert sound industry needs to develop its own internal guidelines and sensitivity to this issue, or it will be governmentally policed, by OSHA or the Department of HEW, or whatever."

How the Ear Behaves

For most people, tinnitus presents itself as a high-pitched ringing, whistling, whining or hissing sound. An estimated 36 million Americans, ages 14 to 85, experience these unwanted sounds in their heads to a disturbing extent. "It can keep some people awake and it interferes with listening," audiologist Otto explains. "It can be extremely bad in some people. I've seen a lot of people who were driven to distraction and felt that they needed some kind of psychotherapy because they were bothered so much by it. There are other diseases of the ear that cause tinnitus, and to the extent that these conditions

are surgically treatable—a punctured eardrum, for instance—the tinnitus can be cured. But the type of tinnitus associated with noise-induced loss is typically permanent.

"Almost everyone will have some tinnitus after a rock concert, unless they have taken some precautions like getting away from the loudspeakers or wearing ear protection," Otto continues. "Tinnitus is its own warning sign. When you leave a concert and your ears ring and you can't quite hear the people next to you speaking, or the background sounds are unclear, this is a sign of some damage. The major problem is that this damage is cumulative. You may only do a small amount of damage at one concert, but each successive exposure can cause a little more damage until you have lost a good portion of your hearing.

"Rest periods during high levels of exposure can make a big difference," says Otto. "If you can keep a set to 30 or 45 minutes and take a 15-minute break to allow your ears to recover a little, that's great. You can't always do that, so you need to think about using some hearing protection. Almost anything is better than nothing."

Hearing protection devices come in three styles: earplugs, which are inserted directly into the ear canal; earmuffs worn over the head with a cup over each ear; and canal caps, which are held against the outer ear by a headband. Most sound professionals choose the earplug approach, available in foam, rubber, wax, plastic and fine mineral fiber.

"The foam type is fine for non-critical listening," Otto explains, "and provides quite a bit of attenuation, about 27 dB. The acoustic filters that are specifically molded to your ear offer about 15 dB of noise reduction across all frequencies. These are available through any hearing aid dispenser and cost under \$100.

"Everyone should look at their own specific needs. If you're the sound engineer for an acoustic group, you probably won't need the same kind of protection as the lead guitar player in a heavy metal band. And even the acoustic filters allow some sound through if you are playing or listening at extremely high levels for long periods, so it's important to remember to take a rest or get yourself out of the direct sound path of the loudspeakers."

Dr. John House, president of the House Ear Institute, notes that the institution is currently doing research on

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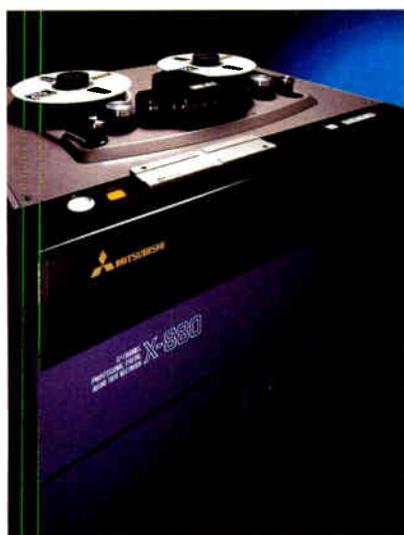
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"former patients who have willed us their temporal bones to study, so that we can look at the fine, delicate structures of the inner ear to determine the extent of noise-induced damage and exactly how it affects the inner ear. We are beginning to see a phenomenon that is not necessarily associated with an extreme hearing loss, but with an extreme sensitivity to noise. There are certain patients whose problems stem from one rock concert or one loud gunshot. This one-time exposure to an extremely loud sound can damage the inner ear and cause these people to become so extremely sensitive to normal, loud environmental sounds—a door slam, cars going by on the freeway—that they have to wear earplugs just to survive in the normal environment.

"We are very active in the prevention of noise-induced loss," House explains. "This is frustrating in that it is totally preventable, and yet we're seeing more and more of it. This type of loss is not correctable. It's not something where we can go in and put in a transplant or new nerve endings. Once the little delicate hair cells in the inner ear are damaged or lost, they are lost forever. But it's very easy to prevent—either by eliminating the extremely loud sound at the source or by wearing ear protection. Now, of course, with music, the ideal situation is to play it at a volume that's safe.

"People who make their living either performing or recording music need to be especially aware of the dangers," House adds. "We have engineers as patients who are very sensitive to this problem. And, fortunately, many of the younger ones seem to be more aware. The big problem lies with the older engineers who have been in the business ten to 20 years and find that they're 40 years old and beginning to have hearing problems. Naturally, this affects their professional life. What is so unbelievable is that they have total control over the levels at which they listen, yet many of them do it at very loud levels.

"The other thing that happens to engineers," House warns, "is that they'll lose their high frequencies first, so when they mix, they add high frequencies because it sounds better to them, although it does not necessarily sound better to everyone else."

"By the way," House adds, "the guidelines we helped establish are a quantitative measure and a universal standard for everything, whether a

machine or music or an airplane engine. Higher-frequency sounds cause more damage, so if someone were listening to noise at between 2,000 and 4,000 Hz, that person would suffer much more damage than someone listening at 1,000 to 2,000 Hz, for example. This is why when we talk about noise level, we are talking about dB on the A scale. The dBA weighting filters out the lower-frequency sounds below about 250 Hz, which we know are not particularly dangerous. So we want to weight it more toward the higher frequencies.

"The general OSHA rules are that someone could be exposed to noise levels of 90 dBA for eight continuous hours, and do that safely five days a week all their lives. Then as the noise level goes up by 5 dB, you must decrease the exposure time by half in order to avoid damage—so at 95 dBA, you could be exposed for four hours, and at 100 dBA you could be exposed for two hours. A rock concert at 120 to 125 dBA only suggests a few minutes of really safe levels. Assuming someone is an engineer in a nightclub or for a stage performance, they are going to need ear protection if the show goes on for two hours at 110 to 120 dBA."

According to House, "Our research has shown that a five- to 15-minute break every hour does make a difference, allowing you to continue the exposure a little longer than you would otherwise."

So what advice does an audiologist give a sound engineer for setting safe, yet effective levels at a concert? "Set a limit of 110 dBA as the maximum—the peak level—at concerts," says House. "The average would be between 100 and 110 dBA for a normal concert. That would be a reasonable compromise. I believe that 90 dBA would be too low because people don't go to concerts eight hours a day, five days a week. Anything over 110 dBA is not necessary from a listening standpoint, and would be potentially harmful."

Note: For more information about hearing protection and treatment, contact Charlie Lahaie, House Ear Institute, 2100 W. 3rd Street, Los Angeles, CA 90057; (213) 483-4431. ■

David Schwartz and Penny Riker Jacob, who co-founded Mix in 1977, played music louder than they should have when they were young. Now they're hoping younger music people will treat their ears like the fragile jewels they are.

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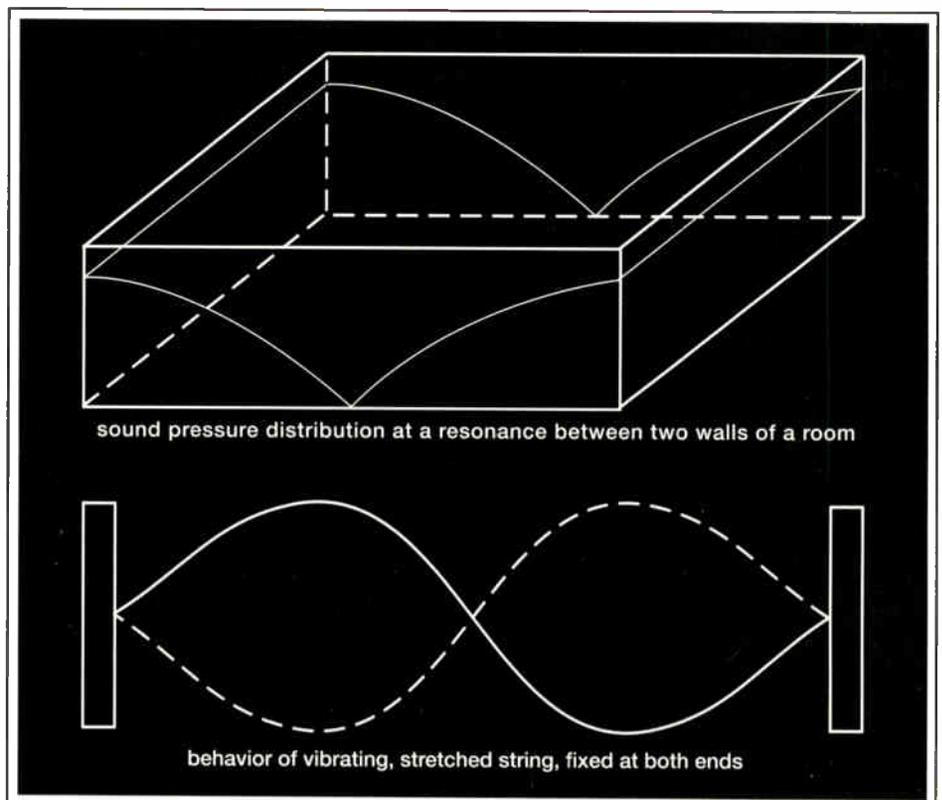


FIGURE ONE

S

mall recording and performance spaces can easily fall prey to undesirable acoustic colorations if the room's frequency responses are not analyzed and properly controlled. Since pre-construction design of room dimensions is a rare luxury, methods of analyzing and manipulating room acoustics must be explored. The computation and interpretation of a room's

resonant frequencies is one of the crucial steps in this process.

All enclosed air columns—whether they are open at both ends (flutes), open at one end (brass instruments), or closed at both ends (organ pipes)—have frequencies that resonate when excited by certain degrees of air pres-

sure. Rooms can be thought of as air columns that are closed at both ends; therefore, rooms also exhibit these resonant frequencies. Such resonances manifest themselves in the form of standing waves, with minimum and maximum intensities appearing as stationary nodes and antinodes. An excellent two-dimensional equivalent of this behavior is the plucking of a

FIGURE TWO

ROOM ONE	12' x 12' x 10'	ROOM TWO	22' x 16' x 10'
p, q, r	mode frequency	p, q, r	mode frequency
1, 0, 0	47.08 Hz*	1, 0, 0	25.68 Hz
0, 1, 0	47.08*	0, 1, 0	35.31
0, 0, 1	56.5	2, 0, 0	51.36
2, 0, 0	94.16*	0, 0, 1	56.5
0, 2, 0	94.16*	0, 2, 0	70.62
0, 0, 2	113	3, 0, 0	77.04
3, 0, 0	141.24*	4, 0, 0	102.72
0, 3, 0	141.24*	0, 3, 0	105.93
0, 0, 3	169.5	0, 0, 2	113
4, 0, 0	188.32*	5, 0, 0	128.4
0, 4, 0	188.32*	0, 4, 0	141.24
0, 0, 4	226	6, 0, 0	154.08
5, 0, 0	235.4*	0, 0, 3	169.5
0, 5, 0	235.4*	0, 5, 0	176.55
6, 0, 0	282.48*	7, 0, 0	179.76
0, 6, 0	282.48*	8, 0, 0	205.44
0, 0, 5	282.5*	0, 6, 0	211.86
		0, 0, 4	226
		9, 0, 0	231.12
		0, 7, 0	247.17
		10, 0, 0	256.8
		0, 8, 0	282.48*
		11, 0, 0	282.48*
		0, 0, 5	282.5*

* notes degeneracies (non-unique mode frequencies)

stretched string that is fixed at both ends (e.g., a guitar string). Fig. 1 illustrates this analogy.

The partial differential wave equation used in physics to describe general wave behavior provides a simple solution for calculating the resonances (or modes) of rectangular rooms:

$$f = c/2 (p^2/L^2 + q^2/W^2 + r^2/H^2)^{1/2}$$

f = mode frequency (Hz)

c = speed of sound in air (1,130 ft/sec)

L = length of room

W = width of room

H = height of room

p, q, r = wavenumber integers

(0, 1, 2, 3...)

After one plugs in the speed constant and the room dimensions, manipulation and substitution of different combinations of wavenumbers will generate a list of the room's modal frequencies.

Room Modes

There are three varieties of rectangular room modes: axial, tangential and oblique. Axial modes occur between one pair of opposite surfaces; tangential and oblique modes occur between two and three pairs, respectively. As would seem logical, setting two of the three wavenumbers equal to zero yields an axial mode frequency present in the remaining of the three dimensions. Tangential modes can be calculated by setting only one wavenumber to zero and solving with the other two;

oblique modes are generated by solving the equation with all three wavenumbers set to integers greater than zero.

Depending on the desired scope of the analysis, one of a couple of assumptions can be made to reduce the amount of computation required. Since axial modes do not suffer the intensity losses caused by reflection and diffusion from multiple wall surfaces, they are the strongest and most critical modes to analyze. Tangential and oblique modes do play a part in the modal response of small rooms, but since these modes are lower in intensity (generally thought of as 3 dB and 6 dB down from axial modes, respectively) and are much more diffuse, they can usually be neglected in a simplified small room modal analysis. A reduced version of the mode equation for axial mode computation only is:

$$f = w(565)/D$$

f = axial mode frequency (Hz)

w = wavenumber integer (p, q or r)

D = dimension (L, W or H, in feet)

Putting the equation into words, the lowest axial mode ($f = 565/D$) for each of the three wall pairs (dimensions) can be multiplied by the wavenumber integers to generate all the axial modes of the given room. If a more complete analysis with all three sets of modes is desired, a method of reducing this task

is the calculation of the "cutoff frequency" of the room:

$$f = 11,250 (T/V)^{1/2}$$

f = cutoff frequency (Hz)

T = reverberation time of room (seconds)

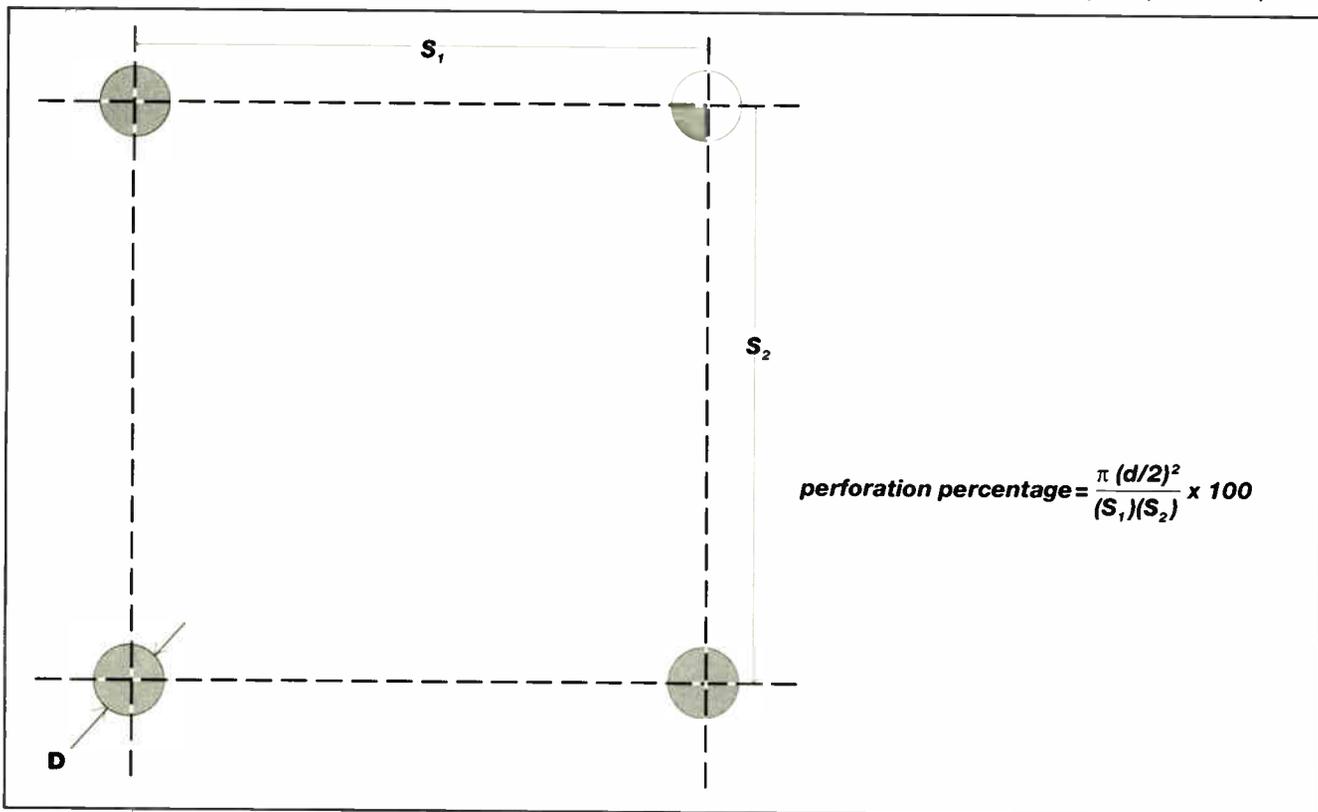
V = volume of room (cubic feet)

(The reverberation time of a room can be calculated by referencing either the Sabine, Eyring or Fitzroy equations widely published in acoustics texts.)

This cutoff frequency does not represent a point at which a brick-wall change in response occurs; rather, it is merely an approximate value around which a transition in the density of a room's modal response takes place. Above this frequency, modal calculations can become mathematical overkill. For the hypothetical analyses presented here, the simplified axial mode analysis will be used with a ceiling of 300 Hz, a point below which the majority of modal complications occur.

Consider two rectangular rooms: "Room One" with the dimensions 12x12x10 feet (LxWxH), and "Room Two" with the dimensions 22x16x10 feet. (For your reference, if reverb times in these rooms are computed as 0.3 and 0.4 seconds, respectively, the rooms' cutoff frequencies would be 162.38 and 119.93 Hz, respectively.) Fig. 2 shows a table listing the axial modes of these two hypothetical rooms with corresponding wavenumbers. The modes are listed in ascending numerical order according to frequency. It is easily seen

FIGURE THREE



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that the identical length and width dimensions of Room One cause identical axial modes to occur. When two or more room modes are identical or very nearly identical, they are commonly referred to as degeneracies.

Degeneracies, especially in an axial mode response, cause audible, unnatural-sounding accentuations in source material. Due to the six sets of identical degeneracies below 300 Hz in the axial mode response of Room One, smoothing the frequency response of this room is very difficult at best, possibly hopeless. In general, a room should have a minimum volume of 1,500 cubic feet with no two identical dimensions in order to exhibit a treatable modal response. Room One's dimensions violate both of these premises. Room Two, on the other hand, with a volume of 3,520 cubic feet and three non-identical dimensions, has a much smoother axial mode response. The two modes at around 103 and 106 Hz, as well as the two at about 177 and 180 Hz, could be degenerate, but these areas could be easily treated. The three coincident modes at 282.5 Hz could cause a more serious coloration. The other two near-coincident pairs probably need treatment as well, but 282 Hz is the degeneracy treated in the following example.

There are several ways that frequency spikes can be counteracted, but the most common is probably the Helmholtz resonator. A Helmholtz resonator consists of an enclosed air cavity with a small opening, allowing air to flow. The opening allows for a plug of air to move in and out of the cavity; the cavity acts as a spring for this plug. The size of the opening as well as the size of the cavity can be adjusted to create a high-Q resonant system.

The classic example of a Helmholtz resonator in everyday life is the soda bottle. The resonant frequency of a soda bottle can be found by blowing across the mouth of the bottle at a certain pressure. For acoustic room treatments, the classic Helmholtz is a cinder block with an opening cut into the air cavity. Our example uses a more easily constructed version of the Helmholtz resonator: a perforated panel absorber. The perforations act as many small Helmholtz resonators that share a common air cavity. The equation for computing the parameters of a perforated panel absorber is:

$$f = 200 (p/(c \cdot d))^{1/2}$$

f = resonant frequency (Hz)

p = perforation percentage ((hole area/

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panel area) x 100)
 t = panel thickness + 0.8
 (hole diameter)
 d = depth of air cavity

Fig. 3 illustrates the method for computing the perforation percentage of the absorber.

After manipulating the interdependent variables in this equation with some hit-and-miss substitution, one practical design that will resonate at 282 Hz is a 1/4-inch thick panel (plywood works well) with 3/8-inch diameter holes drilled 2.25 inches apart (measured from the hole centers, with the holes in straight horizontal and vertical rows). The panel is separated from the wall by 2-inch furring lumber on all four edges, creating a 2-inch deep air cavity.

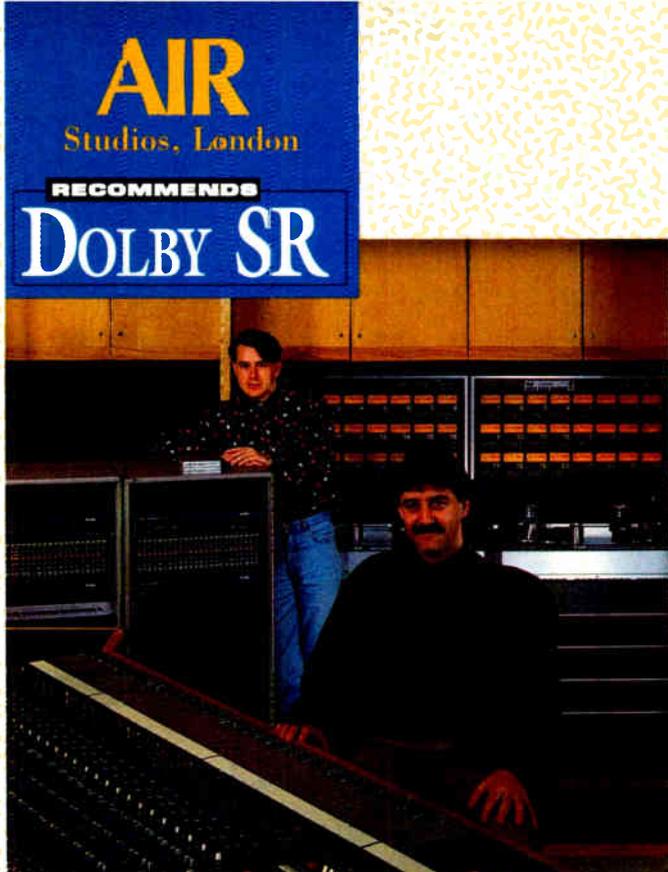
This combination of dimensions yields an approximate perforation percentage of 2.18%. A thin layer of fiberglass may be placed inside the air cavity (usually against the wall side) to widen the bandwidth (Q) of the absorber if desired. Another thin layer of fiberglass may be placed on the outer face of the panel to absorb high frequencies and prevent unwanted reflections from the plywood. Absorbers such as this can be easily designed and built for any problem frequencies in a room. There are also commercially produced absorbers and resonators available, perforated and otherwise. The introduction of absorbers can drastically improve the acoustics of a room, allowing it to be truer to the original frequency content of source material.

When designing or analyzing a particular room, it should be understood that reflection, absorption, reverberation and room modes are all interacting phenomena; they should *not* be thought of as existing separately from one another. And while there are different equations to analyze and predict these individual parameters, they should be recognized as being interdependent.

The calculation and interpretation of a room's modes is only one step in its design and analysis. While mathematics represents the best objective means to academically assess acoustic phenomena, those numbers merely represent our most current explanation of audio behavior in nature. Of course, the ultimate judge of the sound of a room should be the human ear. ■

Derel Monteith is an independent engineer and producer hailing from Charlotte, North Carolina.

See Page 272 for Reader Service



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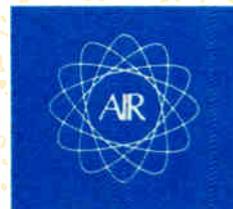
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LIVE ECHO

“If there’s anybody out there who thinks any artificial echo system sounds better than a live chamber, I haven’t met ‘em.”

Live chambers are out of style these days.

There are a number of reasons why they’re not popular. Most of them are well-known and sound perfectly logical, but if there’s somebody out there who thinks *any* artificial echo system sounds better than a live chamber, I haven’t met ‘em.

The usual response to inquiries about live chambers is: “Oh yeah, they sound great, but...

...they take up too much room.”

...there’s too much noise around here.”

...they’re not controllable like the (fill in the blank) system.”

Every one of those “buts” is valid. *But...* for some years, the best vocal chamber available to the mixers at United Recorders on Sunset Avenue in Los Angeles was about seven miles away on Fairfax.

Neat trick? Not really, just the same kind of phone lines that have been used to carry the bulk of high-quality audio around the country since net-

work radio came online in the 1920s. As a matter of fact, they were so pervasive that we still use Ma Bell’s transmission line standards for virtually all recording equipment.

They used to be called Class A lines. The current term is Radio and TV Broadcast lines, and they’re guaranteed out to 15 kHz.

The cost of R/TV-quality lines is wildly variable over long distances, but for a run of a few miles, two unbalanced stereo pairs would probably double your phone bill. Not cheap, but it’s a resource.

If you can get direct wiring, an old trick for monaural drive is to use two balanced pairs, and hang the drive line on one leg of each balanced pair. It’s called a phantom line, and you get one free line for every line you buy, starting with two at the cost of a couple of transformers per phantom. In other

by Malcolm Chisholm

CHAMBERS

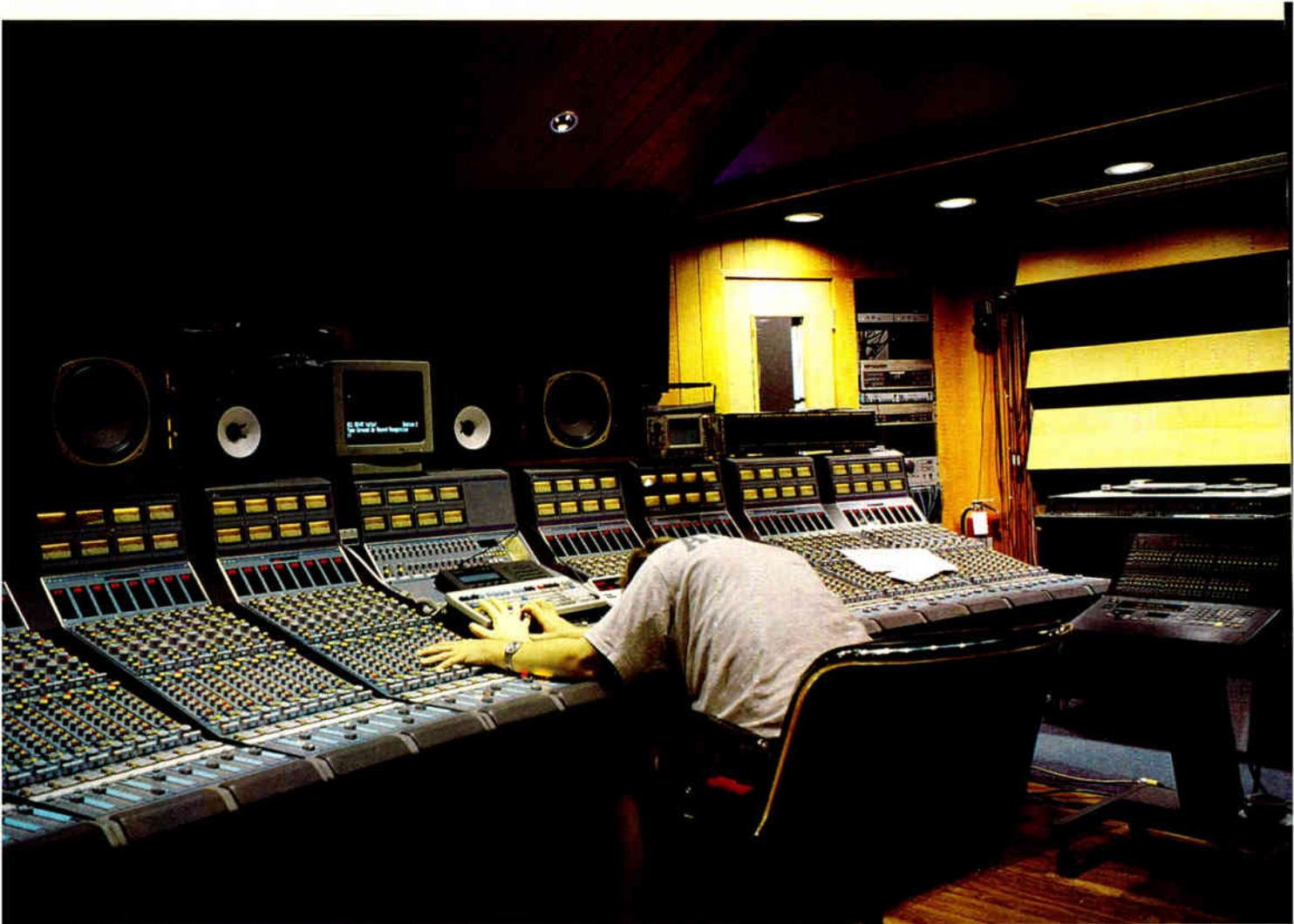


PHOTO: AMY ZIFFER

The intersection of St. Andrew's Place and Melrose Avenue is like any one of thousands of unobtrusive corners in Hollywood. Most of the people passing by are too busy rushing from the freeway to the nearby Paramount lot to notice the sign that advertises Conway Recording Studios. Yet, inside is one of Los Angeles' premier music recording facilities.

Conway has existed in various forms and at various locations in Los Angeles since 1958. It didn't begin to take on its present shape, however, until Buddy and Susan Brundo purchased it 15 years ago. They converted the 6,000-square-foot, one-room studio into a 36,000-square-foot, three-room complex in a secluded garden setting, which gives one the sense of having been transported somewhere away from the city.

Over the last decade and a half, hundreds of artists, engineers and producers have passed through Conway. Luckily, one of Brundo's employees started a scrapbook years ago that reveals familiar names and faces. There are assistants who have gone on to be well-respected engineers in their own right, engineers who later became owners of other facilities or accepted positions

with major audio manufacturers, and artists whose careers have been honored with Grammys. It's come pretty far from those early days, when it was the site of such classic recordings as "Does Your Chewing Gum Lose Its Flavor On The Bedpost Overnight?"!

Conway made more history recently with the construction of Studio C, consisting of a spacious control room with a large, attached live recording area and three isolation booths. Studio C draws notice for two reasons: It was built from the ground up rather than remodeling a pre-existing space; and it houses the first Focusrite console in Los Angeles.

The board is the world's second new-generation Focusrite, offered after the company was purchased by former Soundcraft co-owner Phil Dudderidge. The board's appearance is unusual enough to have reeled in a film director, who used Studio C as the set for *Session Man*, an upcoming Showtime movie about the music business.

Conway has been the scene of many "firsts." Buddy Brundo has a reputation for taking chances on new, untried equipment. "He's been a real pioneer over the

CONWAY RECORDING STUDIOS

by Amy Ziffer

⊕

**Sometimes
You Have To
Take A Risk**

years,” says Dudderidge. In his office at the studio, surrounded by photographs of the Formula cars he races for recreation, Brundo was happy to discuss his approach.

“George Augspurger came up with the first two-way TAD system for me in 1978,” he says. “We still have the original Northwest horns that were made out of structural foam. We helped develop the Neve V console into the V2, the V3 and then the VR. We also helped George [Massenburg] with his automation. We were his test facility, along with The Complex, for a while.

“When I saw the Focusrite, I knew I had to have it,” he continues. “Everybody said, ‘You’re crazy! You’re buying something you’ve never heard?’ I said, ‘Well, that’s the fun of it.’ How else can you do it? You have to take a risk or you wind up in the mud.”

Brundo was also one of the first to try Studer’s A827 analog 24-track and D820-48 digital 48-track, as well as the now popular Perreux amplifiers, which he came across when a client rather casually suggested he try these “great amps” he’d picked up in New Zealand. “I

can’t think of anything I’ve bought and regretted,” he says, insisting his risk-taking has never backfired.

Of course, he also takes into consideration the reputation of the people and companies he deals with. “With Focusrite, you’re talking about a company whose roots go back to the best-sounding consoles ever built,” he rationalizes. “I thought it had to sound good, because what’s there? An equalizer, a mic preamp...”

They’re the same modules about which Dudderidge says, “We reckoned we couldn’t go wrong building a console around an equalizer that people pay hundreds of dollars to rent.”

“Let me tell you why I made the right decision,”

**Filming a
scene from
Session
Man in
Conway’s
Studio C.**



PHOTO: CAROL STODDARD

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Jeff Baxter
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Criteria Studio

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Brundo says, jumping up to go to his desk. He finds a client list and reads it: "Since December, we've had Aaron Neville, Rod Stewart, B.B. King, Bonnie Raitt, Ringo Starr, Little Feat..."

Notably, Brundo also took a chance with studio architect Vincent Van Haaff back in 1978, with an experimental, expansion-ceiling room design in Studio A (at that time, the only room in the facility). Based on its sound and the positive response from clients, Brundo called on Van Haaff again in the early '80s for Studio B, and a third time in 1987, when plans for Studio C were first drawn up. "In the late '70s," Brundo says, "the craze was the compression ceiling. Now this room is flourishing all over the world." Indeed, Van Haaff has built rooms based on the idea first implemented at Conway in Japan, Italy, Australia and Canada.

Because Studio C started as an empty lot, Van Haaff was able to set optimal dimensions. The exterior shell of the control room measures 22 feet deep, 27 feet wide and 17 feet at the highest point. The exterior dimensions of the recording area are 42x45x19.

Van Haaff has certain principles to which he adheres in all of his designs. "I feel there should be a certain amount of rear reflection in the control room to simulate a real world environment, like a living room or a car," he says. "The more efficient the room, the less the amps have to work to achieve a given sound pressure level, because there's more room loading and less absorption."

He also strongly believes that the fewer implements of acoustical tuning that are introduced into a recording area, the more the artists and engineers have the freedom to create. In keeping with that philosophy, the studio is finished very simply. The floor consists of four separate and independent risers, with a resonating volume of air underneath. Having four individual risers gives some control over leakage into microphones of noise transmitted through the floor.

The north wall is a large diaphragmatic absorber, which functions to remove very low frequencies from the room. The walls are gypsum board finished with paint. Three iso booths are finished in the same way, each with windows overlooking a landscaped courtyard. There are no built-in wall or floor treatments. To deaden the rooms, the engineer has to place gobos or put down carpet.

"This is a very live drum room for

rock 'n' roll," says Brundo. "I didn't compromise and say we're going to have rock 'n' roll one day and a film date the next. I want to see real drummers!"

George Massenburg, whose co-production with Linda Ronstadt of Aaron Neville's new album, *Warm Your Heart*, was the first project completed in Studio C, believes Van Haaff and Brundo did the right thing. "They didn't overdesign it," he says. "Buddy solicited the opinions of a lot of engineers and producers, and most said, 'Try to keep it live. Don't put up a lot of absorption.'"

"I think the recording business in the late '80s and early '90s is about diffusion and saturated sounds," Massenburg adds. "I find Studio C to be a unique environment with great color and character—and flattering to rock 'n' roll. The whole environment really supports working hard at making music."

The Focusrite is outfitted with Massenburg's own GML automation, as are the two Neve boards in Studios A and B. "This was our first site for an automation system," says Massenburg, "so to an extent it was the faith that

Buddy had in us that got us started as a company." GML is also a technology partner with Focusrite, currently involved in developing a switch reset system.

Comfort and convenience are big concerns at Conway. Although it's a little unconventional, two of the studios (including C) have picture windows. Studio B overlooks an expanse of lawn bordered by hanging plants and rose bushes, and the view from C is of a covered patio. When a client books a room, they also get an office for business calls, equipment storage—whatever. Conway technical director John Hurst and studio manager Jill Pearlman try to make sure clients' needs are met.

With Conway, Brundo has tried to bring together all of the elements he feels are necessary for great recording, with a great deal of success. Massenburg sums it up best when he says, "Running studios is best left to people who want to run studios. Buddy is very good at running a studio." ■

Amy Ziffer is Mix's Los Angeles editor. Her column, "L.A. Grapevine," appears monthly in our "Coast to Coast" section.

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STUDER
EDITECH

by Dan Daley

A NEW GENERATION OF WORKSTATIONS FOR PROJECT ROOMS

Digital audio workstations from MI manufacturers were a mathematical certainty. The same market and technology forces that produced \$150 CD players and VCRs within a few years of their high-priced introductions were bound to have a similar effect when applied to the DAW phenomenon.

The question is how this develop-

ment will affect the project studio market—the prime market for the new generation of machines. There are some reasonably certain answers, as well as a few that could bounce either way.

What's definite is that it will have *some* effect; the ability to go multitrack on a hard drive or digital tape system



Clockwise from top: Roland DM-80, Yamaha DMR8, Korg SoundLink

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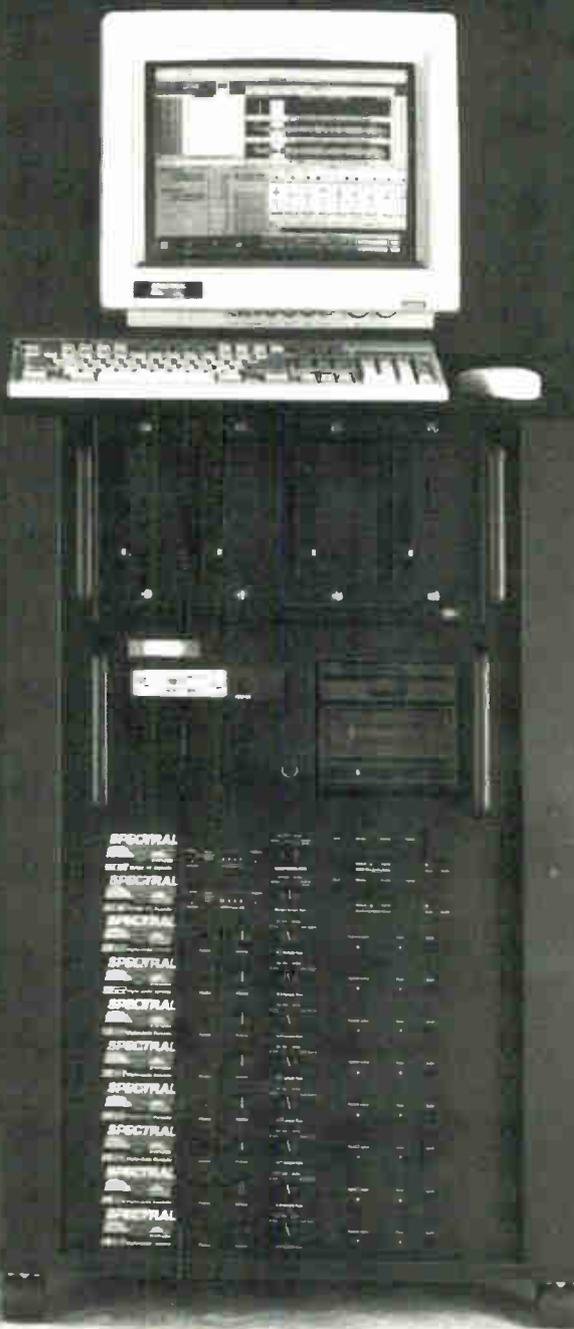
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STUDIO VIEW

at prices of \$40,000 or less is bound to be attractive to many project studios, especially ones that already participate in digital recording by using DAT as a mastering medium. What's also certain is that those who've not been following the ongoing angst over compatibility—or more precisely, the lack thereof—will be rudely awakened. After living in the highly compatible world of 8-, 16- and 24-track analog, project studios that go digital will encounter the same interface-between-facilities-and-systems problem that commercial facilities using workstations have endured for years. However, commercial rooms and the DAW industry have thrived in spite of the incompatibility issue, so there's every reason to assume project rooms will do the same with the MI workstations.

An interesting factor is that project room owner/operators for the most part share an MI background; they began their careers as musicians, and their equipment choices centered around that. This is quite distinct from the traditional sequence of events in which someone enters the industry from a technical/business background and purchases equipment with client needs uppermost in mind.

When MI-based manufacturers enter the DAW market, they'll find a customer base that's basically grown up with them. They started out with a Roland, Yamaha or Korg synthesizer, added signal processing, guitars and amplifiers from the same companies, and it's not a stretch to assume that they would strongly consider adding the next generation of equipment to their inventories from the same companies. This level of brand identification, if not necessarily brand loyalty, is, I suspect, at least a partial factor in the MI manufacturers' decision to enter the DAW market. Certainly, brand loyalty is just as important as the economics of the technology in terms of cost-effectiveness. A mature digital environment and a ready-made marketing base make this next stage virtually inevitable.

Mike Nicoletti at Yamaha acknowledged that the company has at least partially counted on the base of musicians operating their own facilities to make its entry successful, citing a marketing target group they refer to as musicians, composers and arrangers as prime contenders to become MI workstation users.

The systems that will become available this year from MI manufacturers—and there is no intent to compare them here—include two hard drive systems and a tape-based system. Korg's SoundLink is an 8-track hard drive unit with an integrated digital mixer, digital EQ and three aux sends, one of which is normaled to an internal DSP, as well as a compressor/limiter on the stereo output. Also included in the system is a 16-track sequencer. Projected price will be just under \$40,000.

Roland's DM-80 is also hard drive-based, with an 8-track record/playback unit priced at \$7,695. It also requires either a dedicated remote unit (DM-80R; \$1,995) or a Macintosh software package (Track Manager; \$595) for the front end. There is an option for a fader unit (DM-80F; \$1,695), as well. The DM-80 package has high- and low-band EQ with sweep, panning and simultaneous record/playback features; no onboard effects are included.

Yamaha's entry is the 8mm tape-based DMR-8. It records 20 bits to tape with 120 dB of dynamic headroom, has a full-feature integrated digital console with real-time automation, three DSP sends normaled to SPX1000-type processors, three bands of EQ and all-type onboard time code capability. The base price is \$34,000, plus \$1,500 for a mic-pre package and \$3,500 for external A/D converters.

The Korg and Yamaha systems follow another path familiar to project studio operators who grew up in the home recording industry: They integrate the recorder and console into a single unit *ala* the seminal PortaStudio approach. There are certainly legitimate technical and ergonomic reasons for this combination, and from a marketing point of view it makes sense to stay with such a successful physical format.

The development of MI DAWs is another step in a series of events that have paralleled the traditional recording industry's growth (albeit in truncated form), providing systems of slightly circumscribed capabilities at affordable price points that grew as the musicians' need did. But just as these two paths have momentarily converged at times in the past—for example, MIDI entering the traditional studio environment in the form of permanent pre-production rooms, and major signal processing manufacturers building down-sized versions of ex-



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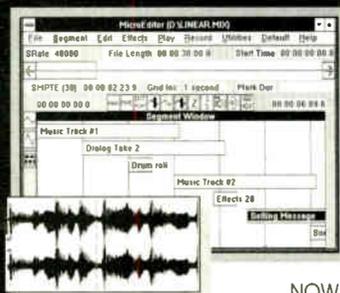
market. That response is directed in particular to those facilities that, in the words of New England Digital's Ted Pine, have reached the point where the need for increased throughput moves them from their initial owner/operator status closer to that of a multi-application facility. Once the incompatibility issue gets resolved—which it will at some point—then transitions between MI and high-end systems will likely become common as project studios grow. Down-sized versions of high-end systems are a possibility, but probably not a likelihood, since that would mean diminished throughput—not really a viable option for manufacturers of big systems. In other words, don't expect a replay of the Detroit-Tokyo syndrome, in which Pintos started rolling off the drawing boards to compete with Corollas.

Speaking of performance, the user interfaces of these new systems were apparently a concern of the first magnitude in their development. Rod Revilock, product and marketing manager for Korg professional audio products, says that the learning curve for the systems should not be steep, since most employ some sort of fader-type console interface, and tape icons are used in some cases to identify recording functions. "If someone is used to using multitrack equipment, then they should be able to get into these systems quite easily," Revilock says, "and we've tried to make the systems as familiar as possible to them. But any machine with a lot of power isn't going to be a simple one."

Project studios are approaching a whole new round of decisions. There will be a period of hesitation, tire kicking and general-purpose anxiety about the new DAWs, and the digital tape-versus-hard disk question remains to be definitively shaken out. But a historical willingness to embrace new technology at reasonable price points, combined with a desire to complete a digital loop already partially in place with DAT and other digital equipment, indicates that a significant number of project studios will seriously consider opting for DAWs in the future. ■

Dan Daley is Mix's East Coast editor. The ongoing fall of communism has left him without a focus for his pathological paranoia. But he's open to suggestions.

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by Sue Gold

JAMES NEWTON HOWARD

SCORING AT HOME

Flatliners, *Pretty Woman* and *Dying Young* have two distinct things in common: Julia Roberts and James Newton Howard. While Roberts lights up the screen, Howard's music helps bring the films to life. Howard is one of the most in-demand film composers around today, having also scored films as diverse as *Three Men and a Little Lady*, *Major League*, *Guilty by Suspicion* and *Man in the Moon*.

The Los Angeles-based composer built his own studio in his former home several years ago. Cables were put in under the floor, the room was sound-proofed and then provided with 200-amp service. Even so, Howard says, electricity has been a major problem in the facility. "I have voltage fluctuations. First we were suffering for a long time from low voltage, and now, mysteriously, we're suffering from high voltage. We've had electrical engineers out here, and they can't figure out what's going on."

In spite of electrical gremlins, Howard has managed to score his last 20 films in his studio, using his Synclavier as one of his primary tools, and a fair amount of the actual recording for the films has taken place there as well. For instance, most of the basic tracks for *Pretty Woman* were done at the studio, as well as four or five cues that were smaller, ensemble-type pieces.

Howard's method of scoring usually involves making fairly elaborate Synclav demos, "not so much for my benefit but for the benefit of the directors, because

it allows them to really hear what I'm doing," he says. "It also prevents any ugly surprises at the scoring stage, because they've heard all this stuff before."

In the case of *Pretty Woman*, "I didn't have a lot of dialog with the director, Garry Marshall, and I was never quite sure I was doing what he wanted me to do, and that's important to me. As long as I'm going to write for a film and a director, I want to be in sync with whomever it is that has initiated the whole idea in the first place, which is usually the director.

More to his liking was his experience on *Flatliners*. Director Joel



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Schumacher gave him a tremendous amount of stylistic latitude. He was given an enormous music budget, and, indeed, music became a very big part of that movie. Howard used a large choir, an orchestra and a massive array of synthesizers in his search for the right moods for the film. "With the synthesizer stuff, we probably did a month of just sampling strings, more traditional sounds and chants," he notes. "I used them mostly as prototypes and recorded a lot of stuff at the studio that I then took and overdubbed an orchestra and a choir into afterward."

Last spring Howard scored his second movie for Schumacher, this summer's weepy Julia Roberts vehicle called *Dying Young*. "I seem to follow Julia Roberts around all over the place," he says with a laugh. "Because Joel and I had worked together before, he specifically shot areas for me to score where there is no dialog. There are just these big montages, because he had the confidence that he and I would understand what we needed to do there. It's challenging and it's kind of intimidating in a way, but that's what makes it interesting."

After Howard reads a script and accepts a scoring job, the temp score process is where much of his work is done. Howard says a lot of what he does at this stage is improvising and recording. He likes to use his sequencer as a digital recorder. Once he gets something he likes, he then tries to develop a few more bars to make it work in the film.

"I put the idea into the sequencer and it's about two-and-a-half minutes long," he says. "Then I hit 'start' on the sequencer and start on my remote for the video at the same time, watch them and mark where it's wrong. Then I go back to the sequencer and leave bar 15, or I insert eight bars of blank space in between bar 6 and bar 15. Then I do it again, and I fill those up with something different. It's cut and paste."

Howard's studio arsenal includes a DDA console, which he describes as "the best mid-size console that I could find," a Sony/MCI multitrack, the

Synclavier, a Yamaha KX88 controller, and about 20 synthesizers.

Howard says that though he has had many successes at his studio, he would still like to find another one. "We're a little cramped here, and we have to adapt to some degree to these rooms—I mean these rooms are bedrooms. More than likely what I'll do is take an existing building and gut it. I'd like to have a big control room, a live room that is big enough for me to do vocals, pianos, guitars and maybe live drums."

Howard doesn't think technology has taken away from his creativity. "Ultimately, it's the music that matters and that's always the case, but I think [equipment] helps. This stuff is a new tool and that's all it is, and it just makes you more fluent in this language. It allows one to explore places that you otherwise couldn't. But if you don't have the music, none of this is going to matter."

***"Ultimately,
it's the
music that
matters and
that's
always the
case."***

Before writing for films, Howard was one of the top session keyboardists in Los Angeles. It wasn't until 1985 that he started doing film scores at the suggestion of his manager at the time. "I was really terrified to do it. The technology scared me. How do you write to picture? How do you lock up the stuff so it works? A lot of unknowns were there that made me very hesitant. I just decided, 'What the hell, I'll do it,' and I liked it. Once I started, I never stopped. It's been a real wild trip."

While Howard views his scores as almost like his own solo albums, he is looking forward to recording a real one with his name on it. "I think I'd like to do sort of ten-minute pieces, several of them with multiformat—lots of orchestral stuff and synthesizer stuff. I like working with choruses. The human voice is just so expressive. You can do incredible sounds with it, and when you have a group of people doing it together, it's really quite astonishing. Now all I need to do is find the time to do it." Judging by the list of projects he has in the works, it might be awhile. ■

Sue Gold is a Los Angeles-based freelance writer.

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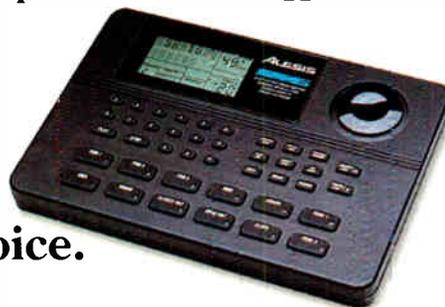
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World Radio History

by Randy Adams

ADVENTURES IN FOREIGN RECORDING

IN WHICH OUR INTREPID CORRESPONDENT
TACKLES A PROJECT THAT TAKES HIM TO
FOUR CONTINENTS

A recording project that takes one half-way around the world is bound to pique the interest of any locked-in-the-studio audio engineer such as myself. So when I was presented with the opportunity to work on a film

crew traveling to Fiji, Czechoslovakia, South Africa and El Salvador, I wasted no time in saying yes. The project is a full-length musical film entitled *Whosoever*, funded by the Assemblies of God Church to pro-

mote the work of missionaries around the world. My job involved the recording of studio and location audio in each of the countries and the final mix and assembly back at my studio in Dallas. The crew consisted of video director David Ford, music producer Dan Smith, cameraman and all-around technical whiz Bruce Deck, and myself.

We began by recording a basic version of the work, so that the choir director in each country could begin the task of teaching the music to their singers. Most of

the choirs also had to learn the English lyrics phonetically.

I checked every resource I could find, but there was almost no mention of recording facilities in the countries to which we were traveling, so I had to rely on local contacts to obtain the information I needed. I sent a detailed list of questions for each studio, practically burning up my fax machine in the process, but it often took several tries to get answers to important technical questions. I thought I had all of my ducks in a row when I left, but now that I know a little more about international communications, I realize I was mistaken.

Our first journey was to Fiji, a tropical paradise in the South Pacific. It took the better part of two days on airplanes and in airports to get there, but that first sunrise at the Nadi airport on the western side of the island was almost worth it. Unfortunately, we had to fly to Suva, a bustling city on the southeastern coast, where it is hotter, noisier, wetter, and generally not much like paradise at all.



Above: South African choir on location. Below: In Fiji's South Pacific Recording.



Above: Recording at Opus Studios in Czechoslovakia. Below: The author with singers in El Salvador's Studio Doble V.



PHOTOS: RANDY ADAMS

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INTERNATIONAL UPDATE

leakage from the foldback monitors sounded. This is a crucial step in remote recording that I learned from Paul Christiansen of Omega Audio, and it's saved me from potential disaster several times. When I played back the room noise, I heard several dropouts, and the problem got worse. It seemed to be related to the heat backstage, which had to be at least 90 degrees. We ran a few diagnostic checks, and it became obvious that we had severe problems with the machine. With our choir arriving in less than two hours, it was panic time!

Fortunately, SPR had a Fostex E-8 in their Suva studio, only a few miles away. This was where I got a lesson in Fijian culture. Although the Fijians are hardworking people, they like to work at their own pace. The concepts of promptness, urgency and other hallowed, American, Type-A behaviors are simply not practiced in Fiji. The trip of a few blocks to pick up the other machine took over an hour. My main concern was the fact that we would have to copy the 1/2-inch slave tape from the Tascam to the Fostex before we could even begin to record. Not only did I have to transfer four songs, somehow using a machine that only moments ago appeared to have completely given up the ghost, but I also had to transfer the time code—no reshaper, regenerator or refresher—just a straight machine-to-machine copy. One thing I learned from another mentor, Mike Simpson of Midcom, is a healthy respect for the care and feeding of SMPTE time code. Copying time code without reshaping the wave to ensure proper playback is always ill-advised. On top of the buckets I was sweating because of the oppressive heat and humidity, I was now sweating over the health of our time code.

The choir arrived, got in place and warmed up just as we finished the last transfer. The only confirmation we would have of the quality of our transfer would be to listen and look at levels as we were recording. To record the choir, I used a matched pair of Beyer MC 740 microphones in an X-Y pattern, since an M-S pair seemed to pick up too much ambience, including buses and bird calls. Fortunately, the choir really sang! Their enthusiasm and unique accent translated into a wonderful sound.

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mini-quad cable to a pair of Symetrix 528 Voice Processors: one-space modules that contain a mic pre, compressor/limiter, 3-band parametric EQ, noise gate and de-esser. The output of the 528s were patched directly into the inputs on the tape machine. A small Fostex mixer was used for playback, and Yamaha NS-10Ms were used for reference, along with Sony MDV-6 headphones. Compared to the process of setting up, the recording went extremely well. In two four-hour sessions, we had all we needed, including a scorching solo by a Fijian woman. The next afternoon, we checked our copied time code and found it to be okay—a major load off of my mind!

During the next two days, we traveled to several locations around the main island, shooting segments on a hillside overlooking a beautiful isle with colorful houses and boats docked on the shore, on the banks of a small waterway at the Pacific Harbour Resort, and in a small church in the neighboring town of Naushori. On the location shoots where electricity was available, we used the Fostex E-8 for playback. There was no way to lock the speed of the playback machine to the internal speed of the Betacam, so the master time code was not frame-accurate to the video.

We had to live dangerously, resolving all of the Fiji shoot to video speed in post-production, but it worked out. David Boothe of Color Dynamics worked a little time code magic during the final assembly that saved us. On later trips, we eliminated the problem by striping the multitrack with code generated by the Betacam running at speed, and using that code for all lockup procedures afterward. This resolved the 30 frames-per-second, non-drop frame SMPTE that our sequencer and automation software prefer to the 29.97 code used by the video editor. I've heard a lot of loose talk about resolving audio playbacks to video speed, and I don't know if this is the best solution or not, but it works. In the future, I'll always use 29.97 SMPTE for everything, and I'll never go out into the field without resolving my audio to video speed first.

After a few weeks back in the U.S., we were on our way to Bratislava, Czechoslovakia. We delayed crossing the border from Austria for as long as possible, because we could not bear to leave Vienna. It is truly one of the great cities of the world, but that's another

story. When crossing international borders with lots of audio and video gear, good paperwork and an honest face are very important. We were carrying a document known as an ATA Carnet, obtained through the U.S. Council for International Business, which has offices in most major cities. Many countries accept a Carnet in lieu of a cash bond, and you need only present the documents and the equipment upon entry and exit. You need to

and lots of cheerleaders. Although the studio had possibly the best microphone selection I have ever seen, the air conditioning was inadequate and noisy, and the creature comforts we have come to expect in Stateside studios were non-existent.

Because of our tight travel schedule, we depended on the choir directors in each country to prepare the singers for the sessions. Although some minor changes and on-the-spot direction



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check the requirements of each country before you leave the U.S., and don't forget to register your equipment before you leave this country. When you return to the States, customs will not appreciate the fact that they didn't get to sign your colorful little forms first!

Our communications with Opus, the local recording studio in Bratislava, had been difficult from the beginning due to problems with both software (language) and hardware (a lousy phone system). We really had no idea what to expect, but we were told that they had a Sony PCM-3324 digital multitrack. When we arrived, we were pleasantly surprised to find a complex with two SSL/Sony-equipped control rooms at right angles to each other, sharing a small recording area between them, and a cavernous studio one floor below that was easily large enough for a marching band, two football teams,

took place, we didn't have time to teach the songs to the choir in the studio. In Czechoslovakia, the choir was so well prepared, we could have recorded everything in one night. Instead, we knocked off early to sample the local nightlife, which consisted of some policemen randomly stopping vehicles with foreign plates and trying to extort money in broken German. We got away by playing extremely dumb. We even ignored the international symbol for extortion: the thumb and forefinger extended and rubbing together.

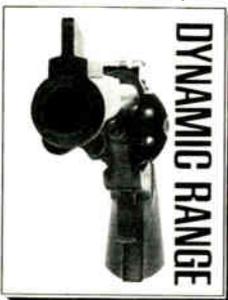
After an evening of Beethoven and Bartok at the Opera House back in Vienna, we headed for Durban, South Africa. At the Vienna airport, the security personnel refused to hand-inspect our carry-on luggage, which contained our audio and video tapes. They insisted that everything, including our

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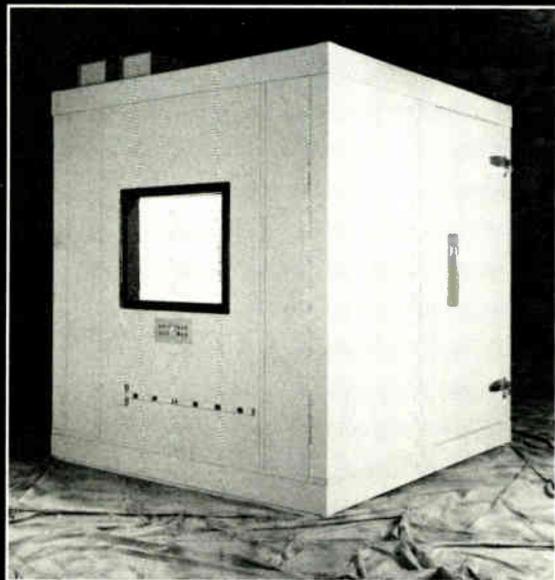
INTERNATIONAL UPDATE

tapes, had to go through X-ray, and they didn't care if we made our flight or not! Fortunately, we were saved at the last minute by the local KLM Airlines manager, who took the tapes, put them in a KLM baggage pouch, and hand-carried them to the plane. We picked them up in Amsterdam and carried them with us the rest of the way.

We had a day off before we began recording in Durban, so we checked out the surfing and swimming in the Indian Ocean just in front of our hotel. (I hear that the sharks are a lot more afraid of you than you are of them.) The next afternoon I went over to Durban Beach Studios to set up for the session that evening. The studio is owned and operated by Neil Snyman, who also serves as a technician for several other studios. His studio is equipped with an MCI 636 console and a 2-inch, 16-track MCI, for which he is actively seeking eight more modules of electronics. For our project, a 1/2-inch 8-track was rented. Neil's technical chops saved us, because we had to go through three tape machines before we found one that was satisfactory. The first machine had such severe wow and flutter that it only lasted about 30 seconds. The second one failed after a couple of hours when a capacitor in a reel motor burned up, making the tape tension uncontrollable. The first night was a wash-out, with equipment failure and a paucity of air conditioning contributing to a generally tense mood, but the second night went a lot better. We brought some food and drinks, the studio was well-chilled in advance, and a good time was had by all.

The only interesting details about our location shoots in South Africa had to do with our efforts to stay cool and shaded while shooting out on the side of a barren hill in KwaZulu, the homeland of the Zulus. Our African hosts found the sight of four white men turning bright red in the noonday sun quite amusing.

But our trip through Gatwick Airport in London on the way home was anything but funny. Once again, the security personnel refused to hand-inspect our carry-on luggage, but this time they also refused to let British Airways load our audio and video tapes on board without going through X-ray. Although the British Airways people were very helpful, the airport



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security people seemed to enjoy watching my frantic efforts to find a way to catch my flight, while saving my tapes from magnetic oblivion. Finally, we all agreed that I had no choice, so I put the tapes through the X-ray machine. As far as I've been able to tell, there were no ill effects, but next time I'll ship the tapes home by some other carrier that does not X-ray packages. The problem with doing this is that the packages have to clear customs at their destination, and some duty or taxes may be charged. Also, customs may X-ray your packages, even if you label the boxes "DO NOT X-RAY." The simplest solution is to avoid flying out of London on the way to or from anywhere until a bit of sanity returns to the airways.

Our trip to El Salvador had originally been scheduled only three days after our return from Fiji, so no one shed any tears when the Salvadoran government canceled all visas because of the elections planned for March. We needed the time off, and the choir needed more time to learn the material, especially the lyrics. We really expected this to be our most difficult trip, due to the country's political unrest, primitive recording facilities, and the

fact that our choir was made up of 60 Salvadoran children who spoke no English. The children attend school in the largest private school system in Latin America, operated by Latin American Child Care, which was founded by our client, the Assemblies of God Church. Much to our surprise, El Salvador turned out to be the highlight of the entire project.

When you land at the only international airport in El Salvador, the first two words which come to mind are "Banana Republic," and I'm not talking trendy clothes. Guns are everywhere: in the airport, on the streets, at restaurants, in front of buildings and homes; automatic weapons on parade! Even the security guards at the Pizza Hut carry Kalishnikovs. Other than that unsettling little detail, El Salvador is a wonderful country, with some of the kindest and friendliest people on Earth.

We spent the first two days at Studio Doble V, owned and operated by Willie Maldonado, who was introduced to me as "The Bob Barker of El Salvador." Willie has a Saturday morning TV game show, which makes him a celebrity everywhere he goes. His studio is a comfortable place to work,

with air conditioning (after this trip, I will never take it for granted again), a wonderful courtyard with a pool and waterfall, and a good working environment. The studio is equipped with a Tascam 38, Tascam mixers, a few old Neumann and RCA mics, and several digital effects processors. Everything has to be kept in good working order because parts and technical help are almost impossible to obtain.

The one thing that doesn't work very well at all is the electrical supply. Power outages and brownouts are an almost everyday occurrence, so Studio Doble V has a power regulator and a generator. Still, everything worked pretty well (that always puts me in a good mood), the children were a joy to be around, and I believe I may have made some friends for life. I have since brought the studio owner's son to the United States as an intern, and I'm trying to encourage some of my clients to do some recording in El Salvador.

Postscript: Well, I'm back in the States now, finishing up post-production at Future Audio in Dallas. As I listen to the choirs we recorded and I see the faces of so many new friends on the video monitor, I long to go back to



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each of these wonderful places and renew the friendships that began there. After all, someone has to use those frequent flier miles! ■

Randy Adams is an engineer at Future Audio in Dallas.

NEWS FROM AROUND THE WORLD

EBU to Hold DAB Seminar in Montreux

The European Broadcasting Union, in cooperation with the National Association of Broadcasters, will hold an international symposium on digital audio broadcasting (DAB) in Montreux, Switzerland, immediately preceding the NAB Radio Montreux show June 8-9, 1992.

The symposium will evaluate the situation for DAB after the World Administrative Radio Conference in March, and assess the possibilities for the introduction of DAB in various parts of the world. The meeting is expected to provide valuable information about DAB system design, political and regulatory challenges, as well as the

economic outlook for the new technology. For more information call (202) 429-5350.

TIPS to Develop Industry Standards

Created in response to a British government training initiative, TIPS is responsible for developing national standards and devising new vocational qualifications for the sound industry. Leading members from the industry have been recruited to look at what is required in terms of qualifications and job skills. Every sector of the industry has been examined, from sound recording to studio design and environmental noise. The resulting standards will soon be in place.

Employers, employees or students wanting further details, and those interested in contributing to the industry debate, should contact Paul Turner, TIPS, c/o Sandwell College, Woden Rd. South, Wednesbury, Sandwell, West Midlands, WS10 0PE England.

British Notes

London-based Dreamhire has become the first European pro audio rental company to invest in the Roland

Sound Space (RSS) system. Two RSS systems were delivered in June, and both have been booked continuously on a variety of projects, including the Rolling Stones' *Flashpoint*. Dynaudio Acoustics recently announced sales of its M1 monitors to top engineers and producers Steve Lipson and Neil Dorfsman. After mixing the new Dire Straits album on M1s, Dorfsman decided to use them as a portable system. Larking Audio, UK distributor of Soundtracs recording consoles, reports delivery of five Megas Studio boards, including one at Gee Street Studios, London, which purchased a 32-channel model as part of a complete redesign. Recent contracts for Soundtracs Quartz production consoles include: Hot Nights Studio in Fulham, which installed a Quartz 32 in Studio 2, and producers/musicians Double Trouble, owners of Noisegate Studio, who purchased a Tracmix-automated Quartz 48. The UK's TVS Television Centre has purchased DAR's DASS 100 multifunction digital interface to fully integrate the digital equipment system in its new all-digital audio dubbing suite. The room is based around a 16-channel SoundStation II Digital Audio

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TUBE-TECH

Production System, with DASS supplying the signal processing, frequency conversion and audio synchronization functions... Solo artist Fish purchased a Mitsubishi X-850 32-track digital machine for Funny Farm Recording Studios, his new residential commercial facility near Haddington in East Lothian, Scotland. The X-850 will be linked to a Studer A820 with Dolby SR and run in conjunction with a DDA 232 56-channel console and Munro M4 monitors... Abbey Road became the first UK studio to install two Mitsubishi PDX-8620 digital recorders, as part of a four-machine order. The decision to buy the new machines is linked closely with EMI Classics' directive to raise recording standards from 16-bit to 20-bit. In other news at Abbey Road, the third Sonic Solutions NoNOISE digital audio workstation was delivered to that venerable facility... Another British studio, Green Room Productions Limited, installed a Mitsubishi PDX-8620, which is linked to customized high-resolution converters from Meridian, dCS and Stax... Paul McCartney invested in a Neve VR72 60-input console with Flying Faders automation for his private studio in southeast England... Amek Mozart consoles have been delivered to Vibe Records in Oldham and Lansdowne Studios in Dublin... 1,000 Fostex D-20 DAT recorders have now been shipped to end-users throughout the world, with the delivery of a unit to the BBC Transcription Unit.

European Tidbits

Norsk Film Studio A/S is the first major Norwegian film company to purchase the DAR SoundStation II Digital Audio Production System, for its editing suite at its Oslo facility... The Hungarian Television Company has just completed its new Obuda center for recording and post-production, located in Budapest. The Studer-equipped facility features two TV production studios, several offline video editing rooms, and post-production suites for both video and audio... A 32-input Neotek Elan console was delivered to Professional Equipment in Milan, Italy... Plus XXX, a large two-studio complex in Paris, hired Paul Jarvis as technical manager. Jarvis is a veteran engineer who has worked at major studios in London and Paris, served as chief engineer at Compass Point Stu-

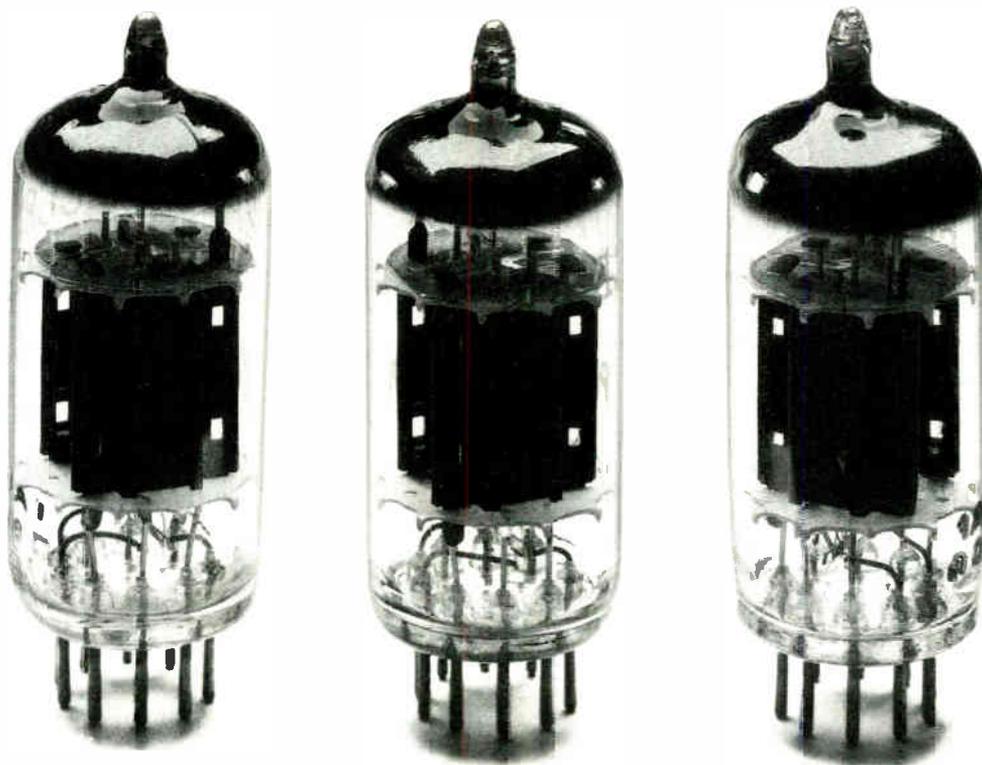
dios in the Bahamas, spent time as service engineer for SSL France, and worked on Jean-Michel Jarre's mega shows. Plus XXX is increasingly involved in film score recording and audio-for-video projects... A TAC Scorpion II console has been installed at Studio M&M AG in Schoenenwerd, Switzerland... Situated in the northern Italian city of Udine, Palace Recording Studio is among the latest facilities in that country to utilize SSL mixing consoles with its purchase of an SL 4048 G Series board... Chateau du Pape, located in Hamburg, has become the first German facility to offer a Neve VR console with the installation in Studio 3 of a VR72 desk fitted with 64 mono and eight stereo channels—and Flying Faders automation.

Pacific Rim Highlights

FM Acoustics amplifiers were installed in a number of South Korean facilities, including Jeil/EMI Recording, Jigu Recording/CBS, Korea Broadcasting System and Tae Kwang Records... Total Audio Concepts announced delivery of a 16-input Magnum console to ERA International, and a 36-input Magnum board to Ozland Studio, both in Taiwan... Brand-new Australian post-production facility Southern International Studios has purchased an AMS Audio-File Plus for audio-for-film. Also incorporating an AudioFile system is Rediffusion in Malaysia, which has added a new audio post-production studio to its facility... Broadcast India '91 will be held November 29 to December 1, in Bombay, India. Officials from broadcast, radio, TV and the film industry from more than 25 countries are expected to attend the event. For more information contact Saicom Trade Fairs & Exhibitions Pvt. Ltd in Bombay. Fax: (91-22) 215 1269.

South of the Border

Joel Solis, leader of popular band Los Bukis, purchased an automated Sony MXP-3036VF console, an APR-24 analog 24-track and a Sony DAT recorder for his studio on the outskirts of Mexico City. Also purchasing an automated MXP-3036 and APR-24 analog 24-track recorder was Beto Villa, one of Colombia's leading composers. Villa's newly constructed studio, Sound Temple, is situated on the north coast of that country. And Buenos Aires-based pop stars Soda Stereo recently installed an APR-24 in their new facility. ■



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AN INTERVIEW WITH BEAU HILL

“**W**hat do I do for fun?” laughs Beau Hill. “Well, damn—most of the time I sleep. Seriously, I’ve been in the studio non-stop for the last two and a half years, and I haven’t had much time for anything else.”

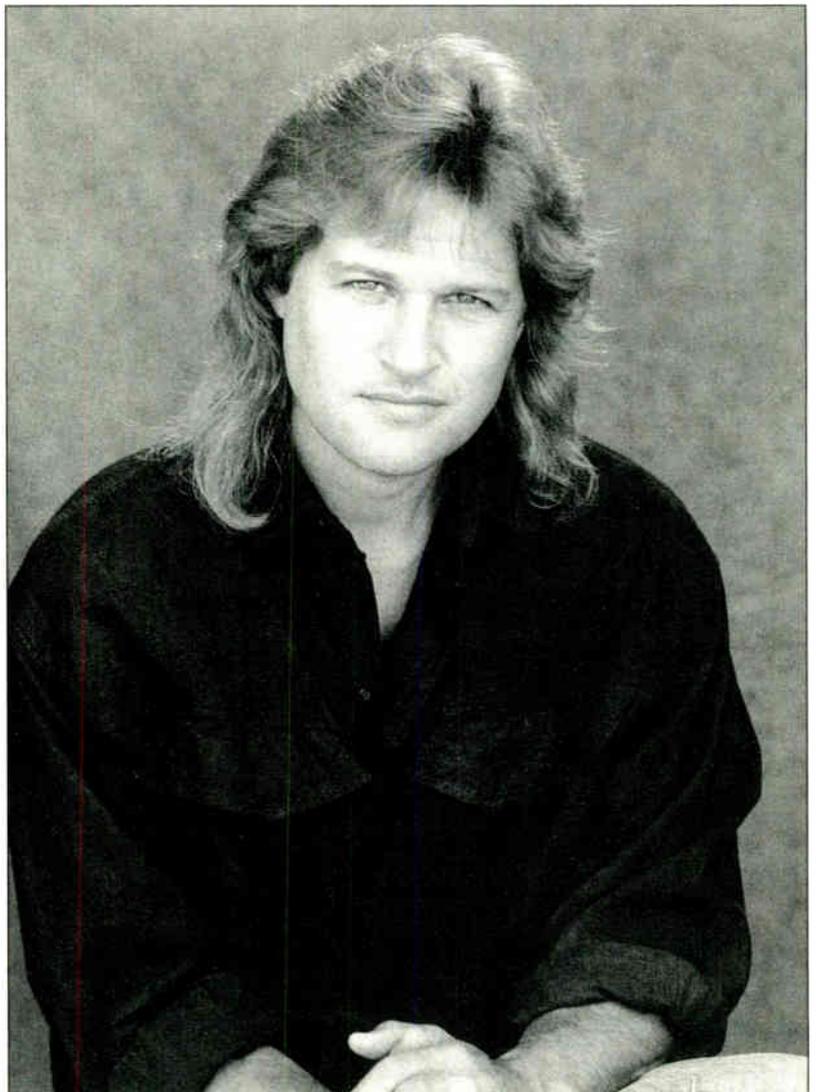
Now living and working out of Los Angeles, the heavy metal capital of the universe, Hill embodies the mystique of the Studio Svengali—lending a magic touch to virtually every project he’s produced. Best known for his work with L.A. denizens Ratt, he recently hit the motherlode by crafting back-to-back multi-platinum albums for mainstream rockers Winger and Warrant.

Trained as a classical pianist in his native Dallas, Tex., Beau Hill entered the music business in the late 1970s as a recording artist, playing both guitar and keyboards (plus singing) for two different bands, Airborne and Shanghai. While awaiting the release of Shanghai’s album in 1980, Hill teamed up with a friend to produce her demos for Modern Records (Stevie Nicks’ label).

Those demos caught the attention of Atlantic Records head Doug Morris, who watched Hill mix them live in the studio without the aid of automation. Impressed by the neophyte producer’s speed and finesse, Morris offered Hill a shot at

working with his latest signing, a hard rock band aptly named Ratt.

Drawing on his own influences (which include Queen, Styx, Foreigner, Led Zeppelin and The Who), Hill crafted elaborate vocal and guitar textures that defined the fabric of his incisive style and helped make the debut Ratt record (buoyed by the AOR



hit "Round and Round") go platinum in a matter of months.

Before long, Hill was a full-time record producer, often juggling several projects at a time through various stages of production. His collaborative dexterity notwithstanding, Hill's celebrity as a recording wizard often brings him kudos, though he insists there's little or no mystery to how he works.

"I'm not into all that secret stuff that some producers hoard," he chuckles, "because we're not exactly drafting legislation to save mankind or putting a man on the moon. We're making rock 'n' roll records for people to enjoy. I'll tell anybody about anything I've done—where the EQ settings were, fader positions, which module I used, what color patch cord I plugged in.

"Seriously, there's nothing I conceal so closely that I feel my career hinges on it," he explains. "So, even though it doesn't make for very exciting reading, the secret in something like the guitar sounds on my records comes from the guitar player rather than the EQ or any producer's tricks."

Most of Hill's projects feature some

pretty kick-ass guitar tracks, but the producer swears there's not all that much to getting those sounds on tape. "I usually just use a combination of a couple of mics to record guitars—mainly a Shure SM57 and an AKG 452EB, occasionally an AKG 414 or a Neumann U87, and sometimes an Electro-Voice RE20 as a third mic.

"In the past, when I miked cabinets, I went through all the rigmarole of sending a tone through a speaker and trying to find the quote—sweet spot—unquote," he continues. "Then one day, thinking I was pretty clever at the time, I did an A-B comparison of that method versus just sticking some mics up. The difference was so minimal that I realized I was doing the artist an incredible disservice—using up so many hours of precious time and money—trying to find that sweet spot."

To get his lush acoustic guitar sounds, Hill *does* admit to stashing a secret weapon in his back pocket. "For acoustics, I use the same old 414s and 452s again. But at the risk of sounding like I'm giving someone a plug, I've struggled with many different guitars and many different manufacturers, and I've fallen in love with some of the new Gibson J-200 Series acoustics. So when

I have to do some acoustic guitar work, I'm going to give the guy that axe and say, 'Play this!' From time to time, some guy says, 'But, hey man—I'm endorsing Sphincter Guitars!' But if you've got his respect and trust, you can cut through the bullshit. I tell 'em, 'Look, this isn't a photo session. We're recording, and with this guitar, we can get a great sound in one microsecond. You're going to love what we have at the end of the day, so just pretend it's a Sphincter and play!

"When you're just starting out as a producer," Hill says, "and don't have the track record to back up your suggestions, artists quite justifiably can ask, 'What makes your way more right than mine?' I've always lobbied my ass off trying to convince someone that a song needs this change or that. But if it doesn't work, I'll be the first to say, 'Whoops, another horrible idea from Beau!'

"I don't consider myself the imperial producer," he jokes. "If people see that not all of my ideas are sacred, that I can come up with a boner just as much as anybody else can, it lightens the attitude in the studio. This way, people are more receptive at those times when I really *do* have a strong feeling about something."

Hill's perspective as an artist often gives him an edge over other producers, especially when it comes to working with vocalists. "I was always the lead singer in my bands, so singing is obviously very important, something I relate to and enjoy. My classical background and [knowledge of] music theory have enabled me to write things out on staff paper and see how the voicings are supposed to work and really know on a theoretical basis who's doing what to whom—and why.

"When we're recording backgrounds," he continues, "I take my notation and stick it right up there in the vocal booth with the other group members and sing. Many times, most of them don't know what the hell's going on, but I do that so I can keep my place in the arrangement. Then I just show them a part by singing it.

"Of course, one secret of mine involves a basic recipe: stick four guys in a very live concrete room, apply scrotal clamps and record generously!" He cracks up. "Seriously, a lot of times, those guys are singing in high areas that even women shouldn't be touching. After a while, it gets a little fatiguing for the artists, and the tracks get a

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little thin.

"But while we're recording, I don't hold myself to any rules—I'll keep layering tracks until it sounds right," he explains. "If two tracks are enough, great, but it can take four, six or however many we need. The main thing is to keep things a little rough so it still sounds like people and not like someone leaning on an organ.

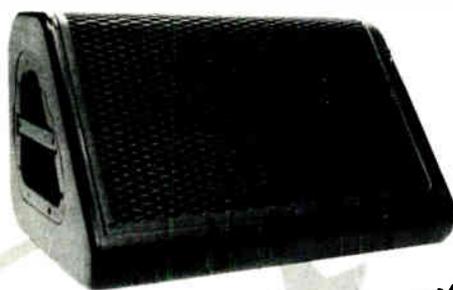
"I've run the gamut of experimentation, and I keep coming back to one idea: If a part is well-conceived and you have good people to execute it, [then] you have the real foundation of a good record—there are no tricks or knobs or devices that can substitute," he affirms. "Believe me—I've tried the easy way around it!"

One of those experiments involved developing an approach to recording based around both analog and digital multitracks, with digital used more for its preservation aspects than its sonic nuances. "I've practiced the same technique for about five years," he explains. "I cut all my basics, like drums, rhythm guitars and bass, on an analog machine, because I prefer its sound. Next, I'll transfer all those basics to a digital slave reel while doing some comp mixes—taking all the toms and putting them down on two tracks. Then, all vocals, keyboards and special effects get cut on the digital machine. That way, I only run the analog reel once when I record, and once when I make the slave reel. I never put it up again until I need the original basic tracks to mix the record."

Why bother with such matters? Hill points out, "In the old days before digital, I struggled with the fact that you can often lose high end on certain things like cymbals because of the physical properties of running analog tape back and forth over the tape heads.

"Now, on anything I'm particularly sensitive about, like cymbals," he continues, "I make the digital copy my source in the mix, because I want those cymbals to remain the same. The reason's pretty simple if you think about it. As you mix, your ears fatigue and your brain fatigues. Even though I mix at relatively low levels, there comes a certain point where you lose some sensitivity to what's going on. So one of the things I like is *not* having to question where the high end is relative to those cymbals, because in the digital domain, theoretically, it stays the same. I like it to stay constant, so I

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know the only thing that's changing is my ears."

What's more, Hill's approach to mixing starts well before the tracking ends. "As we're constructing a song, I like to hear as much of the final product as possible. I've learned to trust my instincts during those flash moments of a creative burst.

"For things like solos," he explains, "I'll usually add effects in the mixing stage, but on vocals, keyboards and drums, I commit to an effect very early on and print it right to tape. I have no problem with committing to something forever and saying, 'This is the sound, this is what we're going to go with.' Besides, most of the people in the room usually say, 'This is great—let's capture it right this minute!' It's like taking a Polaroid."

Though more than content with his recent successes on the great rock 'n' roll playing field, we'd heard some rumors about an impending move to the front office. "It's true," Hill confirms, "I'm going into partnership with Ted Fields and Jimmy Iovine, and we're starting our own record com-

pany." (The label, Interscope Records, put out its first releases this past summer, including the Hill-produced debut by the Storm, featuring former members of Journey and 707.)

"As a matter of fact, the Warrant record will be the last project I do as an independent producer, though I'll still be producing. This new role will allow

"Heavy metal producers and groups are looked down on as the leper colony of the music industry. (But) it's an area I can really make a dent."

me to develop certain artists that I normally might not be able to produce, so if record companies don't call me to do a certain type of project, I can now go find an artist and sign them to my own label."

Does this have anything to do with getting out of the heavy metal gridlock

he's been stuck in? "Actually, after the first couple of Ratt records, I tried to branch out and do other types of music," Hill recalls. "I've worked with Chaka Khan, Steve Walsh, Bob Dylan, Eric Clapton, Roger Daltry, Gary Moore and Fiona, doing anything I could do.

"Believe it or not, my favorite artist in the whole world is Peter Gabriel. His music is exactly where I live as a musician and a writer. But the double-edged sword of having success as a producer is that you get pigeonholed. As much as I want to do a Whitney Houston record, and as much as I think I would be tremendous doing a record with her, she would never for two seconds consider me, because I'm a heavy metal hack.

"Unfortunately," he continues, "heavy metal producers and groups are kind of looked down on as the leper colony of the music industry. I understand hard rock or heavy metal, if that's what you choose to call it, because I play it, write it and really love it. There's no denying that it got a little monosyllabic for a while, but I finally realized that this is what I'm meant to be—this is what I'm good at. It's an area where I can really make a dent."

And as to the critics whose conspiratorial gang rushes often seem to be aimed squarely at the metallic contingent at large, Hill shrugs them off. "Often mainstream rock 'n' roll, which is what I call bands like Warrant and Winger, gets the worst critical acclaim. But they follow up with the best album sales.

"Musically, it's much more difficult to break new bands right now because of the climate of the marketplace—the way that radio is and everything else," Hill attests. "So I think you have to get out there with a better song, a better singer, a band that looks, moves, films and plays better than anyone else.

"I already know how to record and how to make records," he continues. "But when I take a group like Warrant or Winger and help them punch through that barrier by making them better than all the bazillions of bands out there—with the same torn t-shirts, the same haircuts and the same spurs on their boots—that's what really gets me off about continuing to do what I'm doing. I'm one of the lucky ones—what a great job!"

Lars Lofas and Nick Armington live the fevered life of producers and writers in New York City.

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by Jeffrey Lipp

HOW TO BUY YOUR NEW SOUND SYSTEM



You've just walked out of your annual budget review meeting. Your boss has granted the big capital improvement budget that you have been requesting for the past three years. Now the big question is what to do from here?

It doesn't matter if you are the chief engineer of a recording stu-

dio, run a sound system for a church, rock 'n' roll band or are the A/V director of a corporation. There are several avenues to travel toward the acquisition of your system. Each direction has its advantages and disadvantages for your particular technical, time-frame and purchasing

requirements.

The first question you should consider is if you want to do the installation in-house or go to an outside design or installation company. Ask yourself if you have the technical ability to handle a full-scale installation project. If you then decide to do the work your-

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Steve Levine, Do Not Erase Productions

Alan Parsons

"The whole concept of the removable disk means hours saved... The DD1000 will find many a happy home among studios, musicians, post-production houses and in broadcasting."

Alan Parsons, MIX Magazine (February 1991)

Rick Schwartz

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Rick Schwartz, Recording Engineer/Producer (October 1990)

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But you would expect us to be excited about the DD1000, it's our baby. Take a moment to read the comments at the left and see what others have to say about it. Then visit your Akai Digital dealer and test drive a DD1000 for yourself.

File Edit Display Options Windows MD Drive SCSI

Cue List: QLIST 1 ...Unit 1

DELETED	Atob	COPY	SCALE	4TRAK MIN
INSERT	SLIP	+1	+B	-
BUTT	BUTT	TIME-6	-	+
<< FRDE >>	00:00:00:00:0	+0dB	0:00:00:0	00:00:00:0
<< FRDE >>	00:00:00:00:0	+0dB	0:00:00:0	00:00:00:0
CUT 3* CHICAGO	00:00:01:00:0	+0dB	0:00:11.8	
CUT 1 PULLUP	00:00:03:00:0	+0dB	0:00:11.8	
CUT 1 DODOR	00:00:11:05:0	+0dB	0:00:00:0	
EDIT: MOVE	00:00:11:05:0	+0dB	0:00:00:0	
CUT 1 PULLOFF	00:00:14:01:4	+0dB	0:00:11.8	
CUT 1 SKID	00:00:24:00:3	+0dB	0:00:11.8	
CUT 1 CPASH	00:00:27:10:2	+0dB	0:00:00:0	
CUT 19 STRICH	00:00:29:23:4	+0dB	0:00:00:0	
<< FRDE >>	00:00:40:22:4	+5dB	0:05:22.2	
<< FRDE >>	00:01:13:04:6	-9dB	0:05:22.2	

Cue Edit: QLIST 1

Sound Cue

TAKE: CHICAGO

CUT: WHOLE

CUT LENGTH: 00:00:03:23.5

EVENT TIME: 00:00:00:0.0

00:00:04:00.2 [L] 00:00:03:23.5 [R] WHOLE 00:00:04:00:2 00:00:00:00:0

00:00:07:23.7 [L] 00:00:07:23.8 [R] INTRO 00:00:04:00:2 00:00:00:00:0

CUT: WHOLE

TAKE: CHICAGO

00:00:05:06.5

Add Delete Replace

Level

0:00:00.0 0:00:00.0

INDEX Add To List Replace Audition

L16 Pan Output

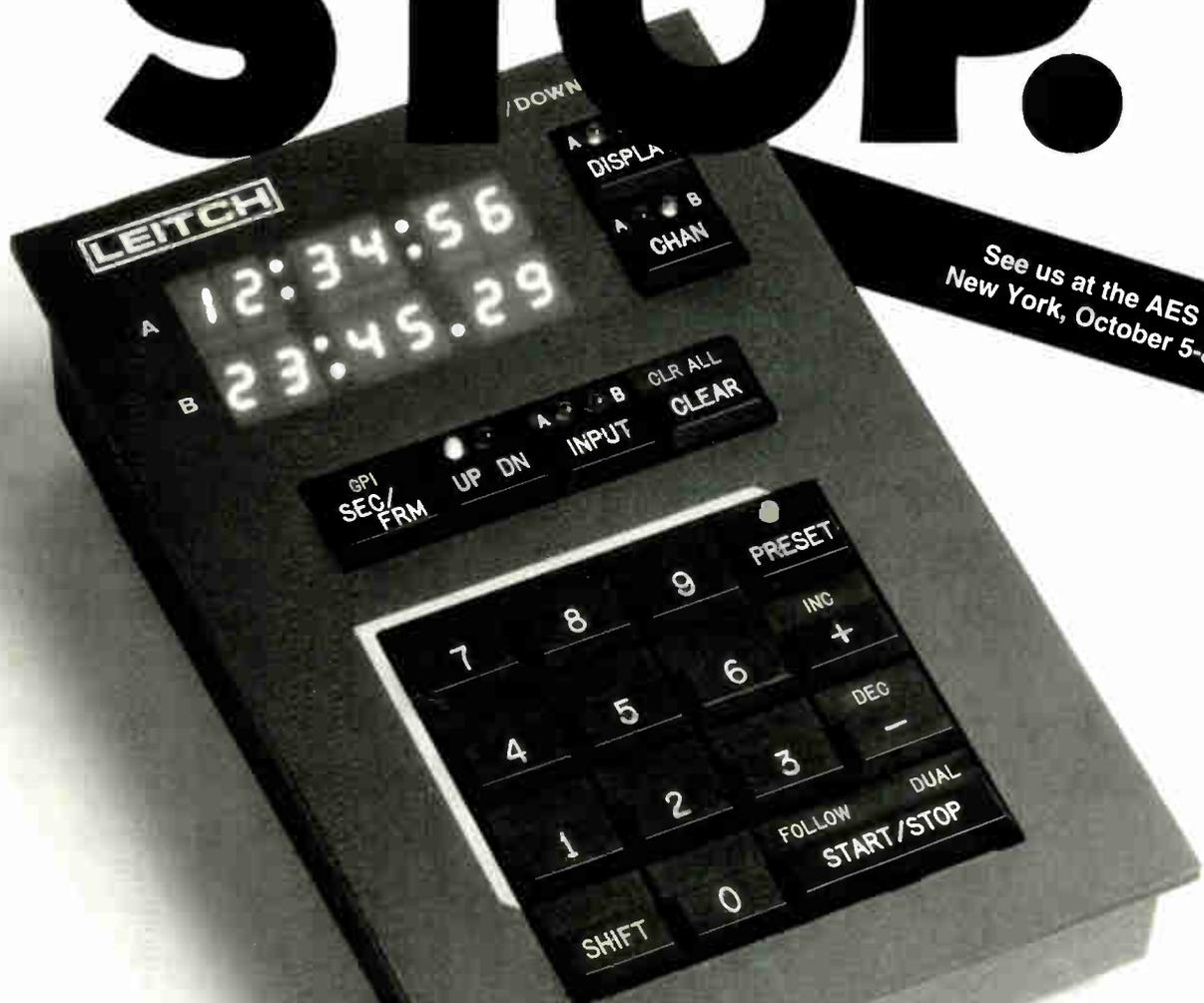


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self, your next task is to find a source from which you will either purchase or rent the equipment.

If you decide to go outside, you will need to find an experienced consultant or design/build contractor to design the system and a highly skilled contractor to do the installation. The use of a system designer is a very important step in the process. All too often, an installed system is purchased after only getting a few quotes on a project. The problem here is that it is impossible to get an accurate "apples-to-apples" comparison. Looking at the bottom line alone tells nothing about the quality of equipment or craftsmanship of the proposed installation.

Quote Process

A customer can request that several vendors supply a price on a loosely prepared list of equipment and installation requirements for a fully integrated system. This is called a quote process. No one designer is responsible for the integrity of the system. Each of the contractors will propose a design with differing creative approaches.

The scenario goes something like this: Your boss grants your budget request, but says there's no budget to hire a consultant or design service of a design/build contractor, but he still wants three prices. You work with a high-quality contractor to get the first price. You then open the phone book to find two more. One comes in with a price at one half of the first contractor. After briefing your boss on the quotes, he gives you no choice but to go with the lowest bottom line. Weeks behind schedule, your system is finally completed. Over the next two years you find so many problems with the equipment and installation that you want to pull your hair out. You would fix them yourself except the contractor never provided you with the proper documentation on your system.

It sounds like a pain, doesn't it? If your situation dictates that you must get quotes, try your best to

see that the line items and services provided are equivalent, and you are not comparing apples to kumquats.

Consultant/Bid Process

To get competitive proposals, a better approach is the consultant/bid process. The use of an independent consultant guarantees equivalency between vendors.

When designing a sound system, the consultant is responsible for preparing a written specification and conceptual drawings (which include equipment lists, wiring diagrams, installation procedures and documentation standards), and making sure that the electrical engineer and architect provide the required electrical work, conduit and carpentry. They must also be concerned with reviewing the contractor's bids, approving any equipment substitutions, shop drawings and performing acceptance tests on the installed system.

The consultant offers an unbi-

ased third-party perspective. While the vendor's concerns are on profit margins, franchise exclusivity and inventory reduction, the consultant takes an objective view of the customer's best interest.

In our industry, many system design firms also offer acoustical consultation. The acoustical consultant will offer recommendations to lower NC levels (background noise) and provide smooth reverberation with a proper mix of early and late reflections. This will increase intelligibility for a speech system, and any sound system benefits from a smooth, natural-sounding decay. Even if you decide to purchase equipment alone, recommendations from an experienced acoustical consultant can be useful for either a recording studio or live sound venue.

Design/Build Approach

The design/build method of purchasing is being used with increasing regularity. In this approach, one contractor is hired to

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LIVE SOUND

provide both the design and installation of a system. While it doesn't offer the benefit of competitive bids, it does offer several advantages over other purchasing methods.

With a design/build approach, communication may be enhanced because there is only one contact. With a consultant involved, you would have to go back and forth between the consultant and contractor to get some small questions answered. Also, with only one contact, the bid process is eliminated, which saves time. As an added benefit, a specification is not needed, which saves on the design budget.

A good design/build contractor can shave months off the turnaround time for a large project. In the case of a large multiroom conference center, one phase of the project may be in design while another is well into the installation.

A contractor who is an equipment dealer can offer additional advantages due to their day-to-day contact with the equipment. Dealers are aware of specials that manufacturers are offering and are able to pass the savings on to the end-user by decreasing their mark-ups.

Dealers are able to show a design customer exactly what they will get by the use of a demonstration. The demo is especially useful for corporate customers who are planning a training room or board room. An executive understands overheads and slide projectors, but knows little of today's high-tech equipment. The demo is an effective tool to quickly educate a design/build customer.

In-House Installation

If you have the in-house technical ability, you should be able to save money by eliminating the system designer and contractor.

Usually, a facility manager will find that the best price can be found by purchasing the hardware alone. Without worrying about acquiring installation serv-

ices, the manager will have many more places to purchase from. A dealer who is not a bona fide contractor may still be in consideration. In fact, each major city has only a few highly skilled sound and A/V contractors, while it has a multitude of pro audio dealers. Many music stores also have pro audio departments, and the number of sources for pro audio and video equipment continues to grow. With more competitors, the selling prices tend to decrease.

One good way to save money on an equipment-alone purchase is to go through a national dealer. National dealers sell a larger volume and can negotiate quantity purchases from the manufacturers. Because their overhead expenses are averaged over greater volume, they require a smaller margin to meet the break-even point.

This seems like an ideal way to purchase, and it is, except for a few points. The amount of technical support a mail order (or box house) salesperson can give is limited to a telephone line. If you are the kind of engineer who wants to touch, feel and listen to a piece before you buy it, you are out of luck. The mail order dealer's demo room may be half-way across the country, if they have one at all.

Some box houses are better than others. It pays to find a reputable national dealer with experienced salespeople and a strong business track record. If you are still a little uncomfortable with mail order and need some hand-holding, then the local dealer is the best choice for you.

On top of the savings on the equipment, engineering and installation expenses can be lowered if an outside contractor is not used. Some facilities have competent technical staffs that can handle large installation projects in-house. The necessary equipment may be purchased or leased, and the facility staff is responsible for integrating the individual items into a working system.

The equipment-purchase-alone method is ideal for broad-

casters. A radio or TV station requires a large engineering staff to operate. Periodic technical changes are the norm, so a broadcast engineer is usually skilled in installation procedures.

This course also works well for minor additions. A studio or P.A. engineer, who would not normally tackle a full-scale system installation, may feel competent to add a new console or tape deck to an existing system.

The primary concern with acquiring equipment alone is the technical ability of in-house personnel. Even the best of production crews may not be familiar with installation procedures. Just think for a moment—do you really know how many 8451 mic cables fit in a 3/4-inch conduit; which is the best way to wire normals on a patch bay; or how you're going to document the system without an Autocad program? If your engineering forte is production, take a good look at turning to a qualified contractor or consultant.

Rental Option

Maybe the best way to go is not to purchase at all. The rental option is a viable alternative in many circumstances.

Our industry is made up of mostly small businesses. Banks tend to shy away from larger loans to small businesses with potential cash flow problems. Yes, it does cost more in the long run, but a long-term rental may be just what it takes when financing is tight.

Theatrical and music productions are fine examples of how well the rental option works financially. Even a Broadway show may be forced to close its doors after a disastrous opening night review. Here the rental could be interrupted prematurely, saving the producer the problem of selling off the newly purchased equipment. Hopefully, though, the production would have a long and prosperous run. In this case, a rental offers the added advantage of ease of service. In most instances, the rental company is re-

sponsible for maintenance of the system, freeing the busy producer from the worries associated with equipment failure and upkeep.

Recording studios frequently use the services of rental companies for short-term projects. A client may require some type of specialty equipment—like a video synchronization system or a piece of signal processing gear—that the studio does not have enough call for to purchase. It's only a small problem to temporarily interface the rental item to the rest of the system.

Your boss may think you are crazy when, after you've finally convinced him to authorize the purchase of new equipment, you tell him you decided not to purchase a thing after all. In some cases, though, a rental may be the most trouble-free and cost-effective way to access the newest, state-of-the-art equipment.

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	8Ω: both chs. driven	: 400W
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your new system installed tomorrow. But try to harness that unbri-dled enthusiasm and think out which purchasing plan is the most logical for your situation. You must first decide on the manner in which you wish to purchase the system.

The next biggest question you should think about is if you can handle the design and installation process or if you need help. If you decide to do the installation in-house, you are in control, but you are also on your own if you have any installation problems. If you should decide on using a consultant or contractor, spend some time to look for experienced individuals who have had clients with similar needs as your own. It takes a creative system designer to integrate all of the pieces together into a great system.

If you do not know any good consultants or design/build contractors, try to find out who designed a few existing projects in

your area. You may also try looking through the Yellow Pages or try membership lists from trade organizations, including: NSCA (National Sound and Communications Association), AES (Audio Engineering Society), NCAC (National Council of Acoustical Consultants) and USITT (United States Institute of Theatre Technology). These leads, though, should be checked out thoroughly.

If you choose to use a consultant, make sure the one you select is familiar with standard documentation procedures. Be careful of inexperienced engineers who hang out a consultant's shingle without the proper qualifications.

The best way to determine the quality of a designer or installer is to research some past jobs. Ask for a list of completed projects. Most consultants and contractors have a list of previous clients they will be glad to share with you. Call the operator of the system and ask how the system is working out, if they had any problems

with the design, if the installation is first-rate, or if they had any specific problems working with the company. If you can arrange a site visit, it's a good idea to get a first-hand look at how the projects were completed. You will find most engineers are proud of their systems and are happy to spend time showing them off.

The final step is to narrow down your choices. Select a designer who you think will do a good job technically and be easy to work with. If you're getting competitive bids, check out the qualifications of the contractors. Remember not to use the bottom line as your only factor in the decision-making process. One contractor may do a much better job than another and at a slightly higher cost. Spend a little time now, and you will be happy for years to come. ■

Jeffrey Lipp is a system designer with Ancha Electronics, a national sound and A/V contractor. He is also an independent writer.

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(mī·krə·fō·bē·ə) n. The fear of feedback.

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1. UHF gets better reception. Yes it does, in the sense that UHF operates at the higher frequency range of 902-952 MHz. There is a lot less *traffic* up in that bandwidth. And, more importantly, less RF interference and noise.

2. New UHF technology has recently been made available. For the UHF Series, Samson put four of our finest wireless engineers[◊] on the case. Using up-to-date developments like Di-Electric filters, Gas-Fet and new cellular technologies, they were able to bring UHF up to a higher level of performance.

3. UHF sounds better. A dangerous generalization perhaps, but it *does* have wider RF dynamic range. And because we're the first to use dbx[†] Noise Reduction in UHF, the resulting audio quality is even more impressive.

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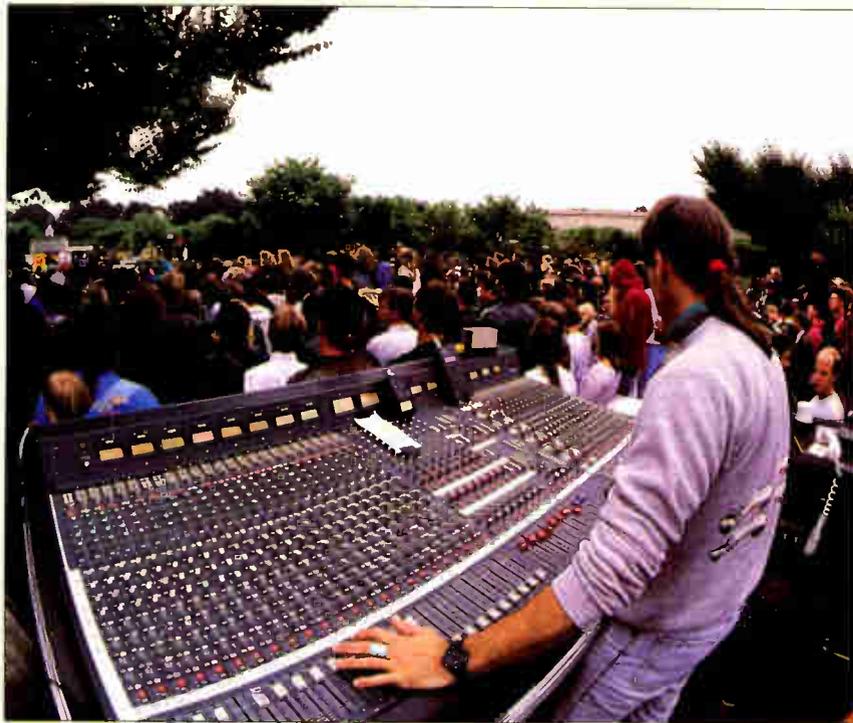
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*In case you were reading too fast, we wanted to remind you that this ad is about UHF, not VHF wireless. ◊As long as you are reading our ad this closely, we thought we'd tell you who they are: Yukinaga Koike, Doug Bryant, Takao Horiuchi, Susumu Tamura. †dbx is a registered trademark of Carillon Industries.

by David (Rudy) Trubitt

SOUND CHECK



Left: Kevin Sims mixing Crowded House at SF's Golden Gate Park. Below: AC/DC's stage at the Oakland Coliseum (see story).

reason the device is not offered separately. Third Ear is evaluating the full Adamson system, and building new monitor wedges using PAS 15-inch coaxial drivers with JBL 2450 horns.

A Semi-Permanent Arrangement

In addition to its touring systems, Audio Analysts fielded several semi-permanent installations for the summer season. For example, the company provided a full house P.A. and delay towers for Pacific Amphitheater in Costa Mesa, Calif. The system, which will be in place until November, includes 56 of the company's own HDS4 cabinets. Audio Analysts has been active in this area for years, says Trish Heczko. "We saw that amphitheater and semi-permanent installs were definitely something that we would put

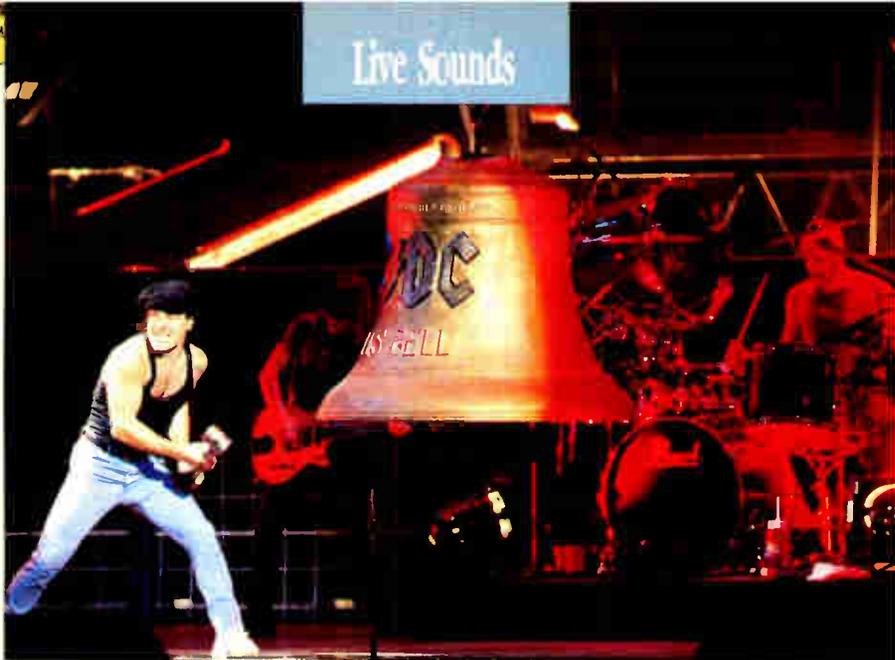
—CONTINUED ON PAGE 178

Third Ear Sound, Richmond, Calif., handles nearly all of San Francisco's street fairs—including this summer's Carnival festival—in addition to a mix of concerts and corporate entertainment events. Third Ear also provided some equipment for a recent Crowded House free concert in Golden Gate Park (see photo). The company has been adding equipment, anticipating September delivery of a Soundcraft Europa console (Soundcraft says the first few dozen Europas will appear domestically that month). Also on the shopping list are new loudspeakers, specifically smaller, louder and flyable boxes. Third Ear's Raul Suarez was especially impressed with the Adamson Acoustics 10-inch Kevlar cone midrange, the M-200. Third Ear has been using Mark Wayne-designed cabinets (see *Mix* June '91 Strawberry story for Wayne info), and hoped to add the

Adamson midrange to a Wayne design, but alas, the driver is not available by itself. Adamson's Jerry Placken cited the synergy between the 200-2,000 Hz, 350W driver and the company's Acoustic Waveguide cabinet as one



PHOTOS STEVE JENNINGS



AC/DC On Tour

Performer: AC/DC

Venue: Oakland Coliseum, Shoreline Amphitheater (Mountain View, CA), June 13 & 14, 1991

Sound Company: dB Sound

House Mixer: Robbie McGrath

Monitor Mixer: Paul Owen

Crew Chief: Scott Pike

"I'm here as a sound engineer through dB Sound, but chosen by the band—it's one of those complicated situations," says house mixer Robbie McGrath. When dB bid on the job, they also put forward names of several potential mixers, including McGrath. "I was really shocked at the phone call to even put my resume in, because I'd been doing Simply Red, Tears for Fears, Sinéad



Above: Yes, it's real. And it's miked, too! Left: House mixer Robbie McGrath.

O'Connor and Art of Noise—it's a different ball game. But I spoke with the guitar player, and he said he was quite fed up with going to hear bands that were too loud, with not enough distinction. I think it's worked. At least they haven't gotten rid of me! The main problem with mixing a band like this is to keep it loud but separated, and try to make the halls sound a little smaller than they are. I'm using the TAC SR9000 [42x16 with 24-input extension], which I've used before, and I find the desk is

—CONTINUED ON PAGE 174

Rigging Issues

By now, you may have heard about a rigging problem at AC/DC's Oakland Coliseum date. Around noon on the day of the show, two Kinedyne (formerly manufactured by Aeroquip) Series L Double-Stud fittings broke free from their L-track, releasing four EV MT-4 cabinets about 30 feet

above the stage. The cabinets involved were an internal column of the FOH system. No one was injured. The entire system was lowered, and all remaining fittings (part of a new, slightly modified strap assembly used for the first time that day) were replaced with older equipment.

Kinedyne traced the failure to

hydrogen embrittlement, which can develop during the process of plating any high-strength steel. Parts are baked after plating to force out excess hydrogen molecules, but if the hydrogen is not removed, the material is significantly weakened and prone to sudden failure. Short of failure

—CONTINUED ON PAGE 177

—FROM PAGE 173, AC/DC ON TOUR

amazing. It gives me everything I need."

Electro-Voice MT-4s are McGrath's loudspeaker of choice; he's used them on previous tours. "The EV is a very unforgiving system, in the sense that it's real easy to mess up. It's not like a Meyer rig, where you always get a Meyer feel from it, or a Clair Brothers, where it's always a Clair Brothers feel. You can get anything out of it, so you really want to know what you're looking for. All in all, I think it's a very good rig. I think a lot of people are frightened of it—it's got a few problems, but nothing you can't get over." A Meyer CP10 provided overall system EQ, with a broad 4dB boost at the low end and a 2dB dip around 2-3 kHz. "The high mids can be quite bitey—you have to be careful that your volume isn't there, because that will destroy everything below it."

"EV is doing some modifications on these boxes for us," says

dB Sound crew chief Scott Pike. "The DH-2 high-mid driver and manifold has been redesigned, because it's kind of peaky in the 2.5k range. These will all be changed next week. EV has been really supportive as far as taking criticism and actually *doing* something about it."

Pike describes the rig's layout: "The first two rows are three-ways hanging with horns on, then the next row is bass. They're all in columns until you get around to the side-hang where they check-erboard to split it up, because you don't need it quite so beamy. When you get it in columns like this, it's really high-powered."

Like most, McGrath enjoys experimenting with new outboard gear, although he shows considerable restraint when mixing. His current fave? "The Eventide H3000 Harmonizer is an amazing machine. I recommend it highly. Before that, it was the Lexicon 480—some of the programs in that are amazing. I like the BSS compressors; I want to try the

new one. They've also got a nice delay with a temperature probe for adjusting delay settings."

Stage miking is fairly straightforward, but McGrath offers a few twists. "I mic the top snare with two 57s [in a crossed-pair configuration], so the pickup area on the drum is much wider than with a single mic. I get a lot more tone out of the snare before cranking the gain. Also, I Aphex [exciter] one of them, which gives me a processed sound on one mic." A third 57 on the bottom head finishes the job. He's also made a less conventional choice for the kick. "I'm using a [Beyer] M88 on the bass drum—it's got a real sweet low end. A lot of people who do this kind of music go for a lot of that 5kHz attack in the bass drum sound, which, to be honest, I don't like, because I think it takes the bass drum too far out of the mix."

Also notable is the Sony wireless mic used by singer Brian Johnson. "I have a love/hate relationship with that thing. Some nights it's great, and some nights... I'd prefer to use Samson or Shure, but Brian likes it, and he's the one out there in front of 16,000 people."

McGrath believes in adapting to each situation. "Every hall sounds different; as long as you apply a bit of care, you can get the hall to sound good within itself. Use whatever the hall is giving you—you don't bring your own sound in there. If you do, it'll drive you mad, 'cause you'll never get every room to sound the same, as we all know. I think using the excuse that the room was bad is a bit lame. We've landed a man on the moon, lads; surely we can hear the guitar at the end of the hall!" His approach to the Oakland Coliseum was to start off slow and build. "If I were to power up too hard in here, it wouldn't work. I'll set the mix up first before bringing it out." He pauses and laughs. "If not, I'll have plan B!"

Monitor duties are covered by Paul Owen, who was last out with Metallica. "I started in rehearsals with AC/DC in September 1990," he explains. "I did two weeks



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with them, which gave me a fair bit of insight into the band. In the studio, we had conventional wedges on the floor, and they sounded great. But as soon as I put them under the metal grilles on this stage, they didn't happen at all. The grilles have a 3/4-inch gap, but it's like looking at a venetian blind. No matter where you put the horns, the sound will only come out one way, and it makes everything bright and sparkly. I had to revamp the whole monitor system during production rehearsals, so I changed to the Delta Max, which responded better under there. I think the processor makes them more efficient, and the overall sound of the cabinet works well, although I don't think the low-end response is that wonderful. Single DMLs sound totally different than two that are within, say, six inches of each other, because you get the coupling at the low end." The monitors are powered by Crown MT2400s for the low end and PSA-2s for the highs.

"I'm using a Ramsa board," Owen continues, "but I'm going to change that to a [Midas] XL3, because I find that on the Ramsa, the EQ isn't that superior. You end up taking so much away on the board that you find you are using the outboard EQ to compensate. So I've inserted parametrics on Brian's vocal and the backing vocals, which has helped to a certain degree, but the biggest problem with this band is the actual volume. At the backing vocal position alone, it's 120 dB A-weighted—just the volume of the guitars. So if they're not [singing] any louder than the guitars at the mic, and they ask for the vocals to be turned up, you just end up increasing the stage volume around them. Brian has been pretty consistent [-3 to +3 VU at input], but toward the end of the tour, he can drop down to just above the stage level [-10]. It's an impossible situation, because he isn't singing louder than the stage."

Of course, AC/DC is a *guitar* band. Malcolm and Angus Young each use eight guitar cabinets—four on each side of the stage.

There are no guitars in the monitors. "They rely mainly on the backline," says Owen, "and they've been doing it so long that they're not really willing to compromise backline-wise. It's always the monitors that have to compete against their level. I find I have to emphasize the high end, probably from 3k to 10k, which hurts my ears, but these guys will say it sounds really dull onstage. But, the frequencies that sound very harsh are the ones that cut through over the loud guitars." Overall, Owen runs 12 channels of monitors. In addition to the DMLs, EV MT-2s are also being used for sidefills.

Keeping the whole operation running is dB Sound crew chief Scott Pike, who also mixes opening act L.A. Guns. I asked if the two responsibilities create any conflicts. "Quite a bit, actually," he says. "I spend a lot of my day making sure things are right for Robbie, and then I have to do the opening act on top of that. You have to kind of separate yourself from that side of it to get into a mixing mode. A lot of the time, I won't get 15 minutes before I walk up to the desk, so it can be difficult." Pike was also busy coordinating a 500,000-watt, 50-truck system for the "Monsters of Rock" European tour, which includes AC/DC, Metallica, the Black Crowes and others.

So how did it all sound? In both venues the sound was quite clean with a very solid (and quite physical) low end. It was also very loud, averaging 116 to 120 dB at mix position. Walking the higher rows of seats at the amphitheater during soundcheck, I noticed some dips in the system's high-end. Perhaps this is the trade-off for the added efficiency gained by the vertical alignment of the main's three-way and low-end boxes. Finally, McGrath's love/hate relationship with the Sony wireless swung to the right at Shoreline, when all the Sonys exhibited a pronounced hump in the low midrange. Nonetheless, overall blend was excellent, especially between the two guitars, which meshed seamlessly throughout. ■

—FROM PAGE 173, RIGGING ISSUES

under load, hydrogen embrittlement can only be detected by examination of the metal under a scanning electron microscope.

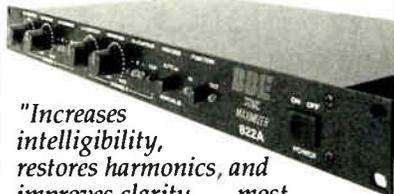
Fortunately, the company was able to quickly identify the batch of suspect fittings, and issued a recall notice to its customers the following day. Only parts purchased from Kinedyne between March 1 and June 17, 1991, are affected. "To the best of our knowledge, we've been able to isolate all the affected parts," says Joe Takacs, director of engineering. "New product is being produced, and the old parts will all be replaced."

Since the problem was manufacturing-related, no changes to the part's design or recommended usage have been made by Kinedyne. However, as an additional precaution, dB Sound is now using double clips on the ends of their straps.

Originally designed for the air cargo industry, hardware of this type is used by many speaker manufacturers and sound companies. However, several experienced riggers contacted for this story voiced some concern over the widespread use of cargo handling equipment for live sound. "Strength-to-weight ratio is important for airborne applications," says Rocky Paulson of Stage Rigging Inc., San Carlos, Calif., "but perhaps those considerations are not of primary importance in designing speaker rigging hardware." However, Kinedyne notes that the connectors have been used successfully for more than 15 years. Steve Kendall of RigStar Rigging adds, "I feel the connectors are safe. The important part is quality control, not just by the manufacturer but by the rigging designer. To compensate for shock value, a safety factor greater than 5:1 should be considered and used in the design of flying equipment. Shock values play a greater role in concert rigging than in cargo restraint."

Everyone knows the importance of this issue. Rig carefully. —RT

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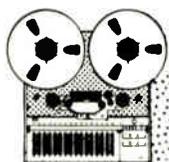
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LIVE SOUND

—FROM PAGE 172. *SOUNDCHECK* some attention into." Other seasonal systems are in place at the Chene Park Amphitheater in Detroit, which includes house and monitor systems and delay towers, and Toronto's Kingswood Music Theater.

Keep Those Cards and Letters Coming...

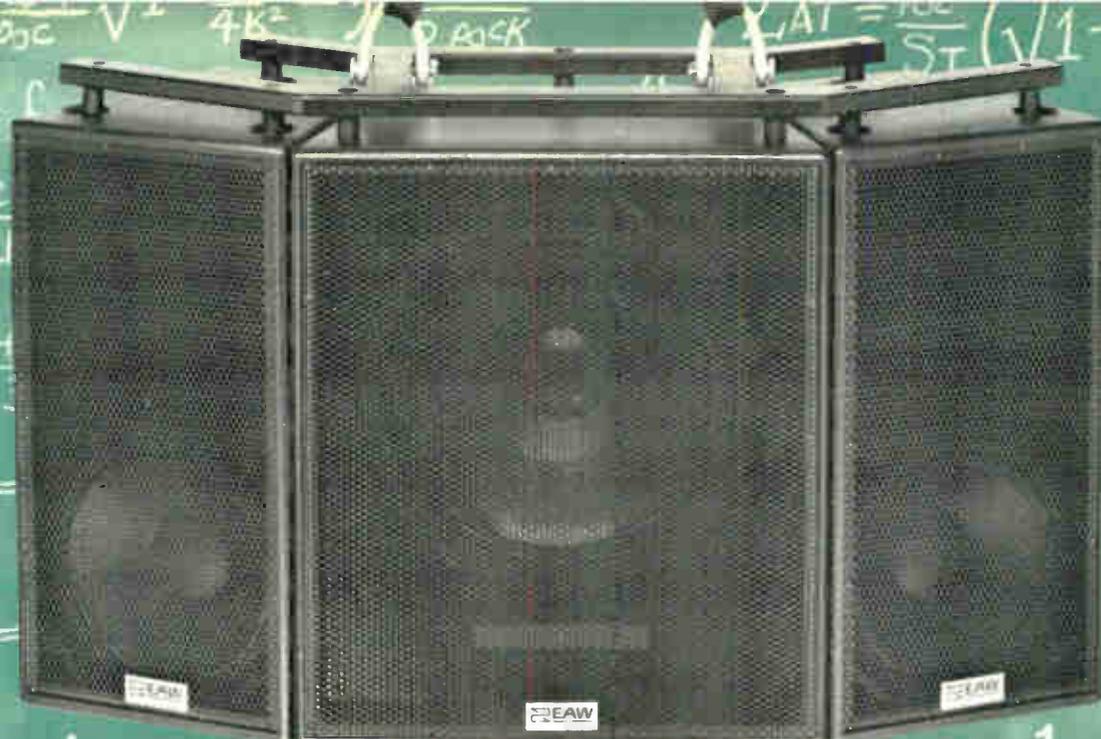
Marshall Stacy, production manager and live sound engineer at Rupert's in St. Louis, took a moment to let us know what he was up to: Rupert's is a 1,100-capacity club that plays host to everything from touring track acts like Tony! Toni! Tone! to the 16-piece house band, which includes six singers and six string players. "It's a big challenge to keep clarity and volume manageable when dealing with a 110dB stage volume," says Stacy, "particularly when I'm 18 feet from the stage." The club's stereo system includes JBL-loaded cabinets, Soundtracs house (40x8x2) and monitor (32x10) consoles, and 20 QSC amps. Delayed speakers help fill the quieter areas and back of the room. Stacy tells us his biggest challenge is keeping the 16-piece band's sound consistent from night to night.

NEWS FLASHES

Proshow recently sold a DDA Arena console to the Seattle Kingdome. The console joins an extensive and highly automated system designed by Proshow and based on Crown's IQ control system... Autograph Sales of London provided additional Meyer equipment, including MSL-3s, for the 25th Anniversary Montreux Jazz Festival. This is the fourth straight year Meyer has been specified by Chris Ridge-way, the house engineer for the event. The venue's permanent system includes MSL-3s, 650-R2s and UPA-1As, and a UM-1A monitor system that was rein-

forced with gear supplied by local Meyer dealer Hyperson Sonorisations. Jürgen Dudda Audio Services of Germany provided the originally installed system and brought in additional equipment to supplement the club's disco... SSE Hire Ltd. of Birmingham, England, was first off the block with the new TAC SR6000 console. The desk, essentially a scaled-down version of the TAC SR9000, was used on the first date of Elvis Costello's European tour, which opened at the Hammersmith Odeon on July 1... Speaking of console sales, Soundcraft Delta 200 boards are now in the hands of Sunbelt Scenic Studios of Phoenix (industrials), Memorial Hall in Dayton, OH (fixed install) and Oliver's Enterprise of Indianapolis (touring sound). The mixer is also seeing service in the church market, including The Vineyard Christian Fellowship of Orange, CA, and Calvin Collage and Seminary of Grand Rapids, MI, which purchased a 24-channel Venue... Tapestry Sound fielded an Apogee/Soundcraft Delta system for a Chubby Checker/Frankie Valli gig in St. Thomas, VI, for corporate client Minolta... M&M Audio, located in the Bay Area city of Danville, opened for business earlier this year. The outfit is headed by Alex Moran, who spent many years working as an independent live sound engineer in the L.A. area. "We do club to concert sound, conventions, and city functions," says Moran. The company is planning to add a 15kW flyable system to its existing 20kW five-way stage rig... Maryland Sound's West Coast operation took delivery of the first TAD TD-40002 high-frequency compression driver built at the company's new manufacturing and assembly facility in Long Beach. The driver is the company's first product manufactured in the U.S. ■

David (Rudy) Trubitt is busy on a dance remix of "Dirty Deeds Done Dirt Cheap." To retain authenticity, he mixes in school-boy attire.



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MGM, and worked at its New York facility, which handled most of the stereo dubbing for the studio's features. "It was called Fine Sound Inc. at that time," he notes. "In addition to the film work, it also offered recording studios to service radio and television clients, as well as general post-production facilities."

Eberenz worked there from 1953 until 1958 when the facility was closed down. Then he moved to Washington, D.C. where he built a post-production studio for Byron Motion Pictures: "mainly doing commercial and industrial work." But he soon returned to New York when the key principals from Fine Sound reorganized and reopened as Fine Recording Inc. "Again, we were doing both film and music recording, and a lot of mobile recording. We also provided tape duplication and all the other usual services," reports Eberenz, who served as VP of technical operations. As such, he designed and built complete facilities for disc, film and duplication.

In 1968 Eberenz joined Todd A-O and moved to Los Angeles as assistant to the head of operations, but after two years he moved back to New York where he set up as a private consultant and built several studios. In 1972 he joined Magna-Tech as VP and became president in 1986. Since June 1, 1991, Eberenz has been semi-retired but remains active. "I still do consultation work, and I still have my own design company, RWE Engineering Company," he explains.

Looking back on his long and diverse career, Eberenz stresses that "post-production has changed beyond all recognition since I started," he recalls. "Back in 1945, all recording and post sound was done directly onto an optical track. It wasn't until the late '40s and early '50s that we really started using magnetic in post. Prior to that, all the recording was on optical—all the tracks were recorded on location or on a soundstage—and generally all the recording that was done was used in the film. There was no looping or ADR at that time. And as far as post goes, it was very simple in those days because we had so few tracks to deal with." But that was to change due to "a revolutionary change in sound."

Eberenz explains: "The appearance of magnetic recording was a pretty drastic change for editors used to

working with optical soundtracks. It took some time for them to adapt to a medium where they could no longer physically see where to make their cuts, and it developed slowly. In fact, not surprisingly, a lot of folks didn't want to make the change to magnetic."

According to Eberenz, by the early 1950s when major manufacturers such as RCA made equipment more available, "it became the norm in post studios. At the same time, we were still using the same type of re-recording consoles we'd been using during the optical days—there wasn't a major change at that point."

However, with the arrival of Cinemascope and groundbreaking stereo features such as Warner's *House of Wax*, consoles were forced to update as well. "We started to expand and jerry-rig consoles, as they were all mono at that time," he notes. "It was a case of modification at first, but eventually we started designing stereo consoles, and those consoles were basically designed by the studios themselves and built in the studios."

Eberenz adds that "probably the most advanced type of console was made by Western Electric to MGM's specifications. In fact, that console was used from the early 1950s right up until the 1970s, because it was so versatile and ahead of its time in terms of its design and capabilities."

According to Eberenz, the next major shift occurred in the mid-to-late '60s when several new companies began designing custom consoles for the film industry. "Magna-Tech was one of the first, along with Electrodyne and Quad-8, who were essentially pioneers in manufacturing stereo consoles. Of course, they were still three-men boards in Hollywood at least, because they still followed the old optical system of having a dialog mixer, a music mixer and an effects mixer. This wasn't the case back East, where they used a one-man system.

"With the advent of these consoles, and with the tremendous advances in music recording, the manufacturers—of which there were maybe 25 in the late '60s—were building consoles for the music industry," Eberenz continues. "As an offshoot, several of them started designing for the film industry. Companies like Neve and Harrison, who'd designed for the music business primarily up to this point, saw a need for much more sophisticated equipment in film with stereo and surround

sound. Concurrently, we went from 20 tracks in a mix up to 40 or more, which again pushed the design aspect."

Eberenz views the '60s and '70s as "a period of fundamental change in design and technology of consoles. Since then, the changes have been even more accelerated. Now you have more inputs, more flexibility, and consoles that are able to handle 6-track Dolby for 70mm releases.

"In fact, we've now reached the point where consoles will be purely digital and not required to handle analog signals at all," he states. "That will be the next major step in the advancement of sound for feature films. We've just had demonstrations of the new Dolby SR•D, in New York and London, showing the advancement of the compatible digital-analog soundtrack for 35mm, and they were very well-received by everyone in the industry."

Eberenz continues, "In my opinion, it will be the impetus to advance more into the digital range in the coming years. It won't be a quick changeover. Just as when we made the change from optical to magnetic, there'll have to be a learning period as the digital equipment used to record and reproduce develops. But I predict within the next five years there will be a major move into digital post-production."

Summing up, Eberenz says, "The most important developments in post-production since I started in 1945 are, without a doubt, the introduction of magnetic recording, first; the introduction of stereophonic recording, second; and, finally, the development of the Dolby SBA stereo optical soundtrack."

Eberenz stresses future advances in sound "are likely to come fast and furious now. For instance, when magnetic first arrived, it took a long time before anything else caused such revolutionary changes in our approach. It was more a case of refinement for many years—such as better quality in the recording and playback systems, better magnetic oxides, extended frequency range—than another major technical change in the industry."

"The arrival of digital," Eberenz points out, "is just such a major technical change." ■

Mix post-production editor Iain Blair is also a freelance writer living in Los Angeles.

POST NOTES

DAR Equips TVS for Digital Dubbing

Britain's TVS Television Centre has just purchased DAR's DASS 100 multi-function digital interface to fully integrate the digital equipment system in its new all-digital audio dubbing suite. Several months in the planning, the new state-of-the-art room is based around TVS's 16-channel SoundStation II Digital Audio Production System, with DASS supplying the signal processing, frequency conversion and audio synchronization functions required for maximum efficiency in its digital dubbing operations.

According to Mike Brooks, TVS's project engineer, "Most audio material arrives here on analog. We then transfer it to digital, and using the DASS 100 system we can stay in the digital domain through all our dubbing until we relay to the VTR. So we don't lose any audio quality through multiple conversions. We feed our TV station's video sync directly into DASS 100, which generates audio word clock and distributes it to our SoundStation and other digital machines. DASS synchronizes the digital signals from our CD players, DAT machines and music samplers, then does the sampling frequency conversions and all the routing so that we can select different source machines to input to SoundStation."

Post Perfect Expands Keycode System

New York's Post Perfect is in the process of integrating its existing Keycode film edge reading system with the FLEX file format, invented by Jim Lindelien of Time Logic Inc. (Moorpark, Calif.). The new system was expected to be up and running this summer, providing the company's clients with additional capabilities.

Post Perfect's existing Keycode system allows film edge keycode numbers and videotape time code to be burned into videocassettes of dailies. With the addition of FLEX, the entire process of film and video editing will be greatly simplified, as FLEX is a database that also stores audio time code numbers from Perfect Sync sources such as Nagra T and R-DAT and sound and film reel numbers, in addition to the standard film edge numbers and video time code. The Time Logic computer stores the infor-

mation, which can then be outputted to a floppy disk or printer in order to provide film editors with a film conform list (or negative cutter's list) for the matchback process.

Digital Magic Opens in Santa Monica

Digital Magic, a brand-new, state-of-the-art video and film visual effects and post-production facility located in Santa Monica, Calif., recently opened three of its online digital suites to service the film, TV, commercial and music video industries. The rest of the 23,000-square-foot facility was expected to open this past summer, of-

fering online digital and videotape editing, digital special effects, computerized graphics, motion control, film-to-tape transfer, tape-to-film transfer and videotape duplication.

Digital Magic also boasts some of the top staff in the industry, including creative director/CEO Rich Thorne (previously senior VP of The Post Group) and president Tom Garofalo (formerly L.A. head of sales for BTS).

CNN Chooses Sanken Lavalier Microphones

After extensive testing, producers of CNN's *Headline News* have switched



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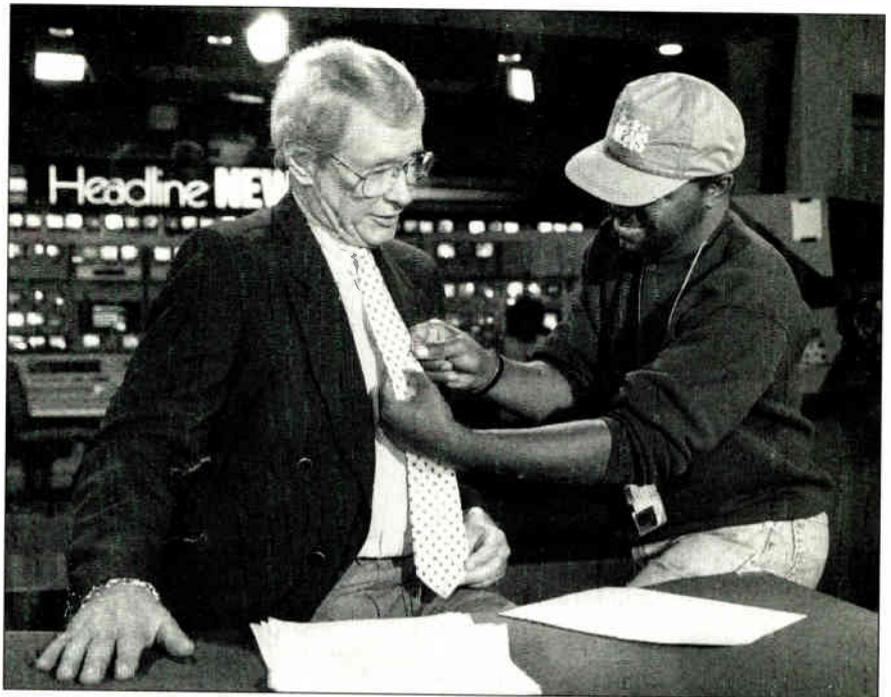
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POST SCRIPT

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"The anchors are very demanding when it comes to image," comments Bill Tullis, audio and music consultant with Turner Broadcasting (Atlanta),

with instant storage. Recent projects making use of the upgrade include the TV series *thirtysomething...* Keller & Cohen (Sausalito, CA) produced original music for Pacific Bell's Centrex System new television campaign. The three 30-second spots were edited at Decoupage in Los Angeles.



CNN Headline News anchor Don Harrison (left) and production assistant Elvis Singleton.

"They like the Sankens because they are so small, unobtrusive—and they get the job done better than any other lavaliers around."

Headline News has taken delivery of 12 COS-11 lavaliers, outfitting the entire section of the CNN operation with the new mics, which feature an innovative vertical diaphragm placement within the mic body.

POST BRIEFS

Communications Concepts Inc. (Cape Canaveral, FL) won six Crystal Reel Awards given by the local chapter of the Motion Picture and Television Association. CCI won three for its premiere issue of *Scanlines*, a quarterly video magazine, two for commercial/public service announcements about chemical dependency, and one for a marketing presentation... Digital audio post-production facility EFX Systems (Burbank, CA) upgraded the automation capability of its Harrison Series-Ten B console. Modified to work with a Mac II, the console provides automated mixing and changes

and the agency was Foote, Cone & Belding... Commercial music production house Music a la Carte (Pacific Palisades, CA) completed two TV post scores for a JC Penney campaign in conjunction with Falcon Productions (Coral Gables, FL), which shot the spots. Both scores were recorded at Criteria Studios in Miami and combined orchestral and electronic elements... Yessian Music (Farmington Hills, MD) has been asked by the General Motors Corporation in cooperation with the Environmental Protection Agency to produce the Spanish language version of the theme song for the public service video "I Need the Earth and the Earth Needs Me." Yessian also produced the music for the English language version, which features actress Colleen Dewhurst... Pacific Video Resources (San Francisco) recently completed post on an opening and nine promo spots for the David Patton Company of San Anselmo, CA. The package was developed for KNBC in Los Angeles. ■

'THE INTEGRITY OF DIGITAL COPYING

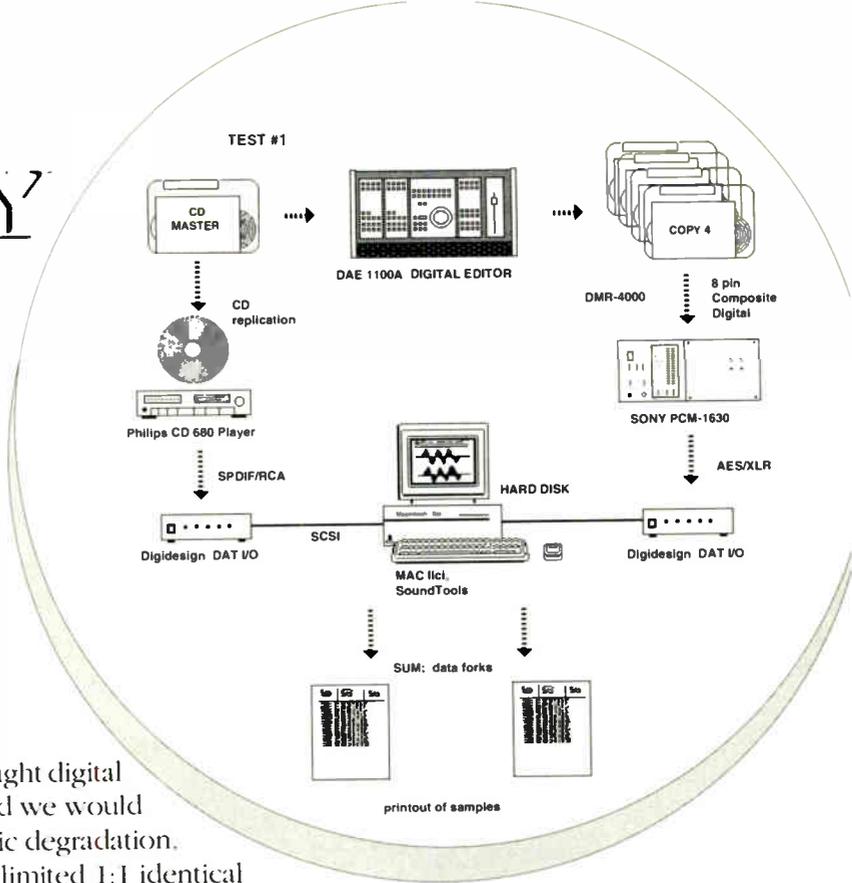
A Scientific Approach

A decade ago, Sony and Company brought digital recording to the masses and promised we would never again have to worry about sonic degradation. Digital audio allowed us to make unlimited 1:1 identical transfers and copies. The age of digital perfection was at hand. Engineers and musicians breathed a sigh of relief. No more second- or third-generation safety copies to revert to. No more buildup of tape hiss, loss of high end and detail. No more loss of quality.

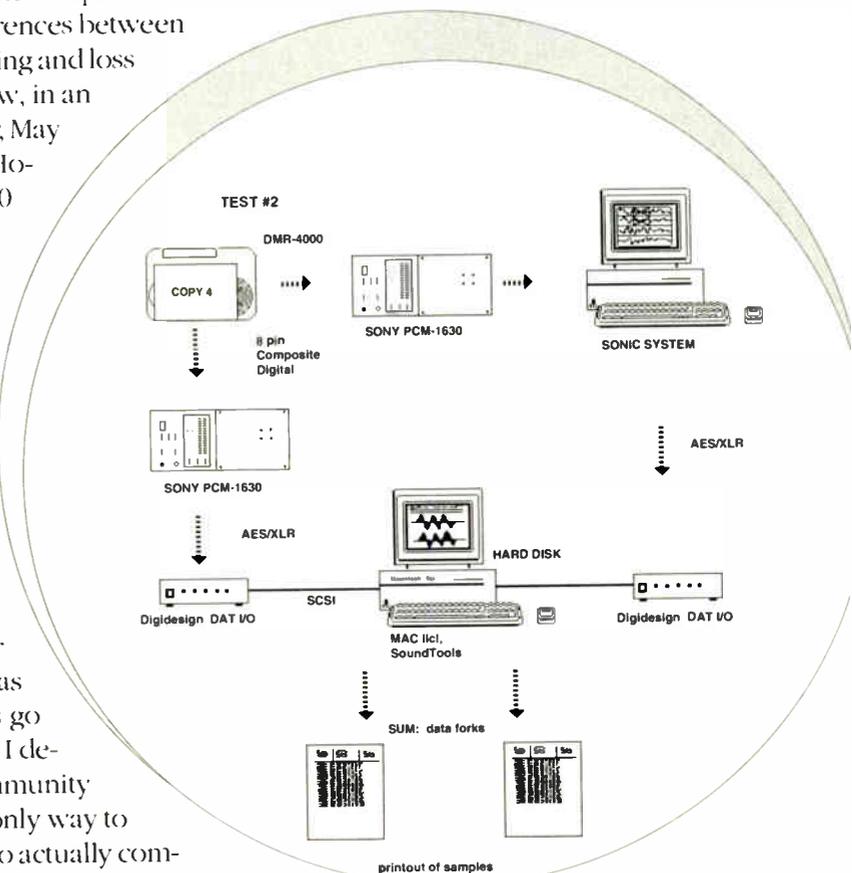
Since then, there has been some grumbling among the cohorts. Claims of digital's magic "not working" have been rampant. Rumors abound. Engineers claim they can hear differences between a master and a digital copy. Some hear smearing and loss of detail. Some claim to hear digital jitter. Now, in an article, "Five Outboard A/D Converters" (*Mix*, May 1991) by Bob Hodas and Paul Stubblebine, Hodas asserts that a transfer from Sony PCM-1630 and back to Dyaxis produced a somewhat degraded signal aurally. The inference is that digital copying simply does not work.

But what is the truth?

Rather than rely on subjective and anecdotal reports, I decided it was time to roll up the shirtsleeves and do some of my own investigative work. Naturally, at Northeastern Digital Recording we have been concerned with the cloning issue. Over the past six years, we have mastered some 2,000 CD projects, and we have copied and cloned like hamsters. Many of our 1630 digital copies have ultimately gone out as CD production tapes, and DAT submasters go out daily as cassette duplication masters. So I decided to perform what the scientific community would call "a controlled experiment." The only way to tell if digital cloning really works would be to actually com-



By Dr. Toby Mountain



ChangesBowie. This was four generations removed from the 1630 master used to make the CD, each generation created through the Sony DAE-1100A at unity gain. I recorded the same passage again into Sound Tools.

After editing off the silence that preceded the music in each file, I compared the results of over a dozen sectors of data using SUM. Nowhere did I find a discrepancy. The files were identical. Printouts of the results of two sectors (200 and 643) are presented in columns A and B of Fig. 1.

Well, I wasn't completely convinced yet (maybe those ones and zeros are just partial to David Bowie), so I took random snippets of parallel passages from four other CDs and 1630 copies. One of the projects was six years old, and the 1630 tape on the shelf was COPY 6! In every case, the data came up the same. Everything identical.

The second test was done using the same David Bowie "Ashes to Ashes" sample from the 1630 COPY 4 tape. It was first digitally loaded into the Sonic System hard drive and later dumped into Sound Tools directly from the Sonic System without adding any EQ, gain or dither. Once again, everything came up the same. The results of the same two sectors (200 and 643) can be compared in Fig. 1 under columns B and C.

For my third test, I used the Bowie CD as the source. The same passage was digitally dubbed to a DAT recorder (Panasonic SV-3500), and 20 generations of digital copying ensued between the Panasonic and a Sony DTC-1000 consumer DAT recorder. The DAT tapes used were from Sony and Maxell, both of which had been recorded over at least 50 times. I pored over a dozen or so data files. Well, you guessed it...the results came in the same! Printouts of the results of the same two sectors (200 and 643) are presented in Fig. 1, under column D.

Are you a believer now? Maybe you're saying that it may work at a fancy mastering studio where everything is carefully controlled. But hey, you can try this at home yourself! If you already have a Mac with Sound Tools and a DAT I/O, all you need is the diagnostic software.

I am sorry that more exhaustive samples of data could not be presented here. Unfortunately, we were limited by printing space restraints. If anyone doubts the validity of the data, please contact me directly at NDR, and I will send whatever you would like. And if

The Effects of Dither

While I still had the Sonic file on the hard drive, I decided to look at the effects of adding dither to the output. I started with the lowest amount (50%). About 30% of the numbers were affected and changed by a value of -1. Using the full amount (1000%) changed about 40% of the numbers.

The Sonic dither is a digital noise generator that randomly adds in zeros and minus ones (FFFF) to the digital output. The sonic result is that the dither has an "equalizing" effect. Dither can successfully smooth out or mask stepping or quantization noise at low gain levels (close to LSB), such as the front of tunes and the ends of fades, or when gain changes have produced truncation after multiplication.

you're still not satisfied, I will invite you to our studios to check out the results for yourself!

Studios should routinely perform these tests on all of their digital equipment when transfers and copying are involved. And disbelievers should definitely do the test! If you get non-corroborative results, then find out from the manufacturer whether there's any phantom filtering or bit changing going on. It's quite possible that such things could account for some of the funny things you're hearing. I would be interested in hearing about such results.

More testing will give us insights into other aspects of the digital transfer process, such as data transfer integrity with excessive error correction and error concealment, and the effects of nominal DSP such as DC removal. Perhaps these topics will be discussed in a future issue of *Mix*.

In the meantime, I hope this article has restored some faith in the process of digital transfers and copying. It works, and we can be thankful for it! ■

Dr. Toby Mountain is the owner of Northeastern Digital Recording, Southborough, Mass.

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by Bruce C. Pilato

JAMES BROWN

BACK ON THE GOOD FOOT

T

he Godfather of Soul. Mr. Dynamite. Soul Brother Number One. The Hardest Working Man In Show Business. Take your pick. James Brown has been called all of 'em. And, many feel, rightly so.

"James Brown," the singer says, "is a concept. A vibration. A dance. It's not me, the man. James Brown is a freedom I created for everyone."

Today, after serving two years of a six-year prison term for aggravated assault and other charges, James Brown—the man—is free once again and back to doing what he does best: *making the baddest funk the world has ever heard.*

"I thank God for being around and being able to breathe," Brown says. "I'm still kickin'. I feel good. And the amazing thing is that right now I *look* really good. I got that real young look. I look 32, 33. I needed the rest real bad."

Brown has certainly been known to speak highly of himself, but this time there is something to his claim. He *does* look remarkably well, considerably better than he did when all of his legal problems came down in 1988.

"Two years of rest is equal to 25 years of what I was doing," he says. "And that's what I needed. I had a chance to analyze a lot of music that I had a strong belief in—music that I had produced myself. I didn't realize that my influence was that dominant until I listened to all the rap people trying to do things I had forgotten. [Brown has been sampled on several hundred rap recordings to date.] Then I realized, 'Hey wait a minute, you really *do* have something here that you can go back and refurbish.'"

While JB gets his performing chops back and gets ready to hit the stage again, however, his fans the world over are enjoying a celebra-

The heart of the 'Star Time' production team, at the PolyGram Studios (left to right): Joseph Palmaccio, project engineer; Harry Weinger, principal producer; Benjamin Forgash, project assistant; and Oscar Yong, co-producer and PolyGram's manager of catalog development.



PHOTO: PATTIE CHIRICO/B.F.P.

was in the studio doing this, I was excited."

Adds Dennis Drake, vice president of PolyGram studio operations, "This boxed set has taken James Brown's music to a whole other level. It's really amazing."

HUMBLE BEGINNINGS

Born in South Carolina in 1928, James Brown learned to sing and dance for pennies while growing up in Augusta, Georgia. He moved in and out of

trouble with the law as a teenager, and had brief careers as a baseball player and boxer.

In the mid 1950s, he decided to make music his life and joined Bobby Byrd's group, The Avons, later renamed The Flames. Their first record in 1956, "Please, Please, Please," became a million seller for Cincinnati's *King Records*, the independent label headed by flamboyant R&B pioneer Syd Nathan. King Records also served as the home of such R&B greats as Roy Brown, Hank Ballard, Bill Doggett and others.

Although Brown failed to recapture the success of "Please, Please, Please" for several more years, his popularity as a dynamic live entertainer eventually soared throughout the country.

In 1963 he released the now classic *Live At the Apollo*, an album that sat high on the R&B and pop charts for 14 months. From 1964, when he blew away the headlining Rolling Stones on the TAMI show TV appearance in London, through the success of "Papa's Got A Brand New Bag," "I Feel Good," and other classics, Brown's rise was unstoppable.

He became the first black artist to head his own entertainment conglomerate. He bought (but eventually had to give up) three radio stations, a chain of soul food restaurants, a private jet, and a castle in Queens, N.Y., complete with a moat, drawbridge and little black Santas on the lawn at Christmastime.

In 1968, Brown virtually invented funk music with his recording of "Mother Popcorn," and for the next 20 years, through his remarkable hit "Living In America" for the *Rocky IV* soundtrack, James Brown was indeed Soul Brother Number One. Only his numerous brushes with the law, including the infractions that landed him in jail in the late '80s, have tainted an otherwise brilliant life in show business.

But rather than derailing his career, Brown's incarceration actually had the effect of stimulating interest in his music, and "FREE JAMES BROWN" became something of a rallying cry for his millions of fans. So the release of *Star Time*—coinciding with JB's own release from prison—couldn't have come at a better moment.

NOW IT'S STAR TIME

The first day Harry Weinger and Alan Leeds worked together on *Star Time*, at the massive PolyGram masters warehouse and recording studios in Edison, N.J., they spent most of the initial hour consumed with photocopies of the original King Records master studio log sheets. "I actually had access to these same books in Cincinnati in 1970 when James' offices were in the same building as King Records," says Leeds, who is currently completing the definitive James Brown discography. "Sometimes the books are misleading. James would often record in various studios when he was on the road, so there was no info

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available to the people at King. The date they would mark down would be the date James returned and turned the tapes in, not the actual dates recorded."

Leeds, a former DJ from WANT in Virginia, first met and interviewed Brown in 1965. "James soon became my friend," he remembers, "and he said, 'Friendship works much better than payola. Friends will play your records forever.'" Eventually, Leeds went to work for Brown. Yet in the PolyGram archives, amid countless Brown recordings, he found himself completely in awe.

The 20,000-plus-square-foot PolyGram masters' warehouse is a priceless collection of popular music. Row after row of masters sit on metal shelves in the massive climate-controlled room.

"Let me show you where the 1966 reels are..." says Weinger, walking toward a row of masters halfway into the room. On the way, he and Leeds stop at a reel that lists ten takes of the Brown classic, "You've Got the Power," recorded at United Recording Studio and originally released in 1960. The next row uncovers ten reels of *Live At the Apollo*, this time in 1967.

"It's a matter of going through the microfiche and looking up the tape boxes," Weinger says, "and then once you get the general number, you have to play private eye, because maybe somebody wrote it down wrong 30 years ago."

To say that Weinger has become a rhythm and blues Sherlock Holmes is a vast understatement. While assembling *Star Time*, he uncovered recordings that many close to Brown thought had vanished forever.

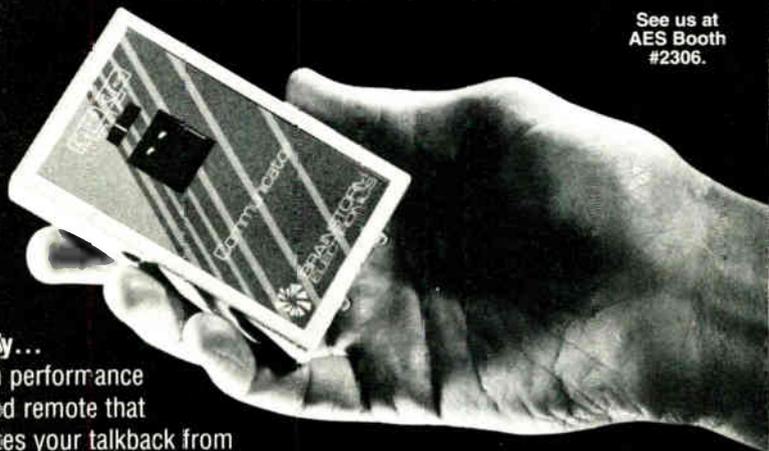
ROCK 'N' SOUL SERENDIPITY

For instance, there's a remarkable story behind the discovery of the original "Papa's Got a Brand New Bag" master. Weinger found a box that listed the track as a remake of the classic R&B hit recorded during a series of Brown sessions with the Louis Bellson Big Band in 1969. "I played the tape, and it sounded nothing like Louis Bellson," he recalls. "It sounded like the hit version, but was much slower and had more of a blues groove to it. It's a fascinating groove. Then I discovered that it was actually the original 1965 master.

"But for the hit version, it had been put through a varispeed and given an increased tempo that was six percent faster. In addition, there were three

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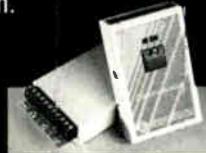


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parts, not two, as Brown had released. Plus, a drum fill at the beginning was eventually cut from the final master, as was Brown's off-hand remark at the beginning: "This is a hit!"

In another case of serendipity, "Phil Schaap, a jazz researcher, was here looking for a Max Roach master," says Weinger, talking of one of his earliest experiences in the warehouse. "And his hand hit the wrong reel and he pulled out a box, and it just says, 'James Brown 2nd Show.' No titles, nothing.

"He gave it to me, and I racked it up and it's *Live At The Apollo, 1962*—the original master. No overdubs, no fake applause. We all thought that had been lost forever. So, I tracked down Chuck Seitz, the original engineer, and he tells me there are two other reels of outtakes. I just haven't found those yet. I'm still looking."

In the mixdown suite of PolyGram Studios, listening to outtakes of Brown recordings is a fascinating experience in itself. During a version of "Love Don't Love Nobody," a track that appears on *Messin' With The Blues*, Brown kicks off the song in full screaming voice, but the track is suddenly cut short when someone in the band makes a mistake. As the studio engineer opens the mic to prepare for take two, an irate Syd Nathan can be heard in the background, clear as a bell, yelling at the engineer: "Tell him not to holler so much!"

The engineer, trying to approach Brown diplomatically, interjects: "Ah, Mr. Nathan would like you to cool the melody a bit. You sang the hell out of it, so maybe we can do it a little more as a melodic thing."

But Brown says Nathan actually gave him a great deal of artistic control by the mid-'60s, something that most black artists didn't have then.

"I was lucky enough when Mr. Syd Nathan gave me a free hand," Brown says. "I had freedom in the studio that I didn't even have sometimes live. He would say, 'Do what you want. What you want is what we want.' In other words, if I made a record and I said, 'This is a final mix,' then that was the final mix. No one came and told me you should have done this or that.

"And when they did that and gave me that authorization and that kind of free hand, I was able to deliver things that will be classics forever," he adds. "Plus, I knew what I was doing. I

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always had people in mind. What's good for the people is good for me. And when I search the room and see everybody's eyes light up—even the engineers and people in the band are hot, and they're enjoying it—then I know that's as far as I need to go at that point."

Throughout the assembly of *Star Time*, Weinger uncovered several other treasures: The 4-track masters of a show recorded at New Jersey's Latin Casino were actually released as *Live At the Garden* in 1967; songs like "Licking Stick" are cataloged under working titles such as "Mama, Come Here Quick"; and the scream at the beginning of "Give It Up or Turn It A Loose" is actually grafted from some other session.

"There are a lot of 7-inch reel-to-reel masters," Weinger says. "James had the freedom to just show up at King with the master of his next single. On these recordings where no multi-track tapes exist, there is still a lot that can be done, yet many suffer from muddy mixes."

"My music wasn't mixed properly the first time around," Brown says. "There were things we were doing so fast they didn't give me the chance to study them. Now I've studied 'Cold Sweat.' I've studied 'Popcorn.' I've studied 'Please Please Please.' I've studied 'Try Me.' I've studied 'Say It Loud, I'm Black And I'm Proud.'"

"The only time I really got back into the music and I really got it right was in the later years when I did 'Living In America' with Dan Hartman. He did the arrangement, and I realized some things weren't right. So I went in and I balanced it. I showed him exactly what he needed to do. And you saw that you went to James Brown if you really wanted to hear it.

"You see, that is the groove, and if you're into that bag, you really want to make it funkier and get on the good foot," Brown continues, "you've got to mix that stuff so it's hittin' proper. So it's crisp and clear. You know where every note is coming from, and you can hear my voice. You can understand the lyrics. Then you've got a good record. I'm about making class. I'm about making records that will last forever and ever and ever."

CLEANING UP THE FUNK

When it came time to assemble *Star Time*, Weinger made sure he had the best source material possible and tried

to re-create recordings as close to the originals as possible.

For the 1963 rarity "Devil's Den," only a mint 45-rpm promo record existed. To get the cleanest sound, Weinger had the track digitally restored by Scott Hull of Masterdisk (New York), who used the Sonic Solutions computer editing system to remove annoying ticks and pops without sacrificing the higher frequencies.

"There were all sorts of clicks and static and noises on some of the other tracks," Weinger says. "We took as much of it out as we could with digital

editing, but it made the recordings too clean. Then we realized some of those clicks were his ring hitting against the mic stand. So, we put them back in.

"Some of the technical problems are inherent in the tapes," he adds. "James' recordings were not clean. On many of the 4-track masters, if you isolate the vocals, you've got a reverb track of drums and horns in the background of James' voice. If you try to dampen that, the recording doesn't work.

"We also had some problems with shedding and curling, although most of the tapes survived all right. We had

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a problem, in particular, with the master of 'Cold Sweat.' James' vocal is on one of the outer tracks that was curling."

On the early masters there was distortion, but in many cases, that actually adds to the excitement. Engineer Joe Palmaccio used notch filters and tube EQ to take away some of the problems, but did so sparingly.

"My goal," says Weinger, "was to make everything soar. So in many cases, you just let it go. They made these records so fast back then. James would come in the studio, do three takes, do a final mixdown and then move on. We're trying to do the same thing. Listen to all of the takes and do a remix right there on the spot."

"I FEEL GOOD!"

Just three weeks after his release from prison, James Brown appears to be at the height of his popularity. A press conference in New York City in March is nothing short of a blizzard of camera flashes and frantic press corp members eager for a quote or two.

But in a peaceful room away from the tumult, Brown sounds reflective and speaks quietly, yet firmly, about his aspirations outside of music.

"We're going to teach the kids that if you're educated you can have a chance—that pressure don't make you have to sell drugs, use drugs or become an alcoholic to release the pressure," he says. "That's what we're going to do. We're going to show people that it's better to be a *have* than a *have not*. Don't give me a hand-out...give me a way out. That's what I'm preaching.

"The only thing worse than poverty is ignorance. Ignorance is poverty. It's worse than drugs. Instead of having a war on drugs, let's have a war on ignorance. When you get ignorance under control, you can control drugs."

And what can we expect from James Brown in the '90s?

"It's going to be the rest of James Brown," he says smiling. "Not the one that sat back and didn't put as much of himself into his music as he would have liked to when others produced him."

Then, Brown starts laughing. "Yeah...the best is yet to come!" ■

Bruce Pilato is a Mix contributing editor who lives in upstate New York with his wife and three sons. Special thanks to Timothy Bright, who contributed invaluable research to this story.

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by Philip De Lancie

MASTERING FOR DCC

FORMAT ADDS NEW DIMENSION TO MASTER PREP

It's not an easy task to guide a new consumer electronics product from conception to mass acceptance. As Sony has inadvertently shown twice (Beta and DAT), technical capability is only one of many important factors contributing to a format's ultimate success. Electronics manufacturers seem to have kept this costly lesson in mind as they planned the transition from analog cassette to digital media. Their latest offerings, DCC (from Philips) and Mini Disc (from Sony), differ significantly from DAT, not only from a technical point of view, but in terms of the ways their developers have chosen to win over the music industry.

The most important revelation in hardware circles is the notion that enthusiastic label support is crucial. So manufacturers have taken a number of steps to bring labels onboard. One approach has been to simply buy up the software makers. At least three of the six major U.S. music companies are

now owned by hardware manufacturers (Sony, MCA and PolyGram). They've also resolved what was the most widely cited (though not necessarily most important) record company concern about consumer digital recording: the home taping/copyright/hardware levy issue (see "Tape & Disc News," September 1991). By agreeing to ask Congress for levies on recording hardware and blank tape, they've sidestepped lengthy and contentious battles with copyright-owning interests.

The copyright issue has also been addressed on the technical side, with the inclusion of the Serial Copy Management System in the specifications for both DCC and Mini Disc. Other attributes of the new systems include the fact that they are more robust than DAT, and thus better suited to personal/portable applications. And since they both use forms of data compression, which arguably makes them less hi-fi than CD, there is supposed to be less

fear of undermining the CD, which was certainly an important obstacle to record company acceptance of DAT.

Perhaps the most important difference between DAT and the new formats, however, relates to the record industry's need to mass produce prerecorded product. DAT was particularly weak in that area. But both DCC and Mini Disc were designed to take that need into account. Sony has yet to release details on Mini Disc replication, but it looks as if the prerecorded discs can be made in existing CD plants with modifications to the molding machines.

In the case of DCC, duplicators will also be able to make the tapes in existing facilities. But significant modifications will be required. The changes won't be just in the equipment used. DCC will also require an all-new master preparation process, which promises to bring greater challenges and responsibilities to the master transfer areas of dupe plants.

In our next issue, we'll check on the progress being made, by both Philips and outside vendors, in readying the required mastering and duplication gear for sale and use in the field. This month, we'll look at the mastering and dupli-

—CONTINUED ON PAGE 200

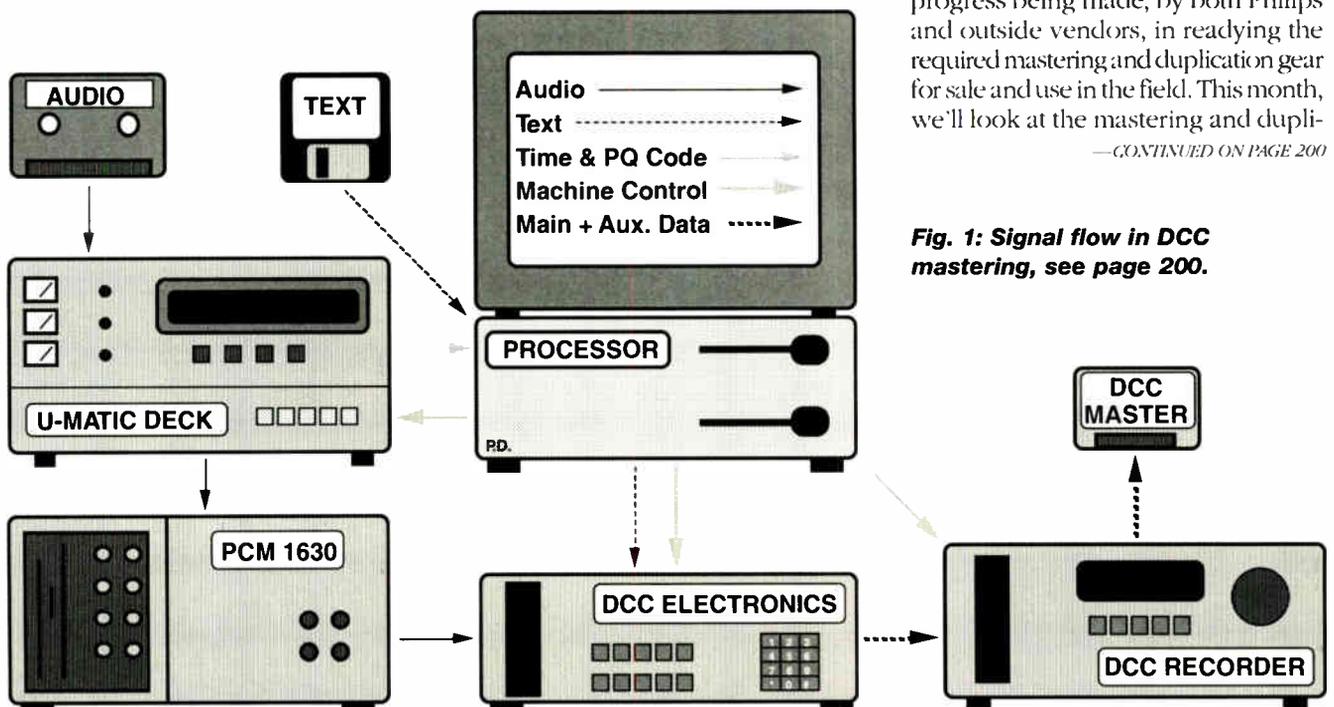


Fig. 1: Signal flow in DCC mastering, see page 200.

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Tape & Disc News

Home Taping Pact Hits Congress

The Audio Home Recording Act of 1991 has been introduced in the U.S. Senate by Senator Dennis DeConcini of Arizona. The bill will put into law the terms of a compromise reached in July between the Electronics Industries Association, the Recording Industry Association of America and the National Music Publishers Association (see "Tape & Disc News," September 1991).

Provisions of the agreement include the exemption of home taping, analog or digital, from copyright restrictions, the required inclusion of the SCMS digital-copying limitations in all consumer digital audio recorders, and the levying of royalties on digital recorders and blank tape. Previous legislation in this area has fallen apart in the face of bitter infighting between the software and hardware sides of the home entertainment industry. But the new pact enjoys the approval of nearly all interested parties, and is thus expected to fare well in Congress.

Sunkyong to Bow Type II Cobalt

Sunkyong plans to expand its range of cassette duplication tapes with the introduction of an additional cobalt-ferric formulation. The new stock, designed for IEC Type II bias and equalization, is expected to debut at the AES convention in New York.

Meanwhile, the company has settled on a designation for the "Type 1-1/2" cobalt-modified ferric previewed at last May's ITA seminar under the tentative name of CMX. The tape, designed to deliver the extended frequency response of cobalt-ferric at a lower coercivity, will be called MCX. Sunkyong's Joe Kempler reports that a number of duplicators, having evaluated MCX samples, are now ordering the tape in quantities of two to three pallets for limited pro-

duction runs. The product will be formally introduced at AES.

WEA Goes Video-line

Warner Music subsidiary WEA Manufacturing has successfully completed testing and initial production of new videodisc capacity at its plant in Olyphant, Pa. WEA uses "video-line" equipment, which integrates multiple manufacturing steps into a hands-off production line, locally enclosed and computer-controlled. As with monoline gear for CDs, the video-line eliminates the need for clean rooms and batch processing.

Another Warner division has announced the release of ten new classical CD+Graphics titles. The discs, which may include libretto, moving illustrations, musical notation and commentary, are available from Warner New Media at a suggested list of \$19.95. The graphics are made to be viewed on a TV, but few CD players support the format.

Menon Joins ICT

Last April, we reported on the introduction of digital cable audio services, and whether cable delivery represents a threat to those who manufacture music on tape and disc. In a move that may allay some music industry fears, International Cablecasting Technologies has added Bhaskar Menon to its board of directors. Menon's record industry credentials are unassailable: He's the former chairman of the board of the International Federation of Phonographic Industries, the industry's worldwide trade association.

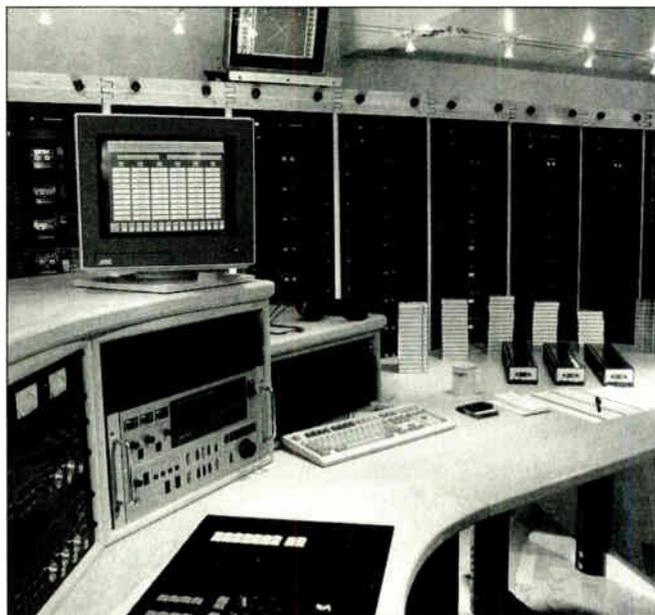
JRF Magnetics Replacement Head

JRF will make its first formal showing at AES of its PLX head, a 1/2-inch, 4-track replacement head for Otari's MTR-12LX low-speed master recorder. Performance is optimized for 3-3/4 ips. According to the company's John French, JRF has already placed quite a few in the field. French also noted an upsurge in interest in the company's azimuth-adjustable T-bars for duplicator slaves.

SPLICES

Ampex Recording Media Corporation announced a reorganization that will involve eliminating about 250 jobs from its worldwide work force. The Redwood City, CA, company hopes the move will increase its ability to devote resources to new and emerging recording format technologies... **American Interactive Media**, Philips' Los Angeles-based CD-Interactive software arm, may be joining forces with **Funk & Wagnalls** to bring out a CD-I encyclopedia. The companies have announced an agreement to cooperatively explore the idea... **Enterprise Corporation of America** has opened the CDCATS Service Bureau. The new division in West Des Moines, IA, evaluates CDs for signal quality, tracking, data integrity and physical dimensions... **The Archon Company** has moved west, relocating from Massachusetts to Peoria, AZ. The company manufactures on-cassette printing gear... Two duplication facilities serving the religious market have added **Versadyne** gear to their facilities: Albuquerque's

Hosanna and San Diego's Exxel purchased Versadyne's 1500 Series duplicators and slaves. Similar systems were recently placed in the Philippines and Australia... **The Pink Room**, a real-time cassette duplication facility, recently opened in London, England. The facility features 150 Nakamichi RX505E three-head decks supported by a computer-based control system custom-built by Audio Digital Technology. ■



**The Pink Room,
London, England**

—FROM PAGE 197, MASTERING FOR DCC

cation process itself, as developed by Philips and its software arm PolyGram.

Defining the Format

To ensure that DCC could fulfill its intended role as heir to the analog cassette, Philips defined certain design parameters at the outset of product development. The product had to use a linear tracking system, as opposed to the video-style rotating heads of DAT. Its exterior dimensions had to conform to those of the analog cassette, as did its tape speed, 1-7/8 ips. Program would be divided into two "sectors," with an auto-reversing transport used to change tape direction. To enable high-speed duplication, the format had to be able to use tape formulations of moderate coercivity (video chrome tape in the 650 Oersteds range), with wavelengths of not less than 1 micron (1 millionth of a meter).

Living within these guidelines dictated a relatively low information density on tape. Maximum feasible bit-rate-per-track was determined to be 95.2 Kbits/second. With the audio interleaved over eight "main data" tracks, the total capacity is 768 Kbits/second. But considering the 47% data redundancy required for error correction (Reed Solomon), the true information rate drops to 384 Kbits/second.

By way of comparison, the 16-bit linear PCM encoding employed with the CD uses 1,500 Kbits/second. So Philips, after (hopefully) thorough psychoacoustic research, came up with PASC as a substitute for PCM. The coding algorithm uses dynamic thresholds in each of the 32 frequency bands to weed out sounds that are either too soft to hear or are masked by adjacent frequencies of greater amplitude. The coding bits saved by discarding these "inaudible" portions of the signal are applied to coding the remaining sound. Making a virtue of necessity, Philips describes this compression of audio data as "maximizing the efficiency of digital coding to create extra room for higher precision."

ITTS

Though the vast majority of the DCC signal is audio, that's not the only kind of information that has to fit on the tape. Philips will offer the listener a variety of information in the form of text. The company is counting on these text-

display capabilities to add consumer appeal to DCC, compared with cassette or CD-Audio. In addition to basics like album title, track list and credits, the tape could provide liner notes or biographical information on composers and artists. There is also a provision for synchronized text, which can provide follow-along lyrics at a rate of up to 15 lines per second.

The system mode in which the text is available has been designated as ITTS, for Interactive Text Transmission System. This will be the normal mode for DCC players at the product's introduction. ITTS will include three display modes to be used depending on the type of display window in the user's hardware. Personal portable applications will use LCDs to show a single line of 12-20 characters at a time. Home players may display two lines of 40 characters each. A full teletext-style display, with 21 lines of 40 characters, is accessed by hooking a player to a TV. Text/graphics data in this mode will be converted in the DCC player to the appropriate video standard (NTSC, PAL, SECAM) for the market in which the machine is sold.

Audio and ITTS, together with copy protection information, comprise the data interleaved on the eight main data tracks. An independent ninth track is used for auxiliary data similar to that which goes on a CD. This includes indexes for locating individual selections, International Standard Recording Code numbers, and timing information (selection time, remaining time, etc.). Auxiliary data is written at one-eighth the bit rate of main data so that it may be read at high speed in search mode.

Making the Master

Having defined the system, Philips began working with PolyGram in 1989 on the development of high-speed duplication techniques. The project was particularly crucial because of DAT's previously noted weakness in that area. Jaap Stulp, manager of Philips' Audio Mastering Group, led the effort on Philips' side. At May's IFA cassette seminar, and in subsequent conversations from his office in Eindhoven, The Netherlands, Stulp described the process of pulling together all the various types of data that go onto the duplication master, which is then recorded directly onto a DCC cassette.

Philips' mastering system is built around a microcomputer processor, for which software has been developed to

control the combining of the data. Special cards in the computer allow it to interface with other components, including a PCM 1630 playback system, DCC electronics and a DCC master recorder (see Fig. 1).

Audio is likely to come into the DCC mastering facility as a PCM 1630 format clone of the CD master of the same project. The mastering process begins with determining where the tape will reverse directions by defining the two audio sectors.

Next, the ITTS text will be edited with software under development at Philips. This involves creating three mandatory "topics": album title, track-list and credits. Additional "free" topics, such as synchronized text or liner notes, may also be created at this point. For each of the three display modes, breaks between "pages" are defined that will work with the available character/line capacity. The timing of the appearance of those segments in the program is also determined. The software will allow simulation of any segment of the program while editing.

ITTS editing also involves specifying characteristics of display in the teletext mode, like color, text style and arrangement on the screen. Limitations in the graphics capabilities will make the creation of exciting visuals a challenge. "You must look at it as a teletext-like system," Stulp says. "You make graphics by making a screen full of characters. But the characters are from a graphics font, so they don't have to look like letters."

Once the ITTS editing is complete, master recording begins. The process is automated—controlled by the computer's processor. When playback is commanded of the 1630, the tape's time code and PQ codes are routed to the computer. The 1630's audio signal goes through an AES digital interface into the DCC electronics, where it is PASC-encoded. At the same time, ITTS and auxiliary track data are transferred from computer storage through a parallel port to the DCC electronics. The audio and ITTS signals are combined, then broken into an 8-channel interleaved datastream, which is error-correction coded. These eight main data channels, along with the auxiliary data, are then recorded as nine tracks on a DCC tape by the master recorder.

Because of the room for creative input in creating the graphics, Stulp thinks that DCC master preparation may end up being done at specialized

mastering facilities rather than in duplication plants. "The creative decisions, if you take the text seriously, will be of a high level," he notes. "If people think they are making 'blue music' and you put red text with it, they will say it doesn't fit the music. So these kinds of discussions will come up if text becomes one of the main features in the future, which we think it will. I expect that in five years the mastering facilities will be working closely on text with creative people."

How long would it take for an audio mastering engineer to become proficient in ITTS editing? "To do the basics," Stulp says, "I think a few days of training would be sufficient. And since we will be selling the equipment, we will be taking care of providing training. But getting really creative

would be for digitally duping an analog cassette.

In loading, the master is played back on a DCC "downloader," which incorporates a DCC player and processing electronics. As of now, transfers take place through a parallel port. But Stulp indicates that Philips may end up settling on a general-purpose interface like SCSI for the job. As the master plays, A and B sectors are read simultaneously. For the B direction data, frames are flipped in the process. Error correction takes place during the loading, which takes as long as the longer "side." For greater efficiency, the SSM allows loading of one program while duping another.

Duplication itself will take place at 64x real time. DCC slave transports are expected to be pretty much the same

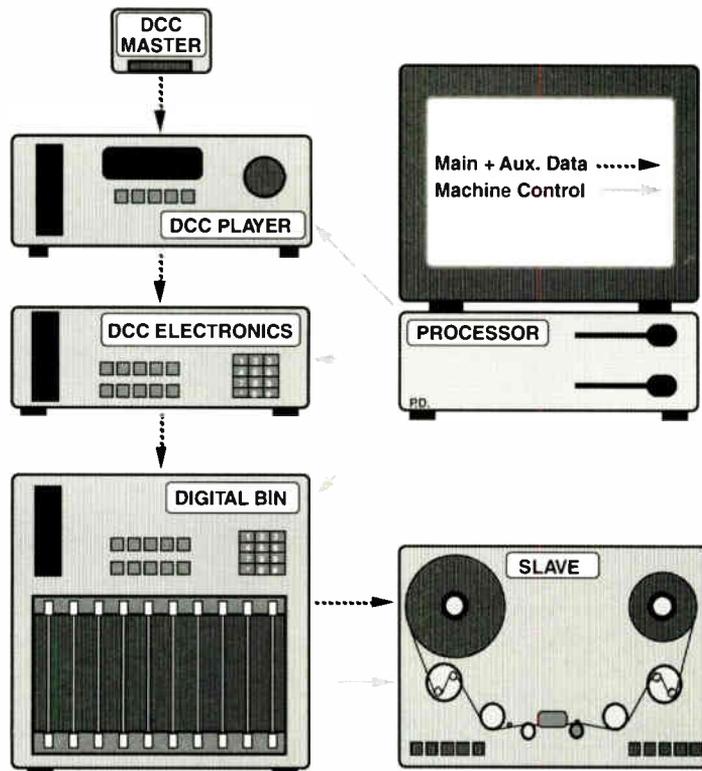


Fig. 2: Signal flow in DCC bin loading and duplication.

would mean learning all the possibilities, and impossibilities, of ITTS. And that could take somewhat longer."

Loading and Duplication

Once the DCC master is completed, it's ready to be loaded into the master reproducer for duplication (see Fig. 2). Philips calls its digital bin the SSM, for Solid State Master. Because the PASC encoding reduces the volume of data, RAM requirements for a given program in DCC are 25-50% of what they

design as those used for analog duplication. But the electronics and the heads will obviously have to be changed to accommodate DCC's 18 tracks (nine tracks for each direction). The overall process, with numerous slaves fed from a digital bin, will be essentially the same as digitally duplicating analog cassettes. ■

Tape & Disc editor Phil De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.

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C O A S T

L.A. GRAPEVINE

by Amy Ziffer

Ocean Way will soon be home to the second Focusrite console in Los Angeles, according to studio manager Jack Woltz. The board will replace an API in Studio A. The change was precipitated by the ongoing demand of customers for more inputs. "The API has only 48 inputs," says Woltz, "but the new one will have 72." Recently, the company experimented with a second

—CONTINUED ON PAGE 205

Doc Severinsen and the Tonight Show Band were at Group IV Recording of Hollywood to record a collection of big band standards and a Christmas album. Pictured (L to R) are producer Jeff Tyzik, Group IV owner Angel Balestier, Doc Severinsen and engineer Hank Cicalo.



SESSIONS & STUDIO NEWS

by Jeff Forlenza

NORTHEAST

Skyline Studios, New York, reports the following activity: James Taylor and producer Don Grolnick completed recording and mixing a project for Sony, with James Farber engineering and Katherine Miller assisting; and R.E.M. were in remixing with producer/engineer Scott Litt and assistant Dave Shiffman on a project for Warner Bros... New York's Power Station had Eric Clapton in with producer Russ Titleman mixing the live recording of his Albert Hall concert with engineer Alex Haas; and Power Station regular Nile Rodgers was in with Bernard Edwards to record the first Chic album in years... At Wish Studios in New York City, Melba Moore did vocals on an anthem for the National Civil Rights Museum in Memphis. The New Voices of Freedom backed her up. The session was engineered by Aman Malik and produced by Michael O'Hara... Glenn "Sweety G" Toby produced a song for Jay Williams' up-

coming album for Big Beat/Atlantic Records at Studio 05A in Queens Village, New York. The song "Take Me Back" was engineered by Gary Garrett... At Hip Pocket Recording Studios, New York, hot Latin producer Carlos Berrios recorded Corina's "Temptation" for Atco and finished Lisette Melendez's debut album for Columbia with engineer Butch Jones... Second City Sound, of Long Island City, NY, reports that R-U-Ready and producer Stephen Galtas cut tracks for a new album on Mechanic/MCA Records. Mario Vasquez engineered, with Brian McGee assisting and Manny Mancuso programming keys for the group... Heavy metal rockers Quiet Riot stopped in at PCI Recording, Rochester, NY, to record their new song "Twisted" for the upcoming movie of the same name starring Christopher Walken. Tom Backus engineered the session... Bruce Hornsby was at Beartracks Recording Studio, Suffern, NY, laying down piano tracks on the new Dave Samuels album for GRP. Jay Beckenstein produced, Larry Swist engineered and Doug Rose assisted... Phil Ramone produced Phoebe Snow's new album for SBK Records at Blank Productions of Stamford, CT... Eastside Sound, NYC, had Brazilian master percussionist Nana Vasconcelos producing various projects with Teece Gohl assisting and Nick Prout engineering...

SOUTHERN CALIFORNIA

Smokey Robinson completed his latest album at Westlake Audio, L.A., with producer Alan Kaufman. Dan Bates engineered the project, with Mark Hagen and Chris Fogel assisting... Guns N' Roses completed mixing their latest project for Geffen Records at Skip Saylor Recording of Los Angeles. Bill

C O A S T

PHOTO: JAY BLAKESBERG



At StudioTech '91, presented by San Francisco NARAS, our roving editor Mr. Bonzai moderated the panel on "How to Produce a Great Record." The producers panel included (standing L to R) Narada Michael Walden, Cookie Marenco, Michael Rosen and Mike Clink; (seated L to R) Bob Margouleff, Bonzai (in beanie) and Sandy Pearlman.

Price engineered with assistant Chris Puram on the double release. *Use Your Illusion I* and *Use Your Illusion II*...Synthesizer expert and songstress Suzanne Ciani block-booked the month of June at Topanga Skyline Recording Co. to record, overdub and mix her new album for Private Music. Peter R. Kelsey engineered, with Luis Quine assisting...Summa Music Group of West Hollywood had singing sensation Mariah Carey in Studio A mixing and overdubbing with producer Walter Affanasieff, engineer Dana Chappelle and assistant Kyle Bess...LL Cool J was at Studio Masters (L.A.) cutting a track

for Christmas release with engineer Wolfgang Aichholz. Assisting the session was Richard Longlee...Russ Freeman was at Alpha Studios, Burbank, mixing a new album for The

—CONTINUED ON PAGE 208

N.Y. METRO REPORT

by Dan Daley

Philip Glass' Looking Glass Studios, on the site of the former Sanctuary Studios, opened its second room in August. It houses a Sony/MCI JH-600 console with Megamix automation, an Otari MTR-90 II, and a Digidesign hard disk system. The studio has a large MIDI implementation and four SampleCell cards with a Mac IIx. Chief engineer is now Angela Dryden.

SSL reported several area

—CONTINUED ON PAGE 206

At Right Track Studios in New York City, Billy Joel joined Richard Marx in the studio to play piano on the track "I Get No Sleep" from Marx's upcoming release *Rush Street* on Capitol Records.



Nashville Skyline

by Dan Daley

Nashville Sony account manager for pro audio products Mike Porter reports an increased interest in digital multitracks around town recently. Leon Russell purchased an upgraded Sony 3324-A 24-track deck for his garage-cum-audio/video studio up in Hendersonville. "The base of digital multitracks is growing slowly but steadily in the area from Nashville to Atlanta and Miami," Porter says, attributing the trend to current leases on older equipment expiring after the last round of upgrades five or six years ago.

Porter believes the local digital multitrack trend is being driven by the engineers using the equipment, rather than demand by studio owners, producers or artists. Due to the high level of freelancing in Nashville, the digital bug is proving highly contagious and mobile, and competition is heating up. As I reported last June, Studio Supply was seeing increased numbers of Otari decks, including several digital ones,

moving through the doors in the second quarter. Porter acknowledges that competition is tough, noting that Sony and Studer back the DASH format while Otari uses PD. "It'll be interesting to see how the choices get made regarding the two formats," he says. On the other hand, DAT has firmly established itself locally and nationally, Porter says, and he expects Sony's new 7000 system to do well.

At Digital Recorders, manager Bill Heath says they've moved the SSL G Series 64-frame console from Studio D to Studio A in preparation for a renovation in D during the late summer/early fall. The 48-input Neve VR in Studio A was sold. Studio D will get a new iso booth as well as added cosmetic touches. Studio B's Neve VR remains in place, as does the vintage Quad 8 Coronado console in Studio C.

Strangers in a strange land...Producers from the coasts are finding Nashville to be a hospitable place on a long-term basis. Glenn Rosenstein, who describes his introduction to Nashville from his native

Brooklyn three years ago by saying, "They brought me here kicking and screaming and now you couldn't pull me away," has produced records for Ziggy Marley and Michelle Shocked, sometimes using Sixteenth Avenue Sound as a home base. "I didn't know much about Nashville," he recalls. "I made the same assumptions that everyone does, that it was all country music." He stayed for the lifestyle and the world-class facilities, and he encourages acts he works with to consider Nashville as an alternative recording site.

"I like the fact that the cost of doing business down here is lower and that the level of professionalism is very high," he says. He expects the number of rock records to increase, but doesn't believe it will ever supplant country music as Nashville's base. "Country music built this town, and the studios and I have great respect for that," he says. "But the nature of country itself is changing, and you have local producers like Tony Brown and Jimmy Bowen making pop records." ■

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THE NEW LIGHT HEAVYWEIGHTS

—FROM PAGE 202, L.A. GRAPEVINE

solution to the same problem by ganging together two Neve consoles and integrating them cosmetically and electronically to make it appear as if they were manufactured that way.

Studio A is being upgraded in other ways, too. "We just added a medium-sized isolation booth," Woltz notes, "and we'll be adding another small one. Prior to this, it didn't have any. We'll also put in a new floor, a new carpet, and make other cosmetic changes."

In North Hollywood, The Bakery celebrated its second anniversary. What began as the home studio of Jon Baker became The Bakery in 1989 when he teamed with Andy Waterman, the former owner of Shade Tree in Chicago.

When they opened two years ago as a one-room operation, they installed the first Amek Mozart console in North America. Six months later, they opened Studio B with a second Mozart. After another six months, construction began on Studio C. It's a low-cost, MIDI pre-production room that can also serve for video sound effects assembly and small live overdubs.

Both Baker and Waterman are musicians and engineers, which, they say, helps them understand their clientele. They attract a varied customer base, with recent projects including album work for Jane Child and David Byrne, as well as scoring specials and commercials for television. "[We] gear our facility to the flexibility that composers require, from designing iso areas with clear sight lines, to having staff assistants who can read music and do a last-minute Scotch-taping of a trumpet part," Baker says.

At Royal Sound in Hollywood, the name is new, but the history hasn't been forgotten. Royal Sound was known as Original Sound until early this year, when it reopened after a redesign. In existence since 1957, it's been the site of memorable recordings for three-and-a-half decades. Owner Art Laboe also owns the affiliated label Original Sound Records, through which he puts out "oldies but goodies." According to studio manager and director of operations Terry Scott, Royal Sound's vaults are filled with masters by artists like Buddy Holly, Ritchie Valens and Harry Nilsson.

Royal consists of two rooms, A and B. Studio A has a 52-input Trident 75B console, while B is outfitted with a Ramsa 24-input WR-8428 board. Royal also has a Hybrid Arts ADAP II 2-track

mastering system, with an ADAP IV 4-in, 4-out workstation on order. Other accoutrements include a 1905 Steinway Grand in showroom condition.

"Studio A is not too live and not too dead," Scott says. "People rave about the room for vocal overdubs. We've also had up to 15 musicians tracking in there at once. Studio B is more for voice-over or recording in the control room." L.A. Guns did the vocal overdubs for their new PolyGram album in Studio A, as well as sequencing for their tour, and A is also a favorite studio for Left Bank Management artists. With all the changes and additions, Royal

Sound seems prepared to continue in the footsteps of its predecessor.

Calling it "the world's best-equipped and most versatile remote truck," Gary Ladinsky, president of audio equipment rental house Design FX, took possession of Record Plant's former Mobile Unit #3. The truck will become the cornerstone of Design FX's new mobile division. As director of operations for the mobile division, Design FX has recruited Terry Stark, former president of Wally Heider Recording and director of location recording for Record Plant.

—CONTINUED ON PAGE 206



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— FROM PAGE 205, L.A. GRAPEVINE

It's confirmed: Equipment retailer Everything Audio closed its doors in mid-July. At press time, calls had not been answered and owner Brian Cornfield was not available for comment.

In other L.A. news...Robert Margouleff & Associates of Los Angeles has been designated exclusive West Coast representative for the New York-based Walters-Storyk Design Group. Storyk is a TEC Award-winning studio designer/architect and record producer. Margouleff is a Grammy Award-winning engineer who gained fame with his mixing and engineering credits for Stevie Wonder. The two met when Wonder and Margouleff recorded at New York's Electric Lady Studios (a Storyk-designed facility) in 1973. For information, call Margouleff at (213) 650-5046 or Walters-Storyk at (914) 255-2255.

Send studio news to Amy Ziffer, c/o Mix magazine, 19725 Sherman Way, Suite 380, Canoga Park, CA 91306, or call (818) 567-1429 or fax (818) 709-6773. ■

— FROM PAGE 203, N.Y. METRO

ScreenSound installations over the last several months. Nutmeg Recording installed their first system for television and radio post-production. Audio Plus Video International also took delivery of their first. Robert Pomann Sound got its first ScreenSound and is using it for sound effects on the Nickelodeon animated series *Doug*. VCA Teletronics acquired a system for mixer John (Saturday Night Live) Alberts. NBC is using one in preparation for the Olympics. Both Soundtrack and East Side Film & Video have added second ScreenSound units. According to SSL's Eastern regional sales engineer, Dave Powell, New York now accounts for slightly more than a third of all U.S. ScreenSound installations.

New York is the home of the recently formed Professional Composers of America (PCA), an organization founded to lobby for the interests of professional composers and scorers. Membership is open to any composer who has been paid for writing music for concerts, dance, jingles, TV, radio, cable, industrial and education films, and music libraries. Contact Doug Wood at (800) 828-6664.

Video Mix installed a JL Cooper MS-3000 automation storage system in the Sony MXP-3036 main post-production

console, replacing the original automation system. Chief engineer Rob Sayers says the Macintosh interface made the difference, since most of the staff at the facility are already proficient on Macs. "We heard about it at the last AES show in L.A.," says Sayers. "It wasn't available then, but as soon as a demo was ready, we had one and went for it." Sayers says it was a cost-effective upgrade—about \$8,000—since the studio already had the necessary Macintoshes for the system.

Yamaha unveiled its DMR-8 integrated, digital recording system at AudioTechniques, which will be the area dealer for the tape-based system. Tom Sheehan, VP and general manager for the YCC center on West 57th Street, told me that the center's focus has shifted from mainly R&D to marketing support for Yamaha's new audio/guitar/synthesizer division with the opening of the pro digital demonstration facility there. Dealer training and client demonstrations for new digital audio products, like the DMR-8 and the DMC-1000 digital mixing console, will be part of the new mission. The facility's control room is acoustically isolated with custom wiring, NS-10 and Westlake TM-3 monitors and the entire Yamaha digital equipment inventory.

"We've muted the R&D aspect, but not totally eliminated it, in favor of providing a resource for dealers to bring customers in to demonstrate products," says Sheehan. "It helps keep our finger on the pulse." The public product showroom on the main floor will also remain.

The ITS Show at the Waldorf got raves from audio exhibitors, who appreciated its intimacy and down-to-business approach. NED's Ted Pine said, "The show was extremely well-run, because it focused on the needs of both facility owners and managers, and many of the seminars dealt with the finance and operations issues as well as the technical subjects."

AMS president John Gluck echoed that assessment: "The ITS is a more intimate forum than the other manufacturers' exhibits. That's its advantage over AES, NAB and SMPTE. I hope this forum retains its friendly character."

Jill Kirschen has joined National Sound, the music and audio division of National Video Center, as its specialist in music selection and sound design. Kirschen is a jazz keyboardist and music editor with numerous broadcast music credits. ■

SPARS



B E A T

by Pete Caldwell

Studio owner/operators often fall into an obvious trap. It's wide open and without camouflage, but we stumble into it far too frequently. Somehow, we get the mistaken idea that what we have to sell is technology.

The truth of the matter is this: Almost anybody can buy equipment, but equipment can't operate itself. It can't send out invoices, talk to clients on the phone or read a financial statement. Most importantly, it is in no way creative. It's not magic and certainly not art. An unperceptive man once said, "Build a better mousetrap, and the world will beat a path to your door." He should have said, "Build, promote and operate a better mousetrap and the world *may* beat a path to your door, with any luck and all other things being equal."

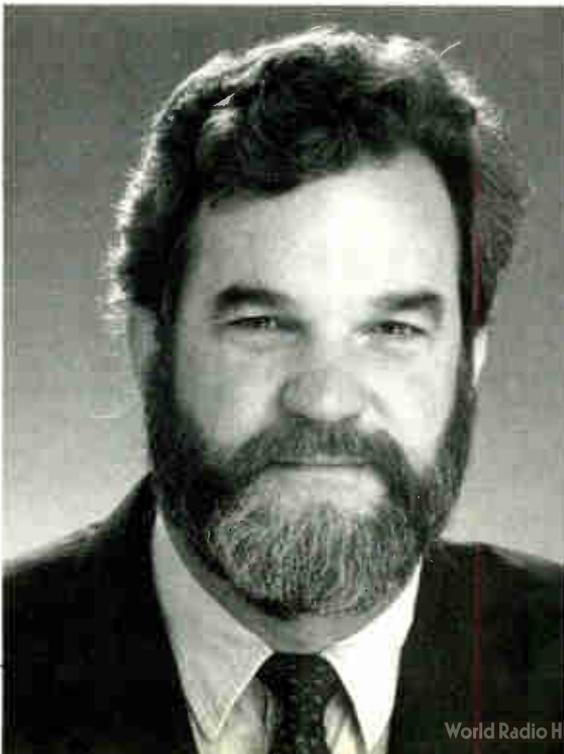
The pro audio industry requires a strange, unlikely mixture of technology, art and business skills. Only a handful of very special people can regularly balance this bizarre equation.

As the 1990-91 president of SPARS, I've learned that it is people

who make the difference. It is people who are determined and shrewd, and most importantly, who are artistic. Yes, SPARS is concerned with technology, but most of all, SPARS is concerned with ideas. SPARS exists to create forums for the exchange of ideas, and not just the ideas of studio people, but of manufacturers, educators and people who support our industry technically, financially and administratively. Human beings supply the impetus and the art—the rest is only wire. It is ourselves that we have for sale.

At this year's AES convention in New York City, I will hand over the baton to the next president of SPARS. In some small way, I hope that I have repaid the benefits of friendship and knowledge that have come my way through the years. If you'd like to participate in the future of SPARS, drop by the SPARS booth, #4921, and join us. For details, call our executive director Shirley Kaye at (800) 771-7727. ■

Pete Caldwell is president of Atlanta's Doppler Studios and 1990-91 president of SPARS.



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— FROM PAGE 203, SESSIONS AND STUDIO NEWS
Rippingtons with Bob Margouleff and Brant Biles engineering... At Paramount Recording Studios of Hollywood, Fleetwood Mac bassist John McVie tracked his solo album with singer Linda Thomas, engineer Peter Granet and assistant Steve Winchester; and guitarist Dave Alvin (of Blasters fame) recorded basic tracks for a solo album

on Hi Tone Records with Mike Becker at the controls...

SOUTHEAST

Jermaine Jackson was at Doppler Studios in Atlanta recording vocals for his upcoming release on LaFace Records. Color Me Badd was in to supply background vocals for the project, which

— CONTINUED ON PAGE 210



Radioactive Studios, The Jingle Specialists

Although he's not cutting million-dollar deals such as Nike's production using the Beatles' "Revolution," Marathon, Florida's own John Bartus of Radioactive Studios IS cutting it in the Florida Keys as a "jingle specialist." Located on 130 miles of a ribbon strip of a road from Key Largo to Key West, which serves the 80,000 year-round residents of Monroe County, is Radioactive.

"It's not just one small town," Bartus explains. "It's more like a whole string of 'em." His clients consist of "local business mainly—restaurants, retail outlets, supply stores."

Radioactive is a MIDI-based setup. According to Bartus, "There's basically two brains to it: An Atari ST computer system and my main sequencer, which is still the Roland MC-500 that drives a Roland MK-520 piano module."

When asked how jingles find their way into mainstream America, Bartus replies, "They do because rock 'n' roll is now mainstream America. That's why advertising firms spend so much money buying the rights to popular songs, a lot of '60s songs. Nike must have spent millions to get the rights to the Beatles' 'Revolution.'"

When he isn't producing jingles, or working on his manual of how to produce your own record or CD in a small studio, which was inspired by his own album-in-the-making, *Eye of the Storm*, John Bartus can be found holding his own on a little island called Marathon, where a dock for your boat is as common as a driveway.

—Vieni Pauloski

The Quiet Rise of Twelve-Step Music

Though it's only been in business since the spring of '90, Twelve Step Music in the San Fernando Valley town of Studio City has been quietly making waves in the L.A. recording world, attracting such diverse clients as veteran engineer Al Schmitt, Lorimar Pictures, Grammy- and Oscar-nominated composer/producer Jorge Calandrelli, producer Ian Ritchie, Zappa band alumnus Tommy Mars, and, most recently, Brian Eno, whose new Warner release was digitally edited and sequenced there.

What is the allure of this Vincent Van Haaff-designed room?

Well, according to engineer Mike Rockwell, the studio has "combined the best of analog recording with the cutting-edge of technology to make it one of the fastest, and therefore most economical, studios I have found in L.A.—ideal for scoring both TV and film." Equipment in this mid-sized studio includes a Soundcraft 6000 console with 68 inputs, a Sony APR-24 recorder, StudioVision and Sound Tools systems for 2-track digital disk recording, Tannoy SGM-10B monitors, Massenburg EQs and a healthy selection of other effects and processing gear.

The main creative force behind the studio is a musician named Gene Woody Cole, whose long career includes work with Neil Young, Stevie Wonder and Waylon Jennings before he succumbed to life in the fast lane. He managed to put himself back together in part through adherence to a 12-step program, and when he formed his new company, he chose people with a similar dedication to clean living as his co-workers. As Cole says of the name, "It represents integrity and rigorous honesty in all we do." Judging from the fledgling operation's early success, others share that vision with him.

Gene Woody Cole

—Blair Jackson



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— FROM PAGE 208. SESSIONS AND STUDIO NEWS
was produced by Daryl Simmons and L.A. Reid. Jim Zumpano engineered with assistance from Steve Schwartzberg and Mitch Eaton... Dan Fogelberg was at Digital Recorders, Nashville, mixing and co-producing his new live album for Sony Music with Marty Lewis engineering and John Hurley assisting... Producer Nick Martinelli was at Criteria Studios in Miami producing four songs for Siedah Garrett's new release, including "Tina T..." a tribute to Tina Turner... At Nickel and Dime Studios in Atlanta, Joey Huffman completed an organ track for the CD *The Times They Are a Changin': Bob Dylan, Vol. 1*. Also on the CD are the group Drag The River and the Indigo Girls on "Tangled Up in Blue." Don McCollister and Peter Williams produced the sessions and McCollister engineered...

NORTH CENTRAL

Paragon Recording Studios of Chicago had the Reverend Clifton Davis, star of the TV sitcom *Amen*, in to record his new gospel radio show. The radio show features contemporary gospel and pop artists and includes an interview with Dionne Warwick and Albertina Walker, a Chicago-area gospel artist with over ten albums to her credit. Sasha Dalton and Davis produced the sessions, with Paragon's Jim Franke engineering and Ken Vick assisting... Dave Cottrell recorded his first solo album, *For The Sheer Fun of It!*, in his new home studio, SuperSound, in Fort Dodge, IA. Cottrell has appeared on records by the Beach Boys, Jan & Dean and Ray Manzarek...

NORTHWEST

Rodney "I Get No Respect" Dangerfield visited Rocky Mountain Recorders, Denver, to record "Great Balls of Fire" for his upcoming movie *Ladybugs*, which was shot in Colorado. The film features Rodney as the coach for a teenage girls' soccer team and is scheduled to be out in April 1992. Singing backup on the session was Denver's own female *a cappella* group, The Dirty Blondes. The session was engineered by RMR principals Gannon Kashiwa and Paul Vastola, and Billy Tragessor of Las Vegas served as musical director... MC Hammer was at The Plant in Sausalito, CA, doing vocal overdubs for his new album for Bustle and Capitol Records. Felton Pilate was producing and engineering, with assistance from Manny LaCarruba and Neil King... Blues singer/guitarist Rory

Block cut vocals and mixed a tune for Michael Mann's soundtrack for the movie *Last of The Mohicans* at Avalanche Recording of Northglenn, CO. Ron Bock and George Counnas engineered with the assistance of Chuck Edwards...

SOUTHWEST

Digital Services Recording, Houston, had musician/producer Alphonso Martin (of Steel Pulse) in Studio A tracking and mixing British artists The Series with engineer Roger Tausz... In Tomillo, TX, Village Productions reports final mixdowns were completed for the debut album from jazz group 2Be, entitled *Step By Step*. The project was engineered and produced by Neil Henderson, assisted by Ted Kelley and Mike Major... Not Records Tapes founder/artist Mike Alvarez completed mixing his new single, "Love," at Austin's Music Lane Studios...

STUDIO NEWS

Lawson Productions Inc. (Seattle) chose an SSL G Series board with Ultimotion and Total Recall automation for its new studio complex, Bad Animals, which will be at the current Lawson address and includes Ann and Nancy Wilson of Heart as partners. The Bad Animals console will be on exhibit at the SSL booth during the AES convention... Prime Cuts Studios (New York) hosted several recording and remixing workshops during this year's New Music Seminar with a number of celebrity producers/remixers, including Justin Strauss and Daniel Abraham... The Toy Specialists, of New York City, became the first rental company to offer the Roland Sound Space (RSS) processing system when they took delivery of the 3-D system in July. They can be reached at (212) 333-2206 or toll-free at (800) 445-3330... Sound Arts Recording Studio (Houston) added a new Tascam ATR-80 2-inch, 24-track recorder to complement its Ampex 24-track machine, adding 48-track capability... D.B. Sound (25 W. 45th Street, NYC) recently completed the addition of two rooms: The new Studio A features the NEI PostPro and 24-track recording, and the new Studio C is a radio room with a Neve console, digital workstation and multitrack. ■

Send sessions and studio news, along with quality photos, to sessions editor Jeff Forlenza, c/o *Mix* magazine, 6400 Hollis St. #12, Emeryville, CA 94608.

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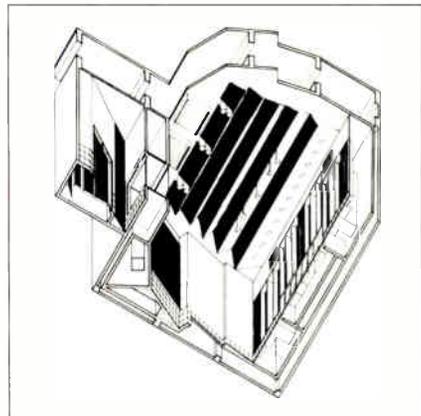
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You're hearing them already, but now listen carefully. Each recording listed here was produced (and often mastered) using the SV-3700 Pro DAT. **Aire LA Studios** *Chuckii* produced by Chuckii Booker; *Tuff* produced by Howard Benson; *Brian Wilson* produced by Brian Wilson & Eugene

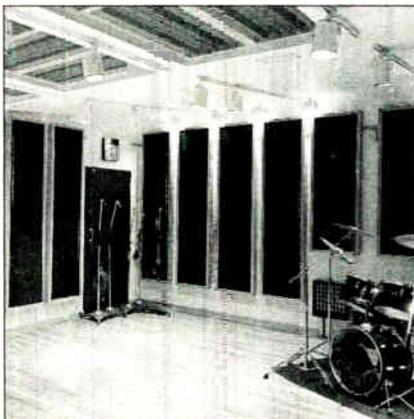
Landy; *Timmy T.* produced by Jon Ryan. **The Castle** *Lee Greenwood* produced by Jerry Crutchfield; *Ricky Skaggs* produced by Mac McAnally. **Chung King Recording Studios** *Run DMC* produced by Jam Master Jay; *3rd Bass* produced by Sam Sever, SD-50, KMD, Prince Paul & Marley Marl; *L.L. Cool J* produced by Marley Marl; *Nikki D* produced by Sid Reynolds. **D & D Recording** *Vanilla Ice* produced by Gail "Sky" King; *Big Audio Dynamite* produced by Jr. Vasquez; *Herb Alpert, Ziggy Marley* produced by Bobby Konders. **Electric Lady Studios** *Queen, West World* produced by John Luongo & Gary Hellman. **Emerald Sound Studios** *Hank Williams Jr.* produced by Barry Beckett, Jim Ed Norman & Hank Williams Jr.; *Alabama* produced by Josh Leo & Larry Lee. **The Enterprise** *Winger, Warrant* produced by Beau Hill; *Nelson, Trixter* produced by Mark Tanner; *The Fixx, Rebel Pebbles* produced by Tony Peluso; *Gladys Knight* produced by Michael J. Powell; *Henry Lee Summers* produced by Ric Wake; *Nia Peeples* produced by Howard Hewitt. **Mad Hatter Recording Studios** *Chick Corea Elektric Band* produced by Chick Corea and Co-Produced by Dave Weckl and John Patitucci; *Lee Ritenour, David Benoit* produced by Mike Abene for "Shannons' Deal." **Magee Audio Engineering** *Los Angeles Philharmonic Orchestra, Pacific Symphony Orchestra, Terry Trotter & Friends* produced by Joseph Magee. **Mobile Fidelity Sound Lab** *Igor Oistrakh Trio* produced by S. R. Britton & Edward Shakhnazarian; *Gennadi Rozhdestvensky & The USSR Symphony Orchestra* produced by Krieg Wunderlich & Tori Swenson. **Music Mill** *Eddie Rabbitt, Earl Thomas Conley, Oak Ridge Boys* produced by Richard Landis; *Anne Murray, Tanya Tucker* produced by Jerry Crutchfield. **One Up/TMF** *Mussingtons, Dumpa* produced by Dianne Norris; *Anita Baker* produced by Michael J. Powell; *Natalie Cole, Smokey Robinson* produced by Terry Marshall. **The Plant Recording Studios** *M.C. Hammer* produced by Felton Pilate; *Mariah Carey, Michael Bolton, Peabo Bryson* produced by Walter Afanasieff; *Tony!Toni!Toné!* produced by Tony!Toni!Toné!; *De Anna Eve* produced by Shake City Productions. **Royal Sound Studios** *L.A. Guns* produced by Michael James Jackson; *Art Laboe* produced by Art Laboe; *Festival Fountain at Caesar's Palace* produced by Champ Davenport. **Sixteenth Avenue Sound** *Ziggy Marley* produced by Ziggy Marley & Glenn Rosenstein; *Michelle Shocked* produced by Michelle Shocked & Glenn Rosenstein. **Studio 4 Recording** *Phil Collins* produced by Phil Collins; *D. J. Jazzy Jeff & The Fresh Prince, Schooly D.* produced by Joe "The Butcher" Nicolo. **For information on the SV-3700, contact Panasonic, 6550 Katella Ave., Cypress, CA 90632 (714) 373-7278. For more great music, listen to:** **Taj Mahal** produced by Skip Drinkwater. **Studio PASS** *Defunkt* produced by Bob Appel; *Nic Collins* produced by Nic Collins; *Paul DeMarinis* produced by Paul DeMarinis; *Tom Cora* produced by Tom Cora. **Keith Thomas** (producer) *Whitney Houston, Amy Grant, Carman, BeBe & CeCe Winans.* **Triad Studios** *Queensrÿche* produced by Peter Collins; *Michael Tomlinson* produced by Dan Dean & Michael Tomlinson. **Trevor Rabin** *Yes.* **Unicorn Studio** *Roger Hodgson.* **Unique Recording Studio** *Mariah Carey, Lisa Lisa & Cult Jam* produced by Robert Chivilles & David Cole; *Madonna* produced by Lenny Kravitz; *Lisette Melendez* produced by Carlos Berrios. **Don Was** (producer) *Bonnie Raitt, Glenn Frey, Paula Abdul, Neil Diamond, Lyle Lovett.* **And this is just the beginning.**

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Product Name: Alpha Pyramid Acoustical Foam. **Contact:** Michael Bias, president. **Date Product Introduced:** 4/15/91.
Product Description & Applications: Alpha Pyramids have a unique design incorporating the latest technology, providing superior sound and noise absorption. Useful in all types of sound contact applications, the Alpha Pyramids are especially effective in controlling standing waves, slap echo and reverberant noise in control rooms and studios. Their appearance provides for a uniform, seamless pattern with a high-tech look.
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ARCOUSTICS INC.
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ARCOUSTICS INC.; 720 Greenwich St., #2C; New York, NY 10014; (212) 727-9645; FAX: (212) 206-7320. **Product Name:** Linear Frequency Absorption Panels. **Contact:** Francis Daniel. **Date Product Introduced:** 1991. **Product Description & Applications:** Based on in-house testing of materials to achieve uniform absorption control, Linear Frequency Absorption Panels are fabricated in combinations to provide low-end to high-end absorptions. See us at AES booth 1621.

—PHOTO/LOGO CONTINUED NEXT COLUMN

ARCOUSTICS INC.; 720 Greenwich St., #2C; New York, NY 10014; (212) 727-9645; FAX: (212) 206-7320. **Product Name:** Reflectorsor. **Contact:** Victor Schwartz/Francis Daniel. **Date Product Introduced:** 1991. **Product Description & Applications:** Originally designed for Music Works studio in Kingston, Jamaica, in March 1991, Reflectorsor is an absorption/diffusion system for the treatment of control room ceilings. See us at AES Booth 1621.

ASC-TUBETRAPS; 245 Jackson; Eugene, OR 97402; (800) ASC-TUBE (272-8823). **Product Name:** Snap Track. **Contact:** Art Noxon, studio designer. **Date Product Introduced:** 6/91. **Product Description & Applications:** At last, our most cost-effective wall or corner-mounted acoustic product. Simply install a set of tracks on wall or across corner and snap these panels into the track. A fast, clean acoustic that can be painted or cloth covered. We just cut the cost of recording studio acoustics to half and there's still no consulting fee. Remember, TubeTraps are leasable. We take VISA. **Basic Specifications & Suggested List Price:** Sug. retail \$17/ft. 1/10x1/20 diamond mesh expanded metal comes grey primer. Inside screen is new ceramic fiber acoustic blanket, with lengths up to seven feet. Wall mounted, 9" wide speed bump profile is good to 135Hz. As a corner-loaded bass trap it's good to 50Hz with 197% acoustic efficiency of 200Hz.

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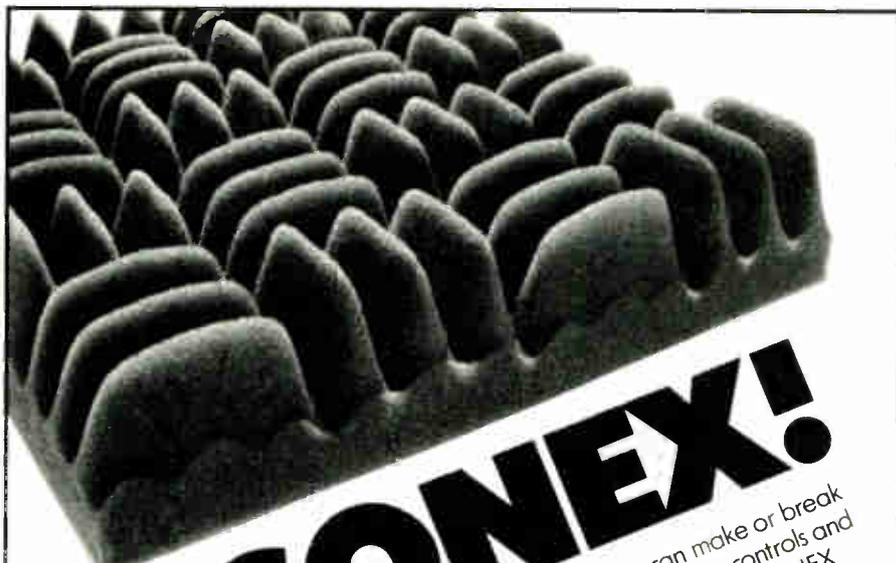
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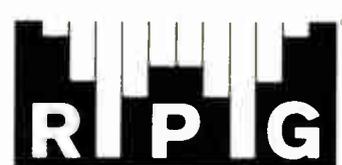
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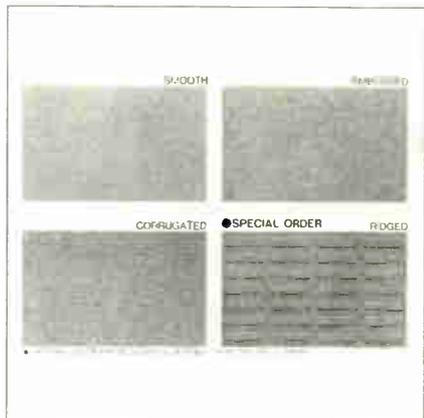
ASC-TUBETRAPS; 245 Jackson; Eugene, OR 97402; (800) ASC-TUBE (272-8823). Product Name: Studio Trap. Contact: Art Hansen, Studio Design, Inc. Date Product Introduced: 10/90. Product Description & Applications: Tube Trap gobo for studio—a real bass trap that bass, reflecting plywood or bass transparent foam. A versatile piece of studio gear. Use one to two to locate instrument or down up hot spots. Use in clustered pattern to get QuickSound field™ acoustic effect. There's no need to fix the room when you can just fix the near-field acoustic of the room. Remember, our products can be leased. **Basic Specifications & Suggested List Price:** Suggested list \$215 each. This studio gobo is a 9" diameter, four-foot long tube trap. The cylinder-shaped Basstrap is spiraled into a counter-balanced riser post with a tripod stand as with all Tube Traps. The front half is a diffuser membrane to 400Hz while whole surface basstraps to 1120 Hz.



RPG DIFFUSOR SYSTEMS, INC.

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RPG DIFFUSOR SYSTEMS INC.; 12003 Wimpleton St.; Largo, MD 20772; (301) 249-5647. Product Name: Kydex. Contact: Dr. Peter D'Antonio, pres. CEO. Date Product Introduced: 10/4/91. Product Description & Applications: Thermolformed ORD™ Diffusor Panels are made of a lightweight ABS and Kydex pattern formed substrate for use in ceiling and wall systems. Kydex is a durable and rigid thermoplastic with a high degree of toughness, impact and scratch resistance. These modules are just the product for large scale applications like studios, gymnasiums, worship spaces, music education facilities and home recording studios. **Basic Specifications & Suggested List Price:** Thermolformed ORD™ Diffusor panels are 2' x 2' panels, 4" deep and weigh 16 lbs. The ABS unit is available for \$145 and Kydex for \$150.



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RPG DIFFUSOR SYSTEMS INC.; 12003 Wimpleton St.; Largo, MD 20772; (301) 249-5647. Product Name: NDC Alimute. Contact: Dr. Peter D'Antonio, pres. CEO. Date Product Introduced: 10/4/91. Product Description & Applications: RPG Diffusor Systems™ is now offering to the music industry a remarkable new, environmentally and biologically safe, pre-finished porous, sintered-aluminum sound absorbing panel 0.118" thick.

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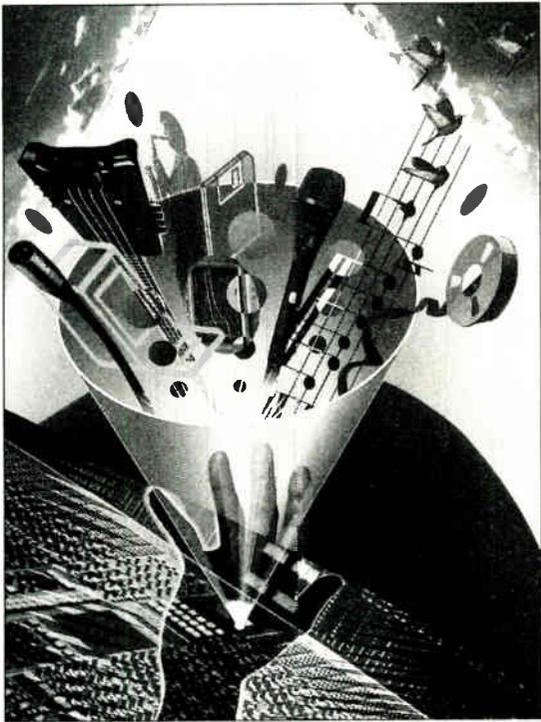
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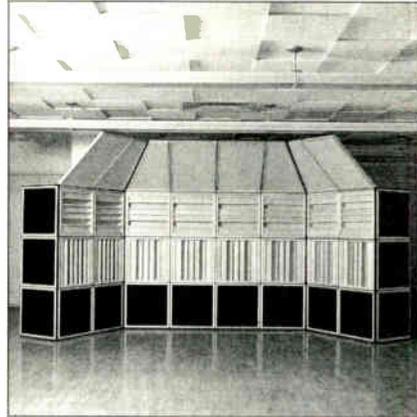
NDC Almute™ is lightweight, non-combustible, non-fibrous shedding, beautifully finished, corrosion-resistant, air-permeable, heat-resistant, moisture-resistant, harder than fiberglass, formable and durable. It has excellent low frequency absorption and an NRC of 1 when spaced by 8" from a boundary with fiberglass in the cavity. **Basic Specifications & Suggested List Price:** Almute™ is finished in a natural silver color and is available in 2'x2' and 2'x4' panels. Almute™ can be used in any application with ecological safety and comparable or better acoustical performance to alternative fiberglass, rockwool and plastic foam absorbers.



RPG DIFFUSOR SYSTEMS INC.
Studio-In-A-Box

RPG DIFFUSOR SYSTEMS INC.; 12003 Wimpleton St.; Largo, MD 20772; (301) 249-5647. **Product Name:** Studio-In-A-Box. **Contact:** Dr. Peter D'Antonio, pres./CEO. **Date Product Introduced:** 10/4/91. **Product Description & Applications:** RPG announces the Studio-in-a-Box kit for home studios, small post-production facilities and edit suites. The kit includes a combination of ready-to-assemble melamine QRD™ Diffusers, fabric upholstered Absorbers, and the new extraordinary porous sintered aluminum NDC Almute™ low-frequency absorbers. A simple procedure using an included mirror allows users to properly locate all panels on front, side, rear walls and ceiling. Installation is quick and simple with professional results. **Basic Specifications & Suggested List Price:** All modular 23 5/8" x 23 5/8" x 9 1/4"

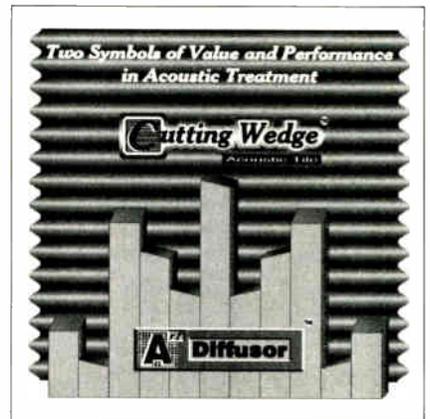
panels are shipped knocked-down for lower shipping costs. Assembly is straightforward and well documented and all necessary tools are included. Panels are available in oak or grey melamine with grey or black fabric. All modules are \$150 allowing a typical room to be outfitted for under \$2,000.



RPG DIFFUSOR SYSTEMS INC.
VAMPS™

RPG DIFFUSOR SYSTEMS INC.; 12003 Wimpleton St.; Largo, MD 20772; (301) 249-5647. **Product Name:** VAMPS™. **Contact:** Dr. Peter D'Antonio, pres./CEO. **Date Product Introduced:** 10/4/91. **Product Description & Applications:** RPG announces a breakthrough in acoustical shells for recording studios, location recording, performing arts facilities, and schools. This patent-pending revolutionary acoustics modular performance shell, VAMPS™, allows the use of any combination of reflecting, absorbing and diffusing panels, because it's completely variable. The same framework system can be adjusted to different musical formats by changing the acoustical inserts. VAMPS™ provides excellent sound projection, enhanced ensemble for performers and acoustical control of the space. **Basic Specifications & Suggested List Price:** A transportable and moveable VAMPS™ shell module is 6' wide and 11' high and consists of (12) 2'x2' modular inserts and a 3' (12) angled cantilevered canopy. The inserts include thermoformed hardwood QRD™ Diffusor, Abifusor™, NDC Almute™ sintered aluminum absorbers, and Reflectors AVAMPS™ module is targeted between \$1,500 and \$2,000.

SYSTEMS DEVELOPMENT GROUP; 18601 Darnestown Rd.; Poolesville, MD 20837; (301) 972-7355; (800) 658-8975. **Product Name:** Art Diffusor "Model P". **Contact:** Bernie Chop, Skip Warrington. **Date Product Introduced:** 10/91. **Product Description & Applications:** The Art Diffusor "Model P" is identical to the original Art Diffusor providing two-dimensional diffusion below 250Hz to over 8kHz. The product will be constructed of rigid polyurethane plastic. The weight of a complete square 15x15x9 is less than 8 lbs. The small footprint and light weight will allow these units to be shipped UPS. The units can be mounted with adhesive. **Basic Specifications & Suggested List Price:** Pricing and specifications will be announced at the fall AES.



SYSTEMS DEVELOPMENT GROUP
Cutting Wedge "WB" (Wideband)

SYSTEMS DEVELOPMENT GROUP; 18601 Darnestown Rd.; Poolesville, MD 20837; (301) 972-7355; (800) 658-8975. **Product Name:** Cutting Wedge "WB" (Wideband). **Contact:** Bernie Chop, Skip Warrington. **Date Product Introduced:** 10/91. **Product Description & Applications:** Cutting Wedge "WB" (Wideband) is constructed with cutting wedge acoustic tile laminated to a high density base. When mounted with the included stand-offs (providing an air gap), this unit will deliver wide-band absorption from 100Hz and up, far lower than is possible with standard acoustic foam. **Basic Specifications & Suggested List Price:** Pricing and specifications will be announced at the Fall AES this year.

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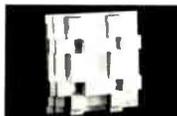
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AUSTRALIAN MONITOR U.S.A.; 11845 Wakeman St.; Santa Fe Springs, CA 90670; (213) 697-7576; FAX: (213) 691-9146. **Product Name:** MOSFET Power Amps. **Contact:** Geoff Keleher, manager. **Date Product Introduced:** 1991. **Product Description & Applications:** The K7 and 1K2 MOSFET audio power amplifiers are designed and built for the professional applications that require both exceptional sonic performance and high reliability. Rugged construction and comprehensive protection have been incorporated to allow continuous operation in arduous environments. Excellent thermal stability and low drift throughout the amplifier circuitry, further enhance operation. Rated output power is 400 watts and 600 watts per ch., respectively into 4-ohm loads. **Basic Specifications & Suggested List Price:** New model K7—400 watts per channel into 4 ohms \$1,595. New model 1K2—600 watts per channel into 4 ohms \$1,990. Existing model AM 1600—810 watts per channel into 4 ohms \$2,295. Existing model AM 1200—320 watts per channel into 4 ohms \$2,365 (a four-channel amp).

BEAR LABS; Jennings Road; Hannacroix, NY 12087; (518) 756-9894. **Product Name:** Symphony No. 1 Amplifier. **Contact:** Randall Bradley, owner. **Date Product Introduced:** 5/91 (studio version). **Product Description & Applications:** Superior amplification, hand crafted, limited production, for sophisticated users. The Symphony No. 1 amplifier features extremely advanced DC-coupled, dual-hemisphere, comple-

mentary input section, high-current MOSFET output stage, 1% MF Resistors, Polypropylene caps. Super high-current supply, 500,000 ufd filters, solid copper buss bars, #10ga. silver-plated Teflon wire. Extremely natural, neutral sonic balance, relaxed, open, extended and extremely dynamic. Non-fatiguing. You'll hear your mix. You can't hear specs: 30-day trial period. **Basic Specifications & Suggested List Price:** 180W RMS, 8 ohms. Slew rate 75V/microsec. Rise time 1 microsec/60V p-p square wave. Voltage gain 26dB, THD .0025%/1kHz, .0065%/10kHz. High bias AB. Balanced input. Machined anodized aluminum chassis, stainless hardware. 19"x24"x8", approximately 120 lbs. Options/finishes, inquire. Bear Labs (2-channel) Symphony No. 1 Amplifier: \$6,485.

BGW SYSTEMS INC.; 13130 Yukon Ave.; Hawthorne, CA 90250; (213) 973-8090; FAX: (213) 676-6713. **Product Name:** BGW. **Contact:** Brian Wachner, president. **Date Product Introduced:** 1/91. **Product Description & Applications:** Professional Power Amplifiers. Includes models 85, 200, 350 and 350A, 750F and G. High performance audio distributor amplifier Model 2242. **Basic Specifications & Suggested List Price:** New model 200-100 watts per channel @ 8 ohms. Single rack broadcast-quality power amp features toroidal power transformer, magnetic circuit breaker, high-performance active balanced inputs, and discrete circuitry. Pro net price \$999.

BOULDER AMPLIFIERS; 4850 Sterling Dr.; Boulder, CO 80301; (303) 449-8220. **Product Name:** Boulder. **Contact:** Marv Farley. **Date Product Introduced:** 6/91. **Product Description & Applications:** 100 watts/channel two-stage, all-discrete BA990DC stereo amplifier. **Basic Specifications & Suggested List Price:** 100 watts/channel @ 8 ohms, 140 watts peak power, 0.005% THD, \$1,999.

CARVER CORPORATION; 20121 48th Ave. W.; Lynnwood, WA 98036; (206) 775-1202. **Product Name:** PT-1800. **Contact:** Steve Payne, national sales manager. **Date Product Introduced:** 9/91. **Product Description & Applications:** High-powered, dual-monaural power amplifier for use with multiple subwoofer systems in fixed or mobile applications. **Basic Specifications & Suggested List Price:** Power output: 20Hz-20kHz 1500 watts/ch. @ 2ohms—1200 watts/ch. @ 4 ohms—750 watts/ch. @ 8 ohms. THD less than 0.5%. IMD less than 0.1%. S/N-100dB A weighted @ rated power into 4 ohms. Damping Factor 200 @ 1kHz. Slew Rate 25 V/us. Frequency Response 20Hz-20kHz +/-0.5dB. Dimensions H5.25"xW19"x D12.75" Weight 48 lbs. Suggested retail \$1,750.

CARVER CORPORATION; 20121 48th Ave. W.; Lynnwood, WA 98036; (206) 775-1202. **Product Name:** PT-2400. **Contact:** Steve Payne, national sales manager. **Date Product Introduced:** 8/91. **Product Description & Applications:** High-powered, dual monaural power amplifier for use with multiple subwoofer systems in fixed and mobile applications. **Basic Specifications & Suggested List Price:** Power output: 20Hz-20kHz 1500 watts/ch @ 2 ohms—1200 watts/ch @ 4 ohms—750 watts/ch. @ 8 ohms. THD less than 0.5%. IMD less than 0.1%. S/N-100dB A Weighted @ rated power into 4 ohms. Damping Factor 200 @ 1kHz. Slew Rate 25V/us. Frequency Response 20Hz-20kHz +/-0.5dB. Dimensions H5.25"xW19"x D12.75" Weight 52 lbs. Suggested retail \$2,100.

DIGITAL PROCESS; 31501 Bluff Dr.; So. Laguna, CA 92677; (800) 835-1533. **Product Name:** DPH-6A. **Contact:** David Harding, owner/mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** DPH-6A headphone distribution amplifier for broadcast standard quality digital. Audio broadcast (DAB) reference quality. RCA/XLR inputs—outputs none better. **Basic Specifications & Suggested List Price:** S/N >96dB. THD <.008. Channel separation >75dB. 27 volt peak to peak preamp included. 100dB common mode rejection on XLR input.

ELAN SOUND RESEARCH LABS; 11610 Morrison St.; N. Hollywood, CA 91601; (800) 966-ELAN; FAX: (818) 985-1624. **Product Name:** Peacemaker X175. **Contact:** Elan. **Date Product Introduced:** 1/91. **Product Description & Appli-**

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cations: 150 watt P/P rackmountable guitar tube power amp hand-made with high-quality, hand-picked parts. Made in the U.S.A. The Peacemaker amp comes in a mono enclosure as a independent mono power amp. Two mono amps on the same front panel will make it a high-reliability stereo power amp with independent power supply, fan, on/off and standby switch. **Basic Specifications & Suggested List Price:** 150 watt P/P, 2 speaker outputs, 4/8/16 ohms select, 2.0% harmonic distortion. Two 6550 output tubes, two 12AX7 driver tubes, cooling fan, volume, color and presence controls. Freq. response 20Hz-22,000kHz +/- .5 dB, input sensitivity 1V RMS for full 150 watts P/P output power, total hum and noise is 65 dB below 150W P/P. Standby & on/off switches.

HILL AUDIO; 1316 E. Lancaster; Fort Worth, TX 76102; (817) 336-5114. Product Name: Chameleon. **Contact:** Ramon West, product specialist. **Date Product Introduced:** 1991. **Product Description & Applications:** First in a new series of power amplifiers, this unit incorporates high-power output, ultra-linear non-switching electronic architecture and superb styling in a single rackspace package. Features include push button illuminated gain controls, exponential heat sink to amplify air flow; five mode protection system, soft start circuitry, balanced XLR and line inputs, four-way binding posts. Utilizes exclusive "head lok" circuitry for protection and thermal limiting without amplifier shut down. **Basic Specifications & Suggested List Price:** 1200w RMS Bridge at 8 ohms, 600w stereo per side at 4 ohms, 28 lbs, 1 rack space, THD .003%, Damping factor >500, slew rate 100v/microsecond, noise -105dB, freq. response: 20Hz-20kHz +/- .0dB, IMD .005%, crosstalk -90dB. Retail price: \$1,599.

HOT HOUSE PROFESSIONAL AUDIO; 275 Martin Ave.; Highland, NY 12528; (914) 691-6077; FAX: (914) 691-6822. Product Name: M2250 Mono High Current/High Voltage Control Room Amplifier. **Contact:** Richard Rose, pres. **Date Product Introduced:** 11/91. **Product Description & Applications:** Simply stated, the new M2250 Mono Bloc MOSFET amplifier was designed for maximum power, fidelity and reliability with no constraints on size or cost. Deriving its "Esoteric Tube Sound" from the same front-end found in the M500, the fan-cooled M2250, with its massive power supply and 24 output devices, is capable of delivering more current and voltage-swing per channel than any other amplifier ever built for the studio...without sacrificing speed, resolution or smooth extended bandwidth. **Basic Specifications & Suggested List Price:** S/N 105dB, THD .01%, frequency response 5Hz to 250kHz, rise time 900 nanoseconds, slew rate 60 volts/microsecond, maximum peak current capability 180 amperes, RMS power output (not including 3dB dynamic headroom) 16 ohm-290 watts, 8 ohm-575 watts, 4 ohm-1150 watts, 2 ohm-2250 watts. Price to be announced.

HOT HOUSE PROFESSIONAL AUDIO; 275 Martin Ave.; Highland, NY 12528; (914) 691-6077; FAX: (914) 691-6822. Product Name: M500HV Mono High Current/High Voltage Control Room Amplifier. **Contact:** Richard Rose, pres. **Date Product Introduced:** 10/91. **Product Description & Applications:** A direct descendant of the standard M500 audiophile High Current Control Room Amplifier, the new HV (High Voltage) model MOSFET shares the same front end, chassis and straight-wire design philosophy, but offers twice the output for powering larger primary monitors and subwoofers. Utilizing the largest MOSFETs, specially designed filter caps and an oversized custom-wound toroidal transformer, the M500HV is capable of supplying massive current reserves and exceptional bandwidth, speed and accuracy from a two rackspace, convection-cooled package. **Basic Specifications & Suggested List Price:** S/N 105dB, THD .01%, frequency response to 5Hz to 250kHz, rise time 900 nanoseconds, slew rate 60 volts/microsecond, maximum peak current capability 100 amperes, RMS power output (not including 3dB dynamic headroom), 8 ohm-275 watts, 4 ohm-500 watts. Price to be announced.

MTX SOUNDCRAFTSMEN; 555 W. Lamm Rd.; Freeport, IL 61032; (815) 232-2000. Product Name: PCR 800. **Contact:** Roger Hagemeyer. **Date Product Introduced:** 1/91. **Product Description & Applications:** Phase control regulated MOSFET amplifier. 205 watts per channel cont RMS: 20-20,000 Hz into 8 ohms; THD 0.05%; S/N >105dB—commonly called a shoe box amplifier. **Basic Specifications & Suggested List Price:** 18 lbs; 8.25x5x12-inches; \$499 SRP.

OCM TECHNOLOGY INC.; 1237 E. Main St.; Rochester, NY 14609; (800) 448-8490; FAX: (716) 684-0463. Product Name: OCM 500 Stereo Amplifier. **Contact:** M.C. (Mary) Southcott. **Date Product Introduced:** 1/91. **Product Description & Applications:** A solid state, amplifier. Built tough, runs cool. Offers true tonal balance and smooth, effortless power; no threat of output saturation, New OCM architecture. **Basic Specifications & Suggested List Price:** Pwr. O/P -200 watts/ch -8 ohms; 400 watts/ch -4 ohms or 800 watts mono-block. Inputs single-ended & bal.; power xfmr 1.5 KVA toroidal; peak current 100 amps; input sens. 1,100mV; freq. resp. -3dB (0.2Hz-100kHz); crosstalk >-80dB; hum and noise >-100dB; slew rate >200V/usec.; weight 65 lbs; price \$2,595.

OSC AUDIO PRODUCTS INC.; 1926 Placentia Ave.; Costa Mesa, CA 92627; (714) 645-2540. Product Name: EX series power amplifiers. **Contact:** Greg McVeigh, dir. of marketing. **Date Product Introduced:** 1/91. **Product Description & Applications:** The newest additions to the EX product line include the EX 800, EX 1250, EX 1600 and EX 4000. Power ratings are from 175 to 720 watts per channel. All amps fea-

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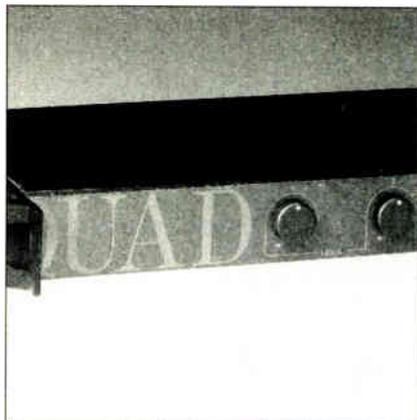


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—LISTING CONTINUED FROM PREVIOUS PAGE

ture Speakon speaker connectors. Open Input Architecture and an advanced thermal management system. QSC will also debut a new computer control system. **Basic Specifications & Suggested List Price:** EX 800—\$948; EX 1250—\$1,198; EX 1600—\$1,498; EX 2500—\$1,898; EX 4000—\$2,298.

QUAD; 111 South Dr.; Barrington, IL 60011; (708) 526-1646. Product Name: Quad 240. **Contact:** Brian T. Tucker, president. **Date Product Introduced:** 2/91. **Product Description & Applications:** The Speakon QUAD 240 is a 1U rack-size professional amplifier. It features XLR3 inputs and the NL4 Speakon outputs. 80 watts/channel, active transformer inputs. The circuit topology is the Quad patented "current dumping" feed forward error correction design. The amplifier incorporates two independent power supplies for maximum transient stability under any load condition. The Quad 240 is ideally suited for high-quality audio in video edit rooms, dubbing suites and studio monitoring. **Basic Specifications & Suggested List Price:** Power output-80W/ch/8ohms at <0.1% THD. Power response -10Hz-30kHz; group delay <6us; group delay error < 1.5us; input sensitivity -4dBu to +8dBu; input imp. >10kohm; CMR>60dB; input connector XLR-3 (IEC); Load stability-any load-unconditional. Price \$995.



QUAD
Quad 240

REDCO AUDIO PRODUCTS; 917 Post Rd., Ste. 318; Fairfield, CT 06430; (203) 256-0532. Product Name: Little Red Cue Box. **Contact:** Bob Berliner, president. **Date Product Introduced:** 11/90. **Product Description & Applications:** Custom Headphone Cue Box for studio or stage use. Four headphones each with individual volume control. May be connected in series using standard microphone cables. **Basic Specifications & Suggested List Price:** List price \$137.50.

SHURE HTS; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2510. Product Name: HTS 400 SPA Signal Processing Amplifier. **Contact:** Glenn T. Koutecky, Special Markets Coordinator. **Date Product Introduced:** 12/17/90. **Product Description & Applications:** Bridgeable two-channel power amplifier with twelve loudspeaker modes for matching the response characteristics and excursion limits to the loudspeaker(s) connected. DMode™ Switch for powering two subwoofers from one amplifier. Designed for a variety of playback and control room monitoring applications including the production of Stereosurround® encoded program material in music, film and television, as well as playback in movie theaters and high-quality home systems. **Basic Specifications & Suggested List Price:** Full complementary, thermally matched-hybrid modules in the output stage, power supply with high-current toroid, computer grade electrolytics, overload distortion protection, thermal and short circuit protection, gold-plated connectors, balanced and unbalanced inputs, rack mount kit available. 100 watts min. per channel into 8 ohms 20Hz-20kHz +/-0.5 dB. \$1,395.

SOUNDCRAFTSMEN; 2200 S. Ritchey; Santa Ana, CA 92705; (714) 556-6191. Product Name: DJ600 power amplifier. **Contact:** Roger Hagemeyer. **Date Product Introduced:** 11/90. **Product Description & Applications:** MOSFET two-channel power amplifier. Design employs Zero Phase Shift and Zero-Delay Feedback for very low distortion. Ideal for near-field monitoring. **Basic Specifications & Suggested List Price:** 125 watts per channel at 8 ohms from 20Hz to 20kHz at less than 0.05% THD with both channels driven. Professional user net is \$599.

SOUNDCRAFTSMEN; 2200 S. Ritchey; Santa Ana, CA 92705; (714) 556-6191. Product Name: DJ900 power amplifier. **Contact:** Roger Hagemeyer. **Date Product Introduced:** 10/90. **Product Description & Applications:** MOSFET two-channel power amplifier featuring proprietary, ultra-smart Phase Control power supply. This unique circuit provides complete protection from any overload condition and AC line regulation to 100 VAC. The amplifier will maintain full power output capability even if AC line voltage dips to 100 VAC. MOSFET design emulates "Audiophile Tube" sound. The amplifier is a perfect match for all studio monitoring. **Basic Specifications & Suggested List Price:** 205 watts per channel into 8 ohms from 20Hz to 20kHz at less than 0.05% THD with both channels driven. Slew rate is 50 volts per microsecond. Signal to noise ratio is 105dB below rated output. Damping factor is greater than 250. Professional user net is \$749.

STEWART ELECTRONICS; 11460 Sunrise Gold Cir., Ste. B; Rancho Cordova, CA 95742; (916) 721-1877. Product Name: PA 800. **Contact:** Christopher Dragon, sales & marketing mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** Unique new amplifier technology utilizing high-frequency switchmode power supply with impedance-optimization circuitry. Stable and efficient into a 2 ohm load or 4 ohm bridged. This unit will accommodate XLR, TRS or barner strip inputs. **Basic Specifications & Suggested List Price:** \$699 retail. Rated output power continuous both channels driven from 20Hz-20kHz 150x2 8 ohm, 250Wx2 4 ohm, 400Wx2 2 ohm. Weight, 9 lbs. Single rackspace. Designed and handcrafted in the U.S.A.

STEWART ELECTRONICS; 11460 Sunrise Gold Cir., Ste. B; Rancho Cordova, CA 95742; (916) 721-1877. Product Name: PA-1200. **Contact:** Christopher Dragon, sales & marketing mgr. **Date Product Introduced:** 1/91. **Product Description & Applications:** Fully dual monaural design. Utilizing high-frequency switch mode power supply with impedance optimization circuitry. Thermally controlled fan cooling, stable and efficient into a 2 ohm load. Average power requirement 5A average. This unit is bridgeable and will accommodate XLR, TRS or barner strip inputs. Unique large gauge five-way binding post outputs or 1/4 phone. **Basic Specifications & Suggested List Price:** \$995 retail. Rated output power continuous both channels driven from 20Hz-20kHz 250Wx2 8 ohm, 400Wx2 4 ohm, 600Wx2 2 ohm. Weight 15 lbs., 2 rackspaces. Designed and handcrafted in the U.S.A.

TUBE WORKS; 8201 E. Pacific Pl., #606; Denver, CO 80231; (303) 750-3801. Product Name: Mos Valve. **Contact:** Greg Hauswirth, sales. **Date Product Introduced:** 1/91. **Product Description & Applications:** Power amplifiers that utilize MOSFET as power source but perform like a tube amp. Recently patented, Mosvalve will never go into harsh square wave clipping. Its waveform and sensitivity is almost identical to that of a tube amp. **Basic Specifications & Suggested List Price:** Model 962 retails at \$600, weighs 13 lbs., occupies two rackspaces, power 80 watts/channel. Model 942 retails \$900, weighs 30 lbs., occupies 2 rackspaces, power 250 watts/channel.

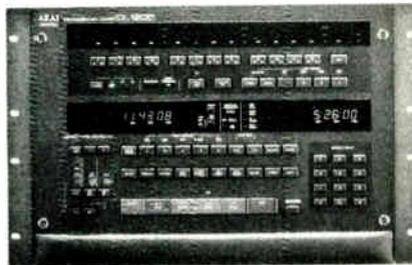
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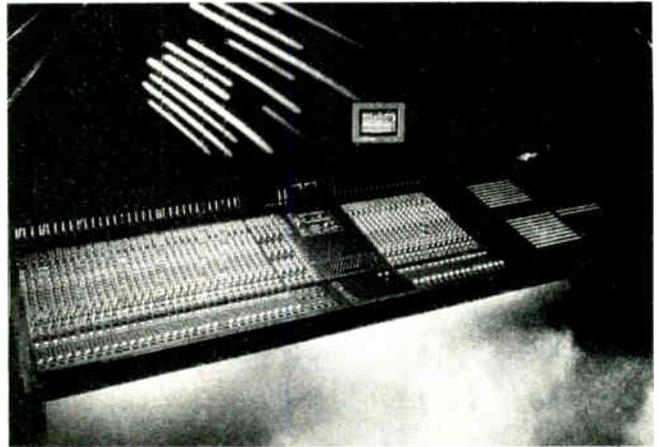


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AUDIO KINETICS UK LIMITED; Kinetics Centre, Throbbald St.; Borehamwood, Herts, WD6 4PJ England; +44 081 953 8118. **Product Name:** ES Lock 1.11 Synchronizer Revision 3. **Contact:** Roger Patten, sales mgr. **Date Product Introduced:** 3/91. **Product Description & Applications:** The E.S. Lock 1.11 Synchronizer Revision 3 software adds an interface to Motionworker allowing direct control from SSL and Neve V Series consoles. VRC reading facilities were incorporated together with Sony simulation facilities. Film control parameters were improved and serial control of Studer, Sony and other transports integrated. **Basic Specifications & Suggested List Price:** ES 1.11 ES Lock Total Synchronizer: \$3,950. Rev 3 software: copy changes only.

AUDIO KINETICS UK LIMITED; Kinetics Centre, Throbbald St.; Borehamwood, Herts, WD6 4PJ England; +44 081 953 8118. **Product Name:** Masterlink. **Contact:** Roger Patten, sales mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** Masterlink—a new PC based automation and synchronizer control software package using a transputer link. It controls Audio Kinetics MX 844 automation computers and integrates cue list control of the new low cost serial synchronizers MS1 and MS2. Accuracy is improved to 0.25 SMPTE frame. Switching software controls certain consoles. Module switching. **Basic Specifications & Suggested List Price:** 32 channel Masterlink automation package: \$13,995 + PC. Masterlink upgrade to existing systems: \$2,495 — PC. MS1 Serial Synchronizer: \$1,995 + cable. MS2 Serial Synchronizer/Generator: \$2,495 + cable.

AUDIOMATION SYSTEMS LTD.; 96 Dudley Rd.; Sudbury, MA 01776; (508) 443-8053; FAX: (508) 443-8484. **Product Name:** "Uptown" automation systems. **Contact:** Richard Vanderslice, VP. **Date Product Introduced:** 6/91. **Product Description & Applications:** Automation systems for recording consoles post production film video consoles and "live" consoles. Modules for EQ and insert switch automation available. Also, new panning pot. **Basic Specifications & Suggested List Price:** Automation using standard 386 PC. Available up to 96 channels, 32 channel system including stereo master, only \$45,200.

BRAINSTORM ELECTRONICS INC.; 1515 Manning Ave., #4; Los Angeles, CA 90024; (213) 475-7570. **Product Name:** SR 15, Time Code Distributor. **Contact:** Bernard Frings, president. **Date Product Introduced:** 7/91. **Product Description & Applications:** The SR 15 combines three units in one, a 1x5 time code distributor with reshaping, and level control on all five outputs, a time code analyzer that includes a time code reader, a frame rate counter and indicators for drop, color and video synchronous code (code properly phased to video), a tone stripper that extracts synchronous 50/60 Hz sine or square wave from code, video or mains. Also available for the SR 15 is an optional black burst generator with BNC output. **Basic Specifications & Suggested List Price:** Enclosed in a single space 19" chassis, it uses XLRs for audio (time code and tone) and BNCs for video. Input signal ranges from below -30dB to above +20dB. Output levels are front panel adjustable. Unit can be used with balanced or unbalanced signals. **Suggested retail:** US \$745.

BRAINSTORM ELECTRONICS INC.; 1515 Manning Ave., #4; Los Angeles, CA 90024; (213) 475-7570. **Product Name:** SR 2. **Contact:** Bernard Frings, president. **Date Product Introduced:** 8/91. **Product Description & Applications:** The SR-2 is identical to Brainstorm's SR 1 time code refresher and has a new four digit display for reading the incoming code's frame rate. This very accurate counter (four updates per second) is ideal for identifying the code's format. (29.97 vs. 30 fr-sec) and can also detect potential problems such as jitter. SR-1 owners can upgrade their units to SR 2. **Basic Specifications & Suggested List Price:** The SR-2 is housed in a small plastic enclosure. It is available with XLR connectors or 1/4" jacks. Input threshold is better than -30dB. Output level is front panel adjustable. Unit can be used with balanced or unbalanced signals. **Suggested retail:** SR 2 \$295, SR 1 to SR 2 upgrade \$125.

CIPHER DIGITAL INC.; 5350 Partners Ct., PO Box 170; Frederick, MD 21701; (301) 695-0200. **Product Name:** CD1. 825 Sony Serial to LTC Converter. **Contact:** Anthony R.

Matlia. **Date Product Introduced:** 4/91. **Product Description & Applications:** Used to recover time code from Sony HI-8 (EVO-9800) recorders. Monitors RS-422 control port and converts time code information to longitudinal time code output. Will work with or without an editor attached to the recorder. **Basic Specifications & Suggested List Price:** Video in/out, RS-422 in/out, SMPTE time code out, \$495.

CIRCUIT RESEARCH LABS; 2522 W. Geneva Dr.; Tempe, AZ 85282; (800) 535-7648. **Product Name:** Real Time Event Sequencer. **Contact:** William L. Ammons. **Date Product Introduced:** 7/91. **Product Description & Applications:** The real time event sequencer is a clock by control one of eight, or one of 255 outputs. The unit can store 200 events. Programming is done via a circular menu system, shown on a back-lit LCD display. Outputs are opto-isolator driven open collectors with selectable latch on, or half and one second closures. The unit may be used to control events in a variety of production applications. **Basic Specifications & Suggested List Price:** Controls one of eight outputs or one of 255 outputs (binary encoded). Controls down to one minute intervals. Stores up to 200 events. One rack high, AC powered, battery backup, standard rackmount.

DNF INDUSTRIES; 1032 N. Sweetzer Ave., Ste. 212; W. Hollywood, CA 90069; (213) 650-5266; FAX: (213) 650-6639. **Product Name:** ST60 VTR Transport Controller with JOG. **Contact:** Dan Fogel, sales. **Date Product Introduced:** 4/91. **Product Description & Applications:** The ST60 controls the full line of SONY 1", 3/4", 1/2" and D2 videotape machines, and Ampex 1" and 1/2" videotape machines. The ST60 controls all transport functions: record assemble & insert, play, stop, fwd, rewind, jog forward and jog reverse. The ST60 is ideal for audio post-production: controlling the master video source of an audio synchronization system, controlling the video layback machine, starting and stopping multiple VCRs simultaneously. **Basic Specifications & Suggested List Price:** Front panel: 6 real-time status LEDs, 1 power LED; rear panel: serial connector—"D" 9 pin, record mode select—4 DIP switches; keypad interface—"D" 15 pin, switch input—dry SPST contact closure, status output—open collector, 50 ma, sink; power—12 volt D.C. 500 ma.; 110 VAC, 50/60 Hz converter supplied; size—7" x 5" x 1 1/2"; weight 2 lbs.

GML INC.; 7821 Burnet Ave.; Van Nuys, CA 91405; (818) 781-1022. **Product Name:** Series 2000 Moving Auto Environment. **Contact:** Cary Fischer, vice president. **Date Product Introduced:** 9/91. **Product Description & Applications:** Series 2000 Moving Fader Automation Environment featuring pan and zoom graphics recall, machine control and "C" peripheral VCA controller. Options include true stereo fader, software nested grouping, VCA-style Auto-Null and switch edit page. All software packages include video post film re-recording configurations. **Basic Specifications & Suggested List Price:** Automation specifications: Fader—1/10th dB, Switches—1/4 frame accuracy. CPU is VME-based 680x0 with 40MB Hard disk, 3.5 floppy and 1MB RAM. Recall specifications: 1024 x 768 ultra-high resolution display. Pan & Zoom trackball control. Machine Control Specifications: All parallel interface audio machines (analog/digital) and Sony serial protocol.

HEDCO; 825 K Greenbrier Cir.; Chesapeake, VA 23320; (804) 424-0896; (800) 433-2638. **Product Name:** 16Xplus Audio Router. **Contact:** Mike Duckworth, sales engr. **Date Product Introduced:** 4/91. **Product Description & Applications:** The 16Xplus system of audio and video routers are modular and expandable up to 256x1. Configurations include 16x1 video with stereo audio, 4 channel 16x1, stereo 32x1, and mono 64x1 in 1RU, or 8 channel 16x1, 4 channel 32x1, and stereo 46x1 in 2RU, up to 8 levels of audio and video can be controlled via local and/or remote panels and RS 232 or RS 422. Also available are HEDCO's 16x16 audio and video routers. **Basic Specifications & Suggested List Price:** Better than digital audio specifications. Total system dynamic range of greater than 114 dB. Excellent crosstalk specifications and High Z or 600 ohm internally selectable input impedance. List prices range from \$990 for 16x1 dual audio only to \$2,705 for 16x1 8 channel Audio.

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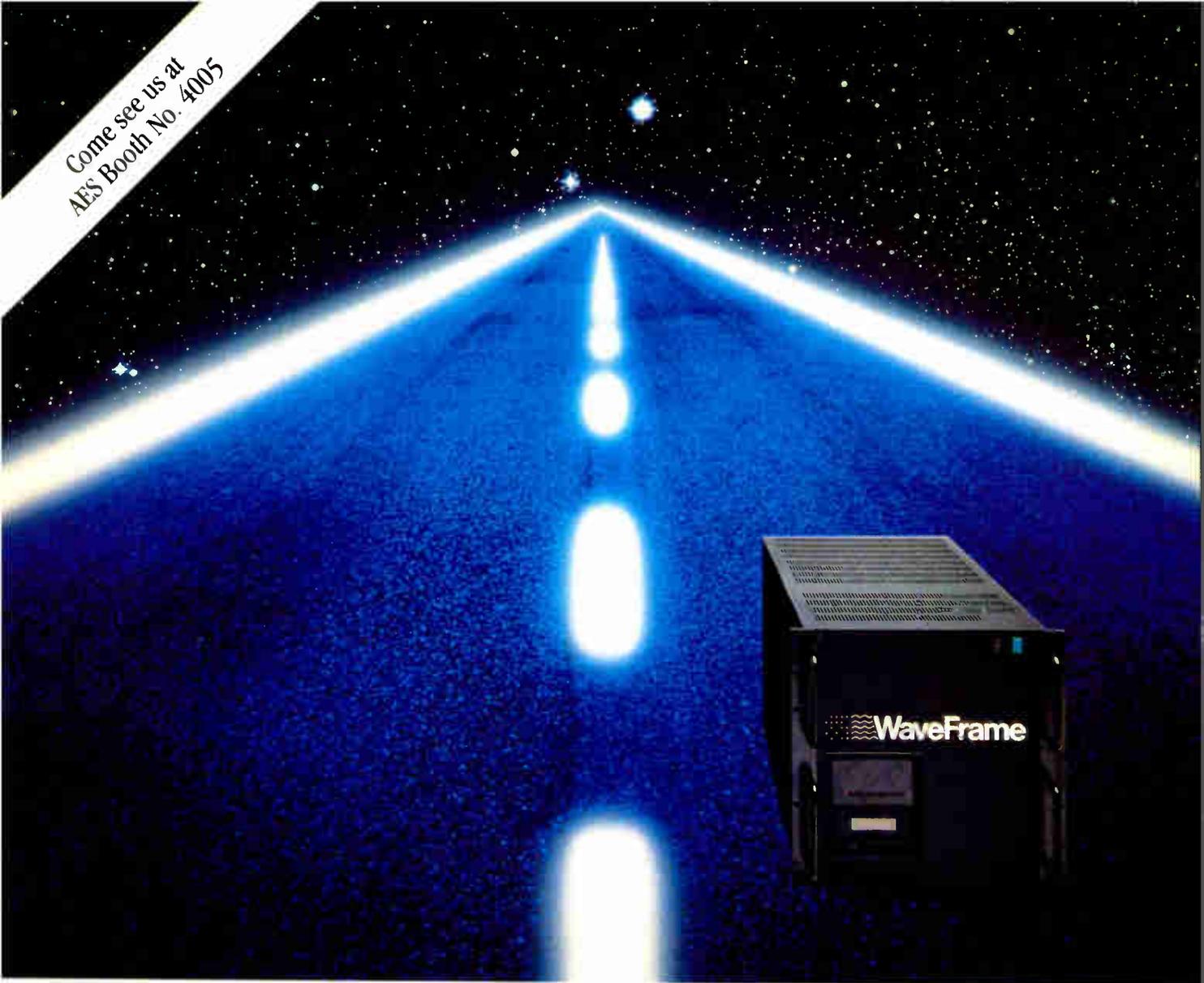
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INTELIX; 5618 Odana Rd.; Madison, WI 53719; (608) 273-6333. Product Name: MIND-Net Communications Protocol. **Contact:** Steven M. Cohan, president. **Date Product Introduced:** 5/91. **Product Description & Applications:** The Intelix MIND-Net is a low-cost, high-speed communications protocol that allows many or all of the products in the audio industry to easily communicate with one another. It can be used with a master controller or as a stand-alone communications system, which will provide stimulus, feedback and status indication wherever needed in the audio environment.

JL COOPER ELECTRONICS; 13478 Beach Ave.; Marina Del Rey, CA 90292; (213) 306-4131. Product Name: Instant Recall. **Contact:** Chuck Thompson, national sales and marketing mgr. **Date Product Introduced:** 6/91. **Product Description & Applications:** Instant Recall audio control system for the engineered sound market can work with any audio mixing console, or can be used as a stand-alone mixer. Instant Recall is ideal for permanent installations in theaters, boardrooms, churches, amusement parks, stadium, convention centers and hotels, or for concert sound reinforcement. The M-8 includes a 9 pin Sub-D connector which supports RS-422 I/O and ES-BUS protocol for AFV (Audio follows video) applications. **Basic Specifications & Suggested List Price:** Instant Recall consists of the M-8 automation master, the C-8 automation controller and the S-8 automation expander. A basic 8-channel system can be expanded to 16, 24, 32 channels. Retail price for the C-8 and M-8 basic system is \$1,499.95. The S-8 expander lists for \$749.95.

JL COOPER ELECTRONICS; 13478 Beach Ave.; Marina Del Rey, CA 90292; (213) 306-4131. Product Name: MixMaster. **Contact:** Chuck Thompson, national sales and marketing mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** MixMaster is an affordable automation system that interfaces with any console to provide fast, real-time audio. MixMaster can also be used as a stand-alone 8x1 or dual 4x2 MIDI automated line mixer/sub-mixer. It can be used with sequencers, computers or MIDI fader units such as the JL Cooper FaderMaster MIDI Command Controller. **Basic Specifications & Suggested List Price:** MixMaster (\$499.95 suggested retail) is a single rackspace unit with eight unbalanced VCA inputs and outputs, a mix output and a stereo mix input. It employs the same high-quality audio circuitry and dbx 2150 VCAs that are used in the JL Cooper MAGI II Automation systems.

RUSS JONES MARKETING GROUP; 17700 Raymer St., Ste. 1001; Northridge, CA 91325; (818) 993-4091. Product Name: Musonix Cue Cube. **Contact:** Ron Sorter or Bill Black, product specialists. **Date Product Introduced:** 1/91. **Product Description & Applications:** MIDI controlled automatic punch-in/punch-out device. Reads both MIDI-clock and MIDI-time code to set auto punch in/out points. Features a "rehearse" mode to verify that punch points are correct. Gives a visual countdown to punch. **Basic Specifications & Suggested List Price:** MIDI in connects to out of sequencer or drum machine. 1/4" cable connects to footswitch punch-in jack on multitrack. Timing accuracy: better than +/-1.5ms. Timing Resolution: MTC & DTL 1 frame, MIDI clock 1/16 note. Size: (57x114x32mm).



RUSS JONES MARKETING GROUP
Niche Audio Control Module

RUSS JONES MARKETING GROUP; 17700 Raymer St., Ste. 1001; Northridge, CA 91325; (818) 993-4091. Product

Name: Niche Audio Control Module. **Contact:** Ron Sorter or Bill Black, product specialists. **Date Product Introduced:** 10/90. **Product Description & Applications:** Eight channel, non-VCA analog audio level attenuator. Stackable up to 8 units, for control of up to 64 audio levels from a single MIDI channel. **Basic Specifications & Suggested List Price:** Signal to noise: better than 95dB; Total Harmonic Distortion: less than .001%; Freq. Response below 30 to above 30kHz flat to within 0.1dB; Crosstalk 0%. Suggested Retail: \$479.

LARTEC SYSTEMS; 4201 W. Burbank; Burbank, CA 91505; (818) 972-1070. Product Name: ADR Control Pro. **Contact:** Bruce H. Larson, VP marketing. **Date Product Introduced:** 11/1/91. **Product Description & Applications:** The ADR Control Pro is a stand-alone software program designed to handle list management and machine control on the ADR stage. It allows the mixer to quickly pull loops from the list for recording and save them back to the list before another loop is accessed, while automatically logging take and track numbers. The ADR Control Pro operates in film footage or SMPTE and is designed to integrate with LarTec's line of editing and spotting systems. **Basic Specifications & Suggested List Price:** List price \$25,000. Also includes LarTec Recorder Interface, Control Pro keyboard, computer and monitor, JSK Engineering ML211B Motion Controller. 8 hours of operator training and 90 day warranty.

LARTEC SYSTEMS; 4201 W. Burbank; Burbank, CA 91505; (818) 972-1070. Product Name: Audio Edit Pro. **Contact:** Bruce H. Larson, VP marketing. **Date Product Introduced:** 3/91. **Product Description & Applications:** LarTec's Audio Edit Pro is a machine control and list management software product developed by sound editing and system engineering experts. It addresses sound effects building, music pre-lay, dialogue clean up, EDLs, auto assembly of dailies of effects, ADR/Foley auto-conforming and much more. It integrates fully with LarTec's other products. **Basic Specifications & Suggested List Price:** The system controls a master VCR, synchronizes up to four slave tape machines, and can sync start multiple source machines. Price varies depending on hardware purchased. Range: \$15,000-\$25,000.

LEITCH INCORPORATED; 825 K Greenbrier Cir.; Chesapeake, VA 23320; (804) 424-7920; (800) 231-9673. Product Name: UDT-5700/5701 Up-down timer. **Contact:** Mike Gardner, sales engr. **Date Product Introduced:** 4/91—rackmounted-version. **Product Description & Applications:** Available in 1RU UDT-5701, or desktop UDT-5700. Leitch combines two programmable up/down timers with a time calculator for pro-

duction and time control applications. Each timer is completely independent, yet allows simultaneous control and may display either hour:minutes:seconds or seconds:minutes:frames. A simple keypad permits stopwatch-style operations, with twenty programmable presets and stacking of six event sequences. The UDT provides a serial (RS-422/422) output of time for computer or control equipment. **Basic Specifications & Suggested List Price:** One channel time-code reader and two-channel generator. Five GPI inputs and four GPI outputs. Inputs programmable to any function key and outputs to a time match or sequence endpoint. SMPTE-DF input at 4Vp-p, +/-12dB and output at +4dBm nominal. Tabletop version in \$995. Rack-mounted version is \$1,295.

MIDIMAN; 30 N. Raymond Ave., Ste. 500; Pasadena, CA 91103; (818) 449-8838. Product Name: Syncman Pro. **Contact:** Michael Paul Inman, national sales mgr. **Date Product Introduced:** 1/91. **Product Description & Applications:** Syncman Pro is the most comprehensive sync box ever built. Syncman Pro does SMPTE regeneration, Spollock™, video sync built in SMPTE display, a 768 MIDI "hit" Foley recorder/player and more. Syncman Pro is most powerful! A total post-production tool for audio as well as video. **Basic Specifications & Suggested List Price:** Syncman Pro is a single rack height unit. Bit jitter less than five microseconds and frame accuracy better than one second in ten hours. Syncman Pro retails for only \$599.95!

RICHMOND SOUND DESIGN LTD.; 1234 W. 6th Ave.; Vancouver, BC, V6H 1A5 Canada; (604) 732-1234. Product Name: Command/cue concurrent. **Contact:** Damon Woolton, general manager. **Date Product Introduced:** 8/91. **Product Description & Applications:** Time code based and real time manual computerized show control package. Hardware capacity: 4096 audio channels, 4096 lighting channels, 4096 stepping motor channels, 8192 analog/TTL outputs. Software simultaneously operates all hardware, communicates via MIDI, RS485, RS422, RS232. Direct programming tools for PLCs. **Basic Specifications & Suggested List Price:** Price range—\$25,000-\$600,000—depending on hardware size and configuration.

SOUND DESIGNERS STUDIO; 424 W. 45th Street; New York, NY 10036-3565; (212) 757-5679. Product Name: Performance Automation. **Contact:** Bernard Fox. **Date Product Introduced:** 10/91. **Product Description & Applications:** Tony award winning shows "City of Angels" and "Will Rogers" employ motorized moving faders as a part of an

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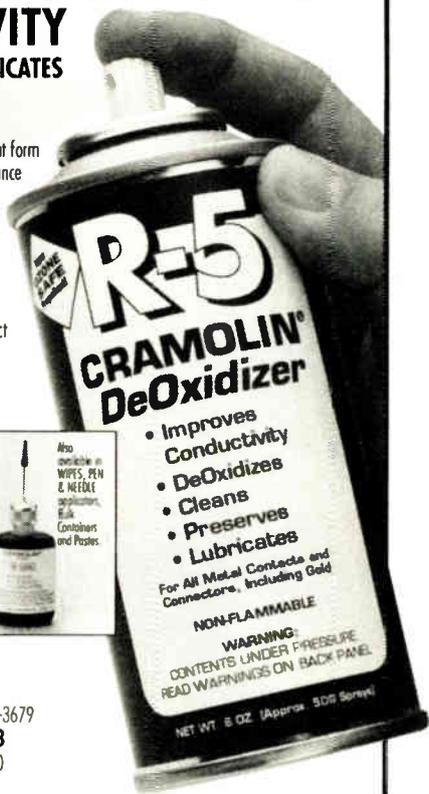
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uncomplicated mixing system. External or internal installation yields 1/4 frame accuracy, with simple, sub and overlap grouping. Full, stand-alone or locked-to-tape SMPTE and MIDI functional, capable of comparing mixes for true A/B'ing, and splice editing for merging various mixes, blend static and dynamic moves with on-board level screens. One year parts and labor guarantee. **Basic Specifications & Suggested List Price:** Designed to operate much like a lighting board, the system includes moving faders, a computer, interface cards, line amps and proprietary software. Up to 96 faders may be utilized per computer board, AT-type microprocessor, which can run alone, independently of any external synchronization, for as little as \$1,145 per channel. On-site maintenance.

360 SYSTEMS; 18740 Oxnard St.; Tarzana, CA 91356; (818) 342-3127. **Product Name:** AM-16/R Remote Control Station. **Contact:** Don Bird, dir. of mktg. **Date Product Introduced:** 10/90 **Product Description & Applications:** Rackmount remote control panel for AM-16/B 16x16 audio switchers. Provides push button selection of X-Y or salvo switching. May be used in multi-drop configurations or to control multiple (max. 4) AM-16/B switchers from a single location. Includes source/destination lockout capability and back lit indicator buttons for verification of all crosspoint connections. **Basic Specifications & Suggested List Price:** Suggested list, \$695.

TIMELINE VISTA INC.; 2401 Dogwood Way; Vista, CA 92083; (619) 727-3300. **Product Name:** Lynx Console Control Unit. **Contact:** Josann Block, administrator. **Date Product Introduced:** 7/28/91. **Product Description & Applications:** The new TimeLine Console Control Unit (CCU) is a miniature keyboard, which may be mounted in the faceplate of Neve, SSL, or other console. Provides machine control for up to six transports with any machine the master. Small 5 1/2" x 5 1/2" footprint. 16-character alphanumeric display shows machine time code location, status and offsets 5 status lights for each machine. The CCU system offers variable speed control of the master for pitch changes of an entire synchronized machine group. **Basic Specifications & Suggested List Price:** Price \$1,500.

TIMELINE VISTA INC.; 2401 Dogwood Way; Vista, CA 92083; (619) 727-3300. **Product Name:** Lynx System Supervisor with Neve Flying Faders Interface. **Contact:** Josann Block, administrator. **Date Product Introduced:** 7/28/91. **Product Description & Applications:** The Lynx System System is now plug compatible with Neve Flying Faders Automation system. Using the Lynx Console Control Unit (CCU) or Lynx Keyboard Control Unit (KCU) you now have a complete machine control package from a single source mounted within your Neve V Console. **Basic Specifications & Suggested List Price:** Price \$3,950.

TRIDENT AUDIO U.S.A.; 2720 Monterey St., Ste. 403; Torrance, CA 90503; (213) 533-8900. **Product Name:** Trident Machine Control System. **Contact:** Phil Wagner, sales mgr. **Date Product Introduced:** 11/89. **Product Description & Applications:** PC-based machine control for music and post-production. Master, slave and MIDI (virtual) transport control via SMPTE and bar-beats. Featuring sophisticated cue list, multiple cycle, automated drop-in and off line functions. Vector-on-board QWERTY keyboard integrates machine control and fader automation. Includes Adams-Smith Zeta 3 synchronizer and IBM compatible 386 computer. **Basic Specifications & Suggested List Price:** Price: \$24,950.

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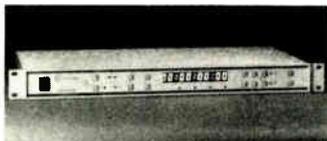
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AKAI PROFESSIONAL; PO Box 2344; Fort Worth, TX 76113; (817) 336-5114. Product Name: DD-QMac Editing Software **Contact:** Chuck Murray. **Date Product Introduced:** 7/91 **Product Description & Applications:** DD-QMac is software for the Apple Macintosh computer which provides complete graphic editing for the Akai Digital DD1000 magneto optical disk recorder. In addition to large, high resolution display of wave form data, DD-QMac allows the user to more easily manipulate the various elements of the DD1000's Q-list, song and play sheet modes. DD-QMac also includes a front panel emulation window which mimics the DD1000's face. **Basic Specifications & Suggested List Price:** DD-QMac requires: Mac IIcx, ci, x, si or LC computer; at least 2 meg of memory; System 6.0.4 or later. List price: \$700.

AUDIOFILE INC.; 4 Militia Dr., Ste. 20; Lexington, MA 02173; (617) 861-2996. Product Name: SyncroMedia™ for Windows 3.X. **Contact:** Campbell Strass, vice president. **Date Product Introduced:** 10/1/91 **Product Description & Applications:** A dynamic link library (DLL) for application software developers of multimedia applications for Windows 3.X™ from Microsoft. The DLL and software developer's kit deliver the run-time library and development tools for application developers to organize their media data, specify synchronization relationships, and maintain those relationships during playback. The multiple media streams such as audio, animation, MIDI, graphics and video are stored in their existing format while the SyncFile™ specifies synchronization relationships and maintains them during playback with the DLL. **Basic Specifications & Suggested List Price:** SyncroMedia™ is available on a software licensing basis to qualified software developers. It requires Windows 3.X and Level 1 MPC™ hardware. MPC™ are trademarks of Microsoft Corporation and Windows 3.X™. SyncroMedia™ and SyncFile™ are trademarks of AudioFile Inc.

THE BLUE RIBBON SOUNDWORKS LTD.; 1293 Briardale Ln. NE; Atlanta, GA 30306; (404) 377-1514; FAX: (404) 377-2277. Product Name: Bars & Pipes Add-on Series. **Contact:** Kathleen Delling-Eiselt, dir. of operations. **Date Product Introduced:** 8/91. **Product Description & Applications:** The Bars & Pipes Add-on Series, a collection of enhancements to Bars & Pipes Professional, currently features seven packages: Multi-Media kit enables Bars & Pipes Professional to control or be controlled by other Amiga applications; Internal Sounds kit features 81 IFF samples, an editor/player and keyboard; Rules for Tools combines 100 pages of programming notes with a service code disk; Creativity kit includes algorithmic music tools; ProStudio kit features Tools for the electronic musician, and MusicBox A & B enhance Bars & Pipes Professional's wide array of musical features. **Basic Specifications & Suggested List Price:** Music Box A & B, MultiMedia kit, Rules for Tools and Internal Sound kit: \$59.95/each Pro Studio kit and Creativity kit: \$69.95/each.

THE BLUE RIBBON SOUNDWORKS LTD.; 1293 Briardale Ln. NE; Atlanta, GA 30306; (404) 377-1514; FAX: (404) 377-2277. Product Name: Bars & Pipes Professional V1.1. **Contact:** Kathleen Delling-Eiselt, dir. of operations. **Date Product Introduced:** 3/1/91. **Product Description & Applications:** Bars & Pipes Professional brings state-of-the-art MIDI sequencing and scoring to the Amiga. Designed by professional musicians, Bars & Pipes Professional favors a musical, not technical, approach to recording and arranging. Its graphical interface allows the composer to see music in a number of intuitive and editable forms, and its expandable architecture enables the ongoing addition of new features and techniques. **Basic Specifications & Suggested List Price:** Unlimited number of tracks and notes, notation editing and printing, graphical song construction, time-line scoring, automated mixing, SMPTE compatibility, graphical tempo mapping, external syncronization, graphical event editing, looping, read/write MIDI file format, fully multi-tasking. (\$379).

BOSE CORP; The Mountain; Framingham, MA 01701-9168; (508) 879-7330. Product Name: Sound System™ Software CAD Programs. **Contact:** Mark Christensen, Sound System Software mgr. **Date Product Introduced:** 1991 **Product Description & Applications:** The Modeler™ program is a comprehensive tool for designing and evaluating sound systems by computer, and is part of the Sound System software family of

programs from Bose. Modeler version 4.0 has a number of important improvements over the previous version. Bose will be introducing a new loudspeaker to its commercial line of products.

cMIDI; PO Box 11586; Lynchburg, VA 24506; (804) 385-0477. Product Name: cMIDI C++ Class Library. **Contact:** Greg Sepes, engineer. **Date Product Introduced:** 6/91 **Product Description & Applications:** A set of C++ classes to allow users to quickly write MIDI applications that do MIDI input, output, and manipulation. **Basic Specifications & Suggested List Price:** \$59 IBM PC/AT/PS2, DOS; Roland MPU-501 interface; Roland C++ computer

CURRENT MUSIC TECHNOLOGY; 146 Paoli Pike; Malvern, PA 19355; (215) 647-9426. Product Name: Mac N' Rak. **Contact:** Chris Wurts, Joel Mazur. **Date Product Introduced:** 10/90. **Product Description & Applications:** Rackmounted Macintosh and IBM computers. Ruggedized for the road. Sound dampened for the studio. Compatible with amplifier control MIDI, digital audio and related systems. **Basic Specifications & Suggested List Price:** All models starting at \$495.

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. Product Name: Pro Store 660. **Date Product Introduced:** 9/90 **Product Description & Applications:** Digidesign's Pro Store series of high speed, rack-mounted SCSI hard drives are for use with Digidesign's Sound Tools and AudiMedia direct-to-disk digital recording and editing systems. Featuring high performance and quiet operation, sturdy rack mounting, and one year warranties, the Pro Stores are ideal for use in the professional studio and are compatible with any SCSI-equipped Macintosh and all Digidesign products. **Basic Specifications & Suggested List Price:** 663 8MB for matted capacity; 16.5 msec/second access time, 19" rackmount, 2U high; quiet fan; 6-foot SCSI cable one-year warranty. Compatibility: any SCSI-equipped Macintosh. Price \$3,495.

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. Product Name: Pro Store Optical. **Date Product Introduced:** 6/91. **Product Description & Applications:** Rackmounted, removable magneto-optical disk drive for professional recording, editing and archiving. Removable, erasable, magneto optical disk drive: 650 MB storage capacity (325 MB per side); 19" rackmount, 2U high; Fast access time: 6-foot SCSI cable; one year warranty. **Basic Specifications & Suggested List Price:** Compatibility: Any SCSI-equipped Macintosh. Price \$4,995.

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. Product Name: ProStore, 1 Gigabyte. **Date Product Introduced:** 8/91. **Product Description & Applications:** Rackmounted, 1-gigabyte hard drive 1035 megabyte storage capacity, extremely fast access time, 19" rack mount, 3U high, quiet fan, 6-foot SCSI cable, one-year warranty. **Basic Specifications & Suggested List Price:** Compatibility: any SCSI-equipped Macintosh. Price TBA.

DR. T'S MUSIC SOFTWARE INC.; 100 Crescent Road, #1B; Needham, MA 02194; (617) 455-1454. Product Name: Intro+ for Macintosh and IBM. **Contact:** Steve Thomas. **Date Product Introduced:** 7/91 **Product Description & Applications:** Intro+ consists of a sequencer, scoring program, MIDI interface, and 2 MIDI cables. It gives the first time MIDI user all he or she needs to turn their computer into a music workstation. Mac version contains Beyond 1.6, music writer, and an Alltech interface. IBM version contains Prism, Copyist apprentice, and a Roland compatible MIDI interface. **Basic Specifications & Suggested List Price:** IBM-Functions on all IBM compatible computers; hard disk recommended: VGA, EGA, Herc monitor; 640 K memory. Mac version—any Macintosh with 1 meg memory. All versions require MIDI. IBM \$299, Mac \$399

DR. T'S MUSIC SOFTWARE INC.; 100 Crescent Road, #1B; Needham, MA 02194; (617) 455-1454. Product Name: X-oR for Macintosh. **Contact:** Steve Thomas. **Date Product Introduced:** 7/91 **Product Description & Applications:** X-oR is a MIDI instrument sound database software program. It has support for over 100 MIDI devices including synthesizers, drum machines, and sound effects processing units. It allows users

to store and edit the sounds and parameters in the hardware and is capable of taking a snapshot of an entire MIDI system and restoring it with one mouse click. **Basic Specifications & Suggested List Price:** X-oR runs on all Macintosh computers with 1 meg memory. It is compatible with MIDI manager, Multi Finder and System 7. List price is \$399

EAST COAST MIDI/MUSOFT SYSTEMS; 21 September St.; Coram, NY; (516) 928-4284. Product Name: ProPatch CM. **Contact:** Gene DeLiberio, partner. **Date Product Introduced:** 1991 **Product Description & Applications:** Editor/Librarian for IBM/PC computers. Supports the Roland MT-32/CM-32L/CM 64/RA-50/CM-32P/LAPC-1 offers complete control including timbre randomization. Call for more info. **Basic Specifications & Suggested List Price:** \$99.95, IBM PC/AT/PS2 or compatible: MPU-401/IPC or equivalent. Mono CGA/VGA/EGA/VGA & Hercules display adapters.

EAST WEST COMMUNICATIONS INC.; 302 West Ocean View Ave.; Del Mar, CA 92014; (619) 755-0599. Product Name: Prosamples. **Contact:** Doug Rogers, president. **Date Product Introduced:** 10/90. **Product Description & Applications:** Prosamples is a series of professional sample libraries on compact disc, CD-ROM, magneto-optical, etc. The first two volumes are from Bob Clearmountain and volume 3 from British producer Steve Levine will be released at AES—NY 1991. Also 90 other products including RAM/ROM cards. **Basic Specifications & Suggested List Price:** Compact disc—\$129; CD-ROMS—\$499; optical—call; RAM/ROMs cards—call

FAST FINGERS MUSIC SOFTWARE; PO Box 741; Rockville Centre, NY 11571; (516) 536-0298. Product Name: Fast Fingers MIDI keyboard lessons. **Contact:** Daniel Chwatsky, president. **Date Product Introduced:** 8/91 **Product Description & Applications:** Practice playing keyboards with your PC. Highly interactive software. Play musical exercises along with your computer. Software can sense your playing, tests and grades your performance. Display shows music notation, a keyboard and fingers. Each exercise can be played in every key signature, treble and bass clef. Adjustable tempo for beginners and advanced players. Play an exercise and the program highlights the current music notation being heard, which keys to press and which fingers to use. **Basic Specifications & Suggested List Price:** Runs on any IBM/PC or compatible with CGA, EGA, or VGA graphics and an MPU-401 compatible MIDI interface. Prices: "Volume 1 Major Scales, Arpeggios, and Triads" (\$39.95), "Volume 2 Minor Scales, Arpeggios and Triads" (\$44.95), "Volume 3 Jazz Modes" (\$49.95), "Volume 4 Jazz Chords" (\$49.94).

FRONTERA ELECTRONICS; 1318 E. Mission Rd., Ste. 202; San Marcos, CA 92069; (619) 727-3410. Product Name: i-cove Rackmount Hard Disk System. **Contact:** Jeff Chamberlain, customer support. **Date Product Introduced:** 1/91. **Product Description & Applications:** Rackmount hard drive systems for SCSI-equipped samplers and computers. These systems range from 40MB to 1200MB and include the popular 45MB removable cartridge drive, CD-ROM units, and tape backup models. With an i-cove hard drive you can load your samples and sequences up to 10 times faster than with floppy disks. Keep all your files on one drive and put it in the rack with the rest of your gear. Perfect for travelling/studio musicians. **Basic Specifications & Suggested List Price:** Each 2-space system features double-shock mounting, cooling fan, auto-switching power supply, push-button SCSI address switch, theft-resistant rack screws, easily expandable, and warranties of up to five years. Toll free support for customers and free EPS sample library also included. Prices start at \$599.

GENEN SYSTEMS; 6261 Variel Ave. #C; Woodland Hills, CA 91367; (800) 545-6900. Product Name: CD Sound & CDJ Classic Music Systems. **Contact:** Jill Shuken. **Date Product Introduced:** 4/91. **Product Description & Applications:** CDJ Classic & CD Sound Music Systems. The ultimate CD music system for businesses, restaurants, hotels, nightclubs and homes. Continuous playback of CD tracks, programmable random playback, touch-screen application and infrared remote control. Works with the NSM CD-2101-AC CD changer (100 CD capacity), Mac & IBM versions. **Basic Specifications & Suggested List Price:** For IBM CD-Sound: Laptop IBM compatible computer, software NSM CD2101 or CD2100 100 disc changer, Genen Systems remote control unit, manual and cables. \$5,995. For Mac: CDJ Classic: CDJ software, NSM CD2101 AC player remote control unit, manuals and cables (Macintosh computer not included). \$4,995

IBM; 11400 Barnet Rd.; Austin, TX; (800) 627-0920. Product Name: M-Audio Capture and Playback Adapter. **Contact:** IBM Multimedia Hotline (800) 627-0920. **Date Product Introduced:** 10/90 **Product Description & Applications:** The M-Audio Capture and Playback Adapter (M-ACPA) is an audio adapter for IBM computers. Digital Signal Processor (DSP) controlled, the adapter is programmed to perform a variety of audio tasks such as audio digitalization, compression and music synthesis. Currently supporting IBM's multimedia programs, the M-ACPA now operates under the Multimedia Extensions to Microsoft's Windows (™ Microsoft). The adapter is available in two models for both AT-bus computers and Micro Channel (™ IBM) PS/2 computers. **Basic Specifications & Suggested List Price:** The M-ACPA has a mono microphone and stereo line inputs and stereo line and headphone outputs. 16-bit PCM

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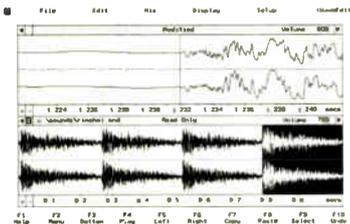
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data with sampling rates up to 44.1 kHz provides quality sound while ADPCM compression and mu-LAW companding reduce storage requirements. List price is \$370 for either adapter.

INTERVAL MUSIC SYSTEMS; 12335 Santa Monica Blvd. #244; Los Angeles, CA 90025; (213) 478-3956. Product Name: Macintosh Editing Software. **Contact:** Scott Morgan, president. **Date Product Introduced:** 3/91 **Product Description & Applications:** Low-cost synthesizer editing software for Macintosh computers. The software features an extremely friendly user-interface and has some of the highest level graphics in the industry. In addition to the standard Ed/Lib features, the software has innovations such as external MIDI patch bay automation and the ability to edit from a keyboard's modwheel. Includes patch randomizer and D/A. **Basic Specifications & Suggested List Price:** Editors available for all Proteus models, Ensoniq VFX-series, Kawai K4 and XCS, KMX MIDI Central. All titles are multi-finder friendly, System ohms, 0 compatible and support Apple's MIDI manager. \$50-\$139 retail.

INTERVAL MUSIC SYSTEMS; 12335 Santa Monica Blvd. #244; Los Angeles, CA 90025; (213) 478-3956. Product Name: VS Wavewrangler. **Contact:** Scott Morgan, president. **Date Product Introduced:** 7/91 **Product Description & Applications:** VS Wavewrangler is editing software for Sequential Prophet VS and Macintosh. The software features full editor and librarian functions as well as the ability to import and convert AIFF (Audio Interchange File Format) files from sample editing programs. Waves can be analyzed and resynthesized in real time. **Basic Specifications & Suggested List Price:** Runs on Mac Plus or higher. Supports Apple's MIDI manager and is multi-finder friendly and System 7.0 compatible. \$199 retail.

INVISION INTERACTIVE INC.; 269 Mount Hermon Road, Ste. #105; Scotts Valley, CA 95066-4029; (408) 438-5530; (800) 468-5530. Product Name: Lightware. **Contact:** Denny Mayer, VP sales. **Date Product Introduced:** 8/89. **Product Description & Applications:** Lightware is a series of sound libraries on CD-ROM disks available for the samplers we've mentioned. **Basic Specifications & Suggested List Price:** Lightware for EMI: Vol. 1 "Symphonic Instruments I" \$995; Vol. 2 "Modern & Classical" \$995; Vol. 3 "Exotic Percussion & Synthesizer" \$995; Vol. 4 "Symphonic Instruments II" \$995; Phase 2. Vols. 1 & 2 "Assorted Instruments" \$1,695 ea.; Sound Effects Vol. 1 \$995; Sound Effects Vol. 2 \$995. Lightware for Emax II: Vol. 1 "Symphonic Instruments I" \$395; Vol. 2 "Exotic Percussion & Synthesizer" \$395. Lightware for Akai S1000/1100: Vol. 1 "Instruments and Percussion I" \$595; Vol. 2 "Pop Instruments" \$395; Vol. 3 "Classical Instruments" \$395.

INVISION INTERACTIVE INC.; 269 Mount Hermon Road, Ste. #105; Scotts Valley, CA 95066-4029; (408) 438-5530; (800) 468-5530. Product Name: Protologic. **Contact:** Denny Mayer, VP sales. **Date Product Introduced:** 11/90. **Product Description & Applications:** Protologic is a 4MB sound memory upgrade board for E-mu's Proteus/1 series synth modules. Protologic doubles the permanent sound memory and adds 128 all new presets to Proteus/1. The new sounds include pop, rock, synth, percussion and ethnic. While Protologic complements the Proteus/1 style of sounds, it also adds sounds that were missing, which completes this already great instrument. Protologic owners will also receive 64 free user presets on a quarterly basis for up to one year after date of purchase. **Basic Specifications & Suggested List Price:** Protologic technical specifications include: Existing E-mu Systems warranty is maintained on Proteus; Full 90-day parts and labor warranty from InVision on Protologic; no linked ROM Presets; compatible with most Ed/Lib software; includes popular drum controller configurations; upgrades Proteus operating system, includes innovative performance articulations; includes stereo image SFX. List Price: \$495.

LIVEWIRE AUDIO; PO Box 561; Oceanport, NJ 07757; (908) 389-2197. Product Name: Livewire Sound Libraries. **Contact:** Mick Seeley, president. **Date Product Introduced:** 12/90. **Product Description & Applications:** Livewire has expanded its product line for synthesizer keyboards and samplers, with new libraries of sounds for the Korg T1, Ensoniq EPS-16+, and Casio FZ samplers. Also new are sound disks and cartridges for the Korg DS 8 and 707, the Casio V2 Series and the Yamaha SY22/TA33 and SY55/TG55 keyboards. **Basic Specifi-**

cations & Suggested List Price: The 1400-program "T1 library" is \$139.95. T1 PCM disks are as little as \$10 each. EPS-16 and F2 disks are \$10-\$15 each. The Casio V2 and Yamaha SY sound disks are \$34.95 for a set of 64 sounds, while the Korg DS-8 +707 400-patch sets are \$39.95. Call for prices and availability of cartridges.

LONE WOLF; 1509 Aviation Blvd.; Redondo Beach, CA 90278; (213) 379-2036. Product Name: MidiHub and Audiotap. **Contact:** Mark Lucas, president. **Date Product Introduced:** 1/92. **Product Description & Applications:** MIDIHub is a MIDI tap port expander. The Audiotap is a fiber optic audio distribution system.



MACBEAT INC.
Compose Yourself

MACBEAT INC.; 1314 Rufina Circle, A4; Santa Fe, NM 87501; (505) 473-4929. Product Name: Compose Yourself. **Contact:** Jack Fishman, author. **Date Product Introduced:** 7/91. **Product Description & Applications:** Compose Yourself includes an 8-track MIDI sequencer with integrated chord computer. It teaches how to compose—covering creating rhythm patterns, deriving melodies from scales, advanced chord techniques, in addition to music fundamentals, all fully explained with examples in various musical styles. Compose Yourself works on all Macintosh computers from the Mac Plus up. For more details please call 1-800-MACBEAT. **Basic Specifications & Suggested List Price:** 8-track Macintosh compatible MIDI sequencer, cassette tape with musical examples, Macintosh Hypercard stack of MIDI files, and glossary of composing techniques, software chord computer.

MARK OF THE UNICORN INC.; 222 Third St.; Cambridge, MA 02142; (617) 576-2760. Product Name: Digital Performer. **Contact:** Susan Patalano, marketing dir. **Date Product Introduced:** 9/91. **Product Description & Applications:** Combines state-of-the-art, Macintosh-based random access digital audio recording (supported by Digidesign Pro Tools, Sound Accelerator, or Audio Media multitrack recording systems) with Performer's award-winning sequencing capabilities. Features up to 16 channels for recording and playback (depending on hardware), unlimited number of audio and MIDI tracks, simultaneous playback and editing of audio and MIDI data, SMPTE synchronization, waveform display, unlimited non-destructive editing, audio data management (including sound file compacting) and more.



MARK OF THE UNICORN INC.
Performer Version 3.61

MARK OF THE UNICORN INC.; 222 Third St.; Cambridge, MA 02142; (617) 576-2760. Product Name: Performer Version 3.61. **Contact:** Susan Patalano, marketing dir. **Date Product Introduced:** 3/91. **Product Description & Appli-**

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NORTHSTAR PRODUCTIONS; 13716 Southeast Ramona St.; Portland, OR 97236; (503) 760-7777; FAX: (503) 760-4342. Product Name: Drumscape™. Contact: Scott James Hybl. Date Product Introduced: 6/91. Product Description & Applications: Drumscape is an audio CD (63 minutes) containing 13 drum tracks with complete song forms cut live to digital. Following the tracks (each approx. 4 min.) are 455 drum samples from the drum kits played by the drummer. All samples are in stereo. The tracks can be digitally edited or the individual samples can be transferred to a sampler and re-sequenced Drumscape are performed by Mark Schulman (Richard Marx, Jeff Lorber) and Brian Willis (Quarterflash). **Basic Specifications & Suggested List Price:** A short demonstration is available by calling the Drumscape demo line at (503) 281-4964. Retail price is \$59.95 plus shipping. There is no charge for the personal use of the tracks or the samples. There is a small license fee for regional/international usage of the tracks. Drumscape comes with a comprehensive booklet detailing song forms and samples.

NORTHSTAR PRODUCTIONS; 13716 Southeast Ramona St.; Portland, OR 97236; (503) 760-7777; FAX: (503) 760-4342. Product Name: Northstar Sampling Library. Contact: Scott James Hybl. Date Product Introduced: Updated 1991. Product Description & Applications: This is an exhaustive musical and sound effects library containing over 1,600 banks for the following samplers: the E-mu Emulator III, the Akai S-1000,

E-mu Emax II, Emax, SP-1200, SP-12, Emulator II, Akai 2-950, S900, Ensoniq 16 plus, Ensoniq Mirage, Oberheim DPX-1. Available on floppy disk, magneto optical, and CD-ROM, a complete listing is available from Northstar Productions. **Basic Specifications & Suggested List Price:** Emulator III: \$100 per 4 meg. bank, \$125 per 8 meg. bank, 4 CD-ROM at App. \$995. Akai S-1000: \$50 per 2 meg. bank, \$80 per 4 meg. bank, \$100 per 8 meg. bank. Emax II: \$80 per 4 meg. bank. Ensoniq 16 plus: \$50 per 2 meg bank, Emulator II: Oberheim DPX-1, SP-1200 & SP-12: \$20 per disk, Ensoniq EPS and Mirage \$15 per disk.

OPCODE SYSTEMS; 3641 Haven Dr., Ste. A; Menlo Park, CA 94025; (415) 369-8131; FAX: (415) 369-1747. Product Name: Galaxy Plus Editors. Contact: Frank Salvemini. Date Product Introduced: 5/91. Product Description & Applications: Galaxy Plus Editors is an editor/librarian software package designed to help musicians organize, edit, store and retrieve vast numbers of sounds and set-ups for synthesizers and other MIDI devices. In addition to over 100 MIDI instruments supported with librarian modules, Galaxy Plus Editors also includes editors for over 45 MIDI devices. **Basic Specifications & Suggested List Price:** Librarian for over 100 MIDI instruments with comprehensive editors for over 45 MIDI devices. Requires a Mac Plus or larger with 1 meg or more. \$379.95.

OPCODE SYSTEMS; 3641 Haven Dr., Ste. A; Menlo Park, CA 94025; (415) 369-8131; FAX: (415) 369-1747. Product Name: Studio 5. Contact: Frank Salvemini. Date Product Introduced: 9/91. Product Description & Applications: The Studio 5 is a MIDI interface, processor, synchronizer and patch bay with a microprocessor for sophisticated processing, mapping and RAM storage for up to 128 patches. When used with OMS compatible software (such as Vision, Studio Vision, Galaxy Plus Editors or MAX), the Studio 5's 15 MIDI ports can be addressed separately for 240 distinct MIDI channels. **Basic Specifications & Suggested List Price:** 15 independent MIDI ins and outs supports 240 MIDI channels. Storage for 128 patches and unlimited virtual instruments and controllers reads all formats of SMPTE including 29.97 non-drop.

OPCODE SYSTEMS; 3641 Haven Dr., Ste. A; Menlo Park, CA 94025; (415) 369-8131; FAX: (415) 369-1747. Product Name: Trackchart. Contact: Frank Salvemini. Date Product Introduced: 7/91. Product Description & Applications: Trackchart is a studio management program designed to simplify the mixing process by providing the mix engineer with printed charts or real time onscreen track substance and movement. Trackchart can generate both track charts and time lines or track overviews of the music for use during recording and mix

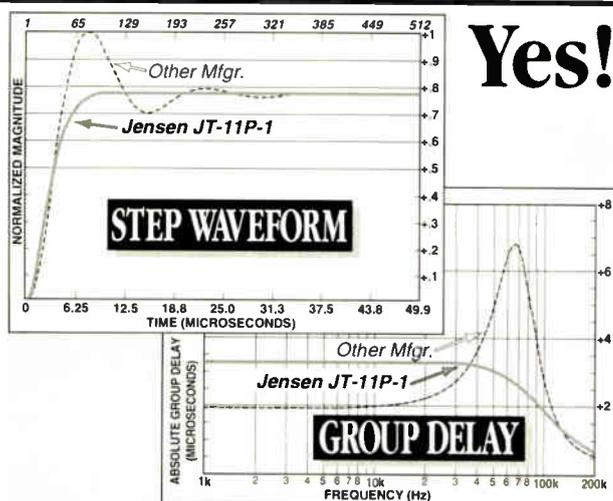
down sessions. Some templates are already stored in the program plus custom set-ups can be created and stored. **Basic Specifications & Suggested List Price:** Macintosh software designed to simplify and document the recording/mixdown process. \$179.95.

PACIFIC COAST TECHNOLOGIES INC.; 7940 Silverton Ave, Suite 206; San Diego, CA 92126; (619) 693-0209. Product Name: Digital Audio Mass Storage. Contact: Parenthesis Devers, marketing. Date Product Introduced: 8/91. Product Description & Applications: Up to four large-capacity hard disk drives can be configured in one 4-space rackmountable case. Based on the original Pacific Coast Technologies design, this new product can hold from 300 megabytes to 2 gigabytes. Standard features include 5-year warranty and effective access times as fast as 3.9 milliseconds. Perfect for all digital audio recording applications, including Sound Tools and Pro Tools by Digidesign, Dyaxis by Studer and Digital Studio by Spectral Synthesis. **Basic Specifications & Suggested List Price:** Available drives: 345MB, 425 MB, 1.2 GB, 1.5 GB, 2.0 GB. Drive mechanisms include Micropolis, Quantum, Wren, Maxtor, Hewlett Packard.



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PANASONIC/RAMSA COMMUNICATIONS & SYSTEMS CO.; 6550 Katella Ave.; Cypress, CA 90630; (714) 373-7278. **Product Name:** Panasonic SV-3900 Software Developers "Toolkit". **Contact:** Steve Woolley, national sales & marketing mgr. **Date Product Introduced:** 6/91. **Product Description & Applications:** The new Software Developer's "Toolkit" streamlines the development of application-specific software for the SV-3900 Pro-DAT. The tool kit features a graphic rendering of a remote control front panel, which provides point-and-click control of the SV-3900 via a mouse or conventional keyboard commands. **Basic Specifications & Suggested List Price:** \$650.

PASSPORT DESIGNS INC.; 625 Miramontes St.; Half Moon Bay, CA 94019; (415) 726-0280. **Product Name:** Media Music. **Contact:** Anastasia Lanier. **Date Product Introduced:** 8/91. **Product Description & Applications:** Media Music is a library of original production music designed for use in multimedia presentations, film scores or commercial jingles. Arrangement lengths vary including five minutes, one minute and 30 second spots. Media Music is available as MIDI files or in most digital audio formats. Media Music MIDI files are in Standard MIDI File format. MIDI information consumes only a fraction of disk space and can easily be edited with MIDI software to customize the music for your needs. **Basic Specifications & Suggested List Price:** Media Music is available for the Macintosh and IBM PC as MIDI files in General MIDI format. Other formats include 16-bit digital audio, 8-bit AIFF, 8-bit SND and MIDI files on CD-ROM for Mac. 16-bit Digital Audio, 8-bit WAVE and MIDI files on CD-ROM for IBM PC. Please call for pricing.

PASSPORT DESIGNS INC.; 625 Miramontes St.; Half Moon Bay, CA 94019; (415) 726-0280. **Product Name:** Sound Magic. **Contact:** Anastasia Lanier. **Date Product Introduced:** 3/91. **Product Description & Applications:** Sound Magic is a CD-ROM that provides more than 1,000 samples and sound effects in Alchemy (AIFF) format. The sounds can be opened in Alchemy, sent directly to your sampler or used with other music software supporting AIFF files such as Sound Designer II. The Sound Magic disc contains a wealth of instrument sounds and sound effects. It's a perfect addition to any production studio. **Basic Specifications & Suggested List Price:** The Sound Magic CD-ROM requires a Macintosh and CD-ROM drive and sample editing Software such as Alchemy. Retail price is \$495.

PERSONAL COMPOSER; 3213 W. Wheeler St., Ste. 140; Seattle, WA 98199; (206) 546-4800. **Product Name:** MusicScript. **Contact:** David Moore, marketing manager. **Date Product Introduced:** 1/91. **Product Description & Applications:** MusicScript software provides PostScript printing capability for non-Postscript printers. Includes Postscript interpreter software and the MusicScript font. Enhances printed quality of scores produced by Personal Composer and by Passport's Encore software. **Basic Specifications & Suggested List Price:** Requires IBM-AT or PS/2, or 286/386 clone. List price \$235.

PERSONAL COMPOSER; 3213 W. Wheeler St., Ste. 140; Seattle, WA 98199; (206) 546-4800. **Product Name:** Personal Composer 3.3. **Contact:** David Moore, marketing manager. **Date Product Introduced:** 11/90. **Product Description & Applications:** Personal Composer 3.3 is an integrated music processing environment for the IBM-PC and compatibles. This software provides all of the tools needed for music notation, transcription and MIDI sequencing. Record and edit in notation (score), piano-roll, standard MIDI and text formats. Publication-quality music printing. **Basic Specifications & Suggested List Price:** 32-track MIDI recorder. Automatic transcription to score. Freeform score layout with text. Multichannel MIDI playback of score. Mouse-menu and Hyperhelp systems. Custom graphic creation and keystroke macro capabilities. Dot-matrix, inkjet, Laserjet, and Postscript printing. List price \$395.

RENKUS-HEINZ INC.; 17191 Armstrong Ave.; Irvine, CA 92714; (714) 250-0166. **Product Name:** EASE/EARS Electro-Acoustic Simulation Software Programs. **Contact:** Carl Dorwaldt, national sales mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** EASE (Electro-Acoustic Simulator for Engineers), and advanced system design software program features simple data input, extreme accuracy, superior color graphics and easy data exchange with AutoCAD. It is an open format program containing loudspeaker performance data from over a dozen major loudspeaker manufacturers. EARS, a supplementary program adds binaural audible simulation (auralization) capabilities to the program and enables consultants, system designers, sound contractors and their clients to listen to the acoustic performance of a room and its sound reinforcement system before the room is built. **Basic Specifications & Suggested List Price:** EASE runs under MS-DOS, version 3.2 or higher on IBM or 100% compatible computers with an EGA or VGA graphics system. A color monitor is recommended, but not required. For enhanced performance, a machine with 12MHz or higher clock speed, 20MB or larger hard disk and a math co-processor are recommended.

SOUND QUEST INC.; 66 Broadway Avenue, Suite 1207; Toronto, M4P 1T6 Canada; (416) 322-6434; (800) 387-8720. **Product Name:** MIDI QUEST Jr. **Contact:** Sound Quest Inc. **Date Product Introduced:** 9/91. **Product Description & Applications:** MIDI Quest Jr. is a Universal Librarian for MicroSoft Windows, PC/XT/AT, DOS, Mac, Amiga, and Atari

computers. The software provides sys-ex storage, Data Base, Bank Editor, and Sound Checker for 130+ instruments. Includes support for: Yamaha SY2 TG33, SY/TG55, SY/TG77, DX7II, TX802, TX812, V50; Roland D-10/20/110, R-5, R-8, R-8m, D50/550, D-70, U-20/220; Korg M1/R/EX, T1-2-3, Wavestation; Ensoniq ESQ/SO-80, VFX, SQ-1, E-mu Proteus 1/2/XR; and many more instruments and MIDI devices. **Basic Specifications & Suggested List Price:** Suggested list: \$99.95. MIDI Quest Jr. contains librarian; Bank Editor featuring: copy, paste, shift, invert, restore, and patch rename; Data Bases take complete snapshots of your entire MIDI system; the Sound Checker uses a Standard MIDI File play so that sounds and patches can easily be auditioned while the music is being played.

SPECTRAL SYNTHESIS INC.; 18568 142nd Ave. NE; Woodinville, WA 98072; (206) 487-2931. **Product Name:** AudioScope™. **Contact:** Ron Bradshaw. **Date Product Introduced:** 6/91. **Product Description & Applications:** Digital effects software processor for use with Spectral DSP board installed in IBM compatible computer. **Basic Specifications & Suggested List Price:** Includes reverb, 7-band stereo EQ, compressor, limiter, gate, mixer, ducker and auto-panner. List \$325.



STEINBERG/JONES
Cubase Audio

STEINBERG/JONES; 17700 Raymer St., Ste. 1001; Northridge, CA 91325; (818) 993-4091. **Product Name:** Cubase Audio. **Contact:** Ron Sorter, Bill Black—product specialists. **Date Product Introduced:** Fall 91. **Product Description & Applications:** Macintosh direct-to-disk recording system integrating Steinberg's Cubase sequencer. Up to 64 virtual tracks containing any number of audio parts or segments, limited only by hard disk space available. Separate quantize points for audio segments, show waveform option, move, cut, copy, paste, mute, etc., as normal with Cubase. **Basic Specifications & Suggested List Price:** Compatible with Digidesign's Sound Tools, Audiomeia, and Pro Tools hardware. Appropriate Macintoshes can record and replay up to four independent mono channels.

STEINBERG/JONES; 17700 Raymer St., Ste. 1001; Northridge, CA 91325; (818) 993-4091. **Product Name:** Cubase Macintosh V 1.8. **Contact:** Ron Sorter, Bill Black—product specialists. **Date Product Introduced:** 7/91. **Product Description & Applications:** MIDI sequencer for Macintosh offers true real-time visual editing. Multiple undo-able quantize methods. 16 arrange windows, each with 64 possible tracks. MIDI mixer page automates any MIDI data, including changeable controllers and sys-ex. Interactive phrase synth offers computer-assisted melody generation. **Basic Specifications & Suggested List Price:** 64 X 16 tracks; compatible with any Macintosh with at least 1 meg of RAM; 5 edit windows, including conditional editing; sync, tempo, key signature track; Apple MIDI manager; sample cell, MIDI time piece, Foster R8, G16, G24 compatible.

TRUE IMAGE; 349 W. Felicita Ave., Ste. 122; Escondido, CA 92025; (619) 480-8961. **Product Name:** MacSpeakerz V 2.0. **Contact:** Sharon Alsup, mktg. dir. **Date Product Introduced:** 4/91. **Product Description & Applications:** MacSpeakerz loudspeaker design application for the Macintosh calculates and displays frequency, excursion, impedance, phase and group delay responses for any loudspeaker driver in any closed or vented box. Version 2.0 includes an array of interactive loudspeaker calculators, each dedicated to a particular aspect of loudspeaker design: rectangular and trapezoidal box calculators, 1st, 2nd and 3rd order Butterworth crossover calculators, 1st order series crossover calculator, resonance compensator calculator, inductance compensator calculator and a tweeter attenuator calculator. **Basic Specifications & Suggested List Price:** Runs on any Macintosh with at least 512K of memory and one 800K drive. Suggested list price \$299.

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TURTLE BEACH SYSTEMS; PO Box 5074; York, PA 17405; (717) 843-6916. Product Name: Multisound **Contact:** Jeff Klinedinst, marketing dir. **Date Product Introduced:** 9/91 **Product Description & Applications:** Multisound is the first serious sound output card for IBM Multimedia. The full-size 16-bit card features 2 tracks of digital audio for compact disc quality recording. The MIDI section surpasses all others by adding 37 voices of 16-bit sample playback technology making 1-to-1 compact disc quality instruments available for play back. Multisound also includes a CD-ROM mixer. **Basic Specifications & Suggested List Price:** \$995. Requires 386 IBM compatible computer and MPC compatible software.

TURTLE BEACH SYSTEMS; PO Box 5074; York, PA 17405; (717) 843-6916. Product Name: Waves for Windows **Contact:** Jeff Klinedinst, marketing dir. **Date Product Introduced:** 9/191 **Product Description & Applications:** Wave for Windows is the first professional sound editing software for the Windows environment. Cut and paste editing, stereo mix, a digital equalizer, and many other powerful tools are on board for audio editing. Wave for Windows is totally MPC compatible so it will work with any MPC compatible hardware. **Basic Specifications & Suggested List Price:** \$149. Requires Microsoft Windows 3.0, a 386 IBM computer and an MPC compatible sound output card.

TWELVE TONE SYSTEMS; PO Box 760; Watertown, MA 02272; (617) 273-4437; (800) 234-1171. Product Name: Cake-walk MIDI Sequencer (V.4.0) **Contact:** Christopher Rice, marketing director. **Date Product Introduced:** 12/90 **Product Description & Applications:** A recording studio for your PC, 256-track MIDI sequencer, sophisticated recording, editing and playback features. Transpose pitches, adjust dynamics, cut, paste, copy, loop, split out or mix down tracks, filter MIDI data and more. Includes bulk dump Sys-Ex librarian for storing and transmitting sound banks, Bus Track, Measure, Note and

Event maps. Powerful Event Filter for conditional events. Tempo maps, meter maps, multi take record, punch in/punch out, more. **Basic Specifications & Suggested List Price:** List price for Cake-walk 4.0 is \$150. Requires IBM PC or compatible, 512K RAM, MIDI interface (call for list of supported devices). MIDI instrument, Microsoft Mouse optional. Two floppy drives or floppy and hard disk required.

TWELVE TONE SYSTEMS; PO Box 760; Watertown, MA 02272; (617) 273-4437; (800) 234-1171. Product Name: Cake-walk Professional 4.0 **Contact:** Christopher Rice, marketing director. **Date Product Introduced:** 12/91 **Product Description & Applications:** All the power and flexibility of Cake-walk, plus features for the professional studio. Supports all formats of SMPTE. MTC supports multi port interfaces including the MIDI Time Piece, variable time base from 48 to 480 pulse per quarter note, fractional tempos, hit to time built in Cake-walk Application Language (CAL) for custom editing, keyboard Macros, quantize by percent age, and more. **Basic Specifications & Suggested List Price:** Cake-walk Professional list price is \$249. Requires IBM PC or compatible, 640K RAM, floppy and hard drive, optional mouse, works with wide variety of MIDI interfaces (call for complete list), requires a MIDI instrument.

VOYETRA TECHNOLOGIES; 333 Fifth Ave.; Pelham, NY 10803; (914) 738-4500. Product Name: Sequencer Plus Classic **Contact:** John Beekman, mktg. **Date Product Introduced:** 12/90 **Product Description & Applications:** Professional grade 500 track sequencer. Provides advanced editing functions ("Transforms") for transposing pitch, quantizing modifying note durations, acceleration, MIDI controller fills, etc. Includes a programmable Tempo Track, Step Entry, and external sync via SMPTE, Song Pointer, or MTC. Requires IBM computer as above. **Basic Specifications & Suggested List Price:** Supports a variety of MIDI interfaces and FM sound cards, including Voyetra V 22 24s, Roland MPU 401, Voyetra V 400s and compatibles, Music Quest MQX 1bs, 32 Yamaha C1, Sound Blaster, AdLib Card, IBM Music Feature, IBM PS 1 MIDI port, ProAudio Spectrum, Covox MIDI Maestro and Sound Master II. Retail \$169.95.

VOYETRA TECHNOLOGIES; 333 Fifth Ave.; Pelham, NY 10803; (914) 738-4500. Product Name: Sequencer Plus Gold **Contact:** John Beekman, mktg. **Date Product Introduced:** 12/90 **Product Description & Applications:** An integrated, All in One solution for every MIDI production need. Combines a professional 12000+ track sequencer with an array of additional MIDI tools: a Universal Librarian, Network Organizer, and a MIDI Data Analyzer. Advanced sequencer features include additional

Transforms, Super Quantize, 11 memory buffers, Jukebox mode. Retail \$299.95. **Basic Specifications & Suggested List Price:** Supports a variety of MIDI interfaces and FM sound cards, including Voyetra V 22 24s, Roland MPU 401, Voyetra V-400s and compatibles, Music Quest MQX 16s/32, Yamaha C1, Sound Blaster, AdLib Card, IBM Music Feature, IBM PS 1 MIDI port, ProAudio Spectrum, Covox MIDI Maestro and Sound Master II.

VOYETRA TECHNOLOGIES; 333 Fifth Ave.; Pelham, NY 10803; (914) 738-4500. Product Name: V 22 V 22m MIDI interface **Contact:** John Beekman, mktg. **Date Product Introduced:** 2/91 **Product Description & Applications:** Dual port, VAPI compatible MIDI interface for IBM compatibles. **Basic Specifications & Suggested List Price:** 2 MIDI in and 2 MIDI out ports. V 22m includes MPU emulation module. Easy upgrade to 4 ports and SMPTE compatibility. Prices: V 22, \$129.95. V 22m, \$219.95.

VOYETRA TECHNOLOGIES; 333 Fifth Ave.; Pelham, NY 10803; (914) 738-4500. Product Name: V 24s V 24sm MIDI SMPTE interface **Contact:** John Beekman, mktg. **Date Product Introduced:** 2/91 **Product Description & Applications:** Quad port, VAPI compatible MIDI SMPTE interface for IBM compatibles. **Basic Specifications & Suggested List Price:** 2 MIDI in and 4 MIDI outs, reads and generates all five SMPTE frame rates, audio click detector input, many advanced SMPTE features. V 24sm includes MPU emulation module. V 24s, \$299.95. V 24sm, \$389.95.

WORDS AND DEEDS; 4480 Sunnycrest Dr.; Los Angeles, CA 90065; (213) 255-2887. Product Name: Archie 3.0 Studio Management System for the Macintosh **Contact:** S. Mahr, sales mgr. **Date Product Introduced:** 6/15/91 (new version). **Product Description & Applications:** Archie is a complete studio management system written by a record producer and former studio manager. It creates tracksheets, timesheets, invoices and statements automatically, using negotiated or book rates, including user definable sales tax calculations. Maintains payable and receivable ledgers and checkbook. Reports include monthly totals updated each month, and earnings and usage ratio for each room in the studio. Manages master tape library and inventory of equipment and supplies. Tracks maintenance scheduling, clients, producers and vendors. **Basic Specifications & Suggested List Price:** Archie is a complete recording studio management software system for the Macintosh computer. It can help run any studio, from a small owner operated room to a large, multi room complex. List price, single user version, \$1,250. Multi user version (up to three workstations), \$1,650.

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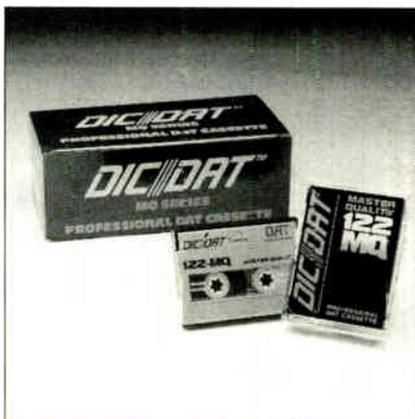
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AMPEX RECORDING MEDIA CORPORATION
Ampex 499 Grand Master®
Gold Studio Mastering Tape

AMPEX RECORDING MEDIA CORPORATION; 401 Broadway, M/S. 22-02; Redwood City, CA 94063; (415) 367-3809. Product Name: Ampex 499 Grand Master® Gold Studio Mastering Tape. Contact: Steve Smith, audio marketing manager. Date Product Introduced: 10/91. Product Description & Applications: Ampex 499 Grand Master® Gold has been designed to perform at levels beyond those previously attainable in analog recording. Low print through combined with

the highest output and lowest noise floor make Ampex 499 the high-performance standard for critical film and studio recording. Ampex 499 proprietary backcoat and lubrication package produces tape handling characteristics second to none on today's sophisticated tape transports. This is accomplished with no compromise in modulation, noise or tape backing performance.



DIC DIGITAL
DIC III DAT MQ Series
Professional DAT Cassette

DIC DIGITAL; 222 Bridge Plaza S.; Fort Lee, NJ 07024; (201) 224-9344. Product Name: DIC III DAT MQ Series Professional DAT Cassette. Contact: Kevin Kennedy, national mktg. mgr. Date Product Introduced: 4/91. Product Description & Applications: DIC//DAT introduces its new MQ Series DAT tape. Master-quality media crafted with second generation technical improvements based on extensive R&D and feedback from audio pros in the field. The one DIC//DAT perfected for professional use. New features include a new tape formulation, new shell design, window calibrations and extra two minutes of tape on the longer lengths as well as a 15 and 30 minute length cassette. The MQ cassette is for any DAT application, specifically mastering.

MAXELL CORPORATION OF AMERICA; 22-08 Rte. 208; Fair Lawn, NJ 07410; (201) 794-5900. Product Name: DX Video Cassettes. Contact: Patricia Byrne. Date Product Introduced: 4/91. Product Description & Applications: DX 1/2" high-density digital videocassettes for 1/2" digital VTRs. Major characteristics of this product are: 1) fine ceramic armor metal particles, 2) special reinforced base film, 3) highly reliable binder system, and 4) high precision cassette mechanisms. Basic Specifications & Suggested List Price: List prices range from \$25 for a small 30 minute tape to \$300 for a large 240 minute tape.

SONY RECORDING MEDIA; Sony Drive; Park Ridge, NJ 07656; (201) 930-6563. Product Name: Professional DAT Digital Audio Tape. Contact: Les Burger, product manager. Date Product Introduced: 8/91. Product Description & Applications: Using ultra-fine "crystal art" metal particles offering crystal-clear audio fidelity with a dynamic range of >90dB and eliminating hiss and modulation noise. The new album pack increases capacity for DAT storage and organizes DAT cassettes into easy-handling, shelf-optimizing modules. The optional album pack includes one tape, affording the flexibility of adding a second. Includes a pocket for liner notes. Basic Specifications & Suggested List Price: Retentivity=2,450 gauss; Coercivity=1,440 Oersted; Squareness=0.86; Tape width 3.81 mm. Model line up: Single pack: DT-30P, 46P, 60P, 90P, 120P. Album pack (includes one tape): DT-30PA, 46PA, 60PA, 90PA, 120PA.

SUNKYONG MAGNETIC/AMERICA INC.; 4041 Via Oro Avenue; Long Beach, CA 90810; (213) 830-6000. Product Name: MCX - Cobalt Modified Duplicating Tape. Contact: Mike Ingalls, VP sales & marketing. Date Product Introduced: 6/91. Product Description & Applications: MCX tape features a coercivity of 450 Oersteds, which makes it a "mid-bias" tape. This unique design accommodates elevated high-frequency recording levels with no compromise in low frequency performance or in any other desirable properties of the finest ferric tapes. This results in improved sound quality distortion, sibilants and other by-products of tape saturation. Basic Specifications & Suggested List Price: The MCX tape is available on tensitized C-60 and C-90 pancakes in all popular lengths.

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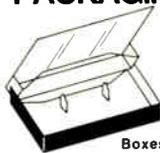
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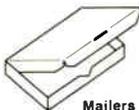
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AUDIO-TECHNICA U.S. INC.; 1221 Commerce Dr., Stow, OH 44224; (216) 686-2600; FAX: (216) 686-0719. **Product Name:** AT4033 Studio Condenser Microphone. **Contact:** Karen Emerson, advertising coordinator. **Date Product Introduced:** 10/91. **Product Description & Applications:** The new AT4033 studio condenser microphone has been designed specifically for critical digital studio applications. The low-mass, gold-plated diaphragm is surrounded by a baffle plate increasing the signal-to-noise ratio. The low-noise circuitry is complemented by a transformerless design with very low output impedance high sensitivity and the capability of handling 140dB SPL without the use of the built-in 10dB pad, resulting in a 121dB dynamic range. **Basic Specifications & Suggested List Price:** Response is smooth and flat to 20kHz, and the AT4033 is supplied with an internal floating element and internal open-cell, foam pop filter between the diaphragm and case assembly and is supplied with the AT8441 isolation stand mount. AT4033 professional net is \$699.

AUDIX CORPORATION; 19439 SW 90th Court; Tualatin, OR 97062; (415) 463-1112. **Product Name:** D-1. **Contact:** Cliff Castle, VP Sales. **Date Product Introduced:** 7/91. **Product Description & Applications:** Unlike neodymium that promotes magnetism to develop output, the Audix D1 represents a new and exclusive VLM-type-C Technology. The D-1 was developed primarily for high-output percussive instruments, and since the output level has been designed to eliminate padding down at the input stage, this allows for an open, more natural sound of the instrument. Tailored to hear the complete audio frequency range and withstand levels in excess of 144 dB. **Basic Specifications & Suggested List Price:** Frequency response: 31.5-15kHz. Pattern: hypercardioid. Transducer type: dynamic, transformerless. Sensitivity: -78 dB. Imp: $250\ \Omega$. Off-axis rejection, greater than 30dB. Housing: aluminum. Finish, black; fusion coating. List \$279.

BRUEL & KJAER INSTRUMENTS INC.; 300 Gage Ave., Unit 1; Kitchener, ON, N2M 2C8 Canada; (519) 745-1158; FAX: (519) 745-2364. **Product Name:** Acoustic Pressure Equalizer. **Contact:** Bill Calma. **Date Product Introduced:** 1991. **Product Description & Applications:** The WA609 acoustic pressure equalizer is a removable, spherical attachment that extends the directivity (reach) of B&K Type 4003 and 4006 microphones.

COUNTRYMAN ASSOCIATES; 417 Stanford Ave.; Redwood City, CA 94063; (415) 364-9988. **Product Name:** Isomax EMW Lavalier Microphone. **Contact:** Carl Countryman. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Isomax EMW is an extremely small omnidirectional lavalier microphone that exhibits very low handling noise and an exceptional degree of water resistance. It is available in five colors and three frequency responses. These features make the EMW an excellent choice where the mic is hidden in the hair or taped to the body of the talent and exposed to moisture. The EMW is available in models for low impedance microphone inputs with phantom power as well for operation with radio mike transmitters. **Basic Specifications & Suggested List Price:** The EMW lavalier for hardwired, phantom powered operation lists for \$210. An accessory battery power supply for use with equipment not providing phantom power lists for \$81. The list price of EMW lavaliers for wireless operation ranges from \$142 to \$190 depending on the type of connector required.

GROOVE TUBES; 12866 Foothill Blvd.; Sylmar, CA 91342; (818) 361-4500. **Product Name:** Tube Direct Tube D-1. **Contact:** Larry Phillips. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Groove Tubes Audio Direct Tube is a direct box designed to mount on a mic stand for the most convenient use by musicians. It is a companion product to the Model One Tube mic, with identical circuit elements. It brings a new standard of sonic excellence to the instrument/console interface. **Basic Specifications & Suggested List Price:** Professional net price is \$450.

GROOVE TUBES; 12866 Foothill Blvd.; Sylmar, CA 91342; (818) 361-4500. **Product Name:** Vacuum Tube Microphone MPS-1. **Contact:** Larry Phillips. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Groove Tubes Audio Model One is a side-address condenser microphone intended



GROOVE TUBES
Vacuum Tube Microphone MPS-1

for the most critical application, particularly where digital signal processing and/or recording is involved. Contemporary vacuum tube technology provides a warmth and sweetness which offsets what is typically described as the sterile or brittle sonic character of digital technology. **Basic Specifications & Suggested List Price:** The Model One utilizes unique modern tube circuitry, permitting an output transformer with the extremely low turns ratio of 3:1. This compares with the typical ratio of 30:1 or more. The model MPS-1 power supply delivers sufficient power to drive any combination of microphones or direct boxes up to four units. Professional net price is \$1,100.

JOSEPHSON ENGINEERING; 3729 Cokerhill Way; San Jose, CA 95121; (408) 238-6062. **Product Name:** Condenser microphone model—C-606A. **Contact:** David Josephson. **Date Product Introduced:** 10/91. **Product Description & Applications:** The C-606A is the new transformerless studio microphone from Josephson, incorporating a new cascade input stage and cross-coupled Darlington output stage, the mic produces superb rendition of acoustic input with very low noise and distortion. It can be used with any of the Josephson interchangeable capsules, including omni, cardioid, hypercardioid or other patterns. The mic is powered with conventional phantom power or may be used with a dedicated direct power supply, which provides an extra margin of headroom. **Basic Specifications & Suggested List Price:** Frequency response with the omni or cardioid capsules, 20-Hz-22kHz. Noise level less than 15 dBA. Output level 8-15mV/Pa. Maximum sound pressure level for 0.5% distortion or less, around 145 dB SPL. Powered by P48 phantom, 5 mA or direct power supply PS-606 (48V, 35mA). List price with cardioid capsule \$1,100.

LIGHT WAVE SYSTEMS; 7760 Burnet Ave.; Van Nuys, CA 91405; (818) 780-3002. **Product Name:** Cuemaster™. **Contact:** Leslie Drever, owner. **Date Product Introduced:** 4/91. **Product Description & Applications:** Cuemaster is a lightweight boom for soundstage and location use, with features that bring new dimensions to the art of directional microphone control. Cuemaster has a practical working distance of twenty feet, with either rotational or direct aiming capabilities. The operator can switch from one mode to the other, quickly, offering great versatility for ongoing scene situations. **Basic Specifications & Suggested List Price:** The unit package includes necessary accessories, including a boom extender, suspension mount extensions, riser mast extension, a 30' mic cable with connectors, etc. A featured accessory also included is an LCD monitor with hood. That provides for precise four-sided safety zone parameters. Cuemaster is packaged in a hard carry case measuring 62"x12"x8".

LIGHTSPEED TECHNOLOGIES INC.; PO Box 19479; Portland, OR 97280; (800) 732-8999. **Product Name:** Impulse 2000D Cordless Microphone System. **Contact:** Jerry

—LISTING CONTINUED TOP OF NEXT PAGE

Ramey, president. **Date Product Introduced:** 5/22/91. **Product Description & Applications:** True dual-tuner diversity cordless microphone system with tone-coded squelch. The audio output of the 2000D receiver is automatically squelched when cordless microphone transmitter is off, preventing spurious interference noise when transmitter is off. No "snap or pop" on-off transmitter shock noise. Eliminates bursts of amplified noise through automatic mixers. **Basic Specifications & Suggested List Price:** VHF High Band System. Dynamic range >100 dB. Signal to Noise ratio >100dB. 1,600 ft. range. Suggested list price: \$1,100. Five-year warranty.

LIGHTSPEED TECHNOLOGIES INC.; PO Box 19479; Portland, OR 97280; (800) 732-8999. **Product Name:** Mini-Pro 200 Cordless Microphone System. **Contact:** Jerry Ramey, president. **Date Product Introduced:** 5/22/91. **Product Description & Applications:** Dual-channel pocket portable cordless microphone system with pocket portable receivers. Configurable for multi-use and multi-user systems such as language translation, tour groups, semi-professional video camcorder cordless mic. **Basic Specifications & Suggested List Price:** VHF high band system, dual-channel traveling frequencies, 900 ft. range. Suggested list \$250.

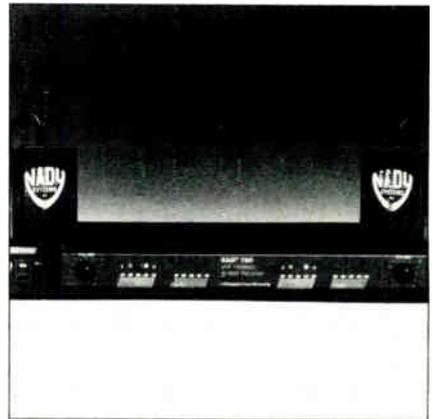


MICROTECH GEFELL GMBH
UM 70S Condenser Microphone

MICROTECH GEFELL GMBH; Muehlberg 2; 6552 Gefell, Germany; U.S. Distributor, Goham Audio; (212) 765-3410. **Product Name:** UM 70S Condenser Microphone. **Contact:** Jerry Graham, eastern sales manager. **Date Product Introduced:** 7/91. **Product Description & Applications:** 3-pattern switchable studio condenser microphone featuring the original M7 large-diameter, dual-membrane capsule, all satin finish, unit construction with improved noise performance; includes MKV 8 swivel, WS 86 windscreen and IC 3/25 cable. **Basic Specifications & Suggested List Price:** \$1,150.

MOBILE FIDELITY PRODUCTIONS OF NEVADA; PO Box 8359; Incline Village, NV 89450; (702) 831-4459. **Product Name:** MS-4. **Contact:** Brad S. Miller. **Date Product Introduced:** 9/91. **Product Description & Applications:** The MS-4 is a discrete four-channel microphone that is designed to emulate human hearing within a 360 degree soundfield. The unit interfaces with the portable Colossus/4 digital audio processor for location soundfield sound effects recording, music, dialog and Foley work. The microphone is capable of handling very high SPLs, including N.A.S.A. launches from less than one mile (144 dB SPL). An outboard power supply allows the MS-4 to be used in stand alone mode. **Basic Specifications & Suggested List Price:** DC served, to avoid low frequency phase shifts (shuttle launches recorded with 1/4 Hz components). Accepts 15-18vdc direct from Colossus digital audio processor or outboard P.S. Freq response: 2 Hz to 20 kHz +2 dB, down 1 dB at 2 Hz. Clip point is +146dB. Phase coherence is absolute, allowing for 2-channel or mono summing of soundfield.

NADY SYSTEMS INC.; 6701 Bay St.; Emeryville, CA 94608; (415) 652-2411. **Product Name:** 301 UHF and 950 UHF Wireless Systems. **Contact:** Joe Ternto, publicity manager. **Date Product Introduced:** 6/91. **Product Description & Applications:** Nady presents the first reasonably priced UHF wireless systems with state-of-the-art frequency synthesis, user-selectable channel selection. The Nady 301 UHF has four channels; the Nady 950 UHF has ten channels. Both rackmountable systems feature true diversity receivers, switchable balanced level out (line/mic), 110/220 and 20-25 VDC power options. The 901 UHF also features bass boost, monitor volume control and Nady's new surface mount technology (SMT) transmitters. **Basic Specifications & Suggested List Price:** Freq. response: 25 Hz-20kHz +/-3dB. Dynamic range: 120dB (max SPL to A-weighted noise level). Harmonic distortion: less than 0.5%. Image rejection: 80dB image and spurious rejection. Frequency stability: better than .005% PLL synthesized. Range: 200 (under adverse conditions), 1,500 feet line of sight. Suggested list: Nady 301 UHF, around \$600. Nady 950 UHF, around \$1,500.



NADY SYSTEMS INC.
750 VHF Dual Discrete Channel Wireless System

NADY SYSTEMS INC.; 6701 Bay St.; Emeryville, CA 94608; (415) 652-2411. **Product Name:** 750 VHF Dual Discrete Channel Wireless System. **Contact:** Joe Ternto, publicity manager. **Date Product Introduced:** 6/91. **Product Description & Applications:** Nady 750 VHF dual-discrete channel wireless system—a one-space rack component containing two true diversity receivers. The highest dynamic range (120dB) and best S/N ratio in wireless. Sophisticated filtering—VF to 10V. 750 systems can be used simultaneously. Available in many handheld, lavalier and instrument transmitter combinations. Nady's new surface mount technology (SMT) transmitters standard. Also balanced and unbalanced outputs, 110/220 and 12V power options, single antenna assembly serves both channels. Standard frequencies: 17.7mHz to 216mHz. **Basic Specifications & Suggested List Price:** Freq. response: 25Hz-20kHz +/-3dB. Dynamic range: 120dB (max SPL to A-weighted noise level). Harmonic distortion: less than 0.3%. Image rejection: 60dB image and 80dB spurious rejection. Frequency stability: +/- .005%. Range: 200 feet in adverse conditions, 1,500 feet line of sight. Suggested list price: starts at \$1,199.95.

SAMSON; 262 Duffey Ave.; Hicksville, NY 11801; (516) 932-3810. **Product Name:** Samson Concert Series II. **Contact:** Kevin Moran. **Date Product Introduced:** 9/91. **Product De-**

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scription & Applications: This new wireless system is the first in the Samson line-up to offer completely professional features at a cost-effective price. Available in instrument, lavalier and hand-held configuration, these systems will be available in 14 different VHF channels and feature name brand mic elements and lavalier. **Basic Specifications & Suggested List Price:** 19" rackmount receiver, dbx noise reduction, permanently attached lavalier and instrument cable, all-new hand-held transmitter design, removable receiver antennas and true diversity.

SANKEN C/O DEVELOPING TECHNOLOGIES DISTRIBUTORS; 1032 N. Sycamore; Los Angeles, CA 90038; (213) 469-4773. **Product Name:** COS-11 BP. **Contact:** Jim Schaller, director of sales. **Date Product Introduced:** 5/91. **Product Description & Applications:** Ideal for voice or instruments, the ultra-miniature COS-11BP assures new levels of transient response, extended frequency range and extremely low sensitivity to mechanical noise. Significantly smaller than previous attempts at ultra-miniaturization. Sanken lavaliers provide unprecedented omnidirectional response, sensitivity, natural sound and concealment. **Basic Specifications & Suggested List Price:** Operates with AA battery or 12-52 volt phantom power. Exclusive vertical diaphragm of PPS for optimum humidity and temperature stability. Built in three-layer windscreen minimizes pops, sibilance and wind noise. Dimensions: 4mmx16.1mm. Suggested price: \$399.

SCHOEPS/POSTHORN RECORDINGS; 142 W. 26th St.; New York, NY 10001; (212) 242-3737; FAX: (212) 924-1243. **Product Name:** Sphere Microphone, Model KFM 6U. **Contact:** Jerry Bruck, president. **Date Product Introduced:** 7/1/91. **Product Description & Applications:** The Sphere Microphone is the outgrowth of recent research into stereophonic techniques. It utilizes two boundary-layer pressure transducers mounted on a spherical surface. The entire soundfield is recorded, with accurate directional cues and full frequency range. This combination of qualities has not been achieved before with the use of pressure (omni) capsules, which are often preferred for the most natural sound. A deep and wide soundstage is realized with loudspeaker playback. **Basic Specifications & Suggested List Price:** Frequency response: 20Hz-16kHz plus/minus 2 dB; Maximum sound pressure for 0.5% THD: 128 dB/SPL; Noise (A-weighted): 17 dB-A. Powering 12-48V phantom @ 4 ma/ch. Sphere diameter: 200mm (7-3/4"). Weight: 1500 g (3 lbs) \$5,795.



SHURE BROTHERS INC.
VP88

SHURE BROTHERS INC.; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2200. **Product Name:** VP88. **Contact:** Customer Service. **Date Product Introduced:** 4/91. **Product Description & Applications:** The VP88 is a single-point MS stereo condenser microphone that incorporates a forward-facing cardioid Mid capsule, a perpendicular bidirectional side capsule and a built-in matrix to provide wide, natural uncolored response for optimal stereo imaging. Yet it is 100% mono compatible. Three switch-selectable levels of stereo effect control the degree of stereo spread and ambience pickup. A fourth switch position provides Mid and Side outputs directly. Also switch-selectable are phantom or six-volt internal battery power and low frequency roll off. Suitable for use when smooth, extended response and excellent stereo imaging are required from a single microphone, such as in video production, electronic news gathering, sporting events coverage and live music

recording. The VP88 has the unique ability to capture the realism and drama of "being there". **Basic Specifications & Suggested List Price:** Stereo condenser, 40 to 20,000Hz frequency response. Polar pattern: Mid: cardioid (unidirectional); Side: bidirectional. Impedance: 150 ohms (100 ohms actual). Output level: (at 1000 Hz, MS mode) open circuit voltage (Mid) -66dB (0.5mV), Side (Level (stereo mode, relative to mid level): low: -6.0dB, medium: -1.9dB, high: +1.6dB. Maximum Sound Pressure Level: (800 ohm load): 129dB. User net price is \$995.

SONY BUSINESS & PROFESSIONAL PRODUCTS; 3 Paragon Dr.; Montvale, NJ 07645; (201) 930-1000. **Product Name:** UHF-800 Series Synthesized Wireless Mic System. **Contact:** Courtney Spencer, VP audio. **Date Product Introduced:** 4/91. **Product Description & Applications:** The 800 Series UHF operated in the 794MHz to 806MHz UHF band. The series features a compander system to minimize the effects of external noise and interference introduced during transmission. The compander system also features extended working distance and a dynamic range of more than 96dB.



STEPHEN PAUL AUDIO

STEPHEN PAUL AUDIO INC.
"The Vintage Series" Original
Thickness Diaphragms

STEPHEN PAUL AUDIO INC.; 2725 W. Burbank Blvd.; Burbank, CA 91505; (818) 566-8231. **Product Name:** "The Vintage Series" Original Thickness Diaphragms. **Contact:** Tony Merrill, product specialist. **Date Product Introduced:** 6/91. **Product Description & Applications:** "The Vintage Series" original thickness diaphragms have been introduced for those who want their vintage microphone capsules rebuilt to original specifications. C12, 251, 414 and other vintage microphones can now have their capsules restored without upgrading their performance with thinner film diaphragms. For those who insist on only the "original" sound of their mics, we now offer this special device. **Basic Specifications & Suggested List Price:** Original moving mass systems installed in your vintage microphone will ensure the original specifications are maintained. It is no longer necessary to give up your old capsule simply because parts are no longer available. Contact us for prices on your particular model.

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ALLEN AND HEATH USA; 5 Connair Rd.; Orange, CT 06477; (203) 795-3594. Product Name: Spectrum Consoles. **Contact:** Chuck Augustowski, VP sales. **Date Product Introduced:** 4/1/91. **Product Description & Applications:** Spectrum Consoles are split format recording consoles for studio and home use. Spectrum features three-band EQ, with sweepable midrange, eight auxiliary sends and Allen and Heath's exclusive V4 mute processor, which includes a built-in sequencer. Available in 16, 24 and 32 input configurations, Spectrum is fully modular in blocks of eight which includes an expandable mainframe. LED peak and ballistic VU meter bridges are available. **Basic Specifications & Suggested List Price:** Retail prices range from \$8,900 (Spectrum 16VU) to \$14,900 (Spectrum 32BG).

ALTEC LANSING CORPORATION; 10500 W. Reno, PO Box 26105; Oklahoma City, OK 73126; (405) 324-5311. Product Name: 3200 Series mixing consoles. **Contact:** John E. Lanphere, mgr. mkt. devl. **Date Product Introduced:** 5/91. **Product Description & Applications:** The 3200 Series sound-reinforcement consoles are available in an 8-input model (3208A), a 16-input model (3216A) and a 24-input model (3224A). These cost-effective mixing consoles feature subgroup capability, individual channel insert, multiple effects sends, phantom power and pre-fader cue. The 3208A may be rackmounted or set on a table top. **Basic Specifications & Suggested List Price:** Frequency response: 20-20kHz +/-1dB. THD <0.05%. 20-20kHz, at +4dBu and less than 0.10% at +24dBu. EIN: -128dBu. S/N: 79dB with masters nominal and inputs off. Max gain: mic in to main out 86dB +/-3dB. List prices: 3208A: \$1,295; 3216A: \$1,900; 3224A: \$2,575.

AMEK SYSTEMS & CONTROLS LTD.; 10815 Burbank Blvd.; North Hollywood, CA 91601; (818) 508-9788. Product Name: Amek BCIII. **Contact:** Steve Harvey, national sales manager. **Date Product Introduced:** 4/91. **Product Description & Applications:** Compact broadcast audio and video production console available in four chassis packages, with six input module options, four group modules and five output stages. TLA circuitry designed for Amek by Rupert Neve brings the characteristics of transformers to mic and line inputs without the bulk and cost. Features include four stereo or eight mono groups feeding one or two separate stereo buses, VCAs on inputs and groups, pre- and post-fader inserts, four auxiliary sends. **Basic Specifications & Suggested List Price:** Mic noise: -128dBu. THD <0.02%. Crosstalk <-95dB. Frequency response 20Hz to 20kHz +/-1dB. Dimensions (compact chassis) front-to-back: 28 in.; depth: 15.4 in.; width: 21 in. (16 pos.); 30.7 in. (24 pos.); 40 in. (32 pos.). Price guide—12/2: \$17,640; 16/8/2: \$24,773; 24/8/2 studio chassis: \$49,303.

AMEK SYSTEMS & CONTROLS LTD.; 10815 Burbank Blvd.; North Hollywood, CA 91601; (818) 508-9788. Product Name: Amek Hendrix. **Contact:** Steve Harvey, national sales manager. **Date Product Introduced:** 4/91. **Product Description & Applications:** Multi-purpose multitrack console based on the technology and concepts used in the highly successful Mozart system. In a lower price range than the Mozart, Hendrix offers a budget-busting innovative design with a high level of integral automation and massively flexible signal flow capabilities. Standard configuration is 40 in-line, dual path input channels with eight stereo effects returns. A 56 input chassis is available. Amek/Steinberg Supertrue automation is standard. **Basic Specifications & Suggested List Price:** Twenty-four bus, twelve aux sends, four-band fully parametric EQ with two swept filters, multi-mode panning, routing matrix for film monitoring speaker systems, eight automated switches per input module. Dimensions—front-to-back: 46 in.; depth (inc. stand): 45 in.; width: 77 in. (40 input chassis), 112 in. (56 input chassis). Price guide—40 input chassis: \$84,857; 56 input chassis: \$122,321.

API AUDIO PRODUCTS INC.; 7951 Twist Ln.; Springfield, VA 22153; (703) 455-8188. Product Name: API Discrete Series Consoles. **Contact:** Paul Wolff, Kevin Raynor. **Date Product Introduced:** 6/1/91. **Product Description & Applications:** The new series of all discrete recording and mixing consoles featuring "touch reset", a system that uses a touch screen for resetting all of the console switches. API is using the

2520 for all summing and output stages, as well as the mic pre & EQ. With the introduction of the new high-voltage discrete op amp, the 2510, the console signal path goes through fewer amplifiers. **Basic Specifications & Suggested List Price:** Uses hi level balanced busing (up to 48) and unterminating summing networks for extremely low bus noise. A48 to 80 input console costs around \$280K to \$480K. This price includes touch reset.

ASHLY AUDIO INC.; 100 Fernwood Ave.; Rochester, NY 14621; (716) 544-5191. Product Name: LM-308. **Contact:** Bob French, sr. VP sales & marketing. **Date Product Introduced:** 8/15/91. **Product Description & Applications:** Originally designed to be used as a superior quality auxiliary mixdown device when linked to other mixers, the LM-308 may also be used on its own any time stereo line level sources need to be combined together. Some typical applications would include keyboard mixing for live sound reinforcement or studio sessions, as well as permanent installations involving multiple stereo line level sources. Up to two microphones may also be used with the LM-308. **Basic Specifications & Suggested List Price:** Frequency response +/-2dB 20Hz-20kHz; distortion <0.1% THD @ +20dBV. 20Hz-20kHz; hum and noise <-90dBu residual output noise; Crosstalk <-65dB adjacent inputs or input to output. Suggested retail \$499.99.

ASHLY AUDIO INC.; 100 Fernwood Ave.; Rochester, NY 14621; (716) 544-5191. Product Name: MM-508. **Contact:** Bob French, sr. VP sales & marketing. **Date Product Introduced:** 7/15/91. **Product Description & Applications:** Designed for use in applications such as church, school, meeting room or small club, the MM-508 features up to 84dB of gain to ensure full output with low-level or distant microphones. It features eight stereo inputs with three-band sweepable EQ and two sends per channel. Phantom power is standard, and each input has a 20dB pad switch, as well as 40dB of variable gain reduction. Transformer-isolated outputs are provided as well as a mono out. **Basic Specifications & Suggested List Price:** Total Harmonic Distortion <.05% @ +4dBu, 20Hz-20kHz. SMPTE IM Distortion <.05% @ +20dBV. Hum and noise, -130dBu EIN, maximum voltage gain 84dB, +48 V phantom power, frequency response +/-1.5dB, 20Hz-20kHz. Suggested retail \$1,499.99.

AUDITRONICS INC.; 3750 Old Getwell Rd.; Memphis, TN 38118; (901) 362-1350. Product Name: IFB/Mix-Minus Systems. **Contact:** Murray Shields, director of sales. **Date Product Introduced:** 4/91. **Product Description & Applications:** Audio mixing console with four stereo and two mono output buses. Separate voice/music signal processing bus structure. User-definable, DIP-switch programmable logic system. All electronic switching w/LED status indicators. All faders control VCAs. Utilizes state-of-the-art thick film hybrid technology. Uses "quick-disconnect" plugs for all pots and faders. Application: radio (on air and production), smaller production facilities. **Basic Specifications & Suggested List Price:** Price on request. Freq. response: +/-5dB, 20Hz-20kHz at 8dBm output. SNR: better than -85dB (ref. +8Bv) at nominal settings. EIN: better than -128.5dBu, 20Hz-20kHz, @ 65dB gain. Distortion: better than .05% THD, 20Hz-20kHz @ +24 dBv. Crosstalk: better than -98 dB (ref +18dBv) @ 1kHz, (-78dB, 20Hz-20kHz).

COOPER SOUND SYSTEMS; 31952 Paseo de Tania; San Juan Capistrano, CA 92675; (714) 248-1361. Product Name: CS 106 + 1 Professional Audio Mixer. **Contact:** Janet Cooper, sales manager. **Date Product Introduced:** 4/91. **Product Description & Applications:** The CS 106 + 1 six channel audio mixer is a top quality unit that will satisfy all location sound requirements, including digital recording, without compromise. It directly interfaces with all location recorders (Nagra 4.2, IVS, studio & RDATs) and includes a comprehensive communications system. This mixer provides more headroom and lower distortion than other mixers of this type. An optional stereo input module with M/S decoder is available. Also available, a custom power supply. **Basic Specifications & Suggested List Price:** Features: Fully modular channels; internal batteries; P & G side faders; Selco VU or PPM meters. External power is 12-27 v DC

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D-one



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on a standard XLR-4 connector. Frequency response: 20-20 kHz better than ± 0.5 dB. THD & N: 20-20 kHz better than 0.01%. Equivalent input noise: 20-20 kHz better than -128 dB. List price: \$10,900.



D&R USA
Marilon

D&R USA; Rte. 3, Box 184-A; Montgomery, TX 77356; (409) 588-3411. Product Name: Marilon. **Contact:** Paul Westbrook. **Date Product Introduced:** 1/91. **Product Description & Applications:** Marilon is a 24 bus, in-line format recording and mixing console designed specifically for the Pro-multitrack/MIDI studio. With the maximum inputs in the least amount of space, this console can have up to 112 inputs in the 32 frame and 160 inputs in the 48 frame. 8 aux sends (switchable to 32), faders on monitor sections, 8 stereo effects returns, 4 band sweepable EQ (two full bandwidth EQs on each module), bal. bantam patchbay and more.

D&R USA; Rte. 3, Box 184-A; Montgomery, TX 77356; (409) 588-3411. Product Name: Orion. **Contact:** Paul Westbrook. **Date Product Introduced:** 8/91. **Product Description & Applications:** The Orion is a recording and mixing console designed for the multitrack and MIDI studio. This eight bus console can feed up to 48 tracks (via D&R's exclusive Floating Subgroup System) without patching. Four band sweepable EQ with split EQ, eight aux send buses, in-line format with subgroups, dual stereo return modules, optional patch bay (bantam) and extensive master selection. **Basic Specifications & Suggested List Price:** Factory direct pricing from \$10,000.



D&R USA
Triton

D&R USA; Rte. 3, Box 184-A; Montgomery, TX 77356; (409) 588-3411. Product Name: Triton. **Contact:** Paul Westbrook. **Date Product Introduced:** 3/91. **Product Description & Applications:** The Triton is a recording and mixing console designed for the Pro-MIDI and 16-48 track studio. Four-band sweepable EQ has unique frequencies and can be partially switched into the monitor, 16 bus with D&R's exclusive "Float-

ing Subgroup systems", ten aux send buses, three mute group, full bantam patch bay, and dual stereo return modules fill out this 90's technology console. **Basic Specifications & Suggested List Price:** Noise: (mic) -129.5 dBu, (A-weighted) 150 Ohm, balanced line inputs, tape sends and returns, $+4$ dBu or -10 dBu interface built-in. Frequency response: 10 Hz-200,000 Hz, -3 dB. Max. output $+26$ dBu into 600 ohms. Noise with 32 channels routed: -84 dBu (A-weighted). Price range is from \$19,500 to \$52,500.

DAX AUDIO; 1816 NE Everett; Portland, OR 97232; (503) 357-1175. Product Name: XM Series II 32x8. **Contact:** Phil Bauder. **Date Product Introduced:** 1991. **Product Description & Applications:** For live sound (i.e. church, auditoriums) and recording studios. Has hi and lo EQ with midsweep. Has three aux. Can add two aux for additional \$119 per aux. Alps faders. Neutrik connectors. Mute, eight LED per channel, out switch. Phantom power. Inc metal carrying case. Black or anodized metal. **Basic Specifications & Suggested List Price:** Suggested retail \$3,900. Frequency response ± 1 dB, 20 Hz to 20 kHz; S/N: greater than 95 dB; size: 60" W x 30" D x 5" H 70 lbs; overall THD: less than 0.1%. 20 Hz to 20 kHz; reverb: Accutronics Type 9 tank; 32 input channels; 8 output channels.

DDA; 200 Sea Lane; Farmingdale, NY 11735; (516) 249-3660. Product Name: Interface. **Contact:** Sam Spennocchio. **Date Product Introduced:** 9/91. **Product Description & Applications:** The Interface is a (4) bus console, available in (8-32) input sizes, designed for live sound reinforcement applications, as well as for audio and audio for video studio applications. Input module choices include a standard input module (mono), and a deluxe input module (same as standard but with expanded EQ). The Interface is compact, rugged, and has audio quality which surpasses that of other consoles in its price range.

DDA; 200 Sea Lane; Farmingdale, NY 11735; (516) 249-3660. Product Name: Profile. **Contact:** Chris L. Fichera. **Date Product Introduced:** 8/91. **Product Description & Applications:** The Profile is a 56-module console incorporating a combined in-line and split design configuration, thus giving a 32/24 format. It features identical four-band fully parametric equalizers on all modules, 10 auxiliary buses with direct out facility, and an aux return function on every module. All this combined makes 136 inputs available in mix mode. Options include moving fader automation with MIDI and tape machine control. Eight automatable switch functions per channel, mic patching lines (studio lines), V.U. or bar graph metering. **Basic Specifications & Suggested List Price:** 56-channel console—\$75,000. 56-channel w/moving fader automation—\$105,000.



EUPHONIX
CSII

EUPHONIX; 220 Portage Rd.; Palo Alto, CA 94306-2242; (415) 855-0400. Product Name: CSII. **Contact:** Andy Wild, VP sales and marketing. **Date Product Introduced:** 5/91. **Product Description & Applications:** The Crescendo System II (CSII) is a digitally controlled analog audio mixing system. The CSII's control surface is a powerful digital interface which remotely controls the analog circuitry residing in the Audio Tower. Snapshot Recall™ enables all controls and switches on the console to be stored to 100 memories, and instantly recalled within 30ms. The system also includes Total Automation which allows every control and switch to be dynamically automated to code. **Basic Specifications & Suggested List Price:** A 56 fader Mix Controller is only 4.5-feet wide. Frequency response: 15 Hz-30 kHz, ± 0.1 - 0.25 dB. Distortion: $< 0.005\%$ IMD SMPTE. Crosstalk: < -90 dB @ unity gain. Prices range from approximately \$115,000 for a 32 to \$280,000 for a 86 fader system.

FURMAN SOUND INC.; 30 Rich St.; Greenbrae, CA 94904; (415) 927-1225. Product Name: DJM-8 DJ Production mixer. **Contact:** Joe Desmond, national sales mgr. **Date Product Introduced:** 9/91. **Product Description & Applications:** Eight stereo inputs routable to four input faders, then to (bypassable) crossfader. Main house output has 3-band EQ, plus a sub-

harmonic synthesizer and dual VU meters. There are 2 aux zone outputs and a switchable patch point for external processors. Two talkover mic inputs have level controls, 3-band EQ and dim/mute switch. Each input has a cue button and indicator. A special switch allows choice of a stereo cue/program blend or a "split mono" mix in the headphones. Other features include "Beat Sync" LEDs to facilitate perfect transitions; extra outs for tape dubs, light sync, and a mono subwoofer system; and a field replaceable crossfader. **Basic Specifications & Suggested List Price:** Suggested list price: \$749.

GML INC.; 7821 Burnet Ave.; Van Nuys, CA 91405; (818) 781-1022. Product Name: Focusrite Recording Console. **Contact:** Cary Fischer, vice president. **Date Product Introduced:** 10/91. **Product Description & Applications:** The Focusrite Recording Console features an "Open" architecture, derived from the best of the traditional Rupert Neve consoles of old with the addition of unique and powerful status switching and Focusrite EQ in each channel. The console also features GML automation fully integrated within the console. **Basic Specifications & Suggested List Price:** The console's audio performance is exemplary whether judged by measurement or audition, the very low mix bus noise being one such example; typically better than -100 dB. The frequency response from line-in to group output is within 1 dB from 4 Hz to 165 kHz which provides both a superb phase response and an openness.

GML INC.; 7821 Burnet Ave.; Van Nuys, CA 91405; (818) 781-1022. Product Name: GML HRT 9100 High Resolution Mixer. **Contact:** Cary Fischer, vice president. **Date Product Introduced:** 10/91. **Product Description & Applications:** HRT 9100 rack mountable mixer features 10 input channels and 2 stereo output channels. The mixer features GML's renowned all discrete circuitry resulting in ultra-high headroom. Each input has a pan, four aux outputs, level attenuation, solo logic, insert and direct out. A special low noise mix bus allows multiple racks to be stacked through only one set of stereo output modules.



GRAHAM-PATTEN SYSTEMS
DIESAM 800 Digital Edit Suite Audio Mixer.

GRAHAM-PATTEN SYSTEMS; PO Box 1960; Grass Valley, CA 95945; (916) 273-8412. Product Name: D/ESAM 800 Digital Edit Suite Audio Mixer. **Contact:** Tim Prouty, VP sales and marketing. **Date Product Introduced:** 4/91. **Product Description & Applications:** The D/ESAM 800 is designed specifically for use in a videotape editing environment. It mixes analog and digital signals together allowing all types of video and audio machines to be used simultaneously. Powerful DSP applications perform complex mixing and processing. Compact packaging makes it ideal for crowded editing suites. Input routing matrix accepts 56 analog and digital inputs. 16-channel digital EQ optional. **Basic Specifications & Suggested List Price:** 16 mixing channels to four output buses. Provides four digital (AES @ 48 kHz), four analog program outputs and four monitor outputs. Analog input use 18-bit conversion, digital inputs accept AES. Internal processing at 24 bits; using Motorola 56 series DSP. Input matrix accepts 56 inputs in groups of 8 channels.

HARRISON BY GLW; 437 Atlas Dr.; Nashville, TN 37211; (615) 331-8800. Product Name: MPC. **Contact:** Brad Harrison, western regional sales mgr. **Date Product Introduced:** 9/1/91. **Product Description & Applications:** The Harrison MPC is designed specifically for motion picture sound post-production mixing. The MPC is unique in that it can be totally automated and configured in numerous physical formats to allow the system to be customized to the exact requirements of a facility. All audio processing is contained in separate racks which may be located over 100 feet away from the control surface. **Basic Specifications & Suggested List Price:** Systems may be configured from 16 to 368 input channels. Control surfaces may be configured for single, two or three mixer operation. Because of the system architecture and total automation capabilities, the MPC can handle many more input channels in the processing racks with fewer channels in the control surface.

HILL AUDIO; 1316 E. Lancaster; Fort Worth, TX 76102; (817) 336-5114. Product Name: Datum. **Contact:** Ramon West, product specialist. **Date Product Introduced:** 1991. **Product Description & Applications:** A range of 4 and 8 bus consoles available in three types—studio recording, sound reinforcement and stage monitoring—with four frame sizes in each type. Three choices of input and output modules, up to 48 inputs, sweepable EQ, up to 8 aux sends, and balanced tape returns, EQ and aux sends on all tape monitors, full width meter bridge, also FX return module give two mono returns and one stereo. **Basic Specifications & Suggested List Price:** EIN -127dB; Res noise: 85dB; Crosstalk -90dB; Max output +24dB, frequency response: 20Hz-20kHz +/-0dB; 20dB input PAD, +48V phantom power, THD 0.005%, +24dB max input. Retail price from \$6,300 to \$19,220 depending on configurations.



MACKIE DESIGNS
CR-1604

MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: CR-1604. **Contact:** Ron Koliha. **Date Product Introduced:** 9/90. **Product Description & Applications:** A compact 16-channel rackmountable audio mixer that delivers high headroom, low noise and sonic integrity, for use in live performance reinforcement systems, live and studio recording, studio and remote broadcasting, and high-quality installed system in schools, churches, hotels, etc. Convertible design allows the mixer's physical format to be changed for rack mount or table-top use. Six discrete +48V phantom-powered mic inputs, 16 line inputs, 7 aux sends per channel, 4 stereo (8 mono) effects returns, 3-band EQ, stereo in-place solo system, Alt 3-4 stereo mix output, lamp socket, built-in power supply. **Basic Specifications & Suggested List Price:** Frequency response: 20Hz-20kHz +/-1dB. Distortion: less than 0.025%, 20Hz-20kHz; Noise: Mic E.I.N. 129.0dBm, 150-Ohm source, -131.2dBv 150-Ohm source, -131.5dBm input shorted, -133.7dBv input shorted. Main output noise: -90dBu, working S/N ratio: 90dBu (ref: +4dBu); Max. output: +28dBu main output (balanced), +22dBu all outputs (unbalanced), Dynamic Range: 108db; Equalization: Treble: shelving +/-15dB @12kHz, Midrange: Peaking +/-12dB @2.5kHz, Bass: shelving +/-15dB @80Hz. Weight: 18 lbs. Price: \$1,099.

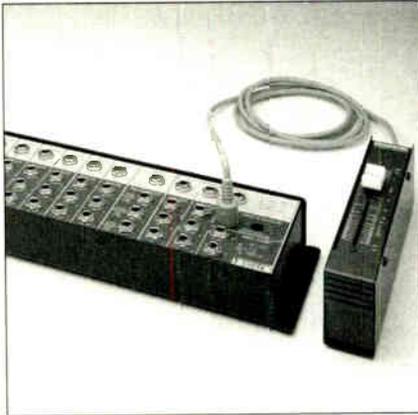


MACKIE DESIGNS
CordPack

MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: CordPack. **Contact:** Ron Koliha. **Date Product Introduced:** 6/91. **Product Description & Applications:** A complete set of high-quality, low-capacitance, su-

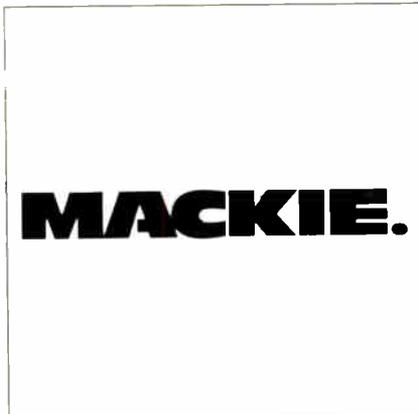
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per flexible 36" cables to connect up to three CR-1604s to one MixerMixer. Included are 36-mono cables for the 7 aux sends and left/right main outputs and 3-stereo cables for the headphone outputs. These are high-quality, low-capacitance cables with durable molded construction with high-strength molded ends, corrosion-resistant contact surfaces, flexible insulation and different-colored ends to make identifying inputs and outputs easy. **Basic Specifications & Suggested List Price:** Price: \$69.



MACKIE DESIGNS
MixerMixer

MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: MixerMixer. **Contact:** Ron Koliha. **Date Product Introduced:** 5/91. **Product Description & Applications:** An active combiner that allows up to three CR-1604s to be used as a single mixer, with no loss of quality. The MixerMixer combines all the CR-1604 outputs, so you need only one set of effects devices, and you don't have to give up any inputs to "cascade" units. For example, three Mackie Designs CR-1604s and a MixerMixer provide 48 line inputs, 18 mic inputs, 12 stereo effects returns, 24 direct out, and 3 stereo or 6 mono submasters! Using the same high-performance components as the CR-1604, the MixerMixer delivers exceptional S/N ratio and headroom throughout its entire signal path, and duplicates the +28dB balanced main output driver found in the CR-1604. **Basic Specifications & Suggested List Price:** Frequency response: 20Hz-40kHz -1dB, +0dB. Distortion 0.025% 20Hz-20kHz, Hum and noise: -94dBu ref +4 dB operating level 20kHz NBW. Dynamic range 112dB. Crosstalk: -84dB @ 1kHz. Power: 5 watts. Shipping weight: w/o remote fader 5 lbs., with remote fader 7 lbs. Price: \$299.



MACKIE DESIGNS
Remote Fader

MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: Remote Fader. **Contact:** Ron Koliha. **Date Product Introduced:** 5/91. **Product Description & Applications:** An optional long-throw master fader that allows the main outputs from all mixers used with the MixerMixer to be governed by a single fader. Pan controls assign each channel to the appropriate output sub-master, then the fader sets the overall output level, left and right outputs on the connected CR-1604s to be used as sub-masters (four subs with two CR-1604s, six subs with three CR-1604s). The Remote Fader for the MixerMixer comes with its own 4-ft. DIN-plug-terminated connecting cable and can be bolted to the side of a CR-1604, handheld, set on a flat surface or semi-permanently mounted with double-backed tape. **Basic Specifications & Suggested List Price:** Price: \$39.

DREAM SCX

Studio Microphone

*You place your SCX where
the other one used to be
You know what you're
looking for*

*Back at the console
Fader up
Sound's good
Right where it should be*

*Finally...
The sound in your dreams
becomes reality*

*Discover the SCX
Make your
Dreams come true*

The AUDIX SCX.
The AUDIX Dream Machine.



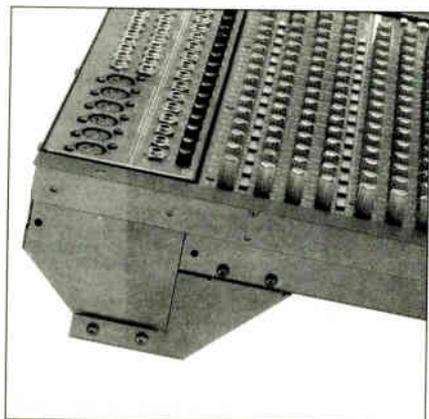
*Only from
AUDIX
Not Sold
Every where.*

Available SCX Capsules:
Omn, Omni Presence, Cardioid
and Hypercardioid
Stereo matched pairs available

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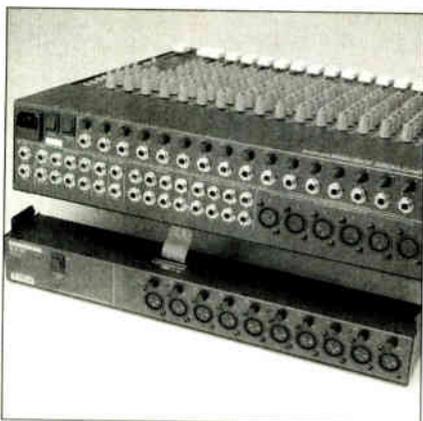
19439 SW 90th Court
Tualatin, OR 97062
Phone: (415) 463-1112
FAX: (415) 463-2149

SCX



MACKIE DESIGNS
RotoPod

MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: RotoPod. Contact: Ron Koliha. Date Product Introduced: 9/90. Product Description & Applications: An accessory bracket and rack rail set that allows the CR-1604's connector pod to be mounted on the same plane as the knobs on the front panel of the mixer. The RotoPod converts the CR-1604 from a 7-rackspace mixer with rear-facing jack panel to a 10-rackspace mixer with rear-facing jack panel. It may also be used on a table-top to provide all connectors facing up. The rack ears on the RotoPod kit are designed to provide either f-usb mounting or recessed mounting for protection of controls and addition of a security cover. All necessary hardware is provided the conversion takes a matter of minutes. **Basic Specifications & Suggested List Price:** Price \$39.



MACKIE DESIGNS
XLR10

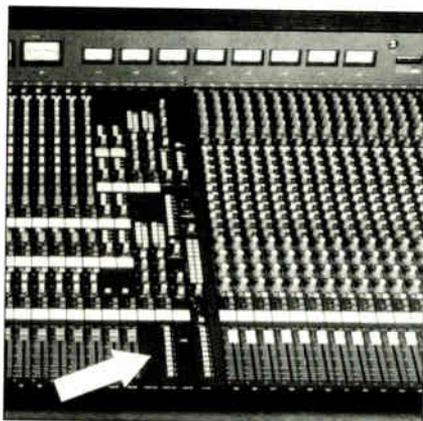
MACKIE DESIGNS; 16130 Woodinville-Redmond Road #2; Woodinville, WA 98072; (800) 258-6883; FAX: (206) 487-4337. Product Name: XLR10. Contact: Ron Koliha. Date Product Introduced: 5/91. Product Description & Applications: An expander for the CR-1604 that provides 10 additional discrete studio-grade phantom powered mic preamps, for a total of 16. The XLR10 mounts directly to the bottom of the CR-1604 jack panel and becomes an integral part of the mixer itself. No external wiring is required, and all mounting hardware is included. Each XLR-10 preamp uses four conjugate-pair transistors with large emitter geometry to reduce distortion at all levels and deliver extremely low noise (our published spec -128dBm @ 150 ohms is real and verifiable). At any gain level, both XLR-10 and CR-1604 mic preamps deliver the additional headroom and low noise floor that set professional mixers apart from music store products. **Basic Specifications & Suggested List Price:** Frequency response: 20Hz-20kHz +/-1dB. Distortion: less than 0.025%. 20-20kHz. Noise: mic E.I.N. -129.0 dBm, 150 Ohm source 20Hz-20kHz. Max gain: 48dB. Max input level: +14dB. Weight: 5 lbs. Price: \$349.

MIDIMAN; 30 N. Raymond Ave., Ste. 500; Pasadena, CA 91103; (818) 449-8838. Product Name: Fineline. Contact: Michael Paul Inman, national sales mgr. Date Product Introduced: 1/91. Product Description & Applications: Fineline has a wide variety of applications from studio to live use. Fineline is the perfect mixer for digital audio applications because of its superior signal to noise ratio. **Basic Specifications & Suggested List Price:** Fineline is a 24-channel, single rack height, line mixer with a signal to noise ratio better than 90dB. Fineline has 20 1/4" inputs and four XLR type inputs as well as an effect loop and headphone jack with independent volume control. Fineline carries a suggested retail price of only \$349.95.

MODULOCK INC.; 3960 Laurel Canyon Blvd., Ste. 321; Studio City, CA 91614; (818) 905-9136; FAX: (818) 783-1578. Product Name: FM-7202 (A, B & C) submixers. Contact: Steve Leonard. Date Product Introduced: 10/90. Product Description & Applications: The FM-7202 Series stereo mixers are exceptionally well suited to high-end studio applications such as bus expansion and adding effects returns. Designed primarily for professional use, the FM-7202 mixers offer absolute sonic accuracy in a space-efficient package. The FM-7202 is intended to be used as a submixer in conjunction with a larger console, however, it can also be used as a stand alone mixer wherever superior audio quality is required. Made in the U.S.A. **Basic Specifications & Suggested List Price:** Freq. resp.: +/-1dB 5Hz to 100kHz; S/N ratio: -96dB; T.H.D.: .008% @ 1kHz; Gain: 13dB max.; dyn. range: >110db; nom. levels: +4 dBv (in & out); dimensions: 19"wx3.5"hx5"d; weight: 8lbs. Model A—\$1,500, 24 inputs (12 pairs) 6 outputs (3 pairs); Model B: \$1,600, 48 inputs (24 pairs), 4 outputs (2 pairs); Model C: \$1,700, 72 inputs (36 pairs), 2 outputs (1 pair).

NEOTEK CORPORATION; 1154 W. Belmont Ave.; Chicago, IL 60657; (312) 929-6699. Product Name: Broadcast Elite. Contact: Tom Der. Date Product Introduced: 6/1/91. Product Description & Applications: The Broadcast Elite serves sophisticated broadcasters who require large, powerful consoles with high-performance electronics and who need multitrack recording capabilities as well as on-air control. The Broadcast Elite offers live mic sensing, mix-minus buses, comprehensive fader logic and monitoring facilities familiar to broadcasters. VCA fader control is optional and allows grouping as well as control of the console by external systems. **Basic Specifications & Suggested List Price:** The Broadcast Elite is available in frame sizes from 32 to 64 inputs with stereo modules and external patch bay options. Broadcast Elites are designed to endure the stresses of custom installation in vehicles while giving years of reliable service. Prices start at under \$70,000. Customization is available.

PACIFIC RECORDERS AND ENGINEERING CORPORATION; 2070 Las Palmas Drive; Carlsbad, CA 92009; (619) 438-3911. Product Name: Productionmixer. Contact: Michael Dosch, marketing mgr. Date Product Introduced: 4/15/91. Product Description & Applications: Productionmixer is a feature-packed broadcast production console that serves double-duty as an air board. Priced well within reach of stations on a budget, Productionmixer delivers famous PR&E quality and value. Features: 8-track capable, stereo effects sends/returns, 3-band parametric EQ, and the most elegant telephone mixing system in the industry. **Basic Specifications & Suggested List Price:** P&G faders, Honeywell switches, Sifam VU meters, rack-mount power supply with toroidal transformer, dual inputs on mic and line modules, distribution-type output amplifiers, stereo cue and solo system, communications and studio monitor facilities. MFR direct price \$20,000 to \$35,000 depending on configuration.



PANASONIC/RAMSA COMMUNICATIONS & SYSTEMS CO.
Programmable mute group add-on for
WR-S840 and WR-S852

PANASONIC/RAMSA COMMUNICATIONS & SYSTEMS CO.; 6550 Katella Ave.; Cypress, CA 90630; (714) 373-7278. Product Name: Programmable mute group add-on for WR-S840 and WR-S852. Contact: Steve Woolley, national sales & marketing mgr. Date Product Introduced: 8/91. Product

Description & Applications: The WR-S852 house console and WR-S840 monitor consoles are audio industry standards. Ramsa has improved the consoles by unveiling a new programmable mute group add-on for the WR-S852 or WR-S840. The mute group option is retrofittable to existing consoles, includes 10 mute groups, nonvolatile memory and MIDI interface.

PEAVEY ELECTRONICS; 711 A St.; Meridian, MS 39301; (601) 483-5365. Product Name: 3680 Performance Console. Contact: Ernie Lansford, nat'l. sales mgr. Date Product Introduced: 4/91. Product Description & Applications: The Performance Series™ 3680 Sound Reinforcement Console is the result of ongoing research into the requirements of sound engineers all over the world. Many technological advancements have been included with this new console, but we have also kept in mind the most needed and most often used features that are common to virtually every sound reinforcement application. We have listened to the requests from countless mix engineers and sound technicians who are professionally involved with theater and concert sound. The Performance Series 3680 has answered those requests with features to spare. **Basic Specifications & Suggested List Price:** The totally modular concept, coupled with performance, function, features and exceptional specifications, offers to the sound reinforcement industry a console that is "tailor made"...but at the same time is an affordable \$16,250.

PEAVEY ELECTRONICS; 711 A St.; Meridian, MS 39301; (601) 483-5365. Product Name: Production Series 1600PB and 2400PB consoles. Contact: Ernie Lansford, nat'l. sales mgr. Date Product Introduced: 10/4/91. Product Description & Applications: We are pleased to introduce the Peavey/Audio Media Research Production Series 1600PB and Production Series 2400PB recording consoles. They will be available in 28x16 and 32x24 standard "split" configurations, each with a built-in 240 point, "miniature TTT" type patch bay. Inputs, master and subs will use simultaneous peak and VU responding LED metering.

PHONIC CORPORATION/HOSA TECHNOLOGY INC.; 6910 E. 8th; Buena Park, CA 90620; (714) 522-5675. Product Name: PMC-Series Sound Reinforcement Mixing Consoles. Contact: Lee Watkins, general mgr., sales, mktg. Date Product Introduced: 1/91. Product Description & Applications: Available in 8, 12, 16 and 24-channel versions, these mixing consoles offer XLR-type low-Z inputs and 1/4" phone line-level inputs per channel, with three-band EQ and mid sweep controls, three aux send per channel (2 post, 1 pre fader), 3 master returns with high and low EQ and panning, on-board 48-volt phantom power for condenser mics, PFL bus for headphone channel soloing, -30dB pad switches on each channel. Intended for church or school installations and combo PA. **Basic Specifications & Suggested List Price:** THD: less than 0.2% 20Hz to 20kHz, Crosstalk adjacent channels: -65dB @ 1kHz, Frequency Response: +1, -3dB 20Hz-20kHz (+4dB output into 600 ohms). Suggested list price: PMC-802: \$699, PMC-1202: \$899, PMC-1602: \$1,099, PMC-2402: \$1,699.

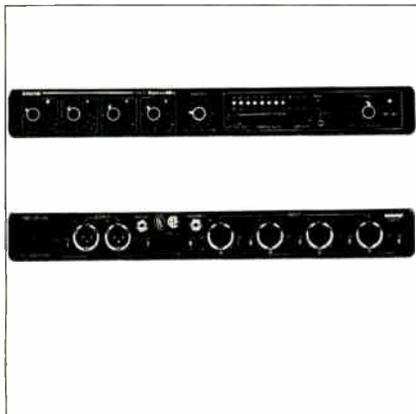
RANE CORPORATION; 10802 47th Ave. W.; Mukilteo, WA 98275; (206) 355-6000. Product Name: CM 86 Commercial Mixer. Contact: Terry Pennington. Date Product Introduced: 9/91. Product Description & Applications: An eight-channel mixer, each input features two sends, EQ, mic/line capabilities and dual output controls for A and B master buses. The outputs consist of two master A and B outputs plus two aux outputs. Housed in a three rackspace 19" size. **Basic Specifications & Suggested List Price:** Specifications and retail pricing to be announced in October 1991.



SAJE
Memory—audio console

SAJE (FRANCE); 222 Rue de Rosny; Montreuil, France 93100; (North American Distributor—Guy Lemire, (514) 287-1684; FAX: (514) 287-7436). Product Name: Memory—audio console. Contact: Guy Lemire. Date Product Introduced: 10/91. Product Description & Applications: The console itself is merely a control surface with the digitally controlled analog situated in remote racks located up to one hun-

dred meters away. Over 10,000 different console configurations can be called upon with all parameters stored to hard disk and instantly recalled in less than 30 ms. MIDI, SMPTE and EBU interface along with remote control of external tape machines etc. Three input connectors per channel gives the ability to select or recall 48 out of 144 sources at any time. Each output channel, either group or matrix, is fitted with two outputs simultaneously. **Basic Specifications & Suggested List Price:** A 32-way matrix of inputs/outputs along with 16 output bus' is available so the console can be configured for front of house, monitor or recording. 16 stereo auxiliary returns with 8 VCA controlled DCA groups. US pricing: MemoryFrame 32x8x16, \$145,000. MemoryFrame 48x48x16, \$340,000.



SHURE BROTHERS INC.
FP410

SHURE BROTHERS INC.; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2200. **Product Name:** FP410. **Contact:** Customer Service. **Date Product Introduced:** 4/91. **Product Description & Applications:** The FP410 is the world's first portable automatic mixer. With its patented operational concept, Shure IntelliMix, the FP410 dramatically improves audio quality by automatically keeping unused microphones turned down. Shure IntelliMix is comprised of three key features. "Noise Adaptive Threshold" activates microphones for speech, but not for constant room noise such as air conditioning; "Max Bus" limits the number of activated microphones to one per talker; and "Last Microphone Lock-On" keeps the most recently activated microphone open until a newly activated microphone takes its place. The FP410 thus provides a "seamless" mix automatically. It is ideal for corporate television, broadcast and field production environments. **Basic Specifications & Suggested List Price:** FP410 features: four transformer-balanced mic/line inputs and outputs, switchable 14V and 48V phantom powering, linking capability for up to 25 mixers, LED indication of input levels, output levels, and limiter action. Defeatable "last Mic Lock-On" circuit maintains consistent background ambience, can be operated as automatic or manual mixer as required. Selectable peak of VU meter. AC voltage operating range: 80 to 132 VAC or 160 to 264 VAC. Also operated on two nine volt batteries. A variety of user modifiable features to meet specific needs; rack mount ears and link cable available. User Net Price is \$1,595.

SOUNDCRAFT; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-4351. **Product Name:** Europa. **Contact:** David Kimm, Gary Lynn. **Date Product Introduced:** 5/91. **Product Description & Applications:** The Europa is Soundcraft's newest live reinforcement console. Frame sizes range up to forty inputs, each size standard with four-band parametric EQ, integrated noise gate, eight VCA subgroups, and eight mute groups. A unique VCA soloing system incorporates solo clear. Full metering on all inputs and groups is included. All inputs and outputs are balanced along with fully differential balanced busing. Twelve auxiliary sends each with individual ON/OFF complete the module. **Basic Specifications & Suggested List Price:** Price range: from \$35,000 to \$60,000.

SOUNDCRAFT; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-4351. **Product Name:** Sapphire. **Contact:** David Kimm, Gary Lynn. **Date Product Introduced:** 4/91. **Product Description & Applications:** Sapphire is an in-line recording and post production console available in 20, 28, 36 or 44 sizes, each with six stereo effect returns. Each input/output (I/O) module incorporates individual noise gates with an advanced 4-band EQ design, splittable between the two signal paths. A combined I/O module gives access to dual signal paths with unique sub-grouping and routing architecture enabling different modes to be easily configured and controlled. **Basic Specifications & Suggested List Price:** Price range: From \$25,000 to \$50,000.

SOUNDTRACS PLC; 91 Ewell Rd., Surbiton; Surrey, KT6 6AH United Kingdom; (44) 81-399-3392. **Product Name:** Megas Stage. **Contact:** Lorraine Cooper. **Date Product Introduced:** 2/91. **Product Description & Applications:** Price conscious dedicated sound reinforcement console. Inputs

—LISTING CONTINUED TOP OF NEXT COLUMN

feature four-band EQ with fixed high and low bands and two swept mid frequencies. Six auxiliary sends are available with aux 6 switchable as a direct auxiliary output. Six mute groups are standard. Full moving coil VU metering supplied with a high efficiency switching type power supply unit in a 2U high 19" rack mount case. **Basic Specifications & Suggested List Price:** Pricing: 5,900-9,300 Pounds UK. 8 bus console. Available in four frame sizes to accept 30, 38, 46 or 54 modules in a combination of mono inputs, stereo inputs, matrix (max. of eight modules to provide 11x8 matrix), dual group outputs (max. of four modules to provide 8 groups) and a 2U master module.

SOUNDTRACS PLC; 91 Ewell Rd., Surbiton; Surrey, KT6 6AH United Kingdom; (44) 81-399-3392. **Product Name:** Megas Studio. **Contact:** Lorraine Cooper. **Date Product Introduced:** 2/91. **Product Description & Applications:** Price conscious dedicated recording console. MIDI muting on all inputs, auxiliary masters and monitors. Inputs feature four-band EQ with fixed high and low bands and two swept mid frequencies. Six auxiliary sends are available with aux 6 switchable as a direct auxiliary output. Optional patch bay. A high efficiency switching type power supply in a 2U high 19" rackmount case is included. **Basic Specifications & Suggested List Price:** Pricing 6,000-14,000 Pounds U.K. 16 or 24 bus console. Available in five frame sizes to accept 30, 38, 46, 54 or 62 modules in a combination of mono inputs, maximum of sixteen stereo inputs, dual group outputs, an 8U comprehensive patch bay option and a 2U master module.

STUDIOMASTER INC.; 3941 Miraloma Ave.; Anaheim, CA 92807; (714) 524-2227. **Product Name:** Diamond 16x4x21 mixing console. **Contact:** Jim Giordano, nat'l sales mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** Specifically designed for sound reinforcement. Features include: balanced mic and line inputs, 48V phantom power, three-band fixed EQ, inserts on all inputs and outputs, 3 aux sends per channel (two post one pre), individual channel mutes, PFL, balanced L/R, group and mono outputs, 2 aux returns, 2-track record/playback and stereo headphone output. **Basic Specifications & Suggested List Price:** List price: \$1,495, delivery late August 1991.

STUDIOMASTER INC.; 3941 Miraloma Ave.; Anaheim, CA 92807; (714) 524-2227. **Product Name:** Diamond 8x2RB. **Contact:** Jim Giordano, nat'l sales mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** Eight channel rackmount mixer, specifically designed for professional audio and video applications. Features include balanced mic and line inputs, 48V phantom power, three-band fixed EQ, 60mm faders, 1 post and 1 pre aux send per channel, 2 aux returns, L/R and mono balanced outputs, 2-track record/playback, stereo headphone output, all steel chassis, connections at the back of the mixer. **Basic Specifications & Suggested List Price:** Frequency response: 25Hz to 19kHz (+0 -1dB), THD: better than 0.08%. Signal to noise -80dB. Total EIN -128.5dBm (DIN AUDIO). Weight: 18 lbs. Dimensions: W=19" x D=14 1/8" x H=2 3/8". Suggested retail price: \$679.95.

STUDIOMASTER INC.; 3941 Miraloma Ave.; Anaheim, CA 92807; (714) 524-2227. **Product Name:** Showmix Series 16x2x1, 16x4x2x1 & 16x8x2x1. **Contact:** Jim Giordano, nat'l sales mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** Professional live reinforcement consoles. All expandable to 40 inputs, balanced mic & line inputs, direct outs, inserts on channels, groups, L/R and mono outputs, individual 48V phantom, phase reverse, 4-band EQ with dual mid sweeps, EQ defeat on channels, 6 aux sends, discrete group assigns, PFL, four stereo aux returns, XLR balanced group, L/R and mono outputs, two-band EQ on L/R outputs w/defeat, BNC lamp connector, and scribble strip. **Basic Specifications & Suggested List Price:** List price: 16x2x1=\$3,325, 8ch expander—\$1,325 each; 16x4x2x1=\$4,650, 8ch expander=\$1,525 each; 16x8x2x1=\$5,545, 8ch expander=\$1,600 each. Delivery early August 1991.

STUDIOMASTER INC.; 3941 Miraloma Ave.; Anaheim, CA 92807; (714) 524-2227. **Product Name:** Stagemaster. **Contact:** Jim Giordano, nat'l sales mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** 16x8 monitor console, expandable to 40 inputs. Features include balanced XLR in and outs, inserts on inputs and outputs, 3 band EQ w/mid & bass sweep, EQ defeat, phase reverse, 48V phantom, channel mutes, PFL/AFL on inputs and output, 3-band fixed EQ on outputs, stereo record playback, XLR balanced outputs, separate engineer's monitor output, BNC lamp connector and scribble strip. **Basic Specifications & Suggested List Price:** List price: 16x8M \$3,750, 8 ch expander: \$1,065 each.

TASCAM; 7733 Telegraph Rd.; Montebello, CA 90640; (213) 726-0303. **Product Name:** M-3700 Series. **Contact:** Bill Stevens, market mgr. **Date Product Introduced:** First shipped 9/91; Introduced AES'90. **Product Description & Applications:** The M-3700's outboard computer controls fader level, channel mute, monitor mute, auxiliary mute, and EQ on/off. Internal SMPTE TC generator as well as MIDI in/out and thruports. Allows use of any SMPTE or MIDI TC standard; real time and snapshot modes. **Basic Specifications & Suggested List Price:** From \$12,999—Snapshot mode allows 99 scenes per file, 63 files per disc. Real time mode provides up to six mixes per disc or a total of 30,000 events, 8-bit/256 step fader resolution.

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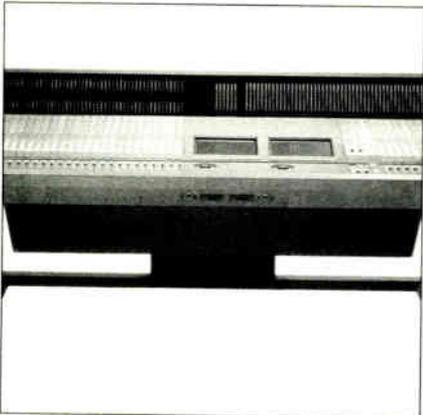
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OM-7



TASCAM; 7733 Telegraph Rd.; Montebello, CA 90640; (213) 726-0303. Product Name: MFA 700. Contact: Bill Stevens, market mgr. Date Product Introduced: 9/91. Product Description & Applications: Moving Fader Automation is now available on any new M-700 series console. Additionally, the M7-MFA retrofit package may be used to automate an existing M-700 or other suitable console. While self-contained, a terminal may be used to enable additional facilities. **Basic Specifications & Suggested List Price:** MFA-700 console \$129,999. M-7MFA Automation only \$50,000.



TOA ELECTRONICS INC.
ix-9000

TOA ELECTRONICS INC.; 601 Gateway Blvd., Ste. 300; South San Francisco, CA 94080; (415) 588-2538. Product Name: ix-9000. Contact: Christina Foran, marketing communications. Date Product Introduced: 10/90. Product Description & Applications: The ix-9000 is a full digital mixing system, capable of making delicate adjustments by employing DSP and advanced computer technologies. Analog audio signals are digitized as they enter the ix-9000 mixing system, processed digitally and then converted back to analog. The ix-9000 features up to 256 discrete modular channels of input and output and is capable of 2500 MIPS (million instructions per second). **Basic Specifications & Suggested List Price:** The ix-9000 features three modules, an interface rack, a DSP rack and a DSP control console. The interface can accept from 4 to 256 channels of analog input and output. The DSP rack will set parameters using software for up to 148 subgroups, and the control console has 48 faders for controlling the 148 groups. Digital encoding uses 18 bits of linear PCM (pulse code modulation) and the sampling rate is 48 kHz. Price varies depending upon the configuration of hardware and software.

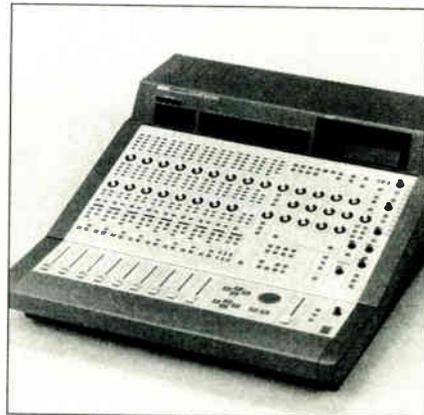
TOTAL AUDIO CONCEPTS LTD.; Unit 17 Bar Lane Ind. Estates; Bar Lane, Basford; Nottingham, NG6 0HU United Kingdom; (44) 602 783306. Product Name: TAC SR6000. Contact: Carl Reavey, product manager. Date Product Introduced: 3/91. Product Description & Applications: The SR6000 is available in either a 40-, 32- or 24-input chassis size. Suitable for F.O.H. sound reinforcement, live sound, theater or post-production applications. Unique split aux system allows up to 16 discrete sends. 10x8 matrix, fed from audio groups and stereo bus. Eight audio groups, eight VCA groups and mutes. All outputs can be slaved to a VCA master fader. Two consoles can be bus and VCA linked in a master/slave arrangement. **Basic Specifications & Suggested List Price:** List price 40-inputs—25,000 Pounds U.K. EQ—hi-swept (bell or shelf), upper mid—fully parametric, lower mid—fully parametric swept, lo-swept (bell/shelf). Variable H.P. filter. Input metering. Four stereo returns. Comprehensive metering of output solo and PFL/AF/L modes. comprehensive talkback and communication facilities.

TOTAL AUDIO CONCEPTS LTD.; 10815 Burbank Blvd.; North Hollywood, CA 91601; (818) 508-9788. Product Name: TAC B2. Contact: Steve Harvey, national sales manager. Date Product Introduced: 1/91. Product Description & Applications: Compact modular audio mixing console for sound reinforcement and video post applications, in 8/4/2, 16/4/2 and 28/4/2 formats. All available with stereo modules and

both parallel and serial interfaces to most major video editors. All capable of monitoring up to nine stereo mastering machines. All with four-band EQ, six aux sends, four stereo effects returns. All complete with either rack mounting or drop-through rails. **Basic Specifications & Suggested List Price:** All balanced: in/buses/out. Mic noise -128dBv. Channel distortion <0.02%. Crosstalk <-72dB. Frequency response 20Hz to 20kHz +/-1dB. Dimensions-front-to-back: 20.4 in., depth: 8 in., width: 17.13 in. (8 input) or 26.69 in. (16 input) or 41.03 in. (28 input). Price guide—8/4/2: \$3,950. 16/4/2: \$6,207. 28/4/2: \$9,590.

TRIDENT AUDIO U.S.A.; 2720 Monterey St., Ste. 403; Torrance, CA 90503; (213) 533-8900. Product Name: Vector 432. Contact: Phil Wagner, sales mgr. Date Product Introduced: 10/90. Product Description & Applications: Trident's latest is an in-line console for music recording, post-production and broadcast applications. Available in 40 to 80 input frames. Balanced buses for 32 multitrack, 4 stereo (with output matrix), 8 auxiliary outputs. Variable high/low pass filter. 4 band parametric equalizer which may be split between channel/monitor. 12 automated switches per channel. Optional stereo input, effects return, dynamics modules. LCRS film sound module. VCA/moving fader automation/machine control options. **Basic Specifications & Suggested List Price:** Price: \$140,000 to \$350,000.

WHEATSTONE CORPORATION; 6720 VIP Parkway; Syracuse, NY 13211; (315) 455-7740; FAX: (315) 454-8104. Product Name: SP 40 Audio Consoles. Contact: Ray Esparolini, national sales director. Date Product Introduced: 9/91. Product Description & Applications: SP-42 and SP-44 mixing consoles: new line of production/air consoles; compact architecture with full multitrack production capability. Incorporate program and audition busing which allows production room to double as back-up on-air facility. Ideal for complex talk or news formats. Available in 2, 4 and 8-track formats with full EQ and aux send features, plus full on-air type machine and console logic. Wheatstone quality throughout. **Basic Specifications & Suggested List Price:** 12, 16 or 24 inputs. Freq. Response: 10Hz-20kHz +/-0.1dB. THD+N=less than .004%, 20Hz-20kHz; Dynamic Range: -114dB; SQ Wave: less than 1% overshoot, less than 1% ringing. Price depends on configuration: consult factory.



YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.
DMC1000 Digital Mixing Console

YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.; PO Box 6600; Buena Park, CA 90620; (714) 522-9011. Product Name: DMC1000 Digital Mixing Console. Contact: Peter Chaikin, sales & marketing manager. Date Product Introduced: 8/91. Product Description & Applications: 22-input digital production console for professional recording, video post, and CD mastering applications. Onboard interface to professional digital I/O formats, dynamic automation and "snapshot" recall of all parameters, onboard digital signal processing, 4-band parametric EQ, RS 422 control, multiple units may be cascaded to provide more inputs, 100mm motorized touch-sensitive faders, 4 aux sends (2 mono/1 stereo) are 20-bit analog as well as digital. Permits all-digital production when interfaced with professional digital multitracks, disk recorders, digital VTRS or Yamaha DUB 20-bit, 8-track digital recorders. **Basic Specifications & Suggested List Price:** 22 inputs, 10 buses, 4 aux, 4-band EQ (each band 20Hz-20kHz), up to 32-bit internal resolution, frequency response 20Hz-20kHz; external optional A/D converter (AD8X 19 bit/delta sigma encoding), external D/A converter optional (DA8X 20-bit), suggested retail price: \$34,000.

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ACOUSTECH CORPORATION; 306 Maple Ridge, Unit 2; Ann Arbor, MI 48103; (313) 663-7013. Product Name: 8025 Monitor Speaker. Contact: Aldo Fucinari, VP marketing. Date Product Introduced: 2/91. Product Description & Applications: The 8025 is a high-performance near or mid field monitor system for small to medium studios, edit suites, boardrooms, etc. Fast, tight bass from below 36 Hz, flat, seamless midband and high frequency to 21kHz make the 8025 an ideal reference monitor where space is at a premium. Flexible placement, including rackmounting in six vert. spaces, the 8025 fits in many applications. **Basic Specifications & Suggested List Price:** Frequency response of 36Hz to 20kHz, power rating: 80 wRMS, 150 w program, 300 w peak. 8" poly/rubber woofer, 26 mm. textile dome H.F. driver, all filters 6 dB/oct for minimum phase error, non-fatiguing sound and stable, accurate imaging. Suggested list, \$1,190/pr.

ADAMSON ACOUSTIC DESIGN CORP.; 850 Brock Rd., Ste. 1; Pickering, ON, L1W 1Z8 Canada; (416) 420-6279. Product Name: FR12. Contact: Jerry Placken, mktg/sales mgr. Date Product Introduced: 10/91. Product Description & Applications: A compact, full-range, passive enclosure utilizing a direct radiating Adamson 12" loudspeaker and a 1" compression driver coupled to an 80x40 degree Acoustic Waveguide. The trapezoid enclosure is ideally suited for arraying. No external electronics are required for this system. The B118 can be added with an AX400 Controller to extend low frequency response of the FR12 in a bi-amped configuration. Applications include small PA systems, stage monitors, AV productions, theaters, night clubs and places of worship. **Basic Specifications & Suggested List Price:** Frequency response: 75Hz-17kHz. Maximum SPL: 130dB peak. Max power handling: 350 watts RMS. Dimensions: 26"H. 17.5W, 15.25"D. Weight: 45 lbs.

**AKG ACOUSTICS INC.
K400/K500 Monitoring Headphones**

AKG ACOUSTICS INC.; 1525 Alvarado St.; San Leandro, CA 94577; (914) 635-9000. Product Name: K400/K500 Monitoring Headphones. Contact: David Ogden, product manager. Date Product Introduced: 4/91. Product Description & Applications: The K400 and K500 incorporate many of the design breakthroughs achieved with the K1000 system. Large transducer areas housed in an acoustically open structure combine to deliver exceptional transient response and improved imaging. The rare earth magnet structures provide extremely high sensitivity, and the signal path is via oxygen-free cables which are terminated in gold-plated combination mini/regular headphone plugs. The K500 system features an extended frequency response and glove leather self-adjusting headband. **Basic Specifications & Suggested List Price:** The K400 and K500 systems present a 120 Ohm load impedance and provide 96dB/mW sensitivity. The earpieces are circum-aural, using special fabrication and materials to achieve a very open-air result. The K400 features a frequency response of 20-26,000Hz and has a suggested professional user net price of \$189. The K500 features a grey glove leather headband, a frequency response of 15-27,000Hz, and has a suggested professional user net price of \$299.



**ACOUSTICAL PHYSICS LABORATORIES
DCM-15**

ACOUSTICAL PHYSICS LABORATORIES; 3877 Foxford Dr.; Doraville, GA 30340; (404) 934-9217. Product Name: DCM-15. Contact: William Morrison. Date Product Introduced: 1/91. Product Description & Applications: The dome/coaxial DCM-15 is a tri-amplified loudspeaker system designed for the highest levels of control room monitoring accuracy. A coaxially mounted dome tweeter is matched to a nine-inch midrange cone driver to allow phase accurate transitions and coincident time arrivals to the listening area. The result is accurate spatial imaging and a lobe-free crossover transition over a large listening area. Low frequency reproduction is handled by two 15" drivers in a transient response optimized alignment. Cabinet construction is dampened high-density composite. **Basic Specifications & Suggested List Price:** Frequency Response: 24 Hz-24kHz (-3 dB points); Amplification: Tri-amplified @ 700 watts/channel; Maximum SPL: 125 db @ 12".



**ADAMSON ACOUSTIC
DESIGN CORP.
MH121**

ADAMSON ACOUSTIC DESIGN CORP.; 850 Brock Rd., Ste. 1; Pickering, ON, L1W 1Z8 Canada; (416) 420-6279. Product Name: MH121. Contact: Jerry Placken, mktg/sales mgr. Date Product Introduced: 2/91. Product Description & Applications: A compact, full range, 2-way enclosure utilizing a direct radiating Adamson 12" loudspeaker and a 1" compression driver mounted on a 80x40 degree Acoustic Waveguide. The trapezoid enclosure is ideally suited for arraying. The B118 can be used with the MH121 in a 3-way application to extend low frequency response. The AX300 or AX400 series controllers are required for operation. This loudspeaker can be utilized in many critical sound reinforcement applications such as concert PA, stage monitors, AV productions, theaters, night clubs and places of worship. **Basic Specifications & Suggested List Price:** Frequency response: 60 Hz-20kHz. Maximum SPL: 132dB peak. Max power handling: 325 watts RMS. Dimensions: 26"H, 17.5"W, 15.25"D. Weight: 55 lbs.

ALTEC LANSING CORPORATION; 10500 W. Reno, PO Box 26105; Oklahoma City, OK 73126; (405) 324-5311. Product Name: M100 Compact Monitor Loudspeaker. Contact: John E. Lanphere, mgr. mkt. devl. Date Product Introduced: 5/91. Product Description & Applications: Ideal for use as a nearfield monitor for a keyboardist or as a spot monitor for line performance. Usable frequency response from 65 Hz with independently protected 5 1/4" woofer and 1" soft-dome tweeter. Threaded inserts allow wide flexibility in mounting arrangements. Extremely smooth response with a superb low end. **Basic Specifications & Suggested List Price:** Frequency response: 65-20 kHz +/-3dB, -10dB at 65 Hz. Sensitivity: 85dB-SPL at 1 meter for 1 watt (2.00 volt) input. Power handling: 160 watts long term per EIA RS-426A with maximum acoustic output at 60 watts. Tuned structural foam enclosure. Unit weighs only 5.7 lbs. List: \$336 per pair.

ADAMSON ACOUSTIC DESIGN CORP.; 850 Brock Rd., Ste. 1; Pickering, ON, L1W 1Z8 Canada; (416) 420-6279. Product Name: B118. Contact: Jerry Placken, mktg/sales mgr. Date Product Introduced: 2/91. Product Description & Applications: A compact loudspeaker utilizing a single direct radiating 18" driver in a vented enclosure designed to be used with the MH121 or FR12 in a 3-way system to extend the low frequency response. The enclosure can be flown with the addition of pan fittings. The AX300/AX400 series controllers must be utilized when the B118 is used with any Adamson system. Applications include concert PA, stage monitors, AV productions, theater, night clubs and places of worship. **Basic Specifications & Suggested List Price:** Frequency response: 40-500Hz. Maximum SPL: 130dB peak. Max power handling: 450 watts RMS. Dimensions: 28"H, 24"W, 19.5"D. Weight: 120 lbs.

ADAMSON ACOUSTIC DESIGN CORP.; 850 Brock Rd., Ste. 1; Pickering, ON, L1W 1Z8 Canada; (416) 420-6279. Product Name: S218. Contact: Jerry Placken, mktg/sales mgr. Date Product Introduced: 7/91. Product Description & Applications: A rugged, trapezoid bass enclosure utilizing two direct radiating 18" drivers in a highly efficient vented box design intended for use with the MH225/B218 Advanced Concert Loudspeaker System. The cabinet can be ordered with or without fly hardware. **Basic Specifications & Suggested List Price:** Frequency response: 30-400Hz. Maximum SPL: 135dB peak. Max power handling: 900 watts RMS. Dimensions: 42"H, 28"W, 29.5"D. Weight: 170 lbs.

ANCHOR AUDIO; 913 W. 223rd St.; Torrance, CA 90502; (213) 533-5984. Product Name: AN 1000X. Contact: Jon Pierson, vice president marketing. Date Product Introduced: 12/91. Product Description & Applications: This compact all-in-one unit is a 50-watt-powered monitor. The AN 1000X uses a current high performance mode feedback amplifier driving a two-way speaker system. Volume, bass and treble controls are located on the front panel. The unit has RCA and 1/4" unbalanced line inputs and a selectable 3-pin XLR connector for balanced line, mic or mic with phantom power. Tuned enclosure is injection molded polycarbonate ABS. **Basic Specifications & Suggested List Price:** Power output: 50 watts; frequency response: 80Hz to 20kHz; max SPL: 108dB; input sensitivity: unbalanced line 200mv, balanced line 200mv, balanced mic 5v; phantom power: 15 volts (switchable on/off); spkr complement: 4 1/2" mid/woofer and 10mm dome tweeter (ferro-fluid cooled); dimensions: 5 1/4"H x 3 8/8"W x 9" D. Weight: 10lbs; tentative list price: \$429.

AUDIO CENTRON; 1400 Ferguson Ave.; St. Louis, MO 63133; (314) 727-4512. Product Name: ACE-1. Contact: Tony Moscal, product manager. Date Product Introduced: 1/1/91. Product Description & Applications: Two-way, medium-throw enclosure for use in sound reinforcement or program playback. Unique 3-position crossover switch enables three distinct frequency responses. **Basic Specifications & Suggested List Price:** 15" cast-frame speaker and constant directivity horn. 400-watt program handling, 100 dB sensitivity. 40-18kHz frequency response. List price: \$575.

AUDIO CENTRON; 1400 Ferguson Ave.; St. Louis, MO 63133; (314) 727-4512. Product Name: CE 155. Contact: Tony Moscal, product manager. Date Product Introduced: 1/1/91.

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Product Description & Applications: Three-way, medium-throw enclosure for use in sound reinforcement, recording monitoring, Radius front enclosure, line array speaker alignment. **Basic Specifications & Suggested List Price:** 1 ea. 15", 1 ea 6", 1 ea dome tweeter, 300 watt program handling, 101 dB sensitivity (1W/1M), 50-18k frequency response. List price=\$425.

AUDIO SYSTEM DESIGN USA INC.; PO Box 4656; Chatsworth, CA 91313-4656; (818) 368-4642. Product Name: Shermann MX-Series Closefield Monitors. **Contact:** Ken Hughes, president. **Date Product Introduced:** 7/1/91. **Product Description & Applications:** Designed for studio and broadcast applications, the Shermann MX-Series close-field monitors offer five models of two-way or three-way passive systems. Two-way systems are available with 5" or 7" bass drive units and utilize a 30mm diaphragm, inverted dome HF unit while the three-way systems are available with 7", 8" or 10" bass drive units and incorporate a 5" mid-range and similar HF unit. **Basic Specifications & Suggested List Price:** MX-Series crossovers feature 5% tolerance—400-volt capacitors, minimal loss air-coiled inductors wound to military spec, and generously rated resistors forming individual L-pad mid and JF attenuation networks. All systems share a common height of just 315mm (12.3 inches). Systems are sold in mirror-image matched pairs from \$1,125 to \$2,475 list price.

AUDIX CORPORATION; 19439 SW 90th Court; Tualatin, OR 97062; (415) 463-1112. Product Name: MM-5. **Contact:** Cliff Castle, VP Sales. **Date Product Introduced:** 6/91. **Product Description & Applications:** The MM-5 is a two-way, compact mini-monitor designed for close-field mixing applications. Being less than 9" high, 6" wide and 9" deep and having an internal volume of only .17 feet, the 100-watt MM-5 produces a smooth and accurate response from 50Hz. It is ideal for applications where severe low end is required but space is at a premium. Features include removable grille, offset HF driver, gold-plated 8-gauge binding posts. Contemporary styling complements even the most dramatic architectural ensemble. **Basic Specifications & Suggested List Price:** Freq. response: 50-18k (plus or minus 3 dB). Sensitivity: 86 dB. Min/Max power: 15-100 watt Imp: 4 ohm. Crossover: 3.2k. Enclosure type: vented. Bass/Mid: One 5" woofer with rubber surround and paper treated cone. Tweeter: 3/4" polycarb dome. Finish: black sand coat. List: \$229 pair.

B&W LOUDSPEAKERS; PO Box 653; Buffalo, NY 14240; (416) 751-4520. Product Name: DM 310. **Contact:** Scott Rundle. **Date Product Introduced:** 8/90. **Product Description & Applications:** The DM 310 is a vented, near-field monitor, employing a high-power, 8" reinforced polypropylene woofer. The high-frequency driver employs the same metal-dome technology as the flagship model, Matrix 801. The DM310 may be bi-amped for improved performance. **MSR \$500 per pair. Basic Specifications & Suggested List Price:** Frequency response: 70Hz-20kHz +/-2dB. Dispersion +/-2dB of response on reference axis 20Hz-15kHz. Horizontal: over 40 degrees. Vertical: over 10 degrees arc. Sensitivity: 90dB SPL (2.83V, 1M). Impedance: nominal 8 Ohms.



B&W LOUDSPEAKERS
Matrix 801 Limited Edition

—LISTING CONTINUED TOP OF NEXT COLUMN

—SEE PHOTO/LOGO BOTTOM OF PREVIOUS COLUMN

B&W LOUDSPEAKERS; PO Box 653; Buffalo, NY 14240; (416) 751-4520. Product Name: Matrix 801 Limited Edition. **Contact:** Scott Rundle. **Date Product Introduced:** 6/91. **Product Description & Applications:** The Matrix 801 is a 12", 3-way monitor regarded as a "reference standard" by many world-renowned studios. The 13 lb., 13,000 gauss bass driver, is housed in a vented cabinet featuring B&W matrix-bracing technology. The 5" Kevlar midrange and 1" metal-dome tweeter are time aligned and feature their own inert enclosures for optimum imaging. The system may be bi-amplified for maximum performance. **MSR \$5,900. Basic Specifications & Suggested List Price:** Frequency response: 20Hz-20kHz +/-2dB. Horizontal: over 60 degrees, vertical: over 10 degrees arc. Sensitivity: 87dB (2.83V @ 1m). Impedance: nominal 8 Ohms.

B&W LOUDSPEAKERS; PO Box 653; Buffalo, NY 14240; (416) 751-4520. Product Name: Matrix 805. **Contact:** Scott Rundle. **Date Product Introduced:** 1/91. **Product Description & Applications:** The Matrix 805 retains the important design features of the Matrix 801 for near-field monitoring applications. Features include a 6 1/2" Kevlar bass/mid driver, time-aligned "tweeter on top", and B&W matrix enclosure technology. Matrix 805 may be bi-amplified and is available in a special horizontal version. **MSR \$1,600 per pair. Basic Specifications & Suggested List Price:** Frequency response: 45Hz-20kHz +/-2dB. Dispersion: +/-1dB of response on reference axis 20Hz-15kHz. Horizontal: over 60 degrees. Vertical: over 10 degrees arc. Sensitivity: 87dB (2.83V @ 1M). Impedance: nominal 8 Ohms.

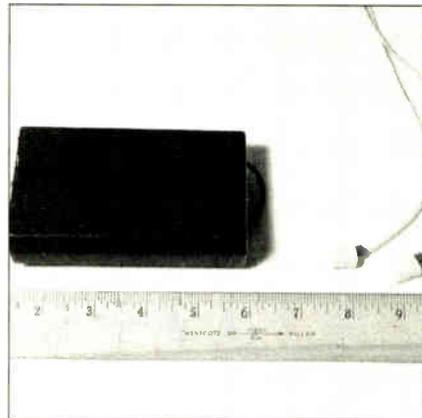
BAG END LOUDSPEAKER SYSTEMS; PO Box 488; Barrington, IL 60011; (708) 382-4550; FAX: (708) 382-4551. Product Name: ELF (Extended Low Frequency) Loudspeaker System. **Contact:** Jim Wischmeyer, president. **Date Product Introduced:** 5/91. **Product Description & Applications:** Extended Low Frequency system, first significant breakthrough in low frequency sound reproduction in forty years. Single or double transducers, and two-channel, state-of-the-art, microprocessor-driven loudspeaker controller. ELF incorporates dual integrators, active equalization, frequency dividing, and system protection limiters in an advanced configuration operates below system resonance. Great sounding, musical sounding, bass in small enclosures. Applications: sound reinforcement, DJ systems, bass guitar, synthesizers, electronic drums, nightclubs, theaters, studios. **Basic Specifications & Suggested List Price:** ELF-1: \$1,988. S-18 ELF \$588. D-18 ELF-R \$1,490. D-18 ELF-I \$1,232. Output = 10V RMS; Input 10V RMS; input common mode rejection >70dB; MOOE = Stereo/oval; signal present threshold: above -20dB RS-232 dB-25; frequency limit = 8—80Hz highpass filter frequency: 50-250 Hz; highpass filter slopes = 0, 12, 24dB/octave.



BAG END LOUDSPEAKER SYSTEMS
TA15-D Time-Aligned®
Loudspeaker System

BAG END LOUDSPEAKER SYSTEMS; PO Box 488; Barrington, IL 60011; (708) 382-4550; FAX: (708) 382-4551. Product Name: TA15-D Time-Aligned® Loudspeaker System. **Contact:** John Vitale, sales manager. **Date Product Introduced:** 5/91. **Product Description & Applications:** High-fidelity, high-efficiency loudspeaker system adaptable to diverse professional applications. Offers remarkable acoustic integrity with unparalleled performance and reliability featuring true time-alignment. Bag End utilizes the time-alignment system to create lifelike sound and unsurpassed transient response while minimizing listener fatigue. Features include: constant directivity coverage, uniform frequency response, minimum EQ required, superb construction technology. Applications: churches, theaters, studios, nightclubs, auditoriums, bass guitar, electronic drums, DJ systems, synthesizers. **Basic Specifications & Suggested List Price:** Price: \$896 (TA15-C), \$1,026 (TA15-D). Frequency response: +/-3dB 50Hz to 19kHz. Dispersion: +/-3dB 90 degrees horizontal X 40 degrees vertical. Sensitivity: 1 watt for 103dB SPL at 1 meter. Enclosure tuning: 40 Hz. Power recommended: 400 w max. Power handling: 200 watts continuous sine wave, 800 watts instantaneous peak. Impedance: 8 Ohms full range.

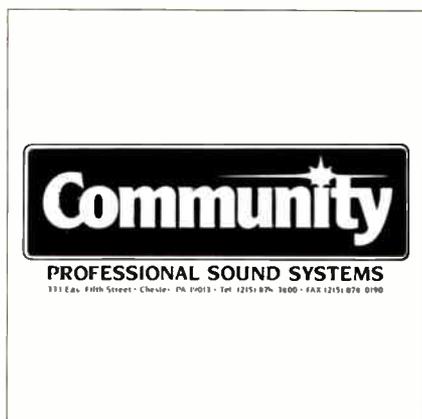
BLACKLIGHT SOUND CO.; 158 S. 4th St.; Hughesville, PA 17737; (717) 584-4117. Product Name: Concert. **Contact:** Steve Kepner, owner. **Date Product Introduced:** 12/1/90. **Product Description & Applications:** 410 cab net designed for the bass player who needs a high-power, bi-amp system. Available in black or grey oxide, gridded front aluminum edging, steel corners, handles, jackplate. **Basic Specifications & Suggested List Price:** Model 4" C/make Concert. Watts—2400 continuous. Imp—4 ohm. Sensitivity—102dB. SPL—1 watt at 1 meter. Range—250Hz-8kHz. Voice coils—4 inch edge-wound copper ribbon. Weight—98 lbs. Size—25x25x16. Suggested list \$1,194.



CIRCUITS MAXIMUS COMPANY INC.
CMCI Wireless
Monitor System

CIRCUITS MAXIMUS COMPANY INC.; 214 N. Park Dr.; Arlington, VA 22203; (703) 276-0125; FAX: (703) 522-0864. Product Name: CMCI Wireless Monitor System. **Contact:** Larry D. Droppa, national rental mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** The CMCI Wireless Monitor System is the only FCC-licensed wireless monitor system in the US. The system has been custom-designed to meet the listening needs of the performers on-stage providing a very high-quality, wearable monitor, yet remaining compact and lightweight. The C-MAX™ Processor and Transmitter are designed for the dynamics of live music and make use of C-MAX™ STEREO, a patent-pending technique giving performers control of what they hear. **Basic Specifications & Suggested List Price:** The transmitter system is five rackspaces. The PR-7 Receiver is 4 1/2" x 2.75" x 1" and is powered by one 9-volt battery. The TE-20 Pocket Reference Monitors are in-the-ear earphones with a 40-15,500 Hz response. The system is available for rent/lease at \$1,500 per week.

CIRCUITS MAXIMUS COMPANY INC.; 214 N. Park Dr.; Arlington, VA 22203; (703) 276-0125; FAX: (703) 522-0864. Product Name: TE-20 Pocket Reference Monitors. **Contact:** Larry D. Droppa, national rental mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** The TE-20 Pocket Reference Monitors are high-quality monitoring earphones designed by leading research audiologists. They provide an impressive level of fidelity and ease of use in a small wearable package. Soft, durable ear-seal flanges precisely couple a very lightweight dynamic driver element to the ear canal, producing a controlled, high-quality listening environment. **Basic Specifications & Suggested List Price:** In the ear response has been smoothed to 40-15,500 Hz. The compact size of the devices makes them virtually invisible when in place. \$495.



COMMUNITY
RS660

—LISTING CONTINUED TOP OF NEXT PAGE

COMMUNITY; 333 E. Fifth St.; Chester, PA 19013; (215) 876-3400. Product Name: RS660. **Contact:** Greg Heim, product specialist. **Date Product Introduced:** 5/20/91. **Product Description & Applications:** High-powered, full-range compact trapezoidal loudspeaker system with integral flying hardware. Featuring signal-aligned, wavefront-coherent design™ and Powersense™ dynamic driver protection along with designated single-rackspace, electronic-system controller. **Basic Specifications & Suggested List Price:** Operating range 70Hz to 18kHz +/-3dB. Crossover 650Hz, 3k. Power handling: 300 w. cont. 750 w. program; Cont. Output: 129dB, peak output: 135dB; Dispersion angle: 65 degree horizontal, 50 degree vertical. Sensitivity: 108 dB SPL; System Impedance: eight Ohms.

DIGITAL DESIGNS; 125 W. Main St.; El Centro, CA 92243; (619) 353-1290. Product Name: B-12. **Contact:** Alice Sandhu, sales and marketing. **Date Product Introduced:** 11/91. **Product Description & Applications:** The new B-12 is a no-compromises, American-made, professional subwoofer designed to provide reference bass to accurately monitor what's on tape. Low-mass cones coupled with compliant suspensions offer fast transients and low distortion. The long gap/short coil motor design ensures that the coil is under the control of the magnet field. An innovative patch bay allows for full range near fields, with or without subwoofer, or subwoofer alone. **Basic Specifications & Suggested List Price:** Woofer: cast-frame 12" dual voice coil. Frequency response: 3dB at 35 Hz. Impedance 4 Ohm dscoil. Sensitivity (1 Watt/M) 92dB. Voice coil diameter 2 1/2". Power handling: 250 Watts. Enclosure: braced, sealed, MDF. Finish: textured black. Dimensions: 16 X 24. Suggested list price each: \$800.

DIGITAL DESIGNS; 125 W. Main St.; El Centro, CA 92243; (619) 353-1290. Product Name: Digital DD161 Reference Monitor. **Contact:** Alice Sandhu, sales and marketing. **Date Product Introduced:** 8/91. **Product Description & Applications:** A new woofer enhances the "DD" series of magnetically shielded reference monitors. This woofer features a long magnetic field motor design with the voice coil enlarged to 33mm. These improvements bring tighter bass, cleaner midrange, increased output and cone linearity. The "DD" series is complemented by the acoustically transparent grille design and the optional angled console stands or a 75 series Omnimount bolt pattern. **Basic Specifications & Suggested List Price:** Driver/Power: (2-way) 1x6.5"/60 watts. Freq. Response: 55Hz-20kHz. Dimensions: (H,W,D. inches)—13.5x9x10. Standard Finish: oak or black oak. Suggested list per pair: \$550.

EAW; One Main St.; Whitinsville, MA 01588; (508) 234-6158. Product Name: SB330. **Contact:** Sandy Macdonald, int'l sales mgr. **Date Product Introduced:** 7/91. **Product Description & Applications:** The SB330 subwoofer is specifically engineered as part of a system including two E.A.W. KF300 full-range VA loudspeaker systems and E.A.W.'s MX300 CCEP signal processing unit. The SB330 extends the low-frequency power bandwidth of the system down to 35 Hz. In addition, its enclosure is designed to simplify the construction of idealized horizontal arrays. **Basic Specifications & Suggested List Price:** Massive Acoustic Output capable of more than 126dB (17 acoustic Watts) at one meter, the SB330's low frequency output is sufficient for the most demanding professional applications. SB330 employs an 18" woofer with a 100mm voice coil and massive magnetic circuit.

EAW; One Main St.; Whitinsville, MA 01588; (508) 234-6158. Product Name: SM200. **Contact:** Sandy Macdonald, int'l sales mgr. **Date Product Introduced:** 7/91. **Product Description & Applications:** The E.A.W. SM200 is a high-definition, high-output loudspeaker system specifically engineered for live on-stage monitoring applications. While keeping with the E.A.W. tradition of durability and engineering philosophy, the SM200 enclosure is also optimized for minimal height above the stage for unrestricted sight lines. This new stage monitor effectively enables musicians & performing artists to hear all aspects of the performance clearly. **Basic Specifications & Suggested List Price:** This is a 2-way stage monitor available in 3 configurations. Two bi-amp versions and 1 passive version. The SM200 incorporates a high powered 12" woofer and carbon fiber 2" HF driver mounted on a new larger version of the WGP high-frequency sub-system.

ECLIPSE RESEARCH CORPORATION; PO Box 8299; Incline Village, NV 89450; (702) 832-0666. Product Name: Omnisphere. **Contact:** Bob Cozior, VP; Ted Haugum, president. **Date Product Introduced:** 7/4/91. **Product Description & Applications:** The "Omnisphere" 2000 Series system is a high-power, omnidirectional speaker system incorporating "Surround Plane Manifold" technology. The design incorporates a laminated composite hemispherical cabinet and time aligning phase plug. Model 2000 is an outdoor, theft-proof, ground-burial unit with epoxy/aggregate protective shell. 2000-C is an indoor, ceiling-mount version which mounts in a standard suspended T-Bar ceiling grid or other surface. 2000-S is a suspended array for gymnasium and arena applications. **Basic Specifications & Suggested List Price:** Model 2000, 35-18,000Hz response, 360/180 degree pattern, \$1,799. Model 2000-C, 35-18,000Hz response, 360/120 degree pattern, \$1,899. Model 2000-S, 45-11,000Hz response, 360/240 degree pattern, \$4,500. Proprietary 12" Coaxial speakers are used in all units. Architectural shells and theft-proof ground mounts are optional.

EMILAR/E3MC; 1620 Missile Way; Anaheim, CA 92801; (800) 421-7071. Product Name: Emilar 2000 Series. **Contact:** Norman Collins, president. **Date Product Introduced:** 1/91. **Product Description & Applications:** 10", 15" and 18" cone speakers for sub woofer and mid/bass applications. 2810X 10" is rated 300 W RMS; subwoofer apps. 2815Z 15" is rated 600 W RMS; subwoofer apps. 2818X 18" is rated 800W RMS; subwoofer apps. 1815X 15" is rated 600 W RMS; mid/bass apps. **Basic Specifications & Suggested List Price:** 1810X, 30-1000Hz, 2"VC, retail list \$242. 2815Z, 25-140Hz, 4"VC, retail list \$315. 2818X, 20-125 Hz, 4"VC, retail list \$390. 1815X, 40-2000 Hz, 4" VC, retail list \$305.

ELAN SOUND RESEARCH LABS; 11610 Morrison St.; N. Hollywood, CA 91601; (800) 966-ELAN; FAX: (818) 985-1624. Product Name: RCAB12 or RCAB18. **Contact:** Elan. **Date Product Introduced:** 1/22/91. **Product Description & Applications:** Rack-mountable speaker cabinet fits 12" or 15" speakers for use with guitar, bass or keyboards. Fits right into your rack systems! **Basic Specifications & Suggested List Price:** List price: \$199.

ELECTRO-VOICE INC.; 600 Cecil St.; Buchanan, MI 49107; (616) 695-6831. Product Name: MH6040. **Contact:** Keith Clark, PR director. **Date Product Introduced:** 6/91. **Product Description & Applications:** The new Electro-Voice MH6040 wide-range horn-and-driver system combines constant directivity and manifold technology, two concepts that the company pioneered. A weatherproof horn/driver system ideal for stadiums and large venues, covering a freq. range of 100-4000 Hz, with a 60 X 40-degree pattern. It's equipped with 2 EV-DL10XWP drivers mounted in a manifold configuration with each driver having a long-term power capacity of 800 watts. Manifolding allows the output of two or more drivers to be summed without the interference problems that commonly plague "Y" throats or multiple sources aimed in the same direction. In addition, manifolding builds redundancy into the system. In the unlikely event of failure of one driver, the other is still available. **Basic Specifications & Suggested List Price:** \$3,165.

ELECTRO-VOICE INC.; 600 Cecil St.; Buchanan, MI 49107; (616) 695-6831. Product Name: S-40. **Contact:** Keith Clark, PR director. **Date Product Introduced:** 5/91. **Product Description & Applications:** Electro-Voice has introduced the S-40, a two-way personal-sized monitor designed to accommodate a variety of monitoring and playback applications. Its long-term power handling is rated at 150 watts per EIA standard RS-426A. The S-40 includes EV's exclusive PRO circuit protection, pro-

viding independent protection for the woofer and tweeter. In case of accidental overdrive, the circuit limits the power being delivered to the components, and automatically resets when the system returns to a safe level. Weighing only five pounds, the S-40 has threaded inserts in combination with optional mounting hardware, providing a flexible mounting system. The optimally vented enclosure is constructed of high-impact polystyrene structural foam and is available in black or white. **Basic Specifications & Suggested List Price:** \$290.

EP SYSTEMS; 9914 W. 62nd Terr.; Merriam, KS 66203; (800) 899-0113; (913) 677-6771. Product Name: EPS215HF Mid/Hi Freq. Enclosure. **Date Product Introduced:** 5/10/91. **Product Description & Applications:** Hi-power, hi-fidelity concert sound reinforcement and playback systems. Constructed of top quality fir plywood covered w/black ozite carpeting. Fly hardware optional. Designed for optimum truck pack. Trapezoidal cabinet for large arrays. Bi-amp only. Input connectors: Neutrik Speakon standard. Loaded w/two RCF 15" and one Renkus/Heinz 2" HF. Designed for use w/EPS 218SB. **Basic Specifications & Suggested List Price:** 101dB 1W/1M sensitivity LF, 110 dB 1W/1M sensitivity HF minimum depending on coverage pattern required. Freq. response with proper CD horn EO 54-18k +/-3dB. Drivers: (2) RCF L15/541, (1) Renkus Heinz SSD 3301 w CBH 820 or 820-6.

EP SYSTEMS; 9914 W. 62nd Terr.; Merriam, KS 66203; (800) 899-0113; (913) 677-6771. Product Name: EPS218SB Sub Bass Enclosure. **Date Product Introduced:** 5/10/91. **Product Description & Applications:** Hi-power, hi-fidelity concert sound reinforcement and playback systems. Constructed of top-quality fir plywood covered with black ozite carpeting. Comes with integral casters and handles for easy moving, and designed for optimum truck pack. Loaded with 2 RCF 18" woofers. Input connectors: Neutrik Speakon standard. Designed for use w/EPS 215HF. **Basic Specifications & Suggested List Price:** 101 dB 1W/1M sensitivity. 1600 watt power handling from 31Hz to 500Hz. Freq. response 36-250Hz +/-0/-3dB. Drivers: (2) RCF L18/200.

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Contact your local dealer, or Celestion for technical information and the name of your nearest Celestion retailer.

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SR-6 Subwoofer with Studio 3 & 5 Monitors

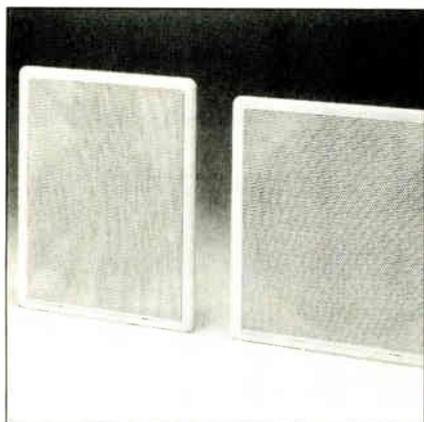
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EQUITY SOUND INVESTMENTS
Bond DF12 Power Cooled Co-Axial

EQUITY SOUND INVESTMENTS; PO Box 752; Sturtevant, WI 53177; (414) 886-4122. Product Name: Bond DF12 Power Cooled Co-Axial. **Contact:** Tom Melzer, VP sales & mktg. **Date Product Introduced:** 4/91. **Product Description & Applications:** Bond Electro-Acoustics: an actively cooled, full-range co-axial loudspeaker (or monitor). These high-quality cabinets offer long-term, full-power operation, exceeding normal output by 6dB or more. Distortion is extremely low due to a centrifugal blower system using less than 1dB of input power to cool the voice coils and vent the heat out of the cabinet. This licensed (from Intersonics) technology allows long-term high output with great clarity and voice intelligibility, high fidelity, high-efficiency and high-power handling. **Basic Specifications & Suggested List Price:** Two-way, 8-Ohm, 12" co-axial: low—800W, high—300W (music). Trapezoid cabinet: Steel-reinforced double wall, 18mm with Baltic birch exterior, 17 1/2 x 17 1/2 x 14", 62 lbs. Steel handles, stand mounts, grille with foam flyable, Neutrik Speakon connectors. Horn: 80x40 with other patterns available. Monitor: 16x16x14", 60 lbs. Response: 80Hz-17kHz +/-3dB.

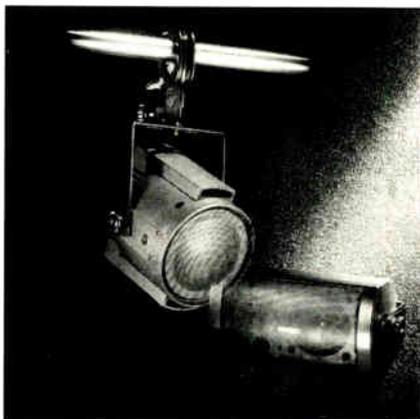


FOSTEX CORP. OF AMERICA
SH2510 & SH2020

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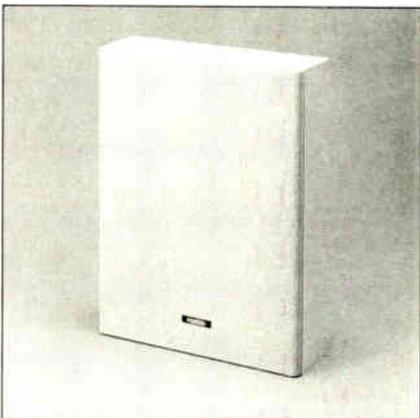
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FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: SH2510 & SH2020. **Contact:** Joyce Jorgensen, Mark Cohen, Rick Cannata. **Date Product Introduced:** 1991. **Product Description & Applications:** In-wall speakers easy to install, true hi-fidelity wall speakers, optional 70 volt transformers. **Basic Specifications & Suggested List Price:** SH2510—\$3250; SH202—\$195.



FOSTEX CORP. OF AMERICA
SH510/520

FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: SH510/520. **Contact:** Joyce Jorgensen, Mark Cohen, Rick Cannata. **Date Product Introduced:** 8/91. **Product Description & Applications:** In wall speakers indoor/outdoor installation (all weather) in wall speakers. Optional 70 volt transformer. **Basic Specifications & Suggested List Price:** SH510—\$200 (list); SH520—\$300 (list).



FOSTEX CORP. OF AMERICA
SH820

FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: SH820. **Contact:** Joyce Jorgensen, Mark Cohen, Bud Johnson. **Date Product Introduced:** 9/91. **Product Description & Applications:** In-wall speaker. Slim-line wall mount two-way speaker with 8" woofer and 1" dome tweeter. The exceptional low profile silhouette makes it inconspicuous. Cabinet can be easily painted.



FOSTEX CORP. OF AMERICA
SPA 32

FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: SPA 32. **Contact:** Joyce Jorgensen, Mark Cohen, Bud Johnson. **Date Product Introduced:** 8/91. **Product Description & Applications:** SP 32/SPA 32: SP 32—2-way PA speaker w/12" woofer and horn tweeter in structural foam cabinet. Features XLR, 1/4" phone jacks and push terminals for connections. SP 32—same as above w/250 watts power amp built-in, mic and line inputs, level control and auto EQ on and off switch. **Basic Specifications & Suggested List Price:** SPA 32—\$900 (list), SP 32—\$500 (list).

GENELEC/QMI; 15 Strathmore Rd.; Natick, MA 01760; (508) 650-9444. Product Name: Genelec 1031A. **Contact:** Scott Berrell. **Date Product Introduced:** 10/91. **Product Description & Applications:** A two-way powered system with DCU Design complementing existing 1035A, 1024A, 1023A systems. Features 2-way crossover 2 x 110 watt current accelerated amplifiers, phase coherent design, fully protected. Designed to be high-output near-field monitor usable vertically or horizontally conveying superb imaging and depth. **Basic Specifications & Suggested List Price:** \$1499 each. Freq resp. 47-21,000 Hz (TZNB) free field. Output SPL 121 dB per pair at 1 meter. DCW design for constant directivity (Smooth off axis response), 2-way 8" and 1" drivers.

INTEGRATED MUSIC SYSTEMS; 4895 Marianna; Salt Lake City, UT 84118; (801) 966-7148. Product Name: Big Mouth. **Contact:** Dan James, CEO. **Date Product Introduced:** 2/91. **Product Description & Applications:** The unusual-looking Big Mouth subwoofers perform efficiently with a flat response down to 28Hz. They are designed to be used in either live applications, with satellite speakers, or in addition to studio monitors. For extended, flat frequency range. **Basic Specifications & Suggested List Price:** 10" 50 lbs 17" square \$399; 15" 78 lbs 20" square \$499; 18" 97 lbs 24" square \$599; Frequency response 28-160Hz; SPL 100dB one watt/one meter, electronic crossover available.

INTEGRATED MUSIC SYSTEMS; 4895 Marianna; Salt Lake City, UT 84118; (801) 966-7148. Product Name: SA-D5. **Contact:** Dan James, CEO. **Date Product Introduced:** 11/90. **Product Description & Applications:** The SA-D5 is a small, dual 5" enclosure designed for high-output applications where space is critical. Works especially well as satellite speakers with a 15" subwoofer or as a small stand monitor. **Basic Specifications & Suggested List Price:** 13" x 9" x 5 1/2", 18 lbs., carpeted with corners, stand adaptor, frequency response 90Hz-17,000 Hz, 100 watts, 4 Ohms.

INTERSONICS; 3453 Commercial Ave.; Northbrook, IL 60062; (708) 272-1772; FAX: (708) 272-9324. Product Name: Servodrive Sub bass amplifier/VANE subwoofer. **Contact:** Barry Bozeman, dir. sales/mktg. **Date Product Introduced:** 10/91. **Product Description & Applications:** The servodrive sub-bass amp. is a low-frequency switching amplifier designed to power servodrive sub-woofers. It features automatic self-analyzing equalization compensation. VANE technology coupled with Servodrive replaces cones as well as magnet and voice coil for a virtually indestructible, distortion-free sub-bass capable of reproducing extremely low frequencies at incredibly low distortions.

JBL; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-8411; (818) 893-4351. Product Name: 4200 Series Monitors. **Contact:** Hector Martinez. **Date Product Introduced:** 10/91. **Product Description & Applications:** JBL's new 4206 and 4208 studio monitors are designed specifically for close-proximity listening. Engineered for console-top placement, these two-way systems feature a unique sculptured baffle for optimum transducer summing at normal listening distances (approximately 1.5 meters and beyond). The baffle shape also positions the acoustic centers of the low and high frequency transducers for minimal phase distortion. The 4206 and 4208 feature 6.5 inch and 8 inch low frequency transducers respectively and employ a 1-inch diameter pure titanium diaphragm high frequency transducer.

KLIPSCH & ASSOCIATES; PO Box 688; Hope, AR 71801; (501) 777-6751. Product Name: Frame Woofers. **Contact:** Bruce Marlin, drive engineer. **Date Product Introduced:** 7/91. **Product Description & Applications:** A line of professional raw frame woofers that will include a 12" (30cm), 4-15" (38cm) with various parameters and 2-18" (46cm) woofers.

KLIPSCH & ASSOCIATES; PO Box 688; Hope, AR 71801; (501) 777-6751. Product Name: KP-101. **Contact:** Roy Delgado, engineer. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Klipsch KP-101 is a high-output, low-distortion, two-way system with a 8" (20.3cm) woofer and a horn-loaded 1" (2.5cm) compression driver. The system is ideal for near-field monitoring or sidefill applications. Options include a 30-watt transformer input (KP-101-T) for distributive systems and a SB-101 speaker bracket for wall mounting or mic stand mounting via a threaded attachment. **Basic Specifications & Suggested List Price:** Freq. response: 75Hz-20kHz, +/-4dB with -10dB down point 51Hz. Sensitivity is 95dB 1W/1M with power handling rated at 80 watts. Dimensions are 15 7/8x11 9/16x7 7/8 and weight is only 18 lbs.



KLIPSCH & ASSOCIATES
KP-320

KLIPSCH & ASSOCIATES; PO Box 688; Hope, AR 71801; (501) 777-6751. **Product Name:** KP-320. **Contact:** Roy Delgado, engineer. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Klipsch KP 320 is a high-output 15" two-way loudspeaker system. The HF section utilizes the new Klipsch-designed hybrid Tractrix horn for maximum energy transfer from the compression driver to the air. The LF section uses a 15" (38cm) woofer with a large 96oz (2.7kg) coupled with a down firing 12" passive radiator. **Basic Specifications & Suggested List Price:** The frequency response is 49Hz-15kHz, +/-4dB with a -10dB downpoint of 38Hz. Sensitivity is +0.1dB IW/IM and a maximum continuous output of 124dB. Power handling is 225 watts (43V) with nominal impedance of 8 Ohms, a minimum of 4.6 Ohms at 138Hz. Dimensions are 31 1/2 x 18 7/8 x 13 3/4. Weight, 71 lbs. Price \$583.

KLIPSCH & ASSOCIATES; PO Box 688; Hope, AR 71801; (501) 777-6751. **Product Name:** KP-480. **Contact:** Roy Delgado, engineer. **Date Product Introduced:** 7/91. **Product Description & Applications:** The Klipsch KP-480 is a bass-reflex, high-output subwoofer using a 18" (46cm) woofer coupled to a down firing 15" (38cm) passive radiator. It will be offered with or without trim handles, paint, etc. There will also be an optional passive crossover.

KRK C/O DEVELOPING TECHNOLOGIES DISTRIBUTORS; 1032 N. Sycamore; Los Angeles, CA 90038; (213) 469-4773. **Product Name:** KRK close field monitors. **Contact:** Jim Schaller, director of sales. **Date Product Introduced:** 10/90. **Product Description & Applications:** KRK monitors feature tweeters of pure Kevlar with inverted domes for the lowest possible distortion and best off-axis polar response. Woofers are honeycomb polyglass with the strongest magnets available. Available in three sizes. KRK close-field monitors are rugged, portable and built to the exacting standards necessary for constant reference in control rooms, remote recording, and in smaller facilities requiring big room power. **Basic Specifications & Suggested List Price:** Suggested price, 703—\$899, 1002—\$1,699, 1301—\$2,699.



KRK MONITORING SYSTEMS
KRK Model 9000

KRK MONITORING SYSTEMS; 16462 Gothard St., Unit D; Huntington Beach, CA 92647; (714) 841-1600. **Product Name:** KRK Model 9000. **Contact:** Keith Klavitter, designer. **Date Product Introduced:** 8/91. **Product Description & Applications:** KRK near-field monitors are the monitor of choice for many recording industry luminaries: Bob Clear-

mountain, Dave Hewitt and Bob Ludwig to name but a few. The new KRK-9000s incorporate a distinguished two-way design with impeccable time-arrayed driver elements. KRK-9000s produce exceedingly smooth frequency response. They're a console top monitor with bandwidth and power handling capacity beyond compare. KRK-9000s combine the newest aerospace technology and materials with the cutting edge in design and construction. **Basic Specifications & Suggested List Price:** The KRK-9000s are a high performance 9.2-way system capable of generating spl's above 100dB and efficiency of 91.5dB, with impeccable two-way time arrayed crossover design. KRK 9000s come 16 1/2" high, 13 3/4" wide and 14" deep. They weigh 35 lbs. See at booth #2201.

THE MASTERING LAB STUDIO PRODUCTS; 6031 Hollywood Blvd.; Los Angeles, CA 90028; (213) 466-3528; FAX: (213) 465-7570. **Product Name:** The Mastering Lab Close-Range loudspeaker System. **Contact:** Doug Sax, owner. **Date Product Introduced:** 9/91. **Product Description & Applications:** The Mastering Lab Close-Range loudspeaker system uses a 10" dual-concentric loudspeaker and the proven Mastering Lab Model 10 crossover network. **Basic Specifications & Suggested List Price:** List price \$2,095.



MEYER SOUND LABORATORIES INC.
DS-2 Mid-Bass Loudspeaker

—LISTING CONTINUED ON NEXT PAGE

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—SEE PHOTO/LOGO ON PREVIOUS PAGE

MEYER SOUND LABORATORIES INC.: 2832 San Pablo Ave., Berkeley, CA 94702; (415) 486-1166; FAX: (415) 486-8356. **Product Name:** DS-2 Mid-Bass Loudspeaker. **Contact:** Mark Johnson. **Date Product Introduced:** 1/91. **Product Description & Applications:** The Meyer Sound DS-2 Mid-Bass Loudspeaker is a high-power, horn-loaded array unit operating with the D-2 Control Electronics unit. The DS-2 utilizes two 15-inch cone drivers in a folded horn enclosure having vertical steel reinforcing rods. The horn features a hyperbolic flare for maximum energy transfer and minimum response ripple with small enclosure dimensions. The balanced compression chamber presents a symmetrical load to the drivers for very high-power handling and low distortion. **Basic Specifications & Suggested List Price:** U.S. List Prices—DS-2 Loudspeaker, \$2,980; D-2 Control Electronics, \$1,610. Frequency response—60-200 Hz +/-3dB; full power bandwidth—80-160 Hz +/-3dB; maximum continuous SPL—60-200 Hz: 130 dB, 80-160 Hz: 135dB; driver complement—(2) 1 inch cone MS-15; connector—Cannon P4 type; dimensions—21.25" W x 56.75" H x 30" D; weight—207 lbs. (94 kg).



MONITOR TECHNOLOGY
Monitor One Reference Limited Edition

MONITOR TECHNOLOGY; PO Box 1102, Nedergade 35C; DK-5100, Odense C Denmark; +45 6613 9981. Product Name: Monitor One Reference Limited Edition. **Contact:** Ole Jensen, sales manager. **Date Product Introduced:** 4/1/91. **Product Description & Applications:** Monitor One Reference limited edition is a two-way, bass-reflex near-field monitor with a passive 1st-order crossover featuring careful optimization to enhance the response particular in the crossover region. All parts in the monitor have been selected to the absolute best performance. The magnets are shielded and the speaker units are damped. The cabinets are made of 32mm middle-density fibreboard together with 4mm Bitumen. The cabinets have been carefully designed to contribute the minimum of reflections while ensuring excellent off-axis response. At 30 degrees off-axis the response is only 2dB down at 15kHz. The monitors are made for high-quality recording, broadcast, television and domestic use. **Basic Specifications & Suggested List Price:** Frequency response: 55-20,000Hz (+/-2dB); Impedance: 8 ohms. Power handling: 100 W RMS. Sensitivity: 89 dB/1W/1M. Woofer: 6.5" woofer. Tweeter: 28mm softdome with ferrofluid in the magnet gap. Bass-reflex: Computer-optimized. Crossover frequency: 2.4 kHz phase/amplitude correct. Enclosure: Pyramid-shaped. Dimensions: H/400mm, W/270mm (bottom), W/235 (top), D/325mm (bottom), D,290mm (top). Net weight: 18 kg. Suggested list price (pair): U.S. \$3,980.

PROFESSIONAL AUDIO SYSTEMS; 660 N. Twin Oaks Valley Rd., Ste. 1; San Marcos, CA 92069; (619) 591-0360. Product Name: Studio Monitor 2. **Contact:** Dan Abelson, national sales manager. **Date Product Introduced:** 10/91. **Product Description & Applications:** The Studio Monitor 2 is a bi-amplified, two-way high-resolution monitor for use where high-output monitoring is required. The system utilizes a coaxial system consisting of a 15" PAS low frequency driver paired with a 2" TAD compression driver for the high frequencies. The system comes complete with stereo crossover with proprietary T.O.C. Time Offset Correction to provide ideal phase and time response. **Basic Specifications & Suggested List Price:** Response -3dB at 35 Hz and +/-2dB to 20kHz, phase response varies less than +/-10 degrees from

100Hz to 10kHz, max. SPL per pair=130dB at 1 meter, power handling LF 400 watts HF 60 watts, nominal impedance 8 Ohms each section. 25" H x 19.5 W x 18.5" D. Suggested retail \$7,500 per pair with electronics.

PROFESSIONAL TECHNOLOGIES; Box 282A Rd. 1; Rome, NY 13440; (315) 337-4156. Product Name: PT 652D. **Contact:** John Puleo, chief engineer. **Date Product Introduced:** 6/77/91. **Product Description & Applications:** The PT 652D is an exceptionally accurate near-field reference monitor consisting of two 6 1/2 inch mid/woofers and a 1 1/4 inch upper/mid tweeter arranged in a D'Appolito configuration to maintain polar integrity. The proprietary crossover utilizes high-quality plastic film capacitors and large, heavy-gauge coils to eliminate saturation distortion. **Basic Specifications & Suggested List Price:** Drivers—two 6 1/2 inch mid/woofers, one 1 1/4 inch upper mid tweeter, frequency resp. 40-20,000 +/-3dB, Pwr handling 350 watts, sensitivity at 1 watt, 1 meter 93dB, nominal impedance 4 ohm (8 ohm available); genuine oak veneer standard with other veneers available (special order).

QUAD; 111 South Dr.; Barrington, IL 60010; (708) 526-1646. Product Name: Quad 520f. **Contact:** Brian T. Tucker, president. **Date Product Introduced:** 10/90. **Product Description & Applications:** The Quad 520f is a 2U rack-size professional amplifier. It features XLR-3 inputs and the NL4 Speakon outputs, 160 watts/channel, active transformer inputs. The circuit topology is the Quad patented "current-dumping" feed forward error-correction design. The Quad 520f incorporates two independent power supplies for maximum transient stability under ANY load condition. The Quad 520f is ideal where high audio is a must under CD mastering applications. **Basic Specifications & Suggested List Price:** Power output -160W/ch/8 at 0.1% THD; power response—10Hz-30kHz; group delay <6us; group delay error <1.5 microseconds; input sensitivity -4dBu to +8dBu; input imp. >10K ohms; CMR >60dB; input connector XLR-3 (IEC); load stability—ANY load—unconditional. Price \$1,395.

QUAD; 111 South Dr.; Barrington, IL 60010; (708) 526-1646. Product Name: Quad ESL-63 Pro. **Contact:** Brian T. Tucker, president. **Date Product Introduced:** 10/90. **Product Description & Applications:** The Quad ESL-63 Pro is a full-range electrostatic dipole studio monitor. Full frequency is achieved without crossovers. Virtual point sound source. Repeatable performance. Low distortion. NL4 'SPEAKON' connectors. The near perfect dipole pattern, even at low frequencies, will not excite room modes which lie on the same axis as the diaphragm. This has significant benefits in terms of stereo perception. The controlled "Directivity" minimizes coloration which is very important for today's CD mastering studios. **Basic Specifications & Suggested List Price:** Sensitivity-86dBspl @ 2.8V/1M; program peak-40V; maximum permitted peak-55V; output level 100dB SPL; instantaneous peak output level 106dB SPL; distortion 1% 40Hz-200Hz @ 90dB SPL, 0.1% 200Hz-20kHz @ 90dB SPL; phase response-linear; driver uniformity-0.5dB; impedance 8 Ohms nominal. Price \$4,700.

RADIAN AUDIO ENGINEERING; 4520 Eisenhower Circle; Anaheim, CA 98207; (714) 693-9277. Product Name: Monitor Standard™ "Limited Edition" studio monitors. **Contact:** Jeff Phillips, mgr. sales & marketing. **Date Product Introduced:** 7/23/91. **Product Description & Applications:** The Radian "Limited Edition" studio monitors represent a significant advancement in the popular "Monitor Standard" line. Precision crossovers and custom cabinets give these monitors a distinctive look and transparent sound which tracks the "main monitors" very well, making the "Limited Edition" a certain success for recording applications large and small. **Basic Specifications & Suggested List Price:** Radian "Limited Edition" monitors feature coaxial "through-the-polepiece" drivers, utilizing a full sized compression driver for superb transient response. Response 30-22kHz, sensitivity 89.5dB (W/W/1M), 150W power capacity.

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RUSH SOUND; 1284 S. Lyon St.; Santa Ana, CA 92705; (714) 543-2855. Product Name: 533-PRO. **Contact:** Jim Rush, president. **Date Product Introduced:** 6/91. **Product Description & Applications:** The Rush Sound 533-PRO is a high performance internally Bi-amplified monitor loudspeaker. Designed for accurate reproduction at 110dB+ levels, the 533 employs high powered amplifiers, and state-of-the-art drivers. The 533 is time coherent and very flat across the board, with a frequency response of +/-1.5dB from 32-22kHz. The 24dB/oct. crossovers, matched to within .1dB, and the smooth diffraction-free baffle produce dynamics and imaging so realistic you can taste them. **Basic Specifications & Suggested List Price:** \$4,000/pair. Weight—65 lbs.; LxWxD—24X14X12; frequency response—28-25kHz +/-3dB, 32-22kHz +/-1.5dB; maximum SPL 113dB continuous, 120dB peak; balanced and unbalanced inputs. Amplifier specifications: frequency response—DC-180kHz + dB; slew rate 40V/microsecond; rsetime 1.5 microsecond, THD—<.07% 20Hz-20kHz. Amplifier power: woofers—180 watts RMS; tweeters—90 watts RMS.

SHURE HTS; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2510. Product Name: HTS 640 LRS Monitor Loudspeaker System. **Contact:** Glenn T. Koutecky, Special Markets Coordinator. **Date Product Introduced:** 12/90. **Product Description & Applications:** Low distortion, high acoustic output design using a 6 1/2 inch woofer and a 1 inch dome tweeter with dispersion ring for uniform polar response. Features magnetic shielding for video applications, curved polymer polypropylene driver diaphragm, fluid-cooled, solid state tweeter protection, 3rd/4th order crossover with mode switch to change equalization for matching signal processing amplifier or conventional amplifier. Built-in threaded insert points for omnimount 75 WA series pivoting wall brackets. **Basic Specifications & Suggested List Price:** Frequency response 60 Hz-20 kHz, sensitivity 85dB SPL/W/M; impedance 5.6 ohms nominal, inch thick particle board cabinet with black oak veneer finish, 13 1/2 x 10 x 8 5/8 inch, 24.2 lbs. \$299.

SHURE HTS; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2510. Product Name: HTS 650 SW Subwoofer System. **Contact:** Glenn T. Koutecky, Special Markets Coordinator. **Date Product Introduced:** 12/90. **Product Description & Applications:** Fourth order vented box subwoofer system featuring 12-inch driver with 10.2 lb. double-magnet system for magnetic shielding, heavy damped paper cone with rolled rubber surround, extended coil length, flat spider suspension, vented coil form, high-temperature adhesives, and undercut pole pieces in magnetic gap, all contribute low-distortion/low-frequency reproduction. Power handling 200 watts, when used with the HTS 400 SPA amplifier, the speaker is capable of handling program peaks excess of 400 watts. **Basic Specifications & Suggested List Price:** Frequency response 33Hz-80Hz; sensitivity 91dB SPL/W/M; impedance 8 ohms nominal, one inch thick (cross braced on panels) particle board cabinet with black oak veneer finish, 10x23x14 inches, 65 lbs. \$499.

SHURE HTS; 222 Hartrey Ave.; Evanston, IL 60202-3696; (708) 866-2510. Product Name: HTS 680 CF Monitor Loudspeaker System. **Contact:** Glenn T. Koutecky, Special Markets Coordinator. **Date Product Introduced:** 12/90. **Product Description & Applications:** Low-distortion, high-acoustic output, symmetrical-array design using two 5 1/2 inch woofers and a 1 inch dome tweeter with dispersion ring for uniform polar response. Featuring magnetic shielding, curved polymer polypropylene driver diaphragms, fluid cooled, solid state tweeter protection, 3rd/4th order crossover with mode switch to change equalization for matching signal processing amplifier or conventional amplifier, acoustic port can be configured for extended low-frequency response without a subwoofer. **Basic Specifications & Suggested List Price:** Built-in threaded insert points for Omnimount 100 WA series pivoting wall brackets. Frequency response 55 Hz-20kHz, sensitivity 88 dB SPL/W/M; impedance 5.6 Ohms nominal; inch thick particle board cabinet with black oak veneer finish, 20 x 13 1/2 x 8 5/8 inch, 37 lbs. \$599.

SMITHLINE AUDIO INC.; 7766 Burnet Ave.; Van Nuys, CA 91405; (818) 786-7324. **Product Name:** 2X4S Shielded Reference Monitor. **Contact:** Toby Sali, vice president. **Date Product Introduced:** 9/90. **Product Description & Applications:** The 2X4S Studio Reference monitor was designed to achieve extremely flat frequency response, high sound pressure level and high-power handling capacity in a small yet attractive enclosure. Ideal for any near-field monitoring or on their sides for a wide window sound. The ultra low inherent driver distortion and high degree of sonic accuracy also lessen ear fatigue. **Basic Specifications & Suggested List Price:** Mirror imaged in pairs 70-20kHz +/-3dB, 4 Ohms, 87dB SPL, 1 watt/1 meter and handles 200 watts RMS power. Two 4" carbon-filled woofers and one 3/4" fabric dome tweeter. 13.25" high x 10" deep x 6" wide, 13 pounds each. Comes in a scratch-resistant finish: charcoal/black/white. \$600 per pair retail.

SMITHLINE AUDIO INC.; 7766 Burnet Ave.; Van Nuys, CA 91405; (818) 786-7324. **Product Name:** MM-1 Studio Reference monitor. **Contact:** Toby Sali, vice president. **Date Product Introduced:** 7/91. **Product Description & Applications:** The MM-1 Studio Reference monitor is identical to the 2X4S Reference monitor with the addition of an 8" carbon-filled

—LISTING CONTINUED TOP OF NEXT PAGE

woofer to allow this larger monitor system to faithfully reproduce the lower frequencies. Used vertically for a point source monitor or for placing the two 4" drivers horizontally will allow for a wide window application. **Basic Specifications & Suggested List Price:** Mirror-imaged in pairs, \$1200 per pair, 50-20kHz, +/-3dB, 4 Ohms, 90dB SPL @ 1 watt/1 meter with 200 watt RMS handling capability. Same as the 2X4S with one 3/4" tweeter, two 4" carbon filled midrange and 8" carbon filled woofer. The system can be bi-amped and comes in a scratch resistant charcoal finish. 16" high X 14" deep X 14" wide. 38 pounds each.

TANNOY; 300 Gage Ave., Unit #1, Kitchener, Kitchener, ONT, N2M 2C8 Canada; (519) 745-1158; FAX: (519) 745-2364. Product Name: Tannoy CPA 5. **Contact:** Bill Calma, sales and marketing director. **Date Product Introduced:** 10/91. **Product Description & Applications:** Highly articulate and intelligible, the new CPA 5 features a five-inch dual-concentric driver based on Tannoy's patented ICT (Inductive Coupling Technology). A one-inch Duralumin HF passive radiator is inductively energized by the electromagnetic energy generated as a byproduct of the LF unit. Shielded and safe for use in close proximity to video monitors, the CPA 5's crossover-free architecture offers excellent performance across myriad applications from distributed music public address to keyboard and MIDI workstation monitoring. **Basic Specifications & Suggested List Price:** Point source—phase coherent; magnetically shielded; extended response 80Hz-22kHz; high sensitivity 90dB 1W/1M; universal mounting; protective grille; 110dB max SPL; 100 watt power handling; 5" ICT driver (Inductive Coupling Technology); dimensions 8.6"H x 6.1"W x 5"D; weight: 6.3 lbs; suggested retail: \$345 (pair).

TURBOSOUND/DIVISION OF AKG ACOUSTICS; 1525 Alvarado St.; San Leandro, CA 94577; (415) 351-3500. Product Name: TFM-250/TFM-350. **Contact:** Dave Talbot, national sales mgr. **Product Description & Applications:** The TFM-250 and TFM-350 are floor monitors. The TFM-250 has a single 12" speaker with a 2" high-frequency compression driver. The TFM-350 has two 15-inch speakers with a single 2" high-frequency driver. **Basic Specifications & Suggested List Price:** USA retail: TFM-250, \$2,195; TFM-350, \$2,694.

USCO AUDIO ENGINEERING; 2623 Canyon Dr., Hollywood, CA 90068-2417; (213) 465-4370. Product Name: DFW-3 Reference Monitors. **Contact:** Bruce Maddocks. **Date Product Introduced:** 1/91. **Product Description & Applications:** The DFW-3s were designed for accurate reference in console top use. The unique construction and use of a down-firing woofer produce very solid imaging and true low end response. The crossovers are second order, minimum phase and distortion, hand-built, measured and matched to 2% tolerances. All the speaker elements are measured and matched. Their small size is perfect for the traveling engineer, and low profiles allow an unobstructed view into the recording room. **Basic Specifications & Suggested List Price:** The components are a 6.5" woofer, 5 1/4" mid, and a 1" dome tweeter. Power handling is 150 watts, sensitivity is 91dB 1W/M. The impedance is 40 nominal. The dimensions are 8"Hx9/5"Wx9.5"D. They weigh 17 pounds each. The suggested retail is \$600.

WALLSPEAKER TECHNOLOGIES INC.; 385 H Bel Marin Keys Blvd.; Novato, CA 94949; (800) 284-5846; (800) BUILT-IN. Product Name: C3-I Center Channel. **Contact:** Dan Dillon, president. **Date Product Introduced:** 6/1/91. **Product Description & Applications:** The C3-I Center Channel Speaker is an in-wall, high-end loudspeaker for use in home theater applications, where clarity of speech and purity of music are given priority. It is used as a center channel with a pair of Wallspeaker Series III speakers or as a L-R-C satellite speaker along with external subwoofers. Drivers are stacked at one end to clear screen. Swiveling tweeter, vibration isolation system and strappable EQ. **Basic Specifications & Suggested List Price:** Paintable metal or cloth grille. 80 to 18 kHz +/-3dB. 90 dB sens., 108 dB SPL max., min. impedance 5 ohms, auto-reset circuit breaker, polypropylene capacitors. Inverted dome samarium cobalt tweeter. Kevlar midrange, polypropylene woofer. Grille 27x16, wall opening 26x14, enclosure 26x13x3.8 inches, including vibration mounting. Suggested retail \$995.

WALLSPEAKER TECHNOLOGIES INC.; 385 H Bel Marin Keys Blvd.; Novato, CA 94949; (800) 284-5846; (800) BUILT-IN. Product Name: Series III Loudspeaker. **Contact:** Dan Dillon, president. **Date Product Introduced:** 10/90. **Product Description & Applications:** The Wallspeaker Series II loudspeakers are designed to be the primary speakers in a high-quality custom audio or video installation. Their exceptionally transparent, natural sound complements the finest electronics. The ultimate in custom sound, with honest bass in a built-in speaker. Fully enclosed three-way system "floats" on vibration isolators, allowing high levels without transmission to next room or vibration through structure. Swivelling Tweeter, strappable EQ for bright rooms. Paintable metal grille. **Basic Specifications & Suggested List Price:** 37 to 18 kHz +/-3dB. 90dB sens., 112dB SPL max., minimum impedance five ohms, auto-reset circuit breaker, polypropylene capacitors. Inverted dome samarium cobalt tweeter. Kevlar midrange, polypropylene woofer. Grille 27x16, wall opening 25x11, enclosure 81x14x3.2 inches, including vibration mounting. Suggested retail \$2,500/pr.



WESTLAKE AUDIO
BBPM-4 Self Powered Reference Monitor System

WESTLAKE AUDIO; 2696 Lavery Ct., #18; Newbury Park, CA 91320; (805) 499-3686. Product Name: BBPM-4 Self Powered Reference Monitor System. **Contact:** Kay Finster, dealer administration. **Date Product Introduced:** 10/91. **Product Description & Applications:** Derived from the field-proven BBSM-4's heritage, the BBPM-4 eliminates the variable of power amplifier/cable/speaker interface. The bi-amplified system incorporates precision level control, active crossover, fully protected amplifiers, and power supply into a compact design. Uses: portable

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personal reference of the highest order. Connect direct to console or editing station output. **Basic Specifications & Suggested List Price:** Signal input: balanced XLR, phono, unbalanced phono. 10K ohm -10 to +10 dBm. Amplifier output power L.F. unit, 150 watt peak, H.F. 66 watt peak. Crossover: frequency 1.6Hz @ 24dB/Oct. Frequency response +/-3dB 65Hz to 20kHz on axis (unbaffled). Dimensions 8"(h)X15"(W)X12.5"(D). Weight 42 lbs. 105-125 vac. Drivers, two 4" L.F., one .75" L.F., one .75" dome tweeter. Price \$1,985.00 each.

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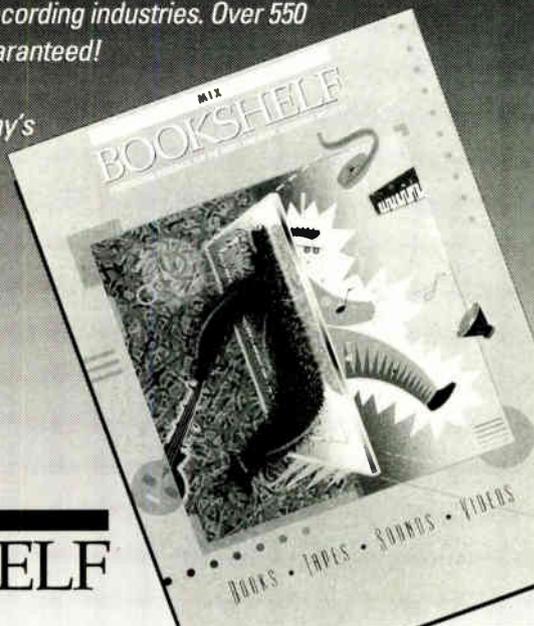
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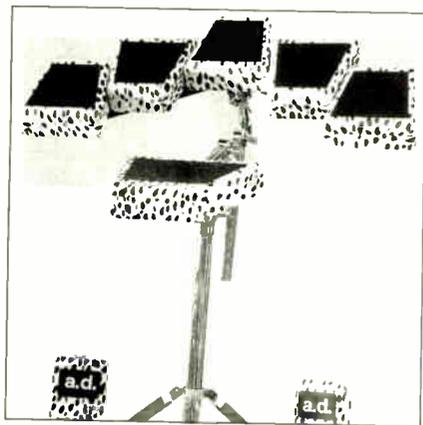
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ADA AMPLIFICATION SYSTEMS; 7303 "D" Edgewater Dr.; Oakland, CA 94621; (415) 632-1323. Product Name: B500B Power Biampifier. **Contact:** Chris Keller. **Date Product Introduced:** 2/91. **Product Description & Applications:** The B500B is a 500 watt bass power biampifier. It is designed specifically for bassists and provides the perfect interface for the ADA MB-1 MIDI tube bass preamp. The B500B employs bi-polar circuitry to deliver up to 500 watts of clean, warm and punchy power. This fan-cooled 2 rack space unit can be used as a single channel amp for full-range applications and can handle 4 to 16 ohm loads. **Basic Specifications & Suggested List Price:** 2 rack spaces, 9.5" depth, 19 lbs, retail \$749.95.

ADA AMPLIFICATION SYSTEMS; 7303 "D" Edgewater Dr.; Oakland, CA 94621; (415) 632-1323. Product Name: MB-1 MIDI tube bass preamp. **Contact:** Chris Keller. **Date Product Introduced:** 2/91. **Product Description & Applications:** The MB-1 features tube/solid-state input stages, contour, compression, 5-band semi-parametric EQ, chorus, dual effects loops and even distortion. All parameters are programmable and storeable to 256 locations. This single rack space unit is equipped with a variable crossover, biamp and full-range outputs, a low frequency limiter and a "selectable-source" D.I. XLR output. MIDI implementation includes MIDI mapping and system exclusive dump/load commands. **Basic Specifications & Suggested List Price:** 1 rack space, 10.5" depth, 6 lbs, Retail \$999.95.



A.D. SPEAKER SYSTEMS
Rok Blox

A.D. SPEAKER SYSTEMS; 404 7th Avenue North; Myrtle Beach, SC 29577; (803) 626-3415. Product Name: Rok Blox. **Contact:** Ron Thompson. **Date Product Introduced:** 6/89. **Product Description & Applications:** Our new Electronic Drums are equipped with sensors that will work with any of the currently available MIDI Drum Translators on the market. The five Tom Pads and the Snare Pad mount on a single, heavy duty tripod stand included with the set. These drums have a natural feel and a fast response. Two Bass Drum Triggers come with the set and will work with any standard Bass Drum Pedals. Excellent for working bands tired of hauling around tons of equipment! **Basic Specifications & Suggested List Price:** Rok Blox fit on a single tom stand. They are trapezoidal in shape and 5 pads are mounted on a rail, the snare mounts below the rail on a separate mount and the kit come with two kick triggers.

AKAI; PO Box 2344; Fort Worth, TX 76113; (817) 336-5114. Product Name: S1100 Stereo Digital Sampler. **Contact:** James Martin. **Date Product Introduced:** 1/91. **Product Description & Applications:** Stereo, 16-bit digital sampler, 16-voice polyphony, 11 polyphonic outputs. Max of 200 samples in memory, 2 meg. RAM expandable to 32 meg. AES/EBU digital output; SCSI port; built-in digital effects processor (which can also process external signals); SMPTE time code read/write

with cue-list programming; 1-bit delta-sigma A/D converters; floating 16-bit D/A conversion. **Basic Specifications & Suggested List Price:** List price: \$5999.95.

ALESIS CORPORATION; 3630 Holdrege Ave.; Los Angeles, CA 90016; (213) 467-8000. Product Name: D-4. **Contact:** Ralph Goldheim, VP sales/mktg. **Date Product Introduced:** 1/91. **Product Description & Applications:** Rack mount digital drum sound module. Over 400 drum and percussion samples, many sampled with stereo reverb and ambience. Dynamic articulation feature enables velocity-triggered tone and pitch modulation of sounds. Trigger to MIDI converter with 12 audio trigger inputs. Applications in recording, live drum performance, MIDI studio, etc. **Basic Specifications & Suggested List Price:** Retail price \$399. 16-bit, 20kHz bandwidth, 48kHz sample rate. Over 400 sounds. 16-voice polyphony. 4-outputs (2 stereo pairs) on 1/4" jacks. 12 audio trigger inputs on 1/4" jacks. Variable sensitivity curves. 21 drum kits user definable. Velocity sensitive preview button

ANGEL CITY AUDIO; 2 Liberty Place; Middletown, CT 06457; (203) 347-5166. Product Name: T Series PCM/Patch Library for KORG T1, T2, T3. **Contact:** Jim Fellows. **Date Product Introduced:** 4/91. **Product Description & Applications:** Disk based patch and PCM sets developed by Jim Fellows for all Korg T-Series synths. Available for models with PCM and models without PCM RAM feature. Volume 1 released April, 1991. Other volumes will be released regularly throughout 1991 and 1992. Demos available for \$2. **Basic Specifications & Suggested List Price:** \$37.50 per disk plus shipping. Write or call for more information: (203) 347-5166, 8-4 (EST) Mon-Fri. Demos available for \$2. Available direct from Angel City only.

ANGEL CITY AUDIO; 2 Liberty Place; Middletown, CT 06457; (203) 347-5166. Product Name: Turbo-EX Expansion for the Korg EX 8000 Synthesizer. **Contact:** Jim Fellows. **Date Product Introduced:** 6/91. **Product Description & Applications:** User-installable expansion for the Korg EX-8000 similar to the TURBO-DW expansion. 512 patch memory expansion. Bi-timbral with splits, layers, transposition, programmable split point. 2 MIDI channel reception, many other features. Also available as Turbo-DW for the DW 8000. Excellent operating manual and installation instructions included. Telephone support 8-4 (EST) Mon-Fri. **Basic Specifications & Suggested List Price:** This piggyback circuit board replaces the original operating system ROM with upgraded ROM, and increased RAM. \$199 + shipping. Available direct from Angel City only. Plugs into ROM socket, requires no soldering.

ASSOCIATED PRODUCTION MUSIC; 6255 Sunset Blvd., Ste. 820; Hollywood, CA 90028; (213) 461-3211; (800) 543-4276. Product Name: APM Mini Package. **Contact:** Jerry Burnham. **Date Product Introduced:** 10/90. **Product Description & Applications:** 38 CDs containing the "best of the best" from the KPM, Burton and Sonoton music libraries. This compilation package is broken down into 28 generic categories including "Americana", "Drama", "Classical", "Prestige/Corporate" and "Warfare", to name a few. The music is licensed on a per production or annual blanket basis. **Basic Specifications & Suggested List Price:** Each CD contains a minimum of 60 minutes of music. All 38 CDs are priced at \$450 (excluding license fees).

ASSOCIATED PRODUCTION MUSIC; 6255 Sunset Blvd., Ste. 820; Hollywood, CA 90028; (213) 461-3211; (800) 543-4276. Product Name: Broadcast 2 (Two). **Contact:** Connie Red. **Date Product Introduced:** 10/90. **Product Description & Applications:** 30 selected broadcast CDs for TV and radio for programs, promos, commercials, bumpers etc., commercial and full length cuts. Updates each year, market size pricing, music search service. Hitline—listen to new releases (800) 328-9797. **Basic Specifications & Suggested List Price:** If you are a broadcaster call Connie Red at (800) 543-4276 for more information.

BONARDI & ASSOCIATES; 20 Sunnyside Ave., A108; Mill Valley, CA 94941; (415) 435-2759. Product Name: "Cafe Noise". **Contact:** Barbara Bonardi, owner. **Date Product In-**

roduced: 9/91. **Product Description & Applications:** Cafe Noise captures the true essence of cafe ambiance. Recorded at popular Bay Area cafes, Cafe Noise carefully blends the many distinctive personalities that visit cafes into an energy-filled, creative background. Various sounds include the grinding of fresh, French roast coffee beans, hot water forced through the filter of the espresso machine, and steam shooting from the espresso nozzle. Cafe Noise is a motivating sound that you can recreate at a moments notice. **Basic Specifications & Suggested List Price:** Cafe Noise gives you over 70 minutes of listening pleasure with the crystal clarity of digital recording. Specially priced at \$40.00 per volume plus shipping.

BRYCO PRODUCTS; 1344 Moorpark St., Ste. 23; Sherman Oaks, CA 91423; (818) 783-9133. Product Name: DATRAX-40 Plastic Line. **Contact:** Brian Bielski. **Date Product Introduced:** 3/91. **Product Description & Applications:** DATRAX-40 Plastic Line holds 40 DAT tapes. Mounts vertically or horizontally on the wall and sits on table. Comes in one color: black/grey swirl. Also available for video 8mm and cassettes. **Basic Specifications & Suggested List Price:** List price is \$21.95. Dimensions 17 1/2" x 7 1/2" x 2".

CLARITY; Nelson Lane; Garrison, NY 10524; (914) 424-4071. Product Name: Retro. **Contact:** Gregory Kramer, president. **Date Product Introduced:** 6/91. **Product Description & Applications:** The Retro is a MIDI-to-control voltage converter. It allows MIDI equipped computers and synthesizers to control analog synthesizers and other analog devices. The 8 control voltage outputs are derived from any MIDI source. Extensive polyphonic options and controller scaling make this the most flexible MIDI-to-CV converter ever produced. **Basic Specifications & Suggested List Price:** 8 analog voltage outputs—0-10 volts, 1 volt per octave tracking. Supports all MIDI controllers and switches, note number, pressure, velocity, etc. Scale by percentage, invert, log and antilog curves; trigger, gate, and note replacement algorithm choices. Easy to use and solid hardware design

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. Product Name: SampleCell. **Contact:** Suz Howells, product mktg. mgr. **Date Product Introduced:** 11/90. **Product Description & Applications:** SampleCell is a 16-bit RAM-based stereo sample playback card for the Mac II. SampleCell features 16 CD quality voices, 8 polyphonic outputs, and up to 8 megabytes of standard Mac II RAM. SampleCell includes a 630 megabyte CD-ROM sound library disk, interface software, and Sound Designer II SC software for sample editing and universal sample transfer. Additional SampleCell cards add 16 more voices each, and the system is compatible with Sound Tools or Audiomeia, creating a direct to disk digital recording and sampling system on the Mac. RAM upgrades are available from Digidesign or through RAM vendors. **Basic Specifications & Suggested List Price:** 16 bit, 16 voice stereo sample playback card. SampleCell editor sample management software; 630 megabyte CD-ROM sound library disc; Sound Designer II SC sample editing software. Compatibility: Macintosh II, Ix, Ix, Icx, Ili, IIfx. Price: \$1995.00 (OMB RAM), \$2995 (8Mb RAM).

ELAN BY METALHEAD ELECTRONICS; 5707 Cahuenga Blvd.; North Hollywood, CA 91601; (818) 980-1975. Product Name: ELAN Mk-II+. **Contact:** Romi. **Date Product Introduced:** 9/91. **Product Description & Applications:** The Elan MkII+ is a three channel, all tube, stereo guitar pre-amp. Its five 12AX7 tubes make this a revolutionary breakthrough in guitar pre-amplification technology. This allows you to create a multitude of clean sounds mixed with various levels of warm sustain and overdrive. In the past this could only be achieved by using two or more amplifiers and other bulky equipment, which seldom gave the desirable results. **Basic Specifications & Suggested List Price:** An all tube guitar preamp is an updated version of the famous Elan Mk-II. Its features include five tubes, three channels, two EFX loops (stereo); built-in noise reduction; digital switching; footswitch and more. Price \$699.

E-MU SYSTEMS INC.; 1600 Green Hills Rd.; Scotts Valley, CA 95066; (408) 438-1921. Product Name: Proccussion. **Contact:** Jim Rosenberg, dir. of product marketing. **Date Product Introduced:** 2/91. **Product Description & Applications:** The maximum percussion module featuring over 1,000 Emulator III percussion sounds! **Basic Specifications & Suggested List Price:** 4MB ROM, 32-voice polyphony, 12 MIDI channels, multitimbral.

E-MU SYSTEMS INC.; 1600 Green Hills Rd.; Scotts Valley, CA 95066; (408) 438-1921. Product Name: Proteus MPS. **Contact:** Jim Rosenberg, dir. of product marketing. **Date Product Introduced:** 9/91. **Product Description & Applications:** A master performance system featuring an enhanced Proteus/I sound complement and a 5-octave velocity/aftertouch keyboard. Additionally, unique functions allow quick and easy access to complex sequence mapping and live performance maps. **Basic Specifications & Suggested List Price:** 4MB ROM, 32 voice polyphony 16-MIDI channel multi-timbral.

FIRSTCOM/MUSIC HOUSE/CHAPPELL; 13747 Montfort Dr., Ste. 220; Dallas, TX 75240; (800) 858-8880; (214) 934-2222. Product Name: Personal Music Library. **Contact:** Robert Jenkins. **Date Product Introduced:** 1/91. **Product Description & Applications:** The Personal Music Library is the

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newest innovation in music libraries that allows clients to choose exactly what they need to build their own totally customized in-house music library. A personal Production Analysis is conducted on each client to determine their own Personal Music Library custom-tailored to both their business and their budget! Clients may choose exactly what they need from any or all of the 5,000 tracks on over 200 CDs from three music libraries: the New FirstCom Library, the Music House Library and the Chappell Recorded Music Library.



GEFEN SYSTEMS

GEFEN SYSTEMS; 6261 Variel Ave. #C; Woodland Hills, CA 91367; (800) 545-6900. Product Name: M&E Organizer System. Contact: Jill Shuken. Date Product Introduced: 4/91. Product Description & Applications: M&E Organizer System—sound effects and production music database search programs to find and audition effects quickly. Interfaced to NSM CD2101-AC (100 CDs) CD changer or the Sony CDK-006 auto disc loader (60 CDs). **Basic Specifications & Suggested List Price:** IBM Version: 286 AT w/VGA color monitor, 640 KB RAM, 40 MB H.D. Mac: SE, Si, IIC, IIFX w/2 Meg RAM & 40 H.D. NSM CD 21010-AC (100 CD) CD changer or Sony CDK-006 (60 CDs).

HAFLER PROFESSIONAL; 613 S. Rockford Dr.; Tempe, AZ 85281; (800) 366-1619. Product Name: G-150. Contact: Jeff Snider, national sales for MI. Date Product Introduced: 5/91. Product Description & Applications: Rackmount MOSFET guitar power amp. The MOSFET is quickly becoming the new standard power source for guitar, and there is no one more qualified than the pioneer of MOSFET technology himself, David Hafler. It's no great mystery why guitarists are discovering the MOSFET to be an ideal output device. With its tube like characteristics (soft clipping voltage driver, even order harmonics) in a much smaller & lighter package, this is definitely the way to go. **Basic Specifications & Suggested List Price:** The G-150 is in a two space, 17 pound package, 75 watts per channel @ 8ohms. 90 watts per channel @ 4ohms, 100 watts bridged mono @ 8ohms. All 1/4" inputs, and 1/4" speaker outputs. Front panel gain controls and a master presence control for instant access. \$549.

HAFLER PROFESSIONAL; 613 S. Rockford Dr.; Tempe, AZ 85281; (800) 366-1619. Product Name: Hafler T-3. Contact: Jeff Snider, national sales for MI. Date Product Introduced: 1/91. Product Description & Applications: Hafler T-3 is the ultimate marriage of our sacred history (the tube), and the established technology of the future (MIDI). From crystal clean to soulful expression, to screaming aggression, we designed this piece with one thing in mind: to deliver all the attitude that the six stringer demands. We gave it MIDI to give you the flexibility to use it any way you want. **Basic Specifications & Suggested List Price:** The T-3 is a three channel all tube stereo preamp. Each channel with its own gain, tone & volume controls. Conventional or MIDI channel switching. A stereo effects loop true stereo outputs with an output level switch from -10dB (inst. level) to +4dB (line level). Ret. \$499.

THE HOLLYWOOD EDGE; 7060 Hollywood Blvd. Ste. 700; Hollywood, CA 90028; (800) 292-3755. Product Name: Super Single CD. Contact: Scott Whitney, sales manager. Date Product Introduced: 7/91. Product Description & Applications: 200 brand new sound effects, includes over 40 new cartoon FX, 15 high energy sounds, 14 different footsteps. Plus a wide variety of new FX. This disc is a must for any sound effects user. **Basic Specifications & Suggested List Price:** 200 sound FX for \$60.

JAMES & ASTER INC.; 115 East 23 Street, Floor 3; New York, NY 10010; (212) 982-0300. Product Name: James & Aster Music Library. Contact: Rob Aster, president. Date Product Introduced: 9/84. Product Description & Applications: Six different music library catalogs with over 120 digitally recorded compact discs to choose from. Large assortment of acoustic and contemporary electronic arrangements covering the full spectrum of "main stream" as well as "off the wall" moods and styles. Library catalogs include: Match Music, Atmosphere Music, Castle Music, Happy Records, SMA/Ring

Records, and Gibbsville. New CD updates released on a regular basis. We are #1 in customer service and product support. **Free brochure and demo. Basic Specifications & Suggested List Price:** Subscribers may select any CD from the catalog on a 30 day approval basis. Flexible licensing arrangements allow subscribers to clear usages of the music by the "needle drop", production blanket/show rate, or via an annual blanket clearance package. Some restrictions apply to annual packages.

KAT INC.; 300 Burrett Rd.; Chicopee, MA 01020; (413) 594-7466. Product Name: KickKAT. Contact: Chris Ryan, artist relations/product spec. Date Product Introduced: 1/91. Product Description & Applications: The KickKAT is a free-standing bass drum pad which offers a wide dynamic range and great tracking of fast footwork. The playing surface is wide enough to use any brand of double bass drum pedal. The "cat-like" shape as well as the steel construction gives the drummer a "road worthy" and eye-catching piece of equipment. Four heavy duty spurs along with industrial strength velcro give the KickKAT a no slip grip. **Basic Specifications & Suggested List Price:** 15.25 inches tall, 14 inches front to back, 11 inches wide, 5.25 inches wide playing surface. 1/4 inch trigger output, heavy duty velcro on bottom, 4 heavy duty spurs. List price: \$259.00.

KAT INC.; 300 Burrett Rd.; Chicopee, MA 01020; (413) 594-7466. Product Name: drumKAT EZ. Contact: Chris Ryan, artist relations/product spec. Product Description & Applications: The drum KAT EZ is an "easy" version of KAT's industry standard drum KAT MIDI controller. Special autotraining features and novice/experienced modes make it easy to use regardless of your MIDI knowledge. Advanced features include foot control input and breath control input to add nuance to your electronic playing. The EZ has a comfortable and responsive playing surface. Made of natural gum rubber. **Basic Specifications & Suggested List Price:** 32 factory 32 user kits, 10 lbs. Dimensions 17.25 X 11.75 X 2.5 CV input, 1 MIDI in 2 MIDI out, 2 trigger inputs. Simple mode, double mode, velocity layered mode. Switch mode. Locking power chord.

KURZWEIL MUSIC SYSTEMS; 13336 Alondra Blvd.; Cerritos, CA 90701; (213) 926-3200, ext. 239. Product Name: K2000. Contact: Kurzweil User Support. Date Product Introduced: 8/91. Product Description & Applications: A quantum leap beyond existing technology, the K2000 is a high quality, portable ROM/RAM-based synthesizer designed for both live performance and studio applications. VAST (Variable Architecture Synthesis Technology) allows the player to take any multisample, waveform or noise and process that sound

using a variety of known synthesis techniques. Features include onboard multi-effects processor which can produce up to four simultaneous effects, 61-note velocity/aftertouch sensitive keyboard with master MIDI controller features, multiple polyphonic outputs, 8 megabytes of new 16-bit soundfiles, disk drive and SCSI. **Basic Specifications & Suggested List Price:** 32-bit internal precision, into 18-bit output DACs; 6 polyphonic audio outputs; over 100 sound programs, in ROM, including piano, drums, waveforms, transient attacks and synthetic timbres; room for over 100 user-created sounds; 16-bit linear sample format; 24-voice polyphony; up to 4 oscillators per voice. 3.5" floppy disk drive; SCSI port for connection to hard disks and optical media (CD-ROM); support stereo sampling (with optional board); optional digital/analog audio input board for user sampling or capturing sounds via DAT, CD or other digital media; 4 SIMM sockets for expanding user sample RAM up to 64 megabytes. Price: \$2,995.

LP MUSIC GROUP; 160 Belmont Ave.; Garfield, NJ 07026; (201) 478-6904. Product Name: Claw® Extended Rod. Contact: Angelo Arimborgo, sales mgr. Date Product Introduced: 5/91. Product Description & Applications: Internationally patented. Our enthusiastic users have asked for a Claw that could mount on the lower rim of their deep toms and reach the top of the drum. We have added four inches to the height of the mic rod so it will easily reach the head of a 12x13 tom. LP 593A Claw with extra long mic rod. **Basic Specifications & Suggested List Price:** Patented clamping device which attaches to drum rims that hold microphones, cymbals & percussion. Attached to drum with hand tightening—No tools required. LP593A—\$38.95 list. LP592S Claw for splash cymbal—\$36.95 list. LP592B Claw for percussion—\$29.95 list.

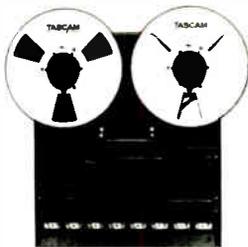
MANHATTAN PRODUCTION MUSIC; 311 W. 43rd St., Ste. 702; New York, NY 10036; (212) 333-5766; (800) 227-1954; FAX: (212) 262-0814. Product Name: Manhattan Production Music Digital Sound Effects. Contact: Ron Goldberg, nat'l sales mgr. Date Product Introduced: 1/92. Product Description & Applications: Manhattan Production Music has completed its 5 CD stereo sound effects library known for its audiophile quality music. MPM's engineering staff digitally recorded its new effects direct to CD using top quality audiophile microphones and recorders. **Basic Specifications & Suggested List Price:** \$395 for 5 CD's.

NETWORK MUSIC INC.; 11021 Via Frontera; San Diego, CA 92127; (619) 451-6400; (800) 854-2075. Product Name: ShockWave. Contact: Bruce Tucker. Date Product Intro-

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duced: 9/91. **Product Description & Applications:** ShockWave—the new ear-opening production elements package from Network. ShockWave contains over 400 cuts, all digitally recorded and mastered on 7 CDs. Unique and exceptionally well-produced, ShockWave includes: Sweepers, Glide/Sweeps, Drones, Winds, Jets, Flybys, Explosions, Punctuators, Hits, Guitars, Phone Tones, Sonic Graphonies, Lasers, Zaps, Bursts, Sprays, Glides, Snarls, Missiles, Wild Things, Sonic Graffiti, Sparkles, Music Beds and Audio Logos. ShockWave was created for professional producers in the audiovisual, commercial and broadcast industries. **Basic Specifications & Suggested List Price:** ShockWave is offered on 7 compact discs. Each production element is addressed to a separate track for easy, reliable cueing. All of the musical themes include :59, :29 and short tag edits. Many of the production elements feature alternate versions with and without additional effects.

NORTHSTAR PRODUCTIONS; 13716 Southeast Ramona Street; Portland, OR 97236; (503) 760-7777; FAX: (503) 760-4342. Product Name: Northstar Sampling Library. **Contact:** Scott James Hybl. **Date Product Introduced:** Updated 1991. **Product Description & Applications:** This is an exhaustive musical and sound effects library containing over 1,600 banks for the following samplers: the E-mu Emulator III, the Akai S-1000, E-mu Emax II, Emax, SP-1200, SP-12, Emulator II, Akai S950, S900, Ensoniq 16 plus, Ensoniq Mirage, Oberheim DPX-1. Available on floppy disk, magneto optical, and CD-ROM, a complete listing is available from Northstar Productions. **Basic Specifications & Suggested List Price:** Emulator III: \$100 per 4 meg. bank, \$125 per 8 meg. bank, 4 CD-ROM at app. \$995. Akai S-1000: \$50 per 2 meg. bank, \$80 per 4 meg. bank, \$100 per 8 meg. bank. Emax II: \$80 per 4 meg. bank. Ensoniq 16 plus: \$50 per 2 meg. bank. Emulator II: Oberheim DPX-1. Emax I, SP-1200 & SP-12: \$20 per disk. Ensoniq EPS and Mirage: \$15 per disk.

PAIA ELECTRONICS INC.; 3200 Teakwood Ln.; Edmond, OK 73013; (405) 340-6300. Product Name: MV-8 MIDI and Control Voltage Processor. **Contact:** John Simonon, president. **Date Product Introduced:** 7/91. **Product Description & Applications:** The MV-8 is a desk or rack mount unit which converts 8 voltages and gates to MIDI as well as MIDI to control voltages and gates. A variety of front panel selected operating modes allow the MV-8 to be used to fully interface a single synthesizer, control pitch, velocity and two wheels of two synthesizers or control pitch of 8 synthesizer voices. The unit can also be used to MIDI retrofit recording or lighting consoles and keyed instruments. **Basic Specifications & Suggested List Price:** CV inputs: 8; CV outputs: 8; Gate inputs: 8; Gate outputs: 8. MIDI data received/sent: Pitch, Velocity, Pitch Wheel, Mod Wheel, Channel Pressure and Continuous Controller. Assembled price \$399.

PAIA ELECTRONICS INC.; 3200 Teakwood Ln.; Edmond, OK 73013; (405) 340-6300. Product Name: SubMix Master. **Contact:** John Simonon, president. **Date Product Introduced:** 7/91. **Product Description & Applications:** The SubMix Master is an inexpensive 8 input stereo mixer expander for the contemporary MIDI studio where panning and level of keyboards and effects are set with MIDI control messages. Rather than each keyboard or effects unit taking up a pair of inputs on a mixing board, up to 8 keyboards or effects units can be pre-mixed with the SubMix Master and then routed to a single stereo input pair on the console. The unit is also useful for expanding effects returns. **Basic Specifications & Suggested List Price:** 8 stereo inputs, 1 stereo output, frequency response +/-0.25 dB, 10 Hz-40 kHz; S/N (unweighted) -94 dB; input impedance: 10k ohm; Max headroom 25v p-p. Kit price \$57.90.

THE PRODUCERS SOUND EFFECTS LIBRARY; 8033 Sunset Blvd. Ste. #289; Hollywood, CA 90046; (818) 707-EFXX; FAX: (818) 707-2643. Product Name: The Producers Sound Effects Library. **Contact:** Melinda Miller/John Roberts. **Date Product Introduced:** 9/91. **Product Description & Applications:** The Producers Sound Effects Library offers high quality sound effects on CD format for use by the film, TV, radio, and audio-visual mediums. 18 CDs are currently offered in the collection with an additional 24 new releases scheduled for 1992. The Producers Sound Effects Library prides itself in its organization of the library and the quality. All effects are recorded and edited by professionals in the motion picture industry in Hollywood. Our company is setting standards for libraries of the future. **Basic Specifications & Suggested List**
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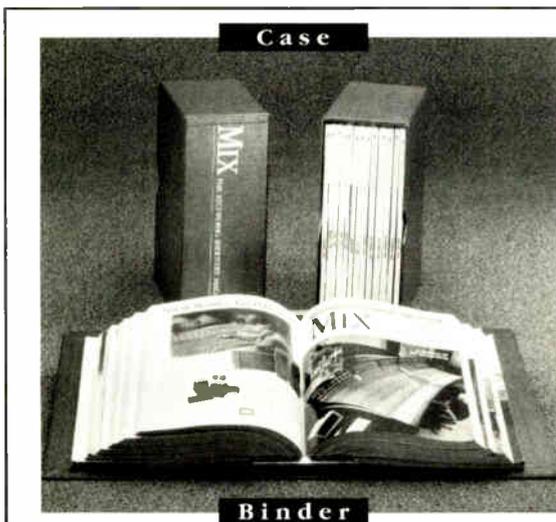


THE PRODUCERS SOUND EFFECTS LIBRARY
The Producers Sound Effects Library

Price: Individual CDs are sold for \$85.99. Sets are available for a substantial savings, please call for pricing and information.

PRODUCTION GARDEN LIBRARY; 2411 NE Loop 410, Ste. #132; San Antonio, TX 78217; (800) 247-5317; (512) 599-9439. Product Name: Production Garden Library. **Contact:** Mel Taylor. **Date Product Introduced:** Updated 7/91. **Product Description & Applications:** Quality buy-out production music featuring lots of fresh contemporary tracks, real acoustic sounds, and new music updates in constant production. The "100" series has broadcast 60's and 30's plus hundreds of work parts. The "200" series is designed for the audio-visual, video, or multi-image producer—theme length compositions plus 60, 30 and tag edits. Five sound effects libraries. Select an affordable lease or lifetime buy-out license. Free demo and catalog. (800) 247-5317.

ROLAND PRO AUDIO/VIDEO GROUP; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141 x337. Product Name: SBX-1000 MIDI Cueing Box. **Contact:** Bob Todrank. **Date Product Introduced:** 1/91. **Product Description & Applications:** The SBX-1000 is a SMPTE/MIDI event generator and synchronizer that offers ease and efficiency for post-



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production audio dubbing. Featuring an innovative Cue Sheet based on SMPTE time code, the SBX-1000 can store a range of MIDI event information such as note number, control change and other real time MIDI messages as well as song position of a connected sequencer. In addition, the SBX-1000 both reads and generates SMPTE time code, and integrates this capability with powerful Tempo Controller function and a sophisticated sequencer. **Basic Specifications & Suggested List Price:** Sound effects spotting and MIDI sequencing; cue sheet function stores up to 30,000 MIDI events; quarter frame SMPTE resolution; enter data by step input or real time; sequencer has 16 tracks and 100,000 note capacity; compatible with the standard MIDI file format and Roland's S-MRC format; Four GPI triggers for audio or video recorder control. Suggested retail price: \$3,495.

ROLAND CORPORATION USA; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141. Product Name: S-750 Digital Sampler. **Contact:** Marvin Sanders. **Date Product Introduced:** 7/91. **Product Description & Applications:** The S-750 is a 16-bit linear 24-voice stereo digital sampler with the same extraordinary sound, large memory capacity, and powerful ver. 2.0 software as the acclaimed S-770. Offers features such as multi-band filtering, "scrubbing" samples, sample rate conversion, and time stretching. Includes an internal resample function for layering waveforms entirely in digital domain. **Basic Specifications & Suggested List Price:** 24-voice polyphony; 32 part multitimbral capability; 16-bit A/D conversion; 20-bit D/A conversion; 24-bit internal processing; 48, 44.1, 24 and 22.05kHz sampling rates; 2MB internal memory (standard) expandable to 18 MB for 93.1 seconds of stereo sampling time at 48kHz; 3.5-inch disk drive; SCSI port; 2 stereo inputs; 8 outputs (stereo + 6); monitor and mouse interface. \$4,995.

SIGNATURE MUSIC INC.; PO Box 98; Buchanan, MI 49107; (800) 888-7151. Product Name: Signature Music Library. **Contact:** Bill Mullin. **Date Product Introduced:** 4/91. **Product Description & Applications:** Fully produced original music created especially for media production—corporate, commercial, institutional video/AV/broadcast. Real orchestration provide right mix of organic with cutting edge electronic, sample available to qualified producers on request. **Basic Specifications & Suggested List Price:** 14 compact discs contain 164 program length themes (2-5 min) with 30/60 edits; complete collection, spot length CDs, program length CDs and individual volumes available separately.

SONIC BOON; 2453 East Virginia Ave.; Anaheim, CA 92806-4228; (714) 535-3344. Product Name: "Dynamic Range" **Contact:** Chris Lango. **Date Product Introduced:** 1990. **Product Description & Applications:** Sound effects library of guns and related effects, containing over 30 different weapons and 1100 effects. Includes interior and exterior shots, bullet impacts, ricochets, silencers, Foley and handling sounds for pistols, revolvers, rifles, shotguns and machine guns. The library comes with detailed descriptive documentation and is supported by Leonardo and Gefen Systems' software programs. **Basic Specifications & Suggested List Price:** 2-CD library list price is \$495, NED optical disc format \$1,750. Significant discounts apply when purchasing multiple libraries.

SONIC BOON; 2453 East Virginia Ave.; Anaheim, CA 92806-4228; (714) 535-3344. Product Name: "The Works". **Contact:** Chris Lango. **Date Product Introduced:** 9/91. **Product Description & Applications:** Sound effects library of industrial, mechanical and specialty sounds, including machines, motors, hydraulics, pneumatics, levers, buttons, switches, stresses, electrical effects and industrial backgrounds. The library contains over 2,000 effects, and the backgrounds are each 6 minutes or longer. The library comes with detailed descriptive documentation and is supported by Leonardo and Gefen Systems' software programs. **Basic Specifications & Suggested List Price:** 8 CD library list price is \$495, NED optical disc format \$2,750. Significant discounts apply when purchasing multiple libraries. Individual CDs from the library are available separately, as well as a single CD of assorted effects compiled especially for use with samplers.

SOUND IDEAS; 105 W. Beaver Creek Rd., Ste. 4; Richmond Hill, ON, L4B 1C6 Canada; (416) 886-5000; FAX: (416) 886-6800. Product Name: Series 5000 Wheels. **Contact:** Brian Nimens, president. **Date Product Introduced:** 5/91. **Product Description & Applications:** Sound Ideas has created the most complete collection of car sounds ever recorded and it's available now! Hot off the line, The Series 5000 Wheels Sound Effects Library will give you the ride of your life showcasing sounds from a vast array of trucks, motorcycles and foreign and domestic late model cars in a variety of makes and sizes. **Basic Specifications & Suggested List Price:** A total of 25 vehicles digitally recorded. Over 3000 sounds in total, all on 24 compact discs. Long recorded passbys with no premature fadeouts. More than 140 interior and exterior sounds per vehicle.

SYNCHROVOICE INC.; 400 Harrison Ave.; Harrison, NJ 07029; (201) 483-7416. Product Name: MidVox®. **Contact:** Dale Teaney. **Date Product Introduced:** 4/91. **Product Description & Applications:** MidVox is a professional voice-to-MIDI converter, using bio-sensor—rather than pitch recognition—technology, whereby vocal fold movements are picked up by a neck-worn transducer and instantaneously converted to MIDI data. Features include: a chromatic mode for keyboard-

style effects; voice gate, loudness gate and voice sync outputs; and continuous pitch and velocity MIDI output from any vocal source. **Basic Specifications & Suggested List Price:** Single rack-space chassis. Price: \$1,895.

TRF PRODUCTION MUSIC LIBRARIES; 1619 Broadway; New York, NY 10019; (800) 899-MUSIC. Product Name: BMG Production Music Library on the RCA Label. **Contact:** Michael Nurko. **Date Product Introduced:** 1991. **Product Description & Applications:** Newest music library to enter this industry. Digitally recorded, mixed and mastered on high quality compact discs. Diversified collection of newly recorded orchestral and instrumental production music by outstanding composers, produced for television, radio, film and video productions. 15 CDs have already been released, over 30 CDs have already been recorded and over 50 CDs will be released within one year. Each compact disc contains music in a particular category or style and many selections are available in several versions including full-length, underscore, jingle length, etc. **Basic Specifications & Suggested List Price:** Each compact disc contains over 75 min. of music with index points within each track for immediate access to cutting points. Each disc is accompanied by a comprehensive booklet with complete descriptions and timings of all tracks. More than 30 CDs. New releases being issued every month. All compact discs are \$20 each.

ULTIMATE SUPPORT SYSTEMS; 2506 Zurich Dr.; Fort Collins, CO 80524; (303) 493-4488; FAX: (303) 221-2274. Product Name: Liberty Mic Stand. **Contact:** Joanne Monath, mktg. serv. mgr. **Date Product Introduced:** 1/91. **Product Description & Applications:** Liberty, a weighted-base mic stand that features a stackable base that allows up to six stands to be stacked in the footprint of one. Liberty also has a quick response on-off clutch that allows adjustment of the shaft with just a quarter turn. **Basic Specifications & Suggested List Price:** Height: 34 3/4" to 64"; base diameter: 10"; and weight: 9 lbs.

ULTIMATE SUPPORT SYSTEMS; 2506 Zurich Dr.; Fort Collins, CO 80524; (303) 493-4488; FAX: (303) 221-2274. Product Name: Z-28. **Contact:** Joanne Monath, mktg. serv. mgr. **Date Product Introduced:** 1/91. **Product Description & Applications:** Sit-down height support stand constructed from a high performance resin that's strong and incredibly durable. Perfect for keyboards or small mixing boards. **Basic Specifications & Suggested List Price:** 28" height; 75 lb. load capacity, 8 lbs. weight, suggested retail of \$45

VALENTINO MUSIC AND SOUND EFFECTS LIBRARIES; 151 W. 46th St.; New York, NY 10036; (212) 869-5210; (800) 223-6278. Product Name: Valentino Music and Sound Effects Libraries. **Contact:** Thomas Valentino. **Date Product Introduced:** 1/91. **Product Description & Applications:** Complete 50 compact disc music library and complete 37 compact disc sound effects library for production and post-production use in television, film, radio and video. **Basic Specifications & Suggested List Price:** Music library—\$2,000 annual fee, less for small markets; Sound Effects—\$1,500 complete buy out; 8 volume budget sound effects library—\$195.

ZM SQUARED; 903 Edgewood Ln., PO Box 2030; Cinnaminson, NJ 08077; (609) 786-0612. Product Name: Themes AV Music Library. **Contact:** Pete Zakroff, president. **Date Product Introduced:** 1/91. **Product Description & Applications:** The 1991-92 Themes AV Music Library Catalog contains a complete listing of the 83 volumes of music in the regular library, our special series of compact discs—The Best of Themes on CD, plus details on music for video transfer and specialty albums for weddings and holidays. **Basic Specifications & Suggested List Price:** Individual tapes or cassettes are priced at \$74.95 each—lower prices for quantity purchases. The CDs are \$199.95 each. The set of six, containing 170 full-length cuts, can be purchased for \$999.95. Tapes for video transfer are \$69.95 each or 6 for \$300.

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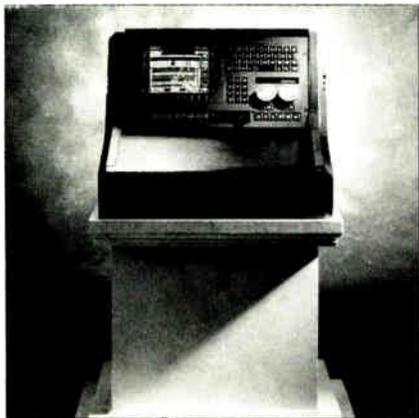


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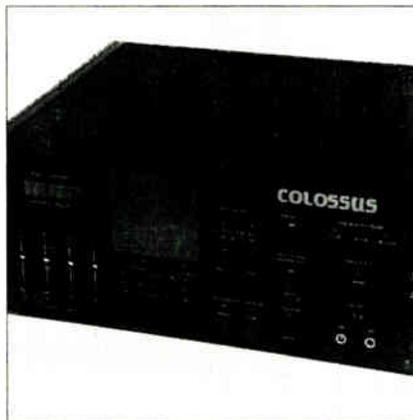
ACCURATE SOUND CORP.; 3475-A Edison Way; Menlo Park, CA 94025; (415) 365-2843. **Product Name:** AS-100 Tape Transport. **Contact:** Ronald M. Newdell, president. **Date Product Introduced:** 1/91. **Product Description & Applications:** AS-100 tape transport designs for handling tape from 1/2" to 1.0" 14" reels. Tape speeds from 15/32 to 480 ips with IEEE computer interface. Designed for following uses: Tape Cleaner/Conditioner, Cassette Tape Pancake Evaluator, High Speed (240 ips) Cassette Slave, Studio Mastering Recorder. **Basic Specifications & Suggested List Price:** AS-100 Transport only with IEEE computer interface \$14,000. 11 speeds selectable from 15/32 to 480 ips. Packing arms available for take up and supply. Bi-directional operation in all speeds.

ALESIS CORPORATION; 3630 Holdrege Ave.; Los Angeles, CA 90016; (213) 467-8000. **Product Name:** ADAT. **Contact:** Ralph Goldheim, VP Sales/mktg. **Date Product Introduced:** 1/91. **Product Description & Applications:** 8-track professional digital audio tape recorder. Forms the basis of a fully digital modular recording system of up to 128 tracks employing 16 fully synchronized ADAT units. Uses standard S-VHS tape with approx. 40 minutes of recording time per cartridge. Supports SMPTE and MTC time code using BRC remote (optional). BRC allows complex assembly editing. Applications in record production, video post, etc. **Basic Specifications & Suggested List Price:** Retail price \$3,995. 48kHz sampling frequency; variable from 42.7kHz to 50.85kHz. 4dBu balanced ins/outs on 56 pin ELCO connector. -10dBV unbalanced ins/outs on 1/4" jacks. Optional AES/EBU interface. Digital I/O: 16-bit digital audio.



AMS INDUSTRIES INC.
AMS AudioFile Plus

AMS INDUSTRIES INC.; 7 Parklawn Dr.; Bethel, CT 06801; (203) 792-4997. **Product Name:** AMS AudioFile Plus. **Contact:** Charles Conte, PR administrator. **Date Product Introduced:** 10/91. **Product Description & Applications:** AudioFile PLUS is the latest 16-output, 8-input version of the AMS AudioFile hard disk digital audio editing and recording system. The AudioFile Plus has analog and digital inputs and outputs, ADR software, remote machine control, and the powerful editing functions and speed of operation that have established the system as the market leader in hard disk editing and recording systems. Software to process and auto conform video-edit decision lists, combined with machine control functions, allow the system to offer an unparalleled degree of automation when conforming original source material and final edits. **Basic Specifications & Suggested List Price:** AudioFile PLUS has the latest DSP processors to provide scrub-editing of the highest quality and "Timelinx" real-time time compression and expansion to further increase the flexibility and speed offered by the hard disk technology. There are now over 85 AudioFile systems in the U.S. alone, and over 300 worldwide.



COLOSSUS: BY THE NUMBERS
COLOSSUS

COLOSSUS. BY THE NUMBERS; PO Box 8359; Incline Village, NV 89450; (702) 831-4459. **Product Name:** Colossus. **Contact:** Brad S. Miller. **Date Product Introduced:** Product on Market begins delivery: 9/1/91. **Product Description & Applications:** Colossus/4 is a four-channel PCM digital audio processor. It may be used as a superior A-D device, or as a stand-alone archival system for both location and studio work. Location "soundfield" digital audio for new film soundtrack and HDV multi channel audio formats is suggested. Scientific and industrial applications include wind tunnel, cavitation measurements, and N.A.S.A. shuttle launches. Five years of applications tests including 60 CDs and "soundfield" SFX library now complete. **Basic Specifications & Suggested List Price:** Includes four discrete digital audio channels, archived on standard NTSC video, tape or disc. 12VDC operating system for location work; 120V/240V AC for studio. Guaranteed 16 bit linearity, sampling rate 44.1; 96dB S/N and channel separation, frequency response 2Hz to 20kHz at all channels, no data compression or error concealment of any kind.

DENON AMERICA; 222 New Rd.; Parsippany, NJ 07054; (201) 575-7810. **Product Name:** DN-7700R CD Cart Recorder. **Date Product Introduced:** 4-91. **Product Description & Applications:** The DN-7700R is a compact disc recorder with 16 channels, recording fully compatible with current compact discs. The track-mountability of it does not require an external computer to control. All functions are controlled via the front panel with a layout similar to a tape recorder. Up to 74 minutes of 16-bit 44.1 kHz digital audio may be recorded per disc. Flex origins may be made over a stage record time period. **Basic Specifications & Suggested List Price:** Retail price, \$20,000. 16 bit A/D and D/A converters, 44.1 kHz Sampling Rate. AES/EBU digital input/output, a so-called digital input/outs. Metering includes peak and VU modes. Ext synch in/out. Variable analog input level control.

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. **Product Name:** ProTools. **Contact:** Suz Howells, product mktg. mgr. **Date Product Introduced:** 9/91. **Product Description & Applications:** ProTools is entirely new techology integrating multitrack digital audio recording and editing, USP, MIDI sequencing and automated digital mixing into a single digital audio workstation based on the Macintosh II platform. It consists of ProDECK™ software for recording and mixing and ProEDIT™ software for graphic editing of both digital audio and MIDI, and two hardware components, the Audio Interface for analog and digital I/O and the Audio Card installed in the Macintosh. **Basic Specifications & Suggested List Price:** 4 to 16 independent channels of recording and playback; XLR analog I/O, AES/EBU & S/PDIF digital I/O; unlimited virtual tracks; graphic non-destructive editing of multiple tracks of audio; 16 MIDI with track slipping, dynamic & state-based automation, MIDI recording, playback

and event editing; SMPTE synchronization; real-time EQ and digital effects; user-selectable crossfades. Compatibility: Macintosh II, Ix, Ilex, Ili, IIfx. Price: complete systems start at \$5,995.

DIGIDESIGN INC.; 1360 Willow Rd., Ste. #101; Menlo Park, CA 94025; (415) 688-0600. **Product Name:** Sound Tools 2.0. **Contact:** Suz Howells, product mktg. mgr. **Date Product Introduced:** 10/90. **Product Description & Applications:** Sound Tools is a stereo direct-to-disk CD-quality recording and playback system with extensive editing features and powerful digital signal processing functions. Sound Tools is ideal for music editing and mastering, audio post production—any application that requires high-fidelity audio and high-speed, flexible editing. Sound Tools consists of the Analog Interface analog-to-digital converter, the Sound Accelerator digital signal processing card, and the Sound Designer II audio editing Software. Options include the digital interface, the Pro I/O professional analog interface, and the Pro Store 660 megabyte hard disk drive. **Basic Specifications & Suggested List Price:** 16 bit, 44.1 kHz stereo direct-to-disk digital recording and playback; non-destructive playlist editing; high quality real-time dynamics compression/expansion/noise gate; stereo time compression/expansion; Pitch shift with time correction; 2:1 or 4:1 data compression options; Real-time parametric graphic EQ; continuous SMPTE resynchronization; sample editing/transfer. Compatibility: Macintosh SE/30, II, Ix, Ilex, Ili, IIfx. Price: \$3,285.

DIGITAL AUDIO RESEARCH LTD.; 2 Silverglade Business Park; Leatherhead Rd., Chessington; Surrey, KT9 2QL England; +44 0372 742848. **Product Name:** SoundStation Sigma. **Contact:** Jeff Bloom, sales and mktg. dir. **Date Product Introduced:** 6/91. **Product Description & Applications:** The new SoundStation Sigma is a completely integrated digital audio production environment that is ideal for all pro-audio, video/film post and broadcast applications. In addition to DAR's powerful Segment Based Equalization and DSP functions, Sigma's host of integrated features include 8 or 16 channels of simultaneous analog or digital recording/playback with full varispeed operation, built-in magneto optical Disk storage, all the comprehensive SoundStation edit functions, and an advanced high-speed CPU for incredibly fast touch-screen response, parameter changes and edit execution. **Basic Specifications & Suggested List Price:** SoundStation Touchscreen Control Console for fast and familiar tape-like functions including reel lock editing, cut mark copy, loop, splice, segment sliding and seamless crossfades. Four analog inputs; 8 to 16 analog outputs. 8 to 16 channels of intelligent AES/EBU digital I/O: 4 to 8 track hours audio storage @ 16 bit, 44.1 kHz DSP with Segment Based Equalization, gain and pan settings, rewritable optical disk sub-system. Full timecode chase, machine control, and auto location; Stereum Warp time compression/expansion, back-up to optical disk, RLUAT or other digital storage media.

DIGITAL BROADCAST ASSOCIATES; Distributed by PEP Inc.; 25 W. 54th St.; New York, NY 10019; (212) 246-2490. **Product Name:** DigiSpot. **Contact:** James B. Tharpe. **Date Product Introduced:** NAB 91. **Product Description & Applications:** DigiSpot is a revolutionary CD quality digital player and player/recorder for radio commercials and music, using new 3.5" digital audio compact cartridges which are re-recordable but cost no more than tape cartridges. The re-recordability of DigiSpot cartridges, plus their inherent long life, introduces a welcome economy to high quality CD sound broadcast operations. DigiSpot provides a practical operating unit with amazing all around performance—sound quality, ease of use, convenience and cost effectiveness. **Basic Specifications & Suggested List Price:** Low cost, maintenance free, read/write removable 3.5" disk compact cartridge. No special care or handling required/MTBF 15,000 POH, typical usage. Preventative maintenance: none; component design life: five years. Tape problems are eliminated. For more information contact Pep Inc.

DUPLITRONICS INC.; 160 Abbott Dr.; Wheeling, IL 60090; (708) 459-6610. **Product Name:** DHS™ I—Digital Head End System. **Contact:** Jeffrey T. Binder. **Date Product Introduced:** 1991. **Product Description & Applications:** The DHS I is a fully functional digital head end system (digital bin) for audio cassette, DAT and digital compact cassette (DCC™) reproduction. Systems include high-speed load at 25:1 and the SRTM system, allowing users to listen to program stored in the system while it is duplicating, without interrupting the duplication line. Self diagnostic hardware and software allows for the instantaneous troubleshooting and the fully modular system makes the changing of boards possible in under five minutes! **Basic Specifications & Suggested List Price:** Encoding schemes—analog cassette/16-bit 44.1 kHz encoding, DAT/16-bit 48kHz encoding, DCC™/PASC. Output speeds—1:1 thru 256:1. Storage medium—1-4 Mbit Random Access Memory. Instantly switchable speed ratios and format types. 32-bit EDAC system for detecting and correcting errors during duplication. System will interface to any slave currently available.

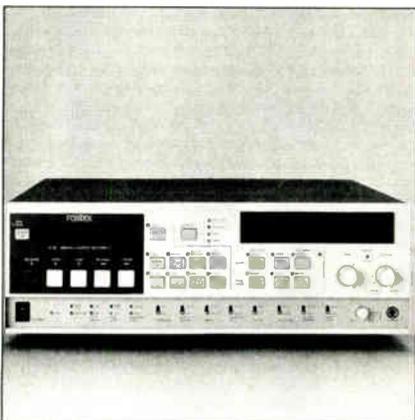
DUPLITRONICS INC.; 160 Abbott Dr.; Wheeling, IL 60090; (708) 459-6610. **Product Name:** MM-100 Master Making System. **Contact:** Jeffrey T. Binder. **Date Product Introduced:** 1991. **Product Description & Applications:** The MM-100 is a dedicated system for larger duplicators who need to increase their daily master production levels. Included with the MM-100

is the high-speed load system, which utilizes a standard S-VHS cassette for archive purposes. Information such as program ID, mastering engineer, program notes as well as myriad other information may be stored on the VHS cassette for recall at the duplication line. **Basic Specifications & Suggested List Price:** Multiply instantly-switchable inputs including SPDIF, AES/EBU, SDIF-2 and analog. Encoding schemes-analog cassette/ 16-bit 44.1kHz encoding, DAT/16-bit 48kHz encoding, DCC™/PASC. Output speeds—1:1 thru 256:1. Storage Medium—1-4 M/bit Random Access Memory. 32-bit EDAC system for detecting and correcting errors during mastering. Post transfer monitor system for verifying program quality from RAM.

EDIFLEX SYSTEMS; 1225 Grand Central Ave.; Glendale, CA 91201; (818) 502-9100. Product Name: Optiflex. **Contact:** Tony Schmitz. **Date Product Introduced:** 4/91. **Product Description & Applications:** The Optiflex is a digital recording system using rewritable optical disks. It replaces the cumbersome 35mm magnetic tape dubbers used on the mixing stage. The Optiflex comes in configurations from 4 channels to 32 channels, mono or stereo. Applications include any situation that requires multitrack synchronous playback for theme park attractions and many more. **Basic Specifications & Suggested List Price:** Analog inputs: +4dBm nominal level, +18dBm maximum level. Balanced differential CMRR 60dB 20Hz. Analog outputs +4dBm nominal level, +18dBm into 600 ohms. Frequency response: 20Hz-18kHz +/- .2dB. 55 Track/minutes per side. Genlock—composite video.

ELECTRO SOUND; 9130 Glenoaks Blvd.; Sun Valley, CA 91352; (818) 504-3820. Product Name: Model 9000. **Contact:** Jim Williams, president. **Date Product Introduced:** 7/91. **Product Description & Applications:** High-speed audio magnetic tape duplication system. This new, cost-effective, ergonomic system features a new master loop bin using a vacuum column servoed tensioning system running at speeds up to 480 ips. The new 9000 slave is a 2-speed dual slave system incorporated in one cabinet using brushless DC servo cont. capstan drives, running at speeds to 240 ips. **Basic Specifications & Suggested List Price:** Duplication ratios (select 2): 32, 40, 64, 80, 128:1.

EVENTIDE INC.; One Alsan Way; Little Ferry, NJ 07643; (201) 641-1200. Product Name: VR240 Digital Audio Logger. **Date Product Introduced:** AES Paris. **Product Description & Applications:** Forsaking the large transports and bulky tape reels of analog designs, the digital VR240 records over 184 hours of audio, divided among 1 to 24 channels, all on a standard DAT tape cassette. The DAT cassette itself is a low-cost, readily available alternative to reel-to-reel. The VR240 is ideal for recording "911" emergency calls, air traffic control, broadcast station logging and telephoned stock transactions. **Basic Specifications & Suggested List Price:** Dimensions: 17" w x 5.2" h x 17.5" d. Weight 25 lbs. AC voltage. 90 to 130 VAC or 180 to 250 VAC. Contact Eventide for pricing info.



FOSTEX CORP. OF AMERICA
Fostex D20 DAT Recorder

FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: Fostex D20 DAT Recorder. **Contact:** Rick Cannata (Fostex Technology); Joyce Jorgenson (PR). **Date Product Introduced:** 10/90. (Updated version). **Product Description & Applications:** DAT digital master recorder, includes 8310, Sony VTR emulation. **Basic Specifications & Suggested List Price:** List price \$8,500. True editing capability; jamsync time code generator built in; direct machine control; extensive synchronizer support; VTR emulation; both IEC code and Fostex T.C.; Fostex update policy.

FOSTEX CORP. OF AMERICA; 15431 Blackburn Ave.; Norwalk, CA 90630; (213) 921-1112. Product Name: G16S & G24S. **Contact:** Joyce Jorgenson, Rick Cannata, Mark Cohen. **Date Product Introduced:** 1991. **Product Description & Applications:** 16 and 24-track recorders: G16S: 16-track recorder w/Dolby S, Sony VTR emulation, integrated synchronizer. G24S: 24-track recorder w/Dolby S, Sony VTR emulation, integrated synchronizer. **Basic Specifications & Suggested List Price:** G16S: \$8,995 (list). G24S: \$14,999 (list).

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G16S & G24S

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Michael Marans- Keyboard May '91

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Dennis Miller- Electronic Musician May '91

"Turtle Beach Systems has a winner here...the 56K offers one of the best ways to enjoy champagne recording quality on a chardonnay budget."

Bob Lindstrom-Computer Shopper June '91

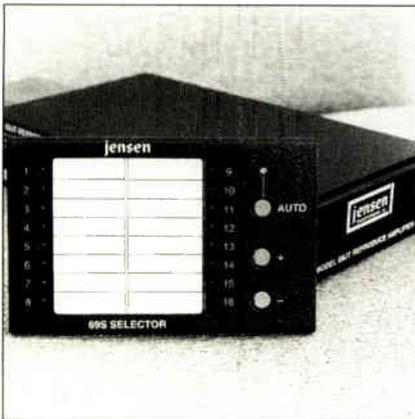
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JENSEN TRANSFORMERS INC.
Jensen 69JT Reproduce Amplifier

JENSEN TRANSFORMERS INC.; 10735 Burbank Blvd., North Hollywood, CA 91601; (213) 876-0059; FAX: (818) 763-4574. **Product Name:** Jensen 69JT Reproduce Amplifier. **Contact:** Dave Hill, VP of operations. **Date Product Introduced:** 2/91. **Product Description & Applications:** The 69JT reproduce amplifier is a high performance exact retrofit for the Magna-Tech 69C, making possible clean, quiet, wide-band film soundtracks. Four "head bump" and two "top end" equalizers allow frequency response to be trimmed so that tracks remain sonically accurate even after several generations of dubbing and noise reduction decoding. Sixteen presets, eight of which are selected automatically as headstacks are changed, eliminate most repetitive and time-consuming gain and EQ adjustments. **Basic Specifications & Suggested List Price:** Frequency response: ± 0.25 dB, 20Hz-20kHz, -3dB at 4 Hz and 40kHz. "Head Bump": EQ: ± 4 dB at 32, 45, 64 and 90Hz. "Top End" EQ: ± 4 dB at 15kHz, ± 10 dB at 20kHz. THD: 0.02% typ, 0.05% max. ± 4 dBu output into 600 ohms @ 1kHz. Noise, "A" weighted: 73dB typ, 70 dB min below 5mV input. Professional net: \$599/channel. (1-24).

KLARK-TEKNIK; 200 Sea Lane; Farmingdale, NY 11735; (516) 249-3660. **Product Name:** DN735. **Contact:** Sam Spennacchio, sales mgr. **Date Product Introduced:** 6/91. **Product Description & Applications:** Digital Stereo Recorder. Internal software allows unit to be controlled by most any video tape editor via RS422 port. Can be used as a "lay off" recorder for stereo videotape editing. Also operates with Abekas A60, 62, 64 digital video devices (under editor control or stand alone) to provide stereo audio which will follow manipulations on the Abekas in real time. **Basic Specifications & Suggested List Price:** Balanced inputs and outputs. Frequency response 20Hz-20kHz ± 0.25 dB. Dynamic range ≥ 93 dB 20Hz-20kHz unweighted. Sampling rate 48kHz. A/D conversion 16-bit, 64x oversampling. D/A conversion 16-bit 4x oversampling. Digital control RS422, remote control GPIB. Storage time up to 175 seconds. \$7,500 retail (44 sec. memory).

KORG USA INC.; 89 Frost St.; Westbury, NY 11590; (516) 333-9100. **Product Name:** Soundlink. **Contact:** Rod Revlock, product manager. **Date Product Introduced:** 10/91. **Product Description & Applications:** The Korg Soundlink is an integrated audio production system that combines an 8-track hard disk recorder/editor with an automated digital mixer complete with equalization and effects processing. Additional functions include a 16-track MIDI recorder/sequencer and full synchronization-to-time code and digital audio signals. System operation is from a hardware-type console. Applications include production and post production sweetening for television and radio commercials, corporate and industrial productions, music production and mastering. **Basic Specifications & Suggested List Price:** 8-track recorder, eight channel mixer, 16-track sequencer, eight analog inputs, ten analog outputs, two channel assignable digital output, 110 minutes of recording time @ 48kHz sample rate, expandable to over 11 hours, 8mm streaming tape back-up system, LTC and VITC timecode inputs, external machine control. Prices start at under \$40,000.

MITSUBISHI (DISTRIBUTED BY NEVE); Berkshire Industrial Park; Bethel, CT 06801; (203) 744-6230. **Product Name:** Mitsubishi X-86E Digital Audio Editing Master Recorder. —LISTING AND PHOTO/LOGO CONTINUED TOP OF NEXT COLUMN



MITSUBISHI (distributed by Neve)
Mitsubishi X-86E Digital Recorder

Contact: Charles Conte, public relations. **Date Product Introduced:** 1/91. **Product Description & Applications:** Mitsubishi X-86E "Razor-edit" 2-channel digital stereo master recorder. Powerful error-correction capabilities and automatic cross-fading techniques (cross-fade times of 2.7, 5.3 and 10.3ms for smooth editing of difficult passages) yield inaudible splices performing better than analog tape-cut editing. Superior aux audio tracks greatly improve cueing system. Internally generated SMPTE/EBU time code (DF, NDF). Also full compatibility with NTSC, PAL and SECAM television standards. With the DIF-2 digital-interface board installed, the X-86E provides two AES/EBU outputs. **Basic Specifications & Suggested List Price:** Freq. response: 20-20kHz ± 0.5 , -1.0dB; 15 ps; 2-hour recording on 14-inch tape reels; 48 or 44.1kHz sampling frequencies; 2 PCM, 2 analog cue, 1 aux digital and 1 time code channel.

NACWESTREX INC.; 1011 W. Alameda Ave., Ste. F; Burbank, CA 91506; (818) 840-6990. **Product Name:** ST-6004 Mag Film Telecine Follower. **Contact:** Dan Garrigan, sales mgr. **Date Product Introduced:** 4/91. **Product Description & Applications:** nacWestrex, working in close cooperation with the leading film-to-tape transfer facilities, has recently introduced the new ST-6004TC Mag Film Telecine Follower. The time-tested Westrex DC servo motor control system, long noted for its speed and agility, has been optimized for fast and accurate synchronizing to modern video transports. Four-channel modular amplifiers supply sound in perfect sync with the picture. With options, up to six channels of audio may be recorded or transferred. **Basic Specifications & Suggested List Price:** The ST-6004TC is supplied complete and ready to use. Reel arms and flanges allow quick loading and unloading of film. Two Tecon headstack assemblies are included. Economies realized by a standard configuration will be passed on to the user.

NEW ENGLAND DIGITAL CORP.; Rivermill Commercial Center; Lebanon, NH 03766; (603) 448-5870. **Product Name:** The DSP Option for the PostPro. **Contact:** Ted Pine, vp marketing and product development. **Date Product Introduced:** 12/91. **Product Description & Applications:** The DSP Option provides real-time, channel multitrack digital signal processing capabilities for the PostPro, PostPro SD and Direct-to-Disk family of workstations. Based on a multiple 68020/56000 processors and incorporating multiple 32-bit data buses, the DSP Option offers on-board mixing capabilities including five-band parametric EQ with switchable shelving, panning, summing, gain control and digital crossfades. 32, 44.1, 48 and 50 kHz and drop-frame sampling rates are supported. I/O options include eight channel 18-bit D/As, SDFI-2 and SDFI-M modules. Mac-based AudioMation™ mixing software, which may be controlled from any MIDI fader module, provides 8 or 16 channel strips with processing available on all channels simultaneously, plus four mono sends and returns configurable as stereo, and four mix buses. **Basic Specifications & Suggested List Price:** The DSP Option provides an 8 or 16 channel digital direct digital bus to the PostPro, 8 or 16 18-bit D/As and optional SDFI-2 and SDFI-M I/O modules. AudioMation™ mixing software. List price depends on channel and I/O configuration.

PANASONIC/RAMSA COMMUNICATIONS & SYSTEMS CO.; 6550 Katella Ave.; Cypress, CA 90630; (714) 373-7278. **Product Name:** Panasonic SV-3900 Pro-DAT. **Contact:** Steve Woolley, national sales & marketing mgr. **Date Product Introduced:** 11/90. **Product Description & Applications:** The Panasonic SV-3900 Pro-DAT features a fully implemented serial control interface for external remote operation of all transport and programming modes, requiring few front-panel controls. The SV-3900's standard nine-pin serial port can be switched to follow ES-BUS or P-2 protocols. For more information, call (714) 373-7278. **Basic Specifications & Suggested List Price:** SV-3900: \$2,100; Remote: \$400.

PLASMEC SYSTEMS LTD.; Weydon Lane; Farnham, Surrey, GU9 8QL UK; +44 (0)252 721 236; in USA, call (213) 393-00; Telex: 14. **Product Name:** ADAS. **Contact:** Simon —LISTING AND PHOTO/LOGO CONTINUED TOP OF NEXT COLUMN



PANASONIC/RAMSA COMMUNICATIONS
Panasonic SV-3900 Pro-DAT

Stannard-Powell, applications manager. Date Product Introduced: 12/90. **Product Description & Applications:** The ADAS family have all been designed with the same philosophy—to provide affordable high quality audio hard disk recording and editing. The ADAS-ST and ADAS-Mc work with the most popular music computers and can record and play back from within the major sequencer programs. The ADAS-PC operates in a Windows environment and offers networked audio with proven technology at an affordable price. The Stand-Alone ADAS needs no external computer. **Basic Specifications & Suggested List Price:** Record and play at 44.1 and 48kHz sample rates, full linear 16-bit quality stereo. ADAS for use with Atari—£715 exc VAT; ADAS for use with Macintosh—£715 VAT; ADAS board for use with PCs—from £715 exc VAT; ADAS Stand-Alones—from £2,000 exc VAT.

RADIO SYSTEMS INC.; PO Box 458; Bridgeport, NJ 08014; (609) 467-8000, ext. 110. **Product Name:** RS-2000 Cart Machine. **Contact:** Paul McLane, sales manager. **Date Product Introduced:** 10/90. **Product Description & Applications:** Audio cart machine with flutter and phase correction, available in record/play and play-only configurations. Each model also includes built-in splice detector, timer, fast-forward, three cue tones, cart-not-cued, lockout, front-panel azimuth adjustment, XLR audio connectors, full remote control. **Basic Specifications & Suggested List Price:** Stereo record/player \$2,895. Only available from factory. S/N Stereo—56 dB minimum (at 7.5 ips). Crosstalk within 50 dB minimum separation at 1 kHz. Max input level +26 dBm (balanced).

RADIO SYSTEMS INC.; PO Box 458; Bridgeport, NJ 08014; (609) 467-8000, ext. 110. **Product Name:** RS-700 DAT machine. **Contact:** Paul McLane, sales manager. **Date Product Introduced:** 2/91. **Product Description & Applications:** Sony/Radio Systems DAT machine with pro features, including cue-to-cue, audio mute, end of message (EOM) functions, fast re-cue, balanced I/O, remote connector, playback at 32/44.1/48kHz. **Basic Specifications & Suggested List Price:** RS-700—\$1,295 only available factory-direct. DAT performance specifications. Full brochure and specs available from Radio Systems.

RECORDEX CORPORATION; PO Box 848; Swainsboro, GA 30401; (912) 237-5501. **Product Name:** 334 WP Stereo Duplicator. **Contact:** Plant. **Date Product Introduced:** 10/90. **Product Description & Applications:** Stereo high-speed cassette duplicator. Reproduces 3 or more 60-minute cassettes in approximately two and one half minutes. Auto rewind, erase heads, end of tape warning lights and reliable VU meters. **Basic Specifications & Suggested List Price:** Reproduce church music, teaching and any other application where high speed cassette duplication is needed.

ROLAND PRO AUDIO/VIDEO GROUP; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141 x337. **Product Name:** DM-80 Multi-track Hard Disk Recording System. **Contact:** Bob Todrank. **Date Product Introduced:** 1/91. **Product Description & Applications:** The DM-80 is available in 4-/8-track configurations (expandable to 32 tracks) and allows simultaneous recording on all tracks. The sampling rates are 48kHz, 44.1kHz and 32kHz. There is a built-in 24-bit digital mixer with two-band digital EQ. Sync to external devices as either master or slave using SMPTE, MTC or MIDI. Choice of remote graphic editor/autolocator or Track Manager software for the Mac, AES/EBU digital I/O (Pro and consumer level) and analog I/O with 16-bit A/D and 20-bit D/A conversion. Non-destructive random-access editing, cut and paste with multiple clipboards and auto punch in/out. **Basic Specifications & Suggested List Price:** Suggested retail price: DM-80-8, 8-track version, \$9,995; DM-80-4, 4-track version, under \$6,995; DM-80-R Remote Controller, \$1,995; DM-80-F, fader unit \$1,695; Track Manager Mac software \$695.

SATURN RESEARCH; Unit 3A, 6-24 Southgate Rd.; London, N1 3J UK; 71 923 1892. **Product Name:** Saturn 624. **Contact:** Julian Blyth, marketing director. **Date Product Introduced:** 2/91. **Product Description & Applications:** A high

performance 2" 24-track providing the 14" format and Saturn quality for lower recording budgets. Standard features include session remote with cue marking, locate cue, cycle cue, locate zero and locate fast play position; 400 ips spooling, +/-50% high resolution varispeed. Long life record heads, exceptional frequency response and audio purity. Optional autolocate remote. Interfaces for external noise reduction, machine control and record control. **Basic Specifications & Suggested List Price:** U.S. list price: \$35,000. "Saturn Direct" price: \$26,000.

SATURN RESEARCH; Unit 3A, 6-24 Southgate Rd.; London, N1 3JJ UK; 71 923 1892. **Product Name:** Saturn 824. **Contact:** Julian Blyth, marketing director. **Date Product Introduced:** 11/90. **Product Description & Applications:** A high performance 2" 24-track with 14" capacity featuring remote digital alignment and fully automatic record calibration. A full-function automatic remote, providing 24 illuminated VU meters with alignment zoom, and user programmable keys, is standard. Spooling is user definable up to 600 ips. The Saturn 824 is renowned for audio purity and exceptionally wide frequency response and can be fully interfaced to external noise reduction, machine control and record control. **Basic Specifications & Suggested List Price:** U.S. list price—\$45,000. "Saturn Direct" price—\$33,000.

SONY BUSINESS & PROFESSIONAL PRODUCTS; 3 Paragon Dr.; Montvale, NJ 07645; (201) 930-1000. **Product Name:** PCM-7000 Series Timecode DAT recorder. **Contact:** Courtney Spencer, vp audio. **Date Product Introduced:** 4/91. **Product Description & Applications:** The PCM-7000 Series timecode DAT recorder is designed to meet the requirements essential to a variety of applications including video editing/audio post production applications. The PCM-7000 series machines' four-head design permits confidence monitoring during recording. The PCM-7000 series exhibits the superior specifications associated with digital audio performance.



SPECTRAL SYNTHESIS INC.
Audio Engine 450 Series

SPECTRAL SYNTHESIS INC.; 18568 142nd Ave. NE; Woodinville, WA 98072; (206) 487-2931. **Product Name:** Audio Engine 450 Series. **Contact:** Ron Bradshaw. **Date Product Introduced:** 8/91. **Product Description & Applications:** Complete integrated digital audio workstation for multitrack hard disk recording/editing up to 16 tracks simultaneously. Systems include built-in digital mixer, 16-bit sampling, effects processing and high-speed editing, all in the digital domain. **Basic Specifications & Suggested List Price:** '386 and '486 based systems are available with a variety of options. Systems range from basic 4-track to 16-track; up to 14 track-hours of recording at 44.1 kHz.

STELLAVOX DIGITAL AUDIO TECHNOLOGIES; c/o IAT Ltd., 13897J Willard Rd.; Chantilly, VA 22021; (703) 378-1515. **Product Name:** Stellamaster™ Studio R-DAT Recorder. **Contact:** Bill Peligh, director IAT Ltd. **Date Product Introduced:** 9/91. **Product Description & Applications:** Versatile, modular studio R-DAT recording system built in a rack mount frame. May be configured to handle virtually any studio R-DAT need, including: four head record and playback, simultaneous double 4-head recording, synchronized 4-track record and playback, editing with a single dual-transport machine, real time tape copy, multiple real time copies using several machines, auto tape test during single tape recording, automatic uninterrupted broadcast. **Basic Specifications & Suggested List Price:** Prices to start approximately at \$9,000 based on modules and accessories chosen.

STUDER REVOX AMERICA INC.; 1425 Elm Hill Pike; Nashville, TN 37210; (615) 254-5651. **Product Name:** D740 CD Recorder. **Contact:** Dave Bowman, director of professional products. **Date Product Introduced:** 4/91. **Product Description & Applications:** Featuring Write-Once optical media in a completely self-contained unit, the D740 allows easy installation and integration into recording studios, mastering suites and audio post rooms. Superior "Studer" sound is achieved through the excellent A-D/D-A converters, and the D740's logically arranged keyboard offers convenient opera-



STUDER REVOX AMERICA INC.
D740 CD Recorder

tion, fast accurate cueing and easy access to commands. A table of contents including exact running times and track numbers is generated by the built-in PC editor. CDRs may be played back on any standard 15 format pro CD players or consumer models. **Basic Specifications & Suggested List Price:** Frequency Response: 20Hz-20kHz +/-0.2dB (record/playback); Phase Linearity: < +/-3 deg. (20 Hz-20kHz) (record/playback); Maximum output level: +24dBm into 600 Ohm load, balanced and floating; Maximum input level: +24dBm; Converter technology: Bitstream in differential mode; Sampling Frequency: 44.1kHz. Digital I/O: Optical, RCA or XLR connections; Data format: SPDIF and AES/EBU; Maximum recording time: 74 minutes.; Fully compatible: Red Book and Orange Book (part II) standards.

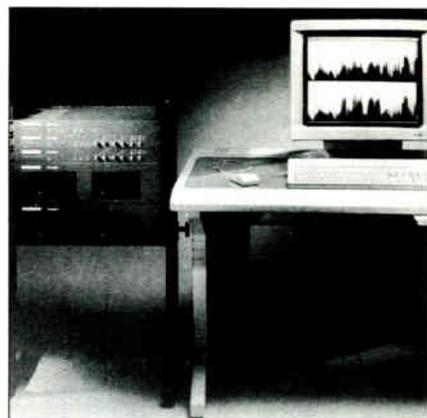


STUDER REVOX AMERICA INC.
Studer D820-48 48-Track Digital Recorder

STUDER REVOX AMERICA INC.; 1425 Elm Hill Pike; Nashville, TN 37210; (615) 254-5651. **Product Name:** Studer D820-48 48-Track Digital Recorder. **Contact:** Dave Bowman, director of professional products. **Date Product Introduced:** 4/91. **Product Description & Applications:** With the 40-second, 4-channel RAM based, internal sound memory, Studer's D820-48 offers highly advanced digital editing. Extremely low-noise A/D converters and passive filters complement the excellent performance of the 4-times oversampling D/A converters to deliver state-of-the-art digital sound recordings. Comprehensive remote functions include channel control, autolocator with synchronizer, and interface for parallel channel control from a mixing console. Two of the D820's four aux tracks can be used as cue tracks. **Basic Specifications & Suggested List Price:** DASH format 48-track digital audio with four auxiliary channels; full compatible with all 24-track DASH tapes; built-in 40-second sound memory; Digital input/output: AES/EBU, MADI, SDIF-Multi; audio memory for editing; DSP based signal processing for crossfading, switching and error correction; built-in synchronization/code generator; built-in test signal generator. S239.D) including full autolocator and remote functions.

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STUDER REVOX AMERICA INC.
Studer Dyaxis Magneto Optical Drive

STUDER REVOX AMERICA INC.; 1425 Elm Hill Pike; Nashville, TN 37210; (615) 254-5651. **Product Name:** Studer Dyaxis Magneto Optical Drive. **Contact:** Dave Bowman, director of professional products. **Date Product Introduced:** 4/91. **Product Description & Applications:** A host of new Dyaxis features are being introduced and shown for the first time at AES including the 600 Meg removable magneto optical hard drive, which yields approximately one hour of studio recording in addition to being a convenient exchange medium between several Dyaxis workstations. Other advantages include instant random access to multiple ongoing projects without reloading or re-re-ordering soundfiles and critical editing information, and long-term storage of very large amounts of digital data such as complete music libraries. **Basic Specifications & Suggested List Price:** Studer Dyaxis Magneto Optical Drive allows users the ability to record sound files on the optical and put mix files on the hard disk. This eliminates having to back-up the sound files from the hard disk as they will already be recorded on the removable optical platter. The optical drive can be easily added to an existing Dyaxis System.

360 SYSTEMS; 18740 Oxnard St.; Tarzana, CA 91356; (818) 342-3127. **Product Name:** DigiCart DCR-1000. **Contact:** Don Bird, dir. of mktg. **Date Product Introduced:** 8/91. **Product Description & Applications:** Digital audio cart recorder/producer. Random access to multiple audio files stored on removable media and/or optional fixed hard disks. Instant start time of any cue-cut, automatic follow-on play, play-listing, non-destructive editing features. **Basic Specifications & Suggested List Price:** Suggested list price for Model DCR-1000 DigiCart: \$3,995.

WAVEFRAME CORPORATION; 2511 55th St.; Boulder, CO 80301; (303) 447-1572. **Product Name:** AudioFrame & CyberFrame. **Contact:** Susan Sloatman, mktg. comm. mgr. **Date Product Introduced:** Summer 1991. **Product Description & Applications:** Exciting new software has been released for both the AudioFrame and the CyberFrame digital audio workstations. Based on the new Microsoft Windows 3.0 environment, both the CyberFrame 3.0 release and the AudioFrame 5.0 release include new features. CyberFrame 3.0 introduces support for removable optical disk drives and the new DSP-X digital mixer and I/O module. AudioFrame 5.0 introduces support for the new multichannel digital interface module, as well as time-compression and real-time punch on the fly recording. **Basic Specifications & Suggested List Price:** CyberFrame 3.0—\$400; AudioFrame 5.0—\$400; Microsoft Windows—\$150.

WAVEFRAME CORPORATION; 2511 55th St.; Boulder, CO 80301; (303) 447-1572. **Product Name:** CyberFrame. **Contact:** Susan Sloatman, mktg. comm. mgr. **Date Product Introduced:** Spring 1991. **Product Description & Applications:** Removable optical disk combines the instant access and flexibility of hard disk for archiving and editing with the convenience and portability associated with tape-based systems. Two tracks of direct audio record and three tracks of audio playback per drive. Can be combined with conventional hard disks. Each drive provided 500MB of audio storage on each side of dual-sided media. **Basic Specifications & Suggested List Price:** Removable Optical Disk Drive—\$7,250 (description above); Removable Optical Blank Media—\$395 stores 500 MB of audio per side; Removable Optical Expansion Rack—\$1,495 holds up to 16 drives.

WHEATSTONE CORPORATION; 6720 VIP Parkway; Syracuse, NY 13211; (315) 455-7740; FAX: (315) 454-8104. **Product Name:** Wheatstone Radio/TV Hard Disk. **Contact:** Ray Esparolini, national sales director. **Date Product Introduced:** 9/91. **Product Description & Applications:** Wheatstone-Not-So-Hard Disk digital audio program library for on-air broadcast. RDM based system supports simultaneous on-air and production room record terminals; with footpedal DJ playback console, mirror drive back-up, networking capability, and console interface (allows tracks or auto-sequence groups to be fired directly from audio console on/off buttons). Can play four stereo tracks simultaneously, supports up to 40 hours of digital quality stereo audio.



YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.
DMR8 Digital Mixer/Recorder

YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.; PO Box 6600; Buena Park, CA 90620; (714) 522-9011. **Product Name:** DMR8 Digital Mixer/Recorder. **Contact:** Peter Chaikin, sales & marketing manager. **Date Product Introduced:** 8/91. **Product Description & Applications:** Integrated all-digital system for exceptionally high quality recording and mixdown. Built in 20-bit digital 8-track recorder with dedicated time code track. 24-input digital console with dynamic automation and snapshot recall of all parameters. 3 on-board effect processors plus 10 line effects. Digital outputs to AES/EBU and CD-DAT devices. Analog outputs for control room monitors and cue

sends. Time code generator and synchronization on board. 24-track mixdown with external DRU8 recorder units. **Basic Specifications & Suggested List Price:** Suggested retail \$34,000. Recorder: 20-bit stationary head, uses Yamaha M20P tape. Dynamic range: 120dB. Freq. response 20Hz-20kHz. Mixer section 24-bit digital inputs, motorized faders, output formats for control room, cue send, stereo bus: Yamaha, AES/EBU, CD-DAT and analog. A/D converters (external): AD8X 19-bit delta sigma encoding.



YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.
DRU8 Digital 8-track

YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.; PO Box 6600; Buena Park, CA 90620; (714) 522-9011. **Product Name:** DRU8. **Contact:** Peter Chaikin, sales & marketing manager. **Date Product Introduced:** 8/91. **Product Description & Applications:** 20-bit digital 8-track recorder provides 120dB dynamic range, 3 rack space transportable unit, eight digital PCM audio tracks, two aux tracks and time code track built in. 8x2 mixer, multiple units may be slaved to provide more tracks, sync-to-time code or MTC. Optional: RC8 remote control. AD8X A/D converter. DA8X D/A converters. **Basic Specifications & Suggested List Price:** Retail \$22,000. Stationary head transport; sampling frequency: 48kHz, 44.1kHz, 32kHz. Variespeed +/-10%, freq. response 20Hz-20kHz. Dynamic range 120dB, wow and flutter undetectable. I/O formats:

Yamaha, other formats with FMC8 converter. Recording time 22 minutes using Yamaha M20p tapes.



YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.
YPDR601 Compact Disc Recorder

YAMAHA CORP OF AMERICA/PRO DIGITAL PROD.; PO Box 6600; Buena Park, CA 90620; (714) 522-9011. **Product Name:** YPDR601 Compact Disc Recorder. **Contact:** Peter Chaikin, sales & marketing manager. **Date Product Introduced:** 8/91. **Product Description & Applications:** A fully self-contained compact disc recording system using optical WORM discs. Two record modes permit recording to be paused or stopped and later resumed. One recording mode unique to YPDR permits playback of partially recorded discs on any standard CD player. All discs created on YPDR are full Red Book compatible. YPDR consists of YPDR601 Recorder and RC601 Remote controller. Applications include radio play list, spots, PSR, sound FX libraries, audio production, demo disc and reference dubs. **Basic Specifications & Suggested List Price:** Records up to 63 minutes of audio on one disc. Accepts AES/EBU and SDIF-2 (CD Prep) digital inputs +4dBu/-10dBu. Balanced analog inputs with level trim. Outputs include balanced analog and AES/EBU. Externally controllable via serial D2 and parallel control protocols. RC601 controls up to seven YPDR601 recorders simultaneously. Retail price \$20,000.

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Signal Processing Devices

AGM DIGITAL ARTS LIMITED; 14-16 Deacons Ln.; Ely, Cambs., CB7 4PS United Kingdom; 011-(44) 353-667707. Product Name: CSP "A" Series Surround Sound Processors. Contact: Anthony Morris. Product Description & Applications: A complex hybrid performance surround sound system incorporates AGM CSP-Enhanced Ambisonic Processing. Encodes and decodes surround sound tracks. Encoding encompasses full-stereo compatibility with phase-coherent summing to mono. Usage in live performances, theatre, cinema, disco and smaller systems for domestic usage and studio. Basic Specifications & Suggested List Price: Systems (processors) for 4 thru 16 channel speaker matrices. Prices range from pounds sterling 2,000 thru 16,000. All highest specifications. Fully balanced I/O, etc.

ALESIS CORPORATION; 3630 Holdrege Ave.; Los Angeles, CA 90016; (213) 467-8000. Product Name: Quadraverb GT. Contact: Ralph Goldheim, VP sales/mktg. Date Product Introduced: 1/91. Product Description & Applications: Simultaneous guitar effects processor featuring an analog preamp section for guitar zone building plus the digital effects of the popular Quadraverb. Analog preamp includes compression, distortion, overdrive, cabinet simulators, bass boost and tone curves, and a noise gate. Digital effects include reverb, delay, chorus/flange, parametric EQ, multitap, graphic EQ and resonators. Basic Specifications & Suggested List Price: 16-bit digital, 20kHz bandwidth, 100 programs. Fully programmable. Extensive MIDI implementation, MIDI modulation. Stereo in/out on 1/4" jacks. Programmable effects loop. Retail price \$599.

APHEX SYSTEMS

APHEX SYSTEMS
9000 Series—Modular Signal Processing

APHEX SYSTEMS; 11068 Randall St.; Sun Valley, CA 91352; (818) 767-2929. Product Name: 9000 Series—Modular Signal Processing. Contact: Paul Freudenberg. Date Product Introduced: 7/91. Product Description & Applications: The Aphex 9000 Series consists of an unpowered 11-slot rack that fits in 3 rack units. A separate power supply is available. Signal processing modules available currently include the 9251 Aural Exciter, 9301 compeller, 9611 expander/gate, and 9651 expessor. Aphex will continue to make our special processing in modular cards as well as producing new modules for this format. Basic Specifications & Suggested List Price: 9251—\$449; 9301—\$549; 9611—\$449; 9651—\$449; 9000R—\$349; 9000PS—\$499.

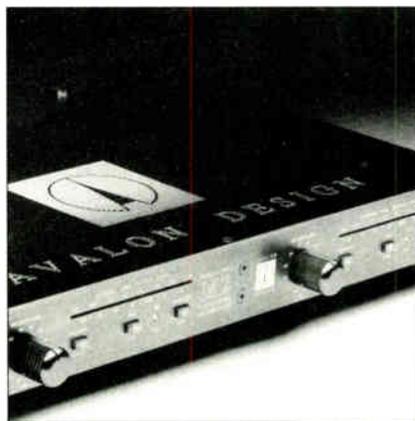
APOGEE ELECTRONICS CORP.; 2103 Main St.; Santa Monica, CA 90405; (213) 399-2991. Product Name: AD-500. Contact: Betty Bennett. VP sales. Date Product Introduced: 7/10/91. Product Description & Applications: The AD-500 is a general-purpose stereo analog-to-digital converter that combines a high-quality analog "front end" with Delta Sigma Conversion Technology. It provides unmatched sonic performance with full 18-bit resolution, but is optimized for all 16-bit

applications such as DAT Recorders, disk-based audio workstations, and CD mastering. Basic Specifications & Suggested List Price: List price: \$1,395

APOGEE ELECTRONICS CORP.; 2103 Main St.; Santa Monica, CA 90405; (213) 399-2991. Product Name: DA-1000-E. Contact: Betty Bennett, VP sales. Date Product Introduced: 6/91. Product Description & Applications: The DA-1000-E is a portable, reference-standard digital-to-analog converter providing various professional interfaces including AES/EBU, SPDIF, SD F-I, SDIF II, Pro Digi I & II, Yamaha, NED and JVC. It provides accurate, uncolored monitoring utilizing dual 20-bit converters optimized for 16-bit performance. Applications include mastering incorporating various two-track machines, digital audio workstations, DAT machines and multitracks. Basic Specifications & Suggested List Price: List price \$1,695.

ARX; PO Box 842; Silverado, CA 92676; (714) 649-2346. Product Name: Alterburner. Contact: Algis Renkus. Date Product Introduced: 7/91. Product Description & Applications: Dual-channel compressor/limiter. Balanced in and out. Can be used as mono dual-band for separate dynamics control for low and high frequencies. Enhances frequency response. Basic Specifications & Suggested List Price: Output +22 dB, signal/noise ratio -85 dB unweighted, freq. res. 20Hz 20kHz + 25 dB. Distortion 1 kHz - 4 db. 0.25%

AUDIO CONTROL INDUSTRIAL; 22313 70th Ave. W.; Mountlake Terrace, WA 98043; (206) 775-8461. Product Name: PCA-200. Contact: Rick Chinn, sales mgr. Date Product Introduced: 10/91. Product Description & Applications: Industrial strength version of our award-winning, patented Phase Coupled Activator. The PCA-200 is a bass enhancement/restoration system designed for live sound, recording, or DJ applications. Applications, dance music, live sound, Recording, Foley/SFX, video remix, broadcast. Basic Specifications & Suggested List Price: Balanced inputs and outputs (+4dBu, TRS), unbalanced inputs and outputs (-10dBu, RCA), side chain (0dBu, TRS unbalanced). Output bandlimiting controls (HF and LF); mix control. Clip LED. Output noise better than -90 dBu, A wtd.

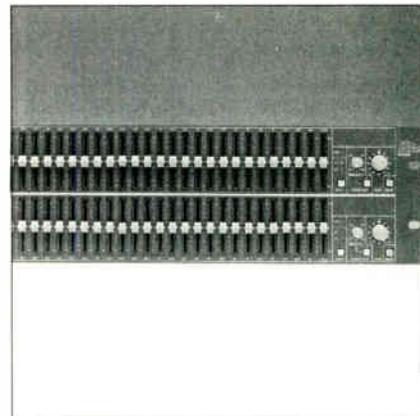


AVALON DESIGN
Avalon Design M2 Microphone Preamplifier

AVALON DESIGN; PO Box 948; Neutral Bay Junction NSW, 2089 Australia; (02) 958-5457. Product Name: Avalon Design M2 Microphone Preamplifier. Contact: Wyton R. Morro, director. Date Product Introduced: 3/91. Product Description & Applications: The Avalon M2 stereo microphone pre amplifier uses advanced, fully discrete, pure class "A" electronics to provide maximum sonic performance. Designed for professional music and dialog recording. Applications include classical music recording, ADR film sound, high-voltage power supplies provide very large signal handling capability. Features include phase reverse, phantom power, -200dB attenuator.

Basic Specifications & Suggested List Price: Input impedance, 1500 ohms balanced transformer. +30dB headroom, -126 dB low noise, DC-1MHz bandwidth, fast response LED signal metering, symmetrical Class A operation at all levels, 75 volts per microsecond slew rate. Dimensions IU 19x1.75x 14.7 inch. 15 lbs.—weight.

BROADCAST DEVICES INC.; 5 Crestview Ave.; Peekskill, NY 10566; (914) 737-5032. Product Name: Modular mic/line amplifier series. Contact: Bob Tarsio. Date Product Introduced: 5/91. Product Description & Applications: A complete line of modular microphones and line amplifiers for use in outboard applications or as stand-alone systems. We manufacture a variety of amplifiers which run off of single or dual rail supplies. All microphone preamps use Jensen-input transformers for low overshoot and superior common-mode performance. Basic Specifications & Suggested List Price: Typical specs for microphone preamps: S/N: better than 70dB below nominal. THD: <.1% of response. .25% from 20Hz to 20kHz. Line amps: S/N: better than 80dB below nominal. THD: <.1% response. .25dB from 20Hz to 20kHz. Prices for mic preamps \$179-\$199; line amps \$99-\$375.



BSS AUDIO
FCS-960

BSS AUDIO; 1525 Alvarado St.; San Leandro, CA 94577; (415) 351-3500. Product Name: FCS-960. Contact: Dave Talbot, national sales mgr. Date Product Introduced: 4/91. Product Description & Applications: The FCS-960 is a dual-channel 31-band graphic equalizer with switch selectable wide or narrow filter bandwidths, making it suitable for both sweetening and room correction. It features long (45mm) slider throw for precise adjustment, and specially contoured slider knobs, which eliminate parallax errors across a wide viewing angle and are easily manipulated without disturbing adjacent settings. Each channel of the FCS-960 features a sweepable 18dB/octave highpass filter, gain adjustment and bandwidth and bypass selections. Inputs and outputs are electronically balanced and floating. Basic Specifications & Suggested List Price: The FCS-960 has a suggested professional user net price of \$1,495.



CAMBRIDGE SIGNAL TECHNOLOGIES
AEC 1000

CAMBRIDGE SIGNAL TECHNOLOGIES; 1 Kendall Square Bldg. 300; Cambridge, MA 02139; (617) 225-2499. Product Name: AEC 1000. Contact: Burke Marthes, president. Date Product Introduced: 1991. Product Description & Applications: New technology for compensation of loudspeaker/room interaction, delivering incredibly accurate tonal balance and stereo imaging. Automatically measures direct sound and room reflections. Adaptively designs precise FIR digital filter. Compensates separately for early response and delayed reflections.

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Makes up to 100 corrections within an octave band. **Basic Specifications & Suggested List Price:** 19" X 2U rack mount. Input/output: analog—L&R balanced XLR-3, unbalanced RCA; sensitivity, -10 dBm to +24 dBm; digital—AES/EBU, S/PDIF (RCA), A/D: 18-bit, 64x oversampling @ 44.1 & 48kHz, D/A: 18-bit, 8x oversampling. Filters: 2 X 2600 tap FIR, 48-bit precision. Full feature remote control.

CANARE; 511 5th St., # G; San Fernando, CA 91340; (818) 365-2446. Product Name: BCJ-JX-TR; BCJ-XR-TR. **Contact:** Barry Brenner, GM. **Date Product Introduced:** 6/91. **Product Description & Applications:** For AES/EBU digital audio inputs/outputs. Converts 110 ohms XLR interface to 75 ohms BNC transmission line. Permits easy and cost-effective relay of two-channel digital audio signals via common 75 ohm coax and video patch bays. **Basic Specifications & Suggested List Price:** Voltage: 5Vp-p. Cable distance: >2,000 meters. VSWR: <1.1. Return loss: >26dB. Suggested list price: @ \$50.

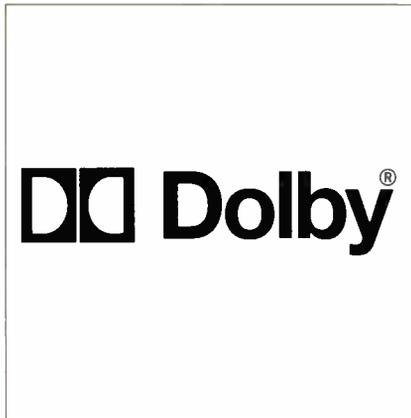
DIGITAL AUDIO RESEARCH LTD.; 2 Silverglade Business Park; Leatherhead Rd., Chessington; Surrey, KT9 2QL England; +44 0372 742848. Product Name: DASS 100. **Contact:** Jeff Bloom, sales and mktg. dir. **Date Product Introduced:** 6/91. **Product Description & Applications:** The newly enhanced DASS 100 is an easy-to-use, multifunction digital audio interface, sampling frequency converter and signal processor. It enables engineers to keep audio in the digital domain while transferring between different pieces of equipment; provides essential signal processing functions and, in short, solves the interface problems that arise in digital studios. DASS 100's comprehensive functions include digital audio sample synchronization, gain adjustment, bit flag display, and set, mixing and test signal generation. **Basic Specifications & Suggested List Price:** Sampling frequency conversion between any two frequencies: 29Hz to 53kHz with 24-bit performance; format conversion between AES, SDIF-2 and SPDIF interface standards; generate audio sample clocks from video, AES, WSYNC and LTC; pre- and de-emphasis; signal generation to 24-bit accuracy; DC removal; gain adjustment; routing selection; time delay.

DIGITAL INTEGRATION; 3530 Forest Lane, #38; Dallas, TX 75234; (214) 350-2230; FAX: (214) 350-6344. Product Name: SRC-1000. Universal Digital Sample Rate Converter. **Contact:** William R. Sink, marketing. **Date Product Introduced:** 5/91. **Product Description & Applications:** New from Digital Integration (Dallas, Texas) is the SRC-1000, an affordable, universal, digital sample rate converter for digital audio. The SRC-1000 converts the sampling frequency in real time, entirely in the digital domain, eliminating A/D and D/A conversion degradation. A typical use of the SRC-1000 is in the video post production environment, to dub sound effects from compact disc (at 44.1 kHz) to the audio tracks on digital videotape (at 48 kHz). **Basic Specifications & Suggested List Price:** The SRC-1000 will convert between any two digital signals whose sampling frequencies are within the range of 30 kHz to 50 kHz. The real time implementation of sample rate conversion (synchronous/asynchronous) is highly accurate, with professional AES/EBU format for I/O interconnection to other digital audio equipment.

DOLBY LABORATORIES INC.; 100 Potrero Ave.; San Francisco, CA 94103-4813; (415) 558-0200. Product Name: DP5500 Series DSTL™. **Contact:** Nancy Byers, studio applications mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** 950 MHz Digital Studio-to-Transmitter Link; 2 audio channels and 2 auxiliary channels in less than 300kHz of RF spectrum. Dolby AC-2 audio coding with state-of-the-art modem and RF technologies for contribution quality audio and robust and spectrum-efficient RF performance.

DOLBY LABORATORIES INC.; 100 Potrero Ave.; San Francisco, CA 94103-4813; (415) 558-0200. Product Name: Model 430. **Contact:** Nancy Byers, studio applications mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** New background-noise-suppression system based on a modified version of Dolby SR, in a similar manner to the way the Cat. No. 43 uses Dolby A-type. Designed to assist film and video-post production users to reduce unwanted background noises present in field recordings. Modular systems that can be configured to provide from one to six channels of background noise suppression. **Basic Specifications & Suggested List Price:** Each system requires a single 1U high 430 Series control unit and appropriate number of processing modules housed in 1-U high two-channel frames. All user controls located on remote fader units designed to mount easily in most consoles.

—SEE PHOTO/LOGO TOP OF NEXT COLUMN



DOLBY LABORATORIES INC.
Model 430

DOLBY LABORATORIES INC.; 100 Potrero Ave.; San Francisco, CA 94103-4813; (415) 558-0200. Product Name: Model DP501/DP502 Audio Coding Units. **Contact:** Nancy Byers, studio applications mgr. **Date Product Introduced:** 10/91. **Product Description & Applications:** Two-channel encoder/decoder units to provide professional-quality audio at 128 kbits/sec per channel (one sixth the rate of 48k samples/sec 16-bit PCM). Ideal for transmission systems requiring both high audio signal transparency and low, spectrum-efficient data rates. Applications: satellite subcarrier, band edge and SCPC schemes, and terrestrial microwave and telecommunications. (T-1) links. **Basic Specifications & Suggested List Price:** Data rate: 128 Kbits/sec per channel. Frequency response: 20Hz to 20kHz +/-0.2dB. Dynamic range: greater than 90dB.

DW LABS INC.; PO Box 882; Millburn, NJ 07041; (201) 376-8453. Product Name: Superconductor-variable volume. **Contact:** Jeff Davis, manager. **Date Product Introduced:** 10/90. **Product Description & Applications:** The Superconductor variable volume is a buffering preamplifier offering up to +12dB of gain controlled by a potentiometer. Total harmonic distortion of .003% and a signal to noise ratio of -105 provide high-quality preamplification in a small durable package. **Basic Specifications & Suggested List Price:** +12dB gain, .003% THD, -105 S/N. List price \$95.

ESE; 142 Sierra St.; El Segundo, CA 90245; (213) 322-2136. Product Name: ES-244. **Contact:** Brian Way, marketing mgr. **Date Product Introduced:** 4/15/91. **Product Description & Applications:** ESE announces the ES-244 (4x4 audio level interface) Bi-Directional I/F to Pro Level/Impedance Interface. This is the ideal way to interconnect semi-pro equipment with professional studio gear. The 4x4 is a bi-directional unit with four independent amplifiers providing full stereo input and output interfacing, RF shielding and output level adjustments. **Basic Specifications & Suggested List Price:** List price is \$179. Single or dual rack-mount panel option \$35.

ESE; 142 Sierra St.; El Segundo, CA 90245; (213) 322-2136. Product Name: ES-246. **Contact:** Brian Way, marketing mgr. **Date Product Introduced:** 4/15/91. **Product Description & Applications:** ESE has added the ES-246 Quad 1x6 audio distribution amplifier to its line of audio and video distribution amplifiers. The ES-246 comes standard with balanced inputs and outputs via terminal block connectors, or the optional XLR connector rear panel can be specified. This transformerless design takes a single input and provides six balanced outputs. If unbalanced outputs are desired, up to 12 separate and isolated feeds can be made for each input. The output levels for each of the four inputs are set via the four pots on the front panel. **Basic Specifications & Suggested List Price:** Gain: +20dB maximum; Input: balanced or unbalanced; 600 or 100k ohms (switchable) +21 dbm maximum input level; Output: 600 ohms balanced or unbalanced +23 dbm maximum output level; Response: 20 - 20000 Hz, +/-0.25dB. Suggested list price is \$395. XLR option is an additional \$200.

ESOTERIC SOUND; 4813 Wall Bank Ave.; Downers Grove, IL 60515; (708) 960-9137. Product Name: Re-equalizer. **Contact:** Mike Stosch, owner. **Date Product Introduced:** 1/91. **Product Description & Applications:** Provides non-RIAA phone equalization for transferring vintage records. **Basic Specifications & Suggested List Price:** Freq. resp.: 20-20kHz +/- .5dB; S/N: 85dB, THD: .01%. Price: \$265.

IVIE TECHNOLOGIES INC.; 1366 W. Center St.; Orem, UT 84057; (801) 224-1800. Product Name: 784P Programmable Matrix Mixer. **Contact:** Glen Meyer, mktg. manager. **Date Product Introduced:** 5/91. **Product Description & Applications:** The 784P is an eight in (mic/line) four out matrix mixer. Any input can be assigned to any output. Mixers may be combined for 16 in and 8 out. All inputs and outputs can be remotely controlled. The mixers may be programmed from either the front panel or by use of an IBM compatible PC with EGA graphics capability. The eight presets control input and output assignments and levels, automatic output level control settings, room combining assignments and remote control configura-

tion. **Basic Specifications & Suggested List Price:** The 784P is one rackspace high. Frequency response is 20Hz to 20kHz +/- 1dB. THD less than .15%. Equivalent input noise better than -125dB. Suggested retail price around \$2,900.

IVIE TECHNOLOGIES INC.; 1366 W. Center St.; Orem, UT 84057; (801) 224-1800. Product Name: RM1/2 Microprocessor Based Remote Controls. **Contact:** Glen Meyer, mktg. manager. **Date Product Introduced:** 5/91. **Product Description & Applications:** The RM1 & RM2 are remote controls intended for use with any Ivie automatic mixer or programmable matrix mixer. Push button actuated with LED bar graph indication of level. Both max & min levels are programmable. Units may be paralleled and track each other for multiple location control. **Basic Specifications & Suggested List Price:** The RM1 and RM2 fit into standard electrical boxes. The retail price on RM1 is around \$300 and \$330 for RM2 (dual control).

JBL PROFESSIONAL; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-8411; (818) 893-4351. Product Name: 7112 Limiter/Compressor. **Contact:** Hector Martinez. **Date Product Introduced:** 10/91. **Product Description & Applications:** The 7112 2-channel limiter/compressor is designed for studio, live sound, installed sound and broadcast applications. The 7112 provides both peak and/or average gain reduction with Smart-Slope (tm) compression characteristics for smooth sound quality. Threshold, Peak/Average Blend, Attack, Release and Compression Ratio are all user adjustable. An automatic preset switch is provided for quick, simple set-up. Other features include selectable link for multi-channel tracking, full LED display, front panel bypass switch, active balanced inputs and 1 rackspace chassis.

JBL PROFESSIONAL; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-8411; (818) 893-4351. Product Name: 7942/7944 Digital Delays. **Contact:** Hector Martinez. **Date Product Introduced:** 10/91. **Product Description & Applications:** The 7942 and 7944 digital delays provide high quality audio delay from 10 microseconds to 4 seconds resolution. Ideal for cluster alignment and virtually any audio application, both units feature 18-bit sigma-delta technology with 64x oversampled converters. The 7942 is a single input/two output device whereas the 7944 features two inputs and four outputs. Other features include precision calibrated attenuators, front panel bypass switch, tamper-proof lockout circuitry and 1 rackspace chassis.

JBL PROFESSIONAL; 8500 Balboa Blvd.; Northridge, CA 91329; (818) 893-8411; (818) 893-4351. Product Name: ES52000 Digital Controller. **Contact:** Hector Martinez. **Date Product Introduced:** 10/91. **Product Description & Applications:** The ES52000 is an advanced digital loudspeaker controller that combines the functions of active frequency division, system equalization, time delay, and transducer protection limiters (in single-channel configurations) into a rackmountable, double space unit. The unit functions in two-way dual channel or two, three or four-way single-channel modes. Internally, the ES52000 utilizes zero phase shift FIR crossover filters, adaptively derived FIR system equalization filters, precision signal alignment of transducer acoustic centers, and 18-bit 64x oversampling input converters. **Basic Specifications & Suggested List Price:** Price: \$3,500.

KLARK-TEKNIK; 200 Sea Lane; Farmingdale, NY 11735; (516) 249-3660. Product Name: DN726V. **Contact:** Sam Spennacchio, sales mgr. **Date Product Introduced:** 6/91. **Product Description & Applications:** Stereo audio delay line for video applications. Delay time display switchable between milliseconds and fields. Switchable between PAL and NTSL standards. Include (4) GPI switch settings. Used to delay audio for video satellite transmission, as well as in the video post production facility to synchronize stereo audio where video has been delayed. **Basic Specifications & Suggested List Price:** Electronically balanced inputs, unbalanced outputs, transformer balancing optional. Frequency response 20Hz-20kHz +/- 1dB any level. Dynamic range >90dB. 20Hz-20kHz unweighted. Delay range 0-1.311 seconds. 50kHz sampling rate. 16-bit linear conversion. Retail price \$3,900.

KLAY ANDERSON AUDIO; 1856 Grover Ln.; Salt Lake City, UT 84124; (801) 272-1814. Product Name: No-Phono. **Contact:** Kay Anderson. **Date Product Introduced:** 2/91. **Product Description & Applications:** Passive, inexpensive device converts unused RCA phono input into high-quality line input. Ideal when "one more input" is needed. Lifetime warranty. **Basic Specifications & Suggested List Price:** Passive electronic, low distortion, RCA ins/outs. \$49.95.

KORG USA INC.; 89 Frost St.; Westbury, NY 11590; (516) 333-9100. Product Name: A1 Performance Signal Processor. **Contact:** Randell Whitney, signal processing product manager. **Date Product Introduced:** 5/91. **Product Description & Applications:** The A1 is a multi-effect signal processor featuring 59 internal effects and user assignable effect algorithms or chains. There are a total of 50 of these effect chains divided into five groups: Series, Dual, Parallel, Key-In and Send/Return. Users can select a particular type of chain and then actually assign specific effects to each position in the chain. Remote control is possible via the optional RE-1 remote editor. The A1 also features real time "Dynamic" effect parameter control with a choice of MIDI controllers, input volume or pedal

sources. **Basic Specifications & Suggested List Price:** 16-bit Linear A/D, D/A conversion; 48kHz sampling frequency, 20Hz-20kHz frequency response, dynamic range: >85dB, inputs (L/mono, R); balanced XLR jacks and unbalanced 1/4" phone jacks. Digital I/O (SPDIF): List-\$1,999.

LAKE BUTLER SOUND CO. INC.; 5331 W. Lake Butler Rd.; Windermere, FL 34786; (407) 656-5515. **Product Name:** MDP-2 Dual MIDI Processor. **Contact:** Emmett Bradford, president. **Date Product Introduced:** 8/91. **Product Description & Applications:** The MDP-2 Dual MIDI Processor has two MIDI ins and two MIDI outs, performing the most popular MIDI data processing functions at an unbelievable price! Each input filter can be set to individually filter each type of MIDI command; with the split function, note data can be split into up to 8 different zones; the Chan function copies command types to other MIDI channels, and the Merge function merges the two MIDI data signals together to either or both MIDI outputs. **Basic Specifications & Suggested List Price:** Micro Mitigator quarter rack audio and MIDI accessories. Sizes 1.5" high x 4.0" wide x 6.0" deep. List price \$195.

LAKE BUTLER SOUND CO. INC.; 5331 W. Lake Butler Rd.; Windermere, FL 34786; (407) 656-5515. **Product Name:** Micro Mitigator MSI:MIDI Switch Interface. **Contact:** Emmett Bradford, president. **Date Product Introduced:** 10/91. **Product Description & Applications:** The MSI-8: MIDI Switch Interface controls up to eight "footswitch" functions via MIDI using real relays! It can switch any amplifier footswitch function as well as audio directly. It can mute mixer channels from their insert points, switch effect loops etc. automatically via MIDI. Each relay has its own LED on the front panel to show it's status. It stores 128 presets of on/off combinations and accepts continuous control for individual control of the relays, and can be set to any MIDI channel. **Basic Specifications & Suggested List Price:** Size: 1.5" High x 4.0" Wide x 6.0" Deep. Quarter-rack audio and MIDI accessories. List \$195.

LAKE PEOPLE; Haidelmosweg 52; D-7750 Konstanz, West Germany; —49 7531-73678; FAX: —49 7531-74998. **Product Name:** A-D Converter ADC F 21 (20 Bit). **Contact:** Fried Reim, director. **Date Product Introduced:** 6/91. **Product Description & Applications:** The ADC F21 is a 20 Bit converter of highest range. The balanced analog inputs are designed for a nominal +6dB level and may be adjusted on the front. Internal sample rates are 44.1 and 48 kHz, external clock may be applied via AES/EBU or word clock inputs. The digital output is simultaneously available in AES/EBU format on XLR; in SDIF-2 format on BNC; and S/PDIF format on cinch and optical. The case is 19" rack size at 1 unit height. **Basic Specifications & Suggested List Price:** Price: approximately \$4,000. Inputs: electronically balanced inputs, (+6dB); adjustable. Sample rates: 44.1, 48kHz; Sync inputs: AES/EBU (XLR), Word clock (BNC). Oversampling: 128 times. Dynamic: 104 dB, THD+N: 0.002%. Digital outputs: AES/EBU (XLR) SDIF-2(BNC), S/PDIF (cinch and opto). Dimensions: 19" 1 Unit height, built in power supply.

LAKE PEOPLE; Haidelmosweg 52; D-7750 Konstanz, West Germany; —49 7531-73678; FAX: —49 7531-74998. **Product Name:** D-A Converter DAC F20. **Contact:** Fried Reim, director. **Date Product Introduced:** 1/91. **Product Description & Applications:** The DAC F20 is a 20-Bit two-channel digital-to-analog converter of highest range. Conversion is made with UltraAnalog modules with 8 times oversampling. Digital signals may be fed via four different digital inputs. These are AES/EBU format on XLR connectors; S/DIF 2 format on BNC connectors and S/PDIF on cinch and optical connectors. Emphasis, 32, 44, 1 and 48 kHz are automatically recognized. The analog outputs are electronically balanced on XLR. **Basic Specifications & Suggested List Price:** Price: \$4,000. Inputs: AES/EBU; S-DIF 2; S/P-DIF (also optical). Sample rates: 32, 44, 1, 48 kHz and varspeed. Deemphasis: automatic and manual. Oversampling: 8 times. Dynamik: 113dB. THD+N: 0.002%. Analog outputs: +6dB, +21dB at digital saturation. Dimensions: 19", 1 unit height.

LEXICON INC.; 100 Beaver St.; Waltham, MA 02154; (617) 736-0300. **Product Name:** LARES (Lexicon Acoustic Reverberance Enhancement System). **Contact:** Steve Barber, advanced products mgr. **Date Product Introduced:** 5/91. **Product Description & Applications:** LARES electro-acoustically augments the natural direct and reflected energy in halls, performance spaces, places of worship, and spaces that require flexible acoustical character. LARES uses microphones, advanced digital electronics, and loudspeakers to generate energy at the optimal time, loudness, and reverberant decay which greatly enhances the pleasure of listening within an environment. The enormous increase in gain before feedback, and decrease in coloration that LARES provides over conventional sound systems constitutes a breakthrough in acoustical enhancement and sound reinforcement. **Basic Specifications & Suggested List Price:** MIDI controlled 18-bit DSP 2X input 4X output +24dB @ 600 ohms. Balances XLR termination. Price dependent on system configuration.

LEXICON INC.; 100 Beaver St.; Waltham, MA 02154; (617) 736-0300. **Product Name:** LFI-10 Digital Audio Format Interface. **Contact:** Will Eggleston. **Date Product Introduced:** 9/91. **Product Description & Applications:** The LFI-10 from Lexicon Inc. is a digital audio format interface. It converts between any of the following digital standards: AES/EBU, S/PDIF,

and SDIF-2. The LFI-10 allows viewing and editing of all auxiliary data embedded in the digital audio bitstreams. This includes all 24 bytes of the channel status and user blocks in the AES/EBU-S/PDIF data streams, and the emphasis and dub prohibit bits in the SDIF-2 data stream. **Basic Specifications & Suggested List Price:** Supports 48kHz, 44.1kHz, 44.056kHz and 32kHz sample rates. Interface connections include XLR, RS422. Single-ended RCA and fiber optic for AES/EBU I/O. BNC or DE-9 (480L Digital I/O) for SDIF-2 interface. Price approx. \$1,500.

ELAN BY METALHEAD ELECTRONICS; 5707 Cahuenga Blvd.; North Hollywood, CA 91601; (818) 980-1975. **Product Name:** Wha-Wha One. **Contact:** Romi. **Date Product Introduced:** 1/91. **Product Description & Applications:** In the WHA-WHA-ONE, all signal processing is made in the rack. No signal travels onstage—especially when using wireless guitar systems. The WHA-WHA-ONE is also a stereo volume pedal. Each channel left and/or right can be independently switched to "on" or "bypass" mode via digital switching. The WHA-WHA-ONE will accept any volume pedal as its control pedal. **Basic Specifications & Suggested List Price:** The unit has a sensitivity control that calibrates the volume pedal used with the WHA-WHA-ONE, and a color control to determine how deep the WHA-WHA-ONE will go. List \$249/B.

MTX SOUND CRAFTSMEN; 555 W. Lamm Rd.; Freeport, IL 61032; (815) 232-2000. **Product Name:** Pro EQ44. **Contact:** Roger Hagemeyer. **Date Product Introduced:** 1/1/91. **Product Description & Applications:** Stereo EQ with differential comparator unity gain circuitry; digital CMOS switching for tape monitor. EQ tape record and EQ defeat; center frequency at 1/3 octaves below 1,000 Hz and 2/3 octaves above 1,000 Hz; filter controls are +15dB. THD >0.017%; S/N 114 dB. **Basic Specifications & Suggested List Price:** \$549.

NEVE; Berkshire Industrial Park; Bethel, CT 06801; (203) 744-6230. **Product Name:** Neve HRC-1 Digital Stereo High-Resolution A-D/D-A Converter. **Contact:** Charles Conte, PR administrator. **Date Product Introduced:** 7/91. **Product Description & Applications:** Neve HRC-1 Digital Stereo High-Resolution A-D/D-A Converter, for use between analog audio console and 20-bit digital recorder. Stereo analog input/output balanced and line level, AES/EBU digital input and output. Synchronization source selected from either AES/EBU audio input, external sync input of AES/EBU format or internal reference of 48kHz or 44.1kHz. DC processing and digital interfacing and re-dithering function. Comprehensive signal routing system. **Basic Specifications & Suggested List Price:** List price \$9,950.

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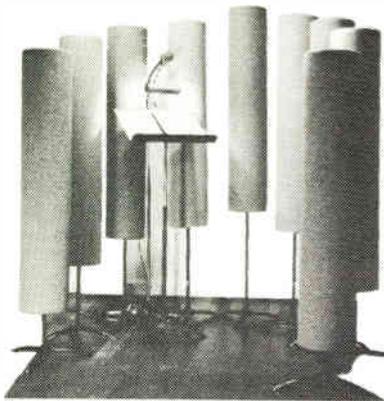
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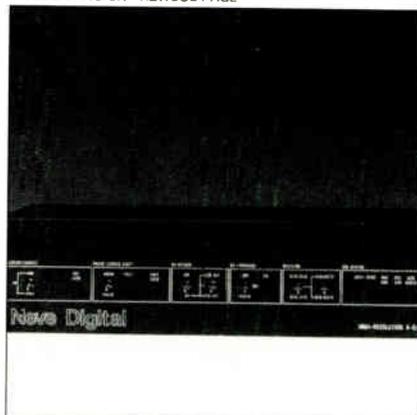
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NEVE
 Neve HRC-1 Digital Stereo High-Resolution
 A-D/D-A Converter

NUMARK ELECTRONICS; 503 Newfield Ave.; Edison, NJ 08837; (908) 225-3222. Product Name: DM 1475. Contact: Todd V. Jensen. Date Product Introduced: 1/6/91. Product Description & Applications: Preamp mixer featuring eight seconds of digital sampling. Sampled material can be triggered for singles or repeat playback at the push of a button. Assignable crossover, 3 phono/2 mic, 4 line/1-CD inputs, pushbutton tuning. Monitor level control, talkover switch, LED level meter, 12V light socket. Gooseneck mounting adaptor. A cost-effective mixer for the Pro DJ with the eight second sampler and dual six band EQ. Basic Specifications & Suggested List Price: List price is \$650.

OCM TECHNOLOGY INC.; 1237 E. Main St.; Rochester, NY 14609; (800) 448-8490; FAX: (716) 684-0463. Product Name: OCM 55 Preamp. Contact: M. C. (Marv) Southcott. Date Product Introduced: 1/91. Product Description & Applications: A solid state, stereo line stage. Incorporates five line-level inputs, two tape outputs, and two main outputs. Separate "listen" and "record" capabilities. New OCM architecture. Basic Specifications & Suggested List Price: Input imp. 50Kohms; Freq. resp. 20Hz-20kHz (+/-0.1dB); Hum and noise 90dB ("A" weighted); Overload sens. 700mV; Gain: 20dB; Distortion 0.05% Im & THD.; Bandwidth 1Hz-200kHz; Weight 10 lbs.; Price \$1,395.

P.A.S.T. PROFESSIONAL AUDIO SYSTEM TECHNOLOGY; 9 Fisher Close, Wisley Meadows; Haverhill, Suffolk, CB9 0LZ England; (011) 44 836 620959. Product Name: P.A.S.T. equalizer and microphone amplifier. Contact: Steve Butterworth, director. Date Product Introduced: 2/91. Product Description & Applications: High quality discrete microphone amplifier, line amplifier and equalizer based on the best of 1970's technology. Includes output fader and meter to facilitate direct connection to the tape machine for tracking and overdubs. VU meter is switchable to line input/output. Mic, line inputs and output are transformer balanced. Gold plated XLRs plus locking 1/4" jack sockets. Designed to complement modern automated consoles, digital recording and mastering. Provides top-quality tracking/overdub channels for large and small studios. Basic Specifications & Suggested List Price: Mic sensitivity -15 to -70dB. Line trim +70dB. 4-band semi-parametric equalizer: +18dB boost/cut for HF, upper mid, lower mid and LF bands. Selectable peak shelf characteristic for HF and LF bands plus switchable Hi-Q for midrange bands. Five high and five low pass filters. Output level 0 to +20dB range. U.K. direct price: 1,500 pounds.

PYGMY COMPUTER SYSTEMS INC.; 13501 SW 128th St., #204; Miami, FL 33186; (305) 253-1212; (800) 44PYGMY. Product Name: Pygmy AD-1 "DSP". Contact: J. Michael Cvengros, dir. sales & marketing. Date Product Introduced: 10/91. Product Description & Applications: The conjunction of our AD-1 Analog to Digital outboard converter. Pygmy introduces a "new" AD-1 DSP optional upgrade. True to our world of non-obsolescence, this simple board level upgrade offers AD-1 users enhanced filtering and overload characteristics through the use of DSP chip technology.

PRECISION STUDIO ELECTRONICS; 5815 6th St.; Tampa, FL 33611; (813) 837-1224. Product Name: Tone Poem. Contact: Michael Vans Evers, designer. Date Product Intro-

duced: 12/91. Product Description & Applications: The Tone Poem is a unique combination of tube and solid-state equalizers. This single-channel 2RU 4-band EQ has two bands of swept frequency tube EQ and two bands of solid-state parametric EQ. Special implementation of the solid-state parametric EQ. Special implementation of the solid-state sections result in a tube like smoothness. The Tone Poem is a powerful combination of old and new technologies, perfect for tracking, mixing or mastering. Basic Specifications & Suggested List Price: The Tone Poem's input impedance is 5k ohms and its output impedance is 50 ohms. The factory direct price is \$1,975.

PRECISION STUDIO ELECTRONICS; 5815 6th St.; Tampa, FL 33611; (813) 837-1224. Product Name: Tube Smooth-e. Contact: Michael Vans Evers, designer. Date Product Introduced: 12/91. Product Description & Applications: The Tube Smooth-e is a single-channel 2RU tube compressor designed for microphone level signals. A balanced all-tube signal path, phantom power, transformer coupling, VU meter, controls for attack, release, threshold, compression ratio and output level are standard features. The sound of the Tube Smooth-e is its best feature: naturally warm with silky smooth compression. This is an excellent stand-alone microphone preamp. Basic Specifications & Suggested List Price: The Tube Smooth-e has input and output impedances of 600 ohms. The factory direct price is \$1,575.

QSOUND/ARCHER COMMUNICATIONS INC.; 2748 37th Ave. N.E.; Calgary, Alberta, T1Y 5L3 Canada; (403) 291-2492. Product Name: The QSystem. Contact: Jim Aiello, technical marketing. Date Product Introduced: 11/90. Product Description & Applications: The QSystem consists of a hardware and software package that interfaces directly with conventional mixing consoles in sound recording studios. The QSystem provides audio engineers the capability to place sound elements in a stereo mix so that their apparent origin is "outside" that of the normal stereo field. These individual elements are perceived to be coming from different locations, by the listener, during playback through conventional playback (stereo) equipment. Basic Specifications & Suggested List Price: Available upon request from the manufacturer.

RANE CORPORATION; 10802 47th Ave. W.; Mukilteo, WA 98275; (206) 355-6000. Product Name: FPL 44 Quad Peak Limiter. Contact: Terry Pennington. Date Product Introduced: 1/91. Product Description & Applications: A four-channel peak limiter in a half-rack H-R standard chassis. Each channel features a threshold level control and a slave switch. Any number of channels may be slaved providing equal gain reduction in each when one or more inputs exceed threshold. Basic Specifications & Suggested List Price: Retail price: \$349.

ROLAND CORPORATION U.S.; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141 x337. Product Name: RSP-550 Stereo Signal Processor. Contact: Bob Todrank. Date Product Introduced: 7/91. Product Description & Applications: True stereo in/stereo out multi-effects processor. Provides professional quality and innovative effects including a variety of reverbs, multi-band chorus, penta chorus, 8-tap delay, vocoder, rotary, phase shifter, flanger, ensemble, 4-part pitch shifter and multi-effect algorithms. Functions as two discrete effects processors simultaneously. Control foot pedal allows manual setting of effect parameters such as delay time or rotary fast/slow. Stereo delay syncs to MIDI clock. Basic Specifications & Suggested List Price: 16-bit A/D/A conversion, 48kHz sampling rate, 15Hz-21kHz frequency response, 95dB dynamic range, .02% or less THD, +/-20 dBm nominal output level, 199 programs (160 user, 39 preset), 39 effects algorithms, bypass jack and switch, \$1,295.

ROLAND PRO AUDIO/VIDEO GROUP; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141 x337. Product Name: RSS-Roland Sound Space. Contact: Bob Todrank. Date Product Introduced: 1/91. Product Description & Applications: The RSS System is a user-friendly, real time digitally controlled processor that enables the reproduction of an enhanced aural environment with spatial localization of sound over a conventional stereo system. Composed of binaural and transaural processors, the RSS System achieves its effect by encoding the stereo signal during production. No decoding is required during playback and the effects can be realized on an inexpensive stereo system. RSS System applications: commercial recording studios, TV and radio broadcasting, audio for film and video productions, audio for video games, theme parks rides and shows, simulator development. Basic Specifications & Suggested List Price: Suggested retail price: \$44,500.

ROLAND PRO AUDIO/VIDEO GROUP; 7200 Dominion Circle; Los Angeles, CA 90040; (213) 685-5141 x337. Product Name: SN-550 Digital Noise Eliminator. Contact: Bob Todrank. Date Product Introduced: 1/91. Product Description & Applications: The SN-550 is a fully digital noise elimination system that employs exclusively designed DSP circuitry to remove all types of noise without "breathing" or changing the tonality of the overall sound. Two separate noise reduction circuits handle noise and hum independently. The Noise Cancel section employs a unique multi-band downward expanding system that attains exceptional noise elimination while preserving the sound's original character. The Hum Cancel section enables AC line hum or buzz from CRT displays and dimmers to be isolated and removed. The SN-550's single-ended design can perform

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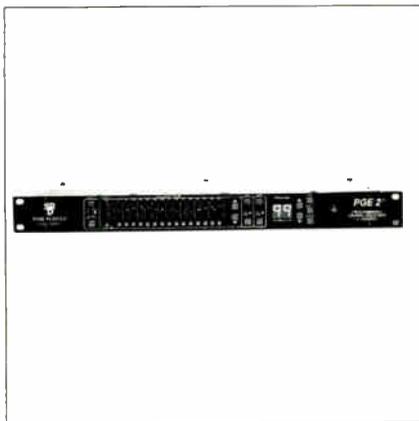
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noise cancellation in real time, making it ideal for professional sound reinforcement and studio use. **Basic Specifications & Suggested List Price:** Suggested retail price \$1,995.

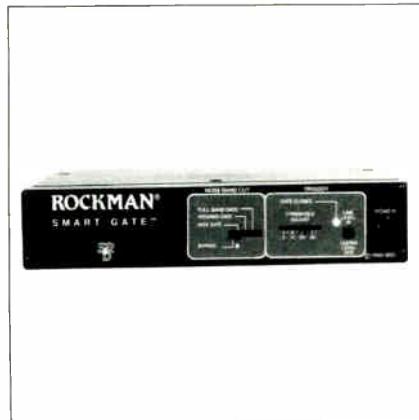
SABINE MUSICAL MANUFACTURING CO. INC.; 6420 NW 6th St.; Gainesville, FL 32609; (904) 371-3829. **Product Name:** FBX. **Contact:** John M. Annin, sales & marketing director. **Date Product Introduced:** 8/90. **Product Description & Applications:** The FBX is a microprocessor-controlled filtering device that automatically finds and eliminates feedback in sound systems. The FBX is placed between the mixer and the amp where it can continuously monitor the program. Once feedback occurs, the FBX places a very narrow notch filter at the precise frequency and depth to eliminate the feedback without adversely affecting the program. **Basic Specifications & Suggested List Price:** FBX—6 filters 1/4 octave filters. Signal-to-noise 78dB. Time to eliminate feedback: .5 sec. Price \$549.95.

SABINE MUSICAL MANUFACTURING CO. INC.; 6420 NW 6th St.; Gainesville, FL 32609; (904) 371-3829. **Product Name:** FBX-900. **Contact:** John M. Annin, sales & marketing director. **Date Product Introduced:** 9/91. **Product Description & Applications:** The FBX-900 is a microprocessor controlled filtering device that automatically finds and eliminates feedback in sound systems. The FBX-900 is placed between the mixer and the amp where it can continuously monitor the program. Once feedback occurs the FBX-900 places a very narrow notch filter at the precise frequency and depth to eliminate the feedback without adversely affecting the program. The newest version of the FBX-900 can better determine the difference between feedback and music and feedback can be eliminated before it becomes loud. **Basic Specifications & Suggested List Price:** FBX-900: 9 filters, 1/10 octave filters. Signal-to-noise 96dB. Time-to-eliminate feedback: .5 sec. Price: \$599.95.



SCHOLZ RESEARCH AND DEVELOPMENT INC.
PGE2

SCHOLZ RESEARCH AND DEVELOPMENT INC.; 1560 Trapelo Rd.; Waltham, MA 02154; (617) 890-5211. **Product Name:** PGE2. **Contact:** Gary Pihl, product dev. **Date Product Introduced:** 9/91. **Product Description & Applications:** MIDI programmable dual 14-band graphic equaliser. Input and output overload indicators. One hundred memory patch locations. Sys Ex features—real time external controllers. Ideal for anyone who needs instant access to 100 different EQ settings. **Basic Specifications & Suggested List Price:** Two independent 14-band equalizers in 1U space. One dB or two dB per step resolution. Programmable and MIDI compatible. List price \$499.95.



SCHOLZ RESEARCH AND DEVELOPMENT INC.
Rockman Smart Gate
—LISTING CONTINUED TOP OF NEXT PAGE

SCHOLZ RESEARCH AND DEVELOPMENT INC.; 1560 Trapelo Rd.; Waltham, MA 02154; (617) 890-5211. **Product Name:** Rockman Smart Gate. **Contact:** Sherri Cohn, coord. adv & promo Gary Pihl, product dev. **Date Product Introduced:** 6/91. **Product Description & Applications:** Input-dependent 3-band noise eliminator. Automatic adjusting attack and release speeds. Input level and threshold controls for any noise problems—hum or hiss reduction. **Basic Specifications & Suggested List Price:** Half rack 3-band noise eliminator. List price \$189.95.

SONY BUSINESS & PROFESSIONAL PRODUCTS; 3 Paragon Dr.; Montvale, NJ 07645; (201) 930-1000. **Product Name:** DPS-D7 Digital Hyper Delay. **Contact:** Courtney Spencer. **VP audio.** **Date Product Introduced:** 4/91. **Product Description & Applications:** The DPS-D7 Digital Hyper Delay unit can carry out high-speed processing of audio signals for comprehensive control over two digital audio signals. The delay incorporates an 18-bit oversampling A/D and Sony-developed, one-bit HDLC D/A converter system with digital filters to offer superb signal linearity, ultra low noise and wide dynamic range.

SUMMIT AUDIO INC.; PO Box 1678; Los Gatos, CA 95031; (408) 395-2448; FAX: (408) 395-1403. **Product Name:** Dual Compressor Limiter, DCL-200. **Contact:** Michael Papp. **Date Product Introduced:** 10/91. **Product Description & Applications:** With adjustable attack, adjustable release, adjustable slope and A.C. threshold controls. Two meters with clipping indicators. Front panel linking for stereo, side chain insert, dual mono mode, individual channel output gain, vacuum tube gain elements. **Basic Specifications & Suggested List Price:** Frequency response: 3Hz to 70kHz. Clipping at +25dBm. Unity gain noise: -84dBm. Distortion: .05% or less at +4dBm. XLR connectors 2U rackspace. 21 lbs. 110/240v 50-60Hz.

SYMETRIX INC.; 4211 24th Ave. W.; Seattle, WA 98199; (206) 282-2555; FAX: (206) 283-5504. **Product Name:** 524E Multi Mode Crossover. **Contact:** Jon Bosaw. **Date Product Introduced:** 8/91. **Product Description & Applications:** 524E Multi Dynamics Processor—processing crossover includes four filters with adjustable frequencies and slopes, protection limiter for each band, driver alignment compensation delay, HF horn EQ and IF excursion control, Precision internal cards are user replaceable. **Basic Specifications & Suggested List Price:** \$1,098 retail. Max output +24dBm, subsonic filter 20Hz, 23dB/oct, attack time 5 msec-25 msec, limit ratio 20:1, distortion less than 0.01%.

SYMETRIX INC.; 4211 24th Ave. W.; Seattle, WA 98199; (206) 282-2555; FAX: (206) 283-5504. **Product Name:** 564E Quad Expander/Gate. **Contact:** Jon Bosaw. **Date Product Introduced:** 8/91. **Product Description & Applications:** 564E Quad Expander/Gate—four channel expander/gate with hi and low pass filters plus key listen on each channel for frequency-conscious gating. Unique range/ratio control gives seamless transition between gate and expand modes. **Basic Specifications & Suggested List Price:** \$989 retail. expander attack 50dB/2ms, release 50dB/17 sec., high-low pass filter response 12dB/octave.

T.C. ELECTRONIC OF DENMARK; 717-C Lakefield Rd.; Westlake Village, CA 91361; (805) 373-1828. **Product Name:** M5000 Digital Audio Mainframe. **Contact:** Ed Smeone, U.S.A. manager. **Date Product Introduced:** 10/4/91. **Product Description & Applications:** The M5000 is a 2U, True Stereo Digital Audio Processor based on T.C.'s Dedicated Audio CO-Processor Technology. This technology boosts the M5000's processor well beyond normal levels of performance. Programs include reverb, sampling, pitch shift, chorus & flanging. I/O ports include AES/EBU, S/PDIF, optical, MIDI, serial remote and SMPTE(in). I/O Options include SCSI, LAN, RamCard & floppy disk. The M5000 may be custom configured for recording, broadcast and sound reinforcement applications. **Basic Specifications & Suggested List Price:** All specs—AD+DA at 48kHz; freq: response 10-22kHz, THD <0.01%, IMD, 0.01%, dynamic range >00dB, max in/out +22dBm, crosstalk, -80dB, phase linearity <5 degrees, group delay linearity <5 microseconds. List price \$2,845. Optional AD+DA \$609. Quad in/out, SCSI, LAN, storage and transformer options. \$TBA.

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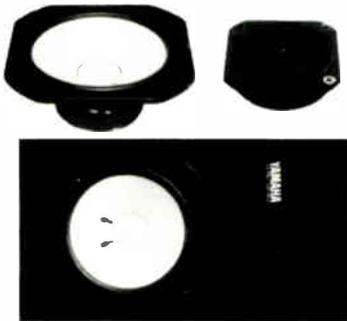
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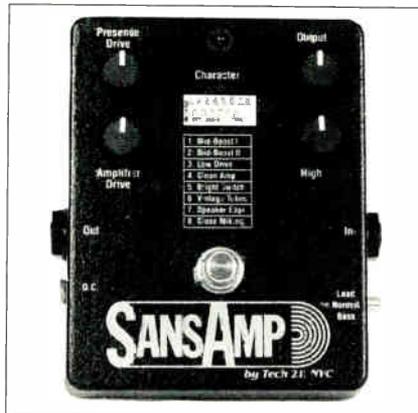
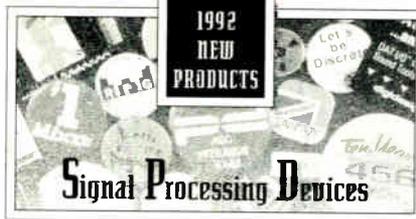
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**TECH 21 INC.
SansAmp**

TECH 21 INC.; 1600 Broadway; New York, NY 10019; (212) 315-1116; Fax: (212) 315-0825; Product Name: SansAmp. Contact: Neal Ostberg, national sales manager. Date Product Introduced: 1/81. Product Description & Applications: SansAmp is a revolutionary tube amp emulator engineered for recording direct and performing live. It delivers the pure, natural sounds of tube amplifiers, ranging from very clean to full saturation. SansAmp's versatility makes it uniquely suitable for any music style and a wide variety of applications—guitar, bass, vocals, keyboards, etc. The original instrument's sound is unaltered and "unprocessed." SansAmp's programmability lets the user explore fine and important nuances within the tube amp sound to achieve a personal voice. **Basic Specifications & Suggested List Price: \$295. Frequency response: Low—10Hz or better; High—harmonic content, 20k-Hz or better (varies according to characteristics programmed). Size: 3.5" X 4.5" X 1.5". Weight: 1 lb., 2 oz. Die-cast aluminum enclosure. Power consumption: 2mA. Operable with one 9V battery up to one year. Power supply included (U.S. only).**

TFT INC.; 3090 Oakmead Village Dr.; Santa Clara, CA 95051; (408) 727-7272. Product Name: Rectifier. Contact: Darryl E. Parker, manager. Date Product Introduced: 10/91. Product Description & Applications: Combines functions of an STL receiver and FM exciter in an FM broadcasting station to reduce noise and distortion by elimination of demod/remod process that normally occurs, and provides a means of synchronizing modulation and carrier components as well as proper propagation delay required to eliminate interference in FM booster applications. **Basic Specifications & Suggested List Price: Input, 930-960 MHz, 60mV; output 88-108 MHz, 50 watts; 0.02% or less THD; SNR better than 85dB. \$10,975.**

TUBE WORKS; 8201 E. Pacific Pl., #606; Denver, CO 80231; (303) 750-3801. Product Name: Real Tube Reverb. Contact: Greg Hauswirth, sales. Date Product Introduced: 10/91. Product Description & Applications: Stereo tube enhanced spring reverb. Full control of reverb w/s-band EQ on both channels. Actual three-spring reverb cans for each side. Full array of input and output options. **Basic Specifications & Suggested List Price: Single rackspace true stereo spring reverb. Price TBA.**

UPTOWN TECHNOLOGIES; 4015 Walnut St.; Fort Atkinson, WI 53538; (414) 563-9932. Product Name: Flash. Contact: Al Jewer, president. Date Product Introduced: 10/90. Product Description & Applications: Flash is a 4x1 stereo switcher with a unique passive design that will switch, blend or distribute a wide variety of signals without adding switching artifacts, pops, noise or distortion. MIDI control, silent switching and passive mixing make Flash useful as a switcher/sub-mixer for effects, synthesizers, microphones, floating triggers, voltage triggers, even SMPTE. Multiple units patched together can create custom switching networks. **Basic Specifications & Suggested List Price: Operated from the front panel, remote or MIDI. Flash silently switches signals up to 100 times/second at S/N > 108dB referenced to ODEM; THD < 0.0008% (unmeasurable), frequency response, +0.1dB 20-20kHz. Standard 1-high rack mount, 120/240 VAC internal transformers, 1/4" connectors, and MIDI In/Out-Thru jacks. List \$499.**

UPTOWN TECHNOLOGIES; 4015 Walnut St.; Fort Atkinson, WI 53538; (414) 563-9932. Product Name: Great Divide 2. Contact: Al Jewer, president. Date Product Introduced: 8/91. Product Description & Applications: Great Divide 2 is a two-channel distribution amplifier with four outputs/channel. Features include two channel gain controls, a ground lift and channels normalised for operation as (2) 1x4 or a 1x8 distribution amplifier. Ultra Low distortion and flat frequency response make Great Divide 2 the ideal choice for microphone, pickup, line or professional signal distribution or level matching. **Basic Specifications & Suggested List Price: Great Divide 2 takes input signals from -30dB to +14dB with gain control from unity to 20dB, with +14dBm output maximum. Specifications include S/N 103dB referenced to +4dBm input, frequency response within 0.1dB from 20-20kHz, Standard 1-high rack mount, 120/240 VAC internal transformer, 1/4" connectors. List \$299.**

UPTOWN TECHNOLOGIES; 4015 Walnut St.; Fort Atkinson, WI 53538; (414) 563-9932. Product Name: Great Divide 4. Contact: Al Jewer, president. Date Product Introduced: 8/91. Product Description & Applications: Great Divide 4 is a four-channel distribution amplifier, with two outputs/channel. Features include four channel gain controls, a ground lift and channels normalised for operation as (4) 1x2 or as (1) 1x4 and (2) 1x2 distribution amp or with mono summing available from stereo input. Ultra Low distortion and flat frequency response make Great Divide 4 the ideal choice for microphone, pickup, line or professional signal distribution or level matching. **Basic Specifications & Suggested List Price: Great Divide 4 takes input signals from -30dB to +14dB with gain control from unity to 20dB with +14dBm output maximum. Specifications include S/N 103dB referenced to +4dBm input, frequency response within 0.1dB from 20-20kHz, Standard 1-high rack mount, 120/240 VAC internal transformer, 1/4" connectors. List \$349.**

VALLEY INTERNATIONAL; 616 Bradley Ct.; Franklin, TN 37064; (615) 370-5901. Product Name: ACE. Contact: Jason Dunaway, VP engineering & marketing. Date Product Introduced: 10/91. Product Description & Applications: Single channel, stereo-linkable compressor with threshold, attack, release, ratio gain and expander threshold controls. Product ideally suited to vocal/instrument compression. Improved metering provides intuitive dynamic display to aid in setup/monitoring. **Basic Specifications & Suggested List Price: Balanced in/output +24 dBV max, IMD distortion < .015% at unity gain. Noise < -87 dBV. Hardwire bypass. Key input included. 1 3/4 X 19" rack.**

VALLEY INTERNATIONAL; 616 Bradley Ct.; Franklin, TN 37064; (615) 370-5901. Product Name: DYNAMITE (2). Contact: Jason Dunaway, VP engineering & marketing. Date Product Introduced: 8/91. Product Description & Applications: Two channel, stereo-linkable compressor, limiter, expander. Balanced input/output, key input. Enables user to compress, limit and expand simultaneously. Ideal for vocal compressing, instrument compression, drum gating, noise reduction and general AGC on mixed program. **Basic Specifications & Suggested List Price: Balanced in/out +24dBV max, IMD distortion approx. .015% at unity gains 60dB of gating range. Noise < -86dBV. Ring tip sleeve, audio jack. Hardwire bypass. 1 3/4" X 19" rack.**

WHITE INSTRUMENTS, DIV. OF C V AN R, INC.; 1514 Ed Bluestein Blvd., Ste. 108; Austin, TX 78721; (512) 389-3800. Product Name: DSP 5000. Contact: Jeff Van Ryswyk, sales mgr. Date Product Introduced: 9/91. Product Description & Applications: Digital delay, 12-band parametric equalization & 2-, 3- or 4-way crossover all in one rackspace, 19-bit, user configurable, single channel in, 4 output channels with 8X oversampled 20-bit converters. Full servo-balanced inputs and outputs. Remote control capability via PA-422, MIDI or contact closures. Two level user programmable password security system. Expansion unit (DSP 5001) available to add signal processing capability without expense of entire device. **Basic Specifications & Suggested List Price: Parametric Equalization: up to 12 bands available per unit, Q adjustable from .1 to 50. Adjustable highpass, lowpass and shelving filters. Delay: Delay-adjustment increment: 20.8 microseconds. Standard delay range: 8 milliseconds. Crossover shapes: Butterworth, Bessel, Linkwitz-Riley, linear phase. Slopes: 12, 18, 24 dB/octave. C.D. horn correction, 1.75"x19"x12". 9 lbs. Suggested list price: \$3,400.**

ZOOM CORPORATION; 385 Oyster Point Blvd. #7; South San Francisco, CA 94080; (415) 873-5885. Product Name: 9030 Advanced Instrument Effects Processor. Contact: Peter Rodgers, natl. sales and mktg. Date Product Introduced: 8/91. Product Description & Applications: The 9030 Advanced Instrument Effects Processor features 47 effects for guitar bass, keyboards, vocals and home recording. 16-bit, 44.1 kHz stereo digital effects, up to seven effects at once, 99 user-programmable patches and stereo digital effects like "harmonizer", pitch shifter, phaser, chorus, tremolo, reverb, and much more. It also has comprehensive real-time MIDI control functions built in and guitar and bass amp simulators for added realism. **Basic Specifications & Suggested List Price: \$749 list price; L/R stereo output 1/4" = 10dBm; Effect programs: 47; Patch memory: 99; Sampling quantization: 16 bit; Dimensions: 220(W)x187(D)x46(H)mm/8.2(x)3.71(x)1.81(x)1.316; Weight: 1.2 kg (2 lbs. 10 oz.). AC adapter DC 9V, 1A.**



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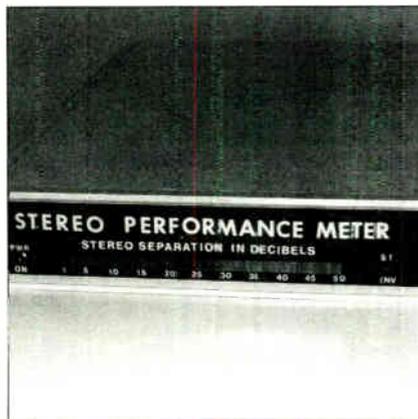
AMBER ELECTRO DESIGN; 6969 Trans-Canada Hwy, Ste. 113; St. Laurent, Quebec, H4T 1V8 Canada; (514) 333-8748; (800) 361-4914 (U.S.). Product Name: Amber 7000 Low-Frequency Measurement System. Contact: Ms. Ilona Scholch, sales and marketing assist. Date Product Introduced: 4/91. Product Description & Applications: The Amber 7000 System is a self-contained, programmable generation (10Hz-100Hz) and measurement (500kHz bw.) system which combines high-performance analog measurement capabilities with the digital processing and measurement functions required by modern mixed-signal systems. Powerful computing resources allow a flexible user interface and extensive programming facilities.

AUDIO CONTROL INDUSTRIAL; 22313 70th Ave. W.; Mountlake Terrace, WA 98043; (206) 775-8461. Product Name: SG-200. Contact: Rick Chinn, sales mgr. Date Product Introduced: 10/91. Product Description & Applications: SG200: Handheld signal generator with sine, square and pink noise outputs. Sine and square wave signals at discrete frequencies from 10 to 100k Hz. Balanced and unbalanced outputs. Runs on a single 9V alkaline battery. Pink noise uses discrete digital noise source with 8-pole filter. **Basic Specifications & Suggested List Price:** Output +8 dBm (balanced) from 10 Hz to 100 kHz. 9V battery. Output frequency set by 10-position switch, with 4-position multiplier.

AUDIO CONTROL INDUSTRIAL; 22313 70th Ave. W.; Mountlake Terrace, WA 98043; (206) 775-8461. Product Name: SG300. Contact: Rick Chinn, sales mgr. Date Product Introduced: 10/91. Product Description & Applications: SG300: Handheld signal generator with sine, swept sine, 1/3 octave warble tone, and pink noise outputs. Sine frequency is infinitely variable. In sweep mode, the unit makes a single sweep from the setting of the main frequency knob to the setting of the stop-frequency knob. In warble mode, the unit's output varies from 1/6 octave above and 1/6 octave below the setting of the main frequency knob. **Basic Specifications & Suggested List Price:** Output: +8dBm (balanced) from 20 Hz to 20 kHz. 9V battery. Output frequency continuously variable. Balanced and unbalanced outputs. Sweep trigger output (CMOS).

AUDIO PRECISION; PO Box 2209; Beaverton, OR 97075; (503) 627-0832. Product Name: FASTest(tm). Contact: Wayne Jones. Date Product Introduced: 3/91. Product Description & Applications: FASTest is an application program that operates with the Audio Precision System One +DSP and System One Dual Domain audio measurement systems that can completely characterize an audio channel, system or device in a second or so. The package will display frequency and phase response, distortion and noise versus frequency and crosstalk versus frequency using a multi-tone test signal with a frequency selective FFT analysis, producing accurate, high-resolution data virtually instantaneously. **Basic Specifications & Suggested List Price:** Measures amplitude and phase frequency response, harmonic distortion versus frequency, intermodulation distortion versus frequency and noise versus frequency. System One DSP model SYS-222 U.S. list price \$11,200.

FM SYSTEMS INC.; 3877 S. Main St.; Santa Ana, CA 92707; (800) 235-6960. Product Name: SPM-1 Stereo Performance Meter. Contact: Frank McClatchie, president. Date Product Introduced: 1/91. Product Description & Applications: The SPM-1 Stereo Performance Meter is the first instrument to measure the actual stereo content of music, enabling accurate placement of microphones for maximum stereo separation, precision mix-down to optimum stereo performance, identification of frequencies causing phasing problems in recording studios, as well as measuring the exact stereo separation present in any musical passage. The SPM-1 measures stereo separation in 1dB steps from 1 to 50 dB and will also indicate stereo polarity reversal. Contact FM Systems Inc. at (800) 235-6960 for instant information and the gratification of being among the first to exploit this new technology. **Basic Specifications & Suggested List Price:** INPUT: Audio Input—left and right; Input Level (specify)—0, +4, +8 dBm (0 dB Std.); Input Impedance—balanced and bridging (Hi-Z). DISPLAY: Stereo Separation—0 to 50 dB in 1dB steps; Resolution—1dB; Accuracy—
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**FM SYSTEMS INC.
SPM-1 Stereo Performance Meter**

(0-35 dB) = 1dB, (36-50 dB) = 2dB, Stereo Inversion—Red LED indicator. Price: \$1,250.

GALAXY AUDIO; 625 E. Pawnee; Wichita, KS 67211; (316) 263-2852. Product Name: "Cricket" Polarity Tester. Contact: Brock M. Jabara, P.E. Date Product Introduced: 7/91. Product Description & Applications: A high quality test instrument that quickly and easily indicates absolute polarity. It tests microphones, mixers, cables, equalizers, crossovers, speakers, etc. The Cricket can be used as a cable tester where cable ends are hundreds of feet apart. The Cricket consists of a send and a receive unit, each housed in a high impact ABS plastic case, and each powered by a single 9 volt battery. Each set comes in a handy carrying case. **Basic Specifications & Suggested List Price:** Send unit has balanced 1/4" and XLR jacks, unbalanced 1/4" speaker out jack, and internal speaker. Receive unit has 1/4" and XLR jacks, a sensitivity control, and internal microphone. Receive unit will test both tip and ring on a 1/4" plug or pins 2 and 3 of an XLR plug. Under \$300.



**GOLD LINE
PN-3 Gated Pink Noise Generator**

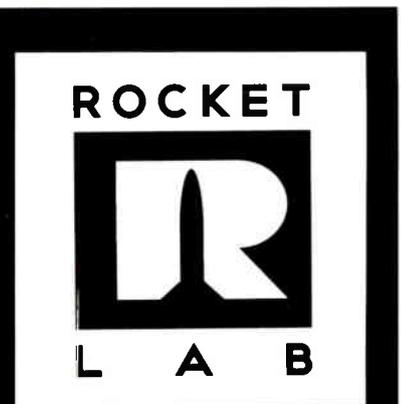
GOLD LINE; PO Box 500; W. Redding, CT 06896; (203) 938-2588. Product Name: PN-3 Gated Pink Noise Generator. Contact: Martin Miller. Date Product Introduced: 3/91. Product Description & Applications: A compact unit that can automatically turn on and off, to reduce the constant drone of pink noise during soundcheck. The PN-3 can operate continuously or in bursts of .75 to 30 seconds, and auto repeat every

10 to 150 seconds. **Basic Specifications & Suggested List Price:** \$129.95; internal 9VDC power; 1/4" unbalanced output.



**GOLD LINE
DSP-30 Portable RTA**

GOLD LINE; PO Box 500; W. Redding, CT 06896; (203) 938-2588. Product Name: Gold Line DSP-30. Contact: Martin Miller. Date Product Introduced: 8/91. Product Description & Applications: The Gold Line DSP-30 is a portable 1/3-octave audio spectrum analyzer which truly classifies as a multifunction test instrument. The ability to measure in 1/4dB increments makes this analyzer an ideal tool for machine alignment using standard test tapes. A full 90dB window allows the analyzer to view the dynamic characteristics of a hall or studio and to monitor distortion levels. The DSP-30 has selectable filter slopes which allow the user to set the analyzer for either IEC type C or IEC type 1 filters. If the application is machine alignment, live music, equalization or the elimination of feedback, the DSP-30 will do it all. **Basic Specifications & Suggested List Price:** The DSP-30 has scales that are adjustable from 1/4dB to 5dB. Unlike other analyzers, the DSP-30 is not limited by the size of the LED window. Any memory can be scrolled up or down to capture a full 90dB range. The filters are software controlled and selectable and therefore there is no problem with overlapping slopes from adjacent channels. The DSP-30 is a sound investment at only \$1,500.



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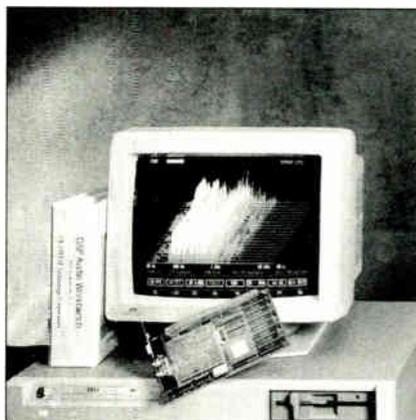
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GOTHAM AUDIO CORP.
DSP Workbench
Real-time FFT Analyzer

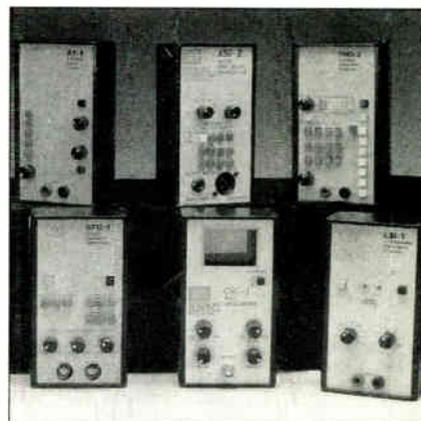
GOTHAM AUDIO CORP.; 1790 Broadway, New York, NY 10019; (212) 765-3410. **Product Name:** DSP Workbench Real-time FFT Analyzer. **Contact:** Russell O. Hamm, president. **Date Product Introduced:** 5/91. **Product Description & Applications:** Gotham's new DSP Audio Workbench brings the power of Digital Signal Processing to the IBM PC environment. The FFT software module allows viewing events in the audio spectrum in real time. The VGA-compatible graphics display plots frequency, amplitude and time in two and three dimensions. The DSP Workbench transforms the familiar 3D waterfall display into a cascade of color. The fundamental frequency and harmonics of audio signals are strikingly vivid. A dynamic range of up to 180dB reveals the contour of any noise floor. Capture FFT data to disk for later replay and analysis. **Basic Specifications & Suggested List Price:** Analog version is \$3,500 and \$4,600 for digital version.

JEANIUS ELECTRONICS; 2815 Swandale Dr.; San Antonio, TX 78230; (512) 525-0719. **Product Name:** RD-T Russian Dragon. **Contact:** Jeanine Davis, ceo. **Date Product Introduced:** 6/91. **Product Description & Applications:** The RD-T is a new, low-cost version of the Russian Dragon. The RD-T will have the same precision as the RD-2 (rack mount version), but with a significantly lower price by eliminating some of the more expensive features not needed in the semipro market. List price of the RD-T is \$249.95. **Basic Specifications & Suggested List Price:** The Russian Dragon measures timing accuracy. For example, it shows how closely a drummer is playing along with a click track; it detects the time delay between an acoustic drum and its triggered replacement; it reveals timing inaccuracies in MIDI systems. List price \$249.95.

MEYER SOUND LABORATORIES INC.; 2832 San Pablo Ave.; Berkeley, CA 94702; (415) 486-1166; FAX: (415) 486-8356. **Product Name:** SIM System. **Contact:** Mark Johnson. **Product Description & Applications:** A portable, DSP-based Fast Fourier Transform (FFT) instrument for acoustical measurements and general electronic audio testing, the SIM System employs an 80486 CPU and an AT&T 32-bit, floating-point DSP circuit to perform signal measurements within 100dB range. The instrument performs transfer function computation between any two of three inputs; single-channel FFT and Impulse Response modes also are provided. A unique Delay Finder function automatically determines microphone distance to test loudspeaker within +/-0.25". The unit incorporates a precision signal generator with low-distortion sine wave, pink noise and modulated impulse outputs; a removable hard disk and floppy drive for data storage; super VGA color monitor; and dedicated multi-pin connectors for interfacing with external SIM switches. **Basic Specifications & Suggested List Price:** Frequency range — 10 Hz to 22.5 kHz; frequency resolution — 1/3rd, 1/12th and 1/24th octave (selectable); phase accuracy — +/-1 degree; amplitude accuracy — +/-0.1dB; measurement dynamic range — 100dB; measurement update rate — 650 msec (10Hz-22kHz); delay finder accuracy — +/-20usec (1 sec time record).

RESEARCH TECHNOLOGY INTERNATIONAL; 4700 W. Chase, Lincolnwood, IL 60664; (708) 677-3000; (800) 323-7520. **Product Name:** TapeChek® Videotape Evaluators/Cleaners. **Contact:** Bill Wolavka, vp sales. **Date Product Introduced:** 1991. **Product Description & Applications:** Cleans—

removes dirt and loose oxide that can damage tape. Extends tape life. Works fast, automatically. Evaluates—if a tape is damaged, TapeChek tells you where and how bad. Several TapeChek models let you choose the machine that's right for your applications; and price range. **Basic Specifications & Suggested List Price:** Cleans and inspects a two-hour tape in less than two minutes. Models available for all formats. Options include erase and hard copy printer. Prices start at \$3,950.



SESCAM INC.
Hand-held Audio Test Equipment

SESCAM INC.; 2100 Ward Dr.; Henderson, NV 89015; (702) 565-3400. **Product Name:** Hand-held Audio Test Equipment. **Contact:** Franklin J. Miller, president. **Date Product Introduced:** 4/91. **Product Description & Applications:** Sescam Inc. has developed a new series of hand-held audio test equipment. These eight new instruments are designed for people that must repair, set up or operate audio equipment in the field. The eight instruments are OSC-1 oscilloscope, ASG-2 low distortion audio oscillator, TAD-2 distortion analyzer, SFG-1 sweep function generator, LSI-1 loudspeaker test, AT-1 audio tester, FM-1 frequency meter and AVM-2 audio voltmeter. These feature low-cost and durability for field use. **Basic Specifications & Suggested List Price:** Send for catalog for complete technical details.

STANFORD RESEARCH SYSTEMS; 1290 D. Reamwood Ave.; Sunnyvale, CA 94089; (408) 744-9040. **Product Name:** DS345 Synthesized Function Generator. **Contact:** Dave Ames, engineer—sales and marketing. **Date Product Introduced:** 4/91. **Product Description & Applications:** DS345—digitally synthesized wave forms to 30 MHz with 1 microsecond resolution. Outputs can be simple sine, triangle, ramp or square waves. Arbitrary signals with up to 16K points and sampling times to 2.5 ms can also be generated. Internally synthesized modulation capabilities include phase continuous linear and log frequency sweeps as well as AM, FM, phase and burst modulation. Spurious components are less than -55dBc (below 1MHz). Optional GPIB & RS232 interfaces provide easy communication with computers. **Basic Specifications & Suggested List Price:** 30 MHz direct digitally synthesized source, 0.00001 Hz resolution; 12-bit, 40 M sample/s arbitrary waveforms. Low phase noise and distortion. Price: \$1,895 (US list).

STANFORD RESEARCH SYSTEMS; 1290 D. Reamwood Ave.; Sunnyvale, CA 94089; (408) 744-9040. **Product Name:** SR760 FFT Spectrum Analyzer. **Contact:** Dave Ames, engineer—sales and marketing. **Date Product Introduced:** 4/91. **Product Description & Applications:** SR760—a full-featured FFT with 90dB dynamic range, frequency spans from 191mHz to 100 kHz and a fast 100kHz real-time bandwidth. Functions such as THD, PSD, octave, band and sideband analysis are menu-driven and supported with on-screen help. Averaging can be performed on up to 64K scans. Data traces, limit & data tables and instrument set-up files can be stored on the 3.5" DOS format disk drive or accessed through the standard RS232 and GPIB interfaces. **Basic Specifications & Suggested List Price:** Measurement range 476 microhertz to 100kHz. Real time bandwidth: 10kHz. Dynamic range: 90dB. 1E bit A/D conversion. Price: \$4,350 (U.S. list).

TECH 21 INC.; 1600 Broadway, New York, NY 10019; (212) 315-1116; FAX: (212) 315-0825. **Product Name:** MIDI Checker. **Date Product Introduced:** 1/91. **Contact:** Neal Ostberg, national sales manager. **Product Description & Applications:** Pinpoints trouble quickly and discreetly. LED light visualizes MIDI signal information. When transmission is occurring, LED will flash in-synch with signals being sent. Test for bad cables, wrong patches, defective equipment in seconds. A must for all studios. **Basic Specifications & Suggested List Price:** Price: \$6.99.

Pro Audio dictionaries and technical reference guides are available through the Mix Bookshelf catalog. Call toll-free (800) 233-9604 for your free copy.



ANNOUNCEMENT TECHNOLOGIES
Compact Disc Search and Sample System

ANNOUNCEMENT TECHNOLOGIES; 1401 Manatee Ave. W., #3; Bradenton, FL 34205; (813) 747-0195. Product Name: Compact Disc Search and Sample System. **Contact:** Jay Rotolo, pres. **Date Product Introduced:** 11/19/90. **Product Description & Applications:** The CD Search and Sample System offers a complete database of 52,000 titles and the ability to sample up to 5,000 CDs. The user may search for CDs by title, composer, artist, label or song title lyrics. The selected song can be "sampled" for 30 seconds, its location in the store pointed out as well as the product number and price. Customers can sample 1,000s of CDs over the telephone. **Basic Specifications & Suggested List Price:** Base CD Search and Sample System includes: cabinet, color, monitor, software and music database, color printer, storage systems that handles up to 500+ albums, headphones, amplifier, compact disc player and custom screen logo. Base price \$9,995.

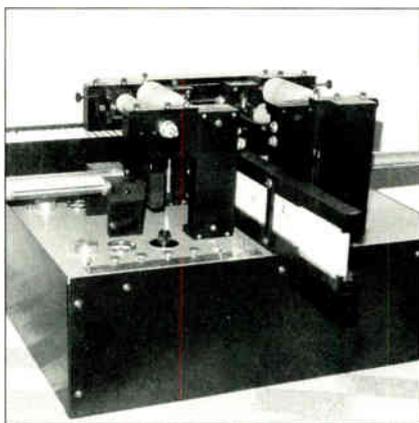
APEX MACHINE COMPANY; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 565-2739. Product Name: CA-20 Audio Cassette Printer with Ultraviolet Drier. **Contact:** Bob Coningsby, sales executive. **Date Product Introduced:** 7/91. **Product Description & Applications:** The CA-20 is capable of automatic feeding, printing in one color on both sides, ultraviolet drying, and restacking up to 150 audio cassettes per minute. This computer controlled machine incorporates the latest technologies available for dry offset printing in order to achieve the finest printing available on audio cassettes. Our new compact ultraviolet drier will also be standard on the CA-20 and will achieve immediate and permanent curing of the ink.

APEX MACHINE COMPANY; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 565-2739. Product Name: RG-1000 Rotary Gravure Video Cassette Printing Machine. **Contact:** Bob Coningsby, sales executive. **Date Product Introduced:** 7/91. **Product Description & Applications:** This fully automatic machine operating on or off line feeds, prints in one color, and dries up to 200 video cassettes per minute. The heart of the RG-1000 is the Apex gravure print head. Incorporated in the print head is our rapid plate change fixture, allowing the operator the ability to change plates in less than one minute. The RG-1000 is computer controlled and complete with our automatic programmable ink pump, which automatically feeds the correct amount of ink at the right viscosity into the machine to insure continuous quality printing.

APEX MACHINE COMPANY; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 565-2739. Product Name: RS-100 Video Cassette Printing Machine. **Contact:** Bob Coningsby, sales executive. **Date Product Introduced:** 7/91. **Product Description & Applications:** The RS-100 Video Cassette Printing Machine is specifically designed as an inexpensive unit for small and medium size duplicators. It is capable of feeding, printing, and ultraviolet drying over 80 video cas-

settes per minute. This particular machine uses the patented method of decorating known as rotoscreeening, which enables the duplicator to produce the finest quality of printing available on the market today. This machine is capable of accepting video, audio, R-DAT cassettes as well as Norelco, video and CD boxes.

APEX MACHINE COMPANY; 3000 NE 12th Terr.; Ft. Lauderdale, FL 33334; (305) 565-2739. Product Name: Z-90 Automatic insert machine & Z-100 Automatic Over-wrap Machine. **Contact:** Bob Coningsby, sales executive. **Date Product Introduced:** 7/91. **Product Description & Applications:** For those duplicators looking for an inexpensive insert and over-wrapping machine, Apex has the answer, the new Z-90 automatic insert machine and the Z-100 automatic over-wrap machine. This automated turnkey system can automatically feed inserts and J-cards into audio cassettes and over-wrap them in a fold at production speeds of approximately 40 to 45 cassettes per minute.



THE ARCHON CORPORATION
Arcoset Printing 1800XSII

THE ARCHON CORPORATION; 7647 W. Yucca St.; Peoria, AZ 85345; (602) 979-4451. Product Name: Arcoset Printing 1800XSII. **Contact:** John Arcotta, president. **Date Product Introduced:** 8/91. **Product Description & Applications:** The Arcoset Mini Printer, Model 1800XSII is a fully automatic variable speed direct on-cassette imprinter which eliminates the use of paper labels. It comes as a double-sided imprinter with an output capacity of 3600 imprints/hour. It is the smallest, most-affordable, user-friendly, high-quality imprinter on the market today. Accessories include an Exit Stacker Assembly. Optional accessories include a low photopolymer platemaker. **Basic Specifications & Suggested List Price:** Pneumatic operation requires compressed air and 100 volts AC. Dimensions 24"x20"x18". Weight 125 lbs. Requires rubber or photopolymer printing plates. Uses air-dry or UV ink. Price \$9,800.

ATM/Fly-Ware; 20960 Brant Ave.; Carson, CA 90810; (213) 639-8282; FAX: (213) 639-8284. Product Name: AMFS Modular Rigging System, AMFS Yoke Assembly. **Contact:** Kerry Bullis, project manager. **Date Product Introduced:** 10/90 & 5/91. **Product Description & Applications:** The AMFS Series Loudspeaker Hardware system attaches directly to the loudspeaker and maintains a very low profile. The need for an overall top grid truss is eliminated with the system enabling very compact and aesthetically pleasing loudspeaker arrays to be constructed. The modularity of the system permits various loudspeaker array configurations to be easily constructed without special components or additional rigging trusses. For specialized applications, a yoke bracket may be used which allows complete 360 degree tilt and attitude adjustment. Yoke brackets are available in one loudspeaker and two loudspeaker widths. The two loudspeaker version allows the loudspeaker

to be played tight or wide. The Yoke Bracket Assembly is designed to be used with AMFS 1X2 trusses. **Basic Specifications & Suggested List Price:** The majority of the AMFS Series components are constructed from high-grade steel, and is conservatively engineered and certified at a safety factor of 6:1. ATM Fly-Ware makes available component certification and data sheets to dealers as requested. Custom and OEM manufacturing are available. Pricing and additional information can be acquired by contacting ATM Fly-Ware.

AUDIO ANIMATION INC.; 6632 Central Ave. Pike; Knoxville, TN 37912; (615) 689-2500; FAX: (615) 689-7815. Product Name: Paragon Studio Processor. **Contact:** Jim Ruse. **Date Product Introduced:** 10/91. **Product Description & Applications:** Audio Animation will introduce the Paragon Digital audio studio processor. This 4-channel, fully digital processor combines dynamics control (compression, expansion, limiting & gating) with both 5-band parametric and 1/3 octave graphic EQ types. The dynamics control can operate within a user-specified frequency range. Other processor combinations can also be obtained. **Basic Specifications & Suggested List Price:** 4-channel; AES I/O; fully digital; RAM based; expandable; \$9,450.

AUDIOLAB ELECTRONICS INC.; 5831 Rosebud Ln., Bldg. C; Sacramento, CA 95841; (916) 348-0200. Product Name: CDS-3500. **Contact:** Ronald A. Stefan, VP sales & marketing. **Date Product Introduced:** 4/91. **Product Description & Applications:** The Audiolab CDS-3500 tape degausser automatically erases all magnetic tape cassettes with a coercivity up to 1600 Oersted and a cassette width of 5". The CDS-3500 transports the tape via conveyor belt into and out of the degaussing field. The magnetic field strength and field orientation ensure complete tape erasure. Erase VHS continuously with single pass operation and Beta SP, Mill intermittently with 2-pass operation. **Basic Specifications & Suggested List Price:** Power: 230 vac +/-5%. Consumption: 8A low, 12A high. Dimensions: 17x47x5.5". Price: \$5,675.

BGW SYSTEMS INC.; 13130 Yukon Ave.; Hawthorne, CA 90250; (213) 973-8090; FAX: (213) 676-6713. Product Name: BGW. **Contact:** Brian Wachner, president. **Date Product Introduced:** 11/90. **Product Description & Applications:** Fabricated metal rackmount accessories include blank panels, vent panels, XLR panels, BNC panels, DE and DB panels, trays, drawers, fans and fan panels, connector plate systems, mounting hardware and custom accessories. **Basic Specifications & Suggested List Price:** 1-4 rack units high, 14-22 GA CRS with powder coat paint or grained and black anodized aluminum. Available in standard or custom sizes.

CLEAR-COM; 945 Camelia St.; Berkeley, CA 94710; (415) 527-6666. Product Name: ICS-60 Matrix Plus User Station. **Contact:** Michael Goddard. **Date Product Introduced:** 4/91. **Product Description & Applications:** The ICS-60 intercom system features six listen/talk dual electronic switching control buttons along with answerback, mic, speaker and call keys. The ICS-60 interconnects with a simple unshielded twisted pair and requires only one rackspace. It also comes in a ten key version ICS-100. The ICS-60 is ideal for broadcasting, TV production, large edit facilities and sound stage applications where a simple 6-key, non-display station would suffice. **Basic Specifications & Suggested List Price:** ICS-60—\$995. ICS-100—\$1,250.

CLEAR-COM; 945 Camelia St.; Berkeley, CA 94710; (415) 527-6666. Product Name: MS-812. **Contact:** Michael Goddard. **Date Product Introduced:** 4/91. **Product Description & Applications:** MS-812-8/MS-812-12 is an 8 or 12 ch. programmable master station. The MS-812 can store and recall four complete station set-ups. It can access and/or control up to 12 party-line channels, 8 external IFB channels and 16 external ISO channels. The MS-812 features individual channel "listen trim" level controls. Separate listen/talk light touch dual action buttons, and a LED display to prompt you through programming. **Basic Specifications & Suggested List Price:** 8 ch version—\$3395; 12 ch. version—\$3,695; 4 ch. IFB option—\$495; 8 ch IFB option—\$835.

COMMUNICATIONS SPECIALTIES INCORPORATED; 89A Cabot Cr.; Hauppauge, NY 11788; (516) 273-0404. Product Name: VGA Extender. **Contact:** Steve Bloom, director—sales & marketing. **Date Product Introduced:** 1/91. **Product Description & Applications:** VGA Extender will extend a computer's VGA video output, keyboard and PS/2 mouse up to 500 feet away from the computer. This system consists of a transmitter located at the computer and a receiver located at the remote location. The transmitter and receiver are connected via a multiconductor composite cable (CAB-21). A local monitor output is provided on the transmitter and both the transmitter and receiver are powered by their own wall-mount power supplies. **Basic Specifications & Suggested List Price:** Maximum extension distance: 500 feet. (1,000 feet upon modification). Supplied accessories: VGA input cable, (2) 115V power supplies (230V power supplies are available), PS/2 Keyboard and mouse cables, manual. Cost: \$795, modified for 1000' add \$100, 230V version add \$50.

COMMUNICATIONS SPECIALTIES INCORPORATED; 89A Cabot Cr.; Hauppauge, NY 11788; (516) 273-0404. Product Name: VGA Splitter. **Contact:** Steve Bloom, director. —LISTING CONTINUED ON NEXT PAGE



1992
NEW
PRODUCTS

Other

—LISTING CONTINUED FROM PREVIOUS PAGE

tor—sales & marketing. **Date Product Introduced:** 1/91. **Product Description & Applications:** TwinSplit™, Quad Split™ and OctoSplit™ VGA splitters will split a computer's VGA video output to 2, 4 or 8 VGA monitors at once, each up to 200 feet away. Compatible with all VGA and Super VGA modes, they are ideal for conference rooms, classrooms, show exhibits and demonstrations. Short and long gain switches are provided on the front panel to compensate for cable loss. Multiple VGA splitters can be cascaded to drive additional VGA monitors. **Basic Specifications & Suggested List Price:** Number of VGA outputs: 2, 4 or 8. Maximum output drive distance (with CAB-19 cable): 200 feet (400 feet upon modification). Supplied accessories: VGA input cable, 115V power supply (230V power supplies are available) and a manual. Cost: TwinSplit™ \$295, QuadSplit™ \$495, OctoSplit™ \$895.

CONNECTRONICS CORPORATION; 300 Long Beach Blvd.; Stratford, CT 06497; (203) 375-5577. Contact: Richard Chivers, president. **Date Product Introduced:** 1991. **Product Description & Applications:** Range of audio and video adaptor/connectors allowing easy, certain and robust adaptation of a wide range of connectors styles. **Basic Specifications & Suggested List Price:** From \$15 and up.

CREATIVE INPUT; 4029 S. Pacific Ave., Ste. #5; San Pedro, CA 90731; (213) 548-0218; FAX: (213) 548-0116. Product Name: QuickCards (for Roland D70, Korg M1 and Alesis Quadraverb). **Contact:** Geoffrey Ryle. **Date Product Introduced:** 7/91. **Product Description & Applications:** QuickCards are double-sided, laminated, reference cards, each individually created for today's most popular electronic music products. QuickCards are filled with information that's important to you, with simple, step-by-step instructions for the most essential functions; editing, storing and recalling programs; global functions like tuning and MIDI settings; the Terminology section acquaints you with technical concepts; plus helpful tips for programming. Instead of struggling with a lengthy and confusing manual, now there's a faster way to use your equipment. **Basic Specifications & Suggested List Price:** 9.5"X7.5"; double-sided; laminated for long life and weighing in at less than 1 ounce. Currently available for: Roland D70, Korg M1 and Alesis Quadraverb. Suggested retail price: \$9.95 each.

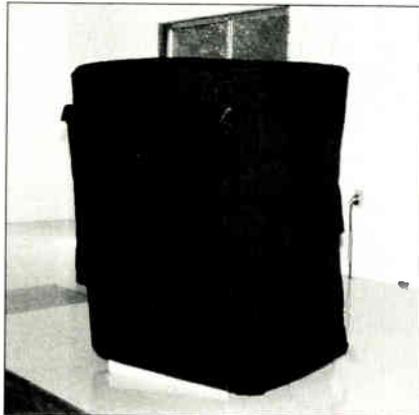
CRYSTAL SEMICONDUCTOR CORPORATION; PO Box 17847; Austin, TX 78760; (512) 445-7222. Product Name: CS5349, single +5V A/D Converter for Digital Audio. **Contact:** Brad Fluke, audio products mktg mgr. **Date Product Introduced:** 8/91. **Product Description & Applications:** The CS5349 is a complete analog-to-digital converter for stereo digital audio systems requiring single supply operation. It performs sampling, A-to-D conversion and anti-aliasing filtering, resulting in a 16-bit serial word for each channel. The CS5349 uses delta-sigma modulation with 64x oversampling, followed by digital filtering and decimation. The passband is DC to 24 kHz. **Basic Specifications & Suggested List Price:** The CS5349 can operate at sampling rates of 32kHz, 44.1kHz. The device features a dynamic range of 88dB and a signal-to-(Noise + Distortion) of 85dB. Pricing is \$38 in 1,000's.

CRYSTAL SEMICONDUCTOR CORPORATION; PO Box 17847; Austin, TX 78760; (512) 445-7222. Product Name: CS8411-AES/EBU Interface Receiver. **Contact:** Brad Fluke, audio products mktg mgr. **Date Product Introduced:** 9/91. **Product Description & Applications:** The CS8411 is a monolithic CMOS device that is used to receive and decode audio data in the AES/EBU format. The CS8411 has an on-chip line receiver and a configurable buffer memory that can be used to buffer channel status and/or auxiliary data. **Basic Specifications & Suggested List Price:** The CS8411 is available in a 28-pin plastic DIP or SOIC and operates from a single +5V supply. Pricing is \$13.40 in 100's.

DREW ENGINEERING COMPANY; 624 Dewitt Rd.; Webster, NY 14580; (716) 544-3337. Product Name: Loopmaster Transmitter TX-1/TX-2. **Contact:** Joseph J. Barone. **Date Product Introduced:** 2/91. **Product Description & Applications:** The Loopmaster Transmitter provides high fidelity hearing assistance. It operates on the induction loop principle to transmit high fidelity program material to large groups of people. **Basic Specifications & Suggested List Price:** TX-1, \$1,995 for 200-foot perimeter loop, TX-2, \$2,495 for 250-400 foot perimeter loops. Frequency response: 50-15kHz.

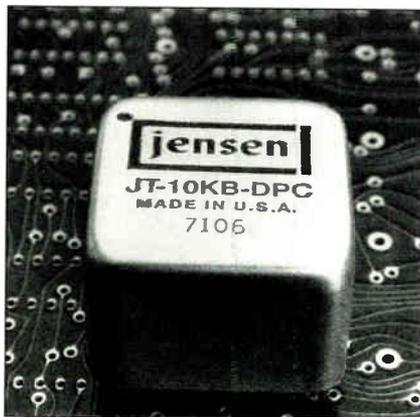
GET ORGANIZED; 328 Cunhnm Rd.; Scotts Valley, CA 95066; (408) 438-0259; FAX: (408) 438-0359. Product Name: Cord Control Kit. **Contact:** Robby Frank. **Date Product Introduced:** 1/91. **Product Description & Applications:** The Cord Control Kits transform rat's nests of messy cords and

cables into a custom snake via our Super Flex slit plastic tubing. There are a variety of labeling systems available as well as many different ties and mounts for securing the tube to any stand or surface. The tubing comes in black, white, red or grey and is large enough to hold up to 20 1/4" cables. **Basic Specifications & Suggested List Price:** The Cord Control Kit has (10) feet of tubing, (32) color coded labels, (8) beaded ties, (1) Velcro go-tie, (1) reusable tie wrap with self-adhesive mounts. Retail \$19.95. All components are also available in bulk with tubing in stock up to 2,000 ft.



INSTRUMENT COVERS
Custom built digital unit covers

INSTRUMENT COVERS; 3468 Peck Ave. S.E.; Salem, OR 97302; (800) 274-4543. Product Name: Custom built digital unit covers. **Contact:** Dennis Haley, owner. **Date Product Introduced:** 11/91. **Product Description & Applications:** Custom built recording unit covers for digital equipment, matching remotes, pianos, speakers, racks, console units for maximum protection yet allows moveable ease and convenience. **Basic Specifications & Suggested List Price:** As all items are custom built to your special needs, prices can range from a low of \$50 to a high of \$630.



JENSEN TRANSFORMERS
JT-10KB-DPC Line Input Transformer

JENSEN TRANSFORMERS INC.; 10735 Burbank Blvd.; North Hollywood, CA 91601; (213) 876-0059; FAX: (818) 763-4574. Product Name: JT-10KB-DPC Line Input Transformer. **Contact:** Dave Hill, VP of operations. **Date Product Introduced:** 6/91. **Product Description & Applications:** The JT-10KB-DPC is an all-new, low-cost, compact printed circuit mount line input bridging transformer, featuring increased headroom, lower distortion, and higher input impedance than our obsolete JE-10KB-C. It is designed for the most demanding applications in recording, broadcast, and sound reinforcement where noise rejection is critical. As part of the new JT series, it also benefits from computer controlled winding, high integrity wire bonding, and improved encapsulation. **Basic Specifications & Suggested List Price:** Magnitude response +/-0.3dB, 20 Hz to 20kHz; bandwidth: -3dB @ 200 kHz; negligible overshoot or ringing; 20 Hz maximum level +/-1% THD; +20.5 dBu, 20 Hz typical THD (below saturation): 0.25%; 1kHz THD @ +20 dBu under 0.01% input impedance >40k ohms (with the recommended load); CMRRs: 110 dB @ 60 Hz, >90dB @ 1kHz, >60 dB @ 10kHz; measures 1.2" square X .93" above PCB; weight 62 g.; \$41.45 @100.

JRF MAGNETIC SCIENCES; 249 Kennedy Rd.; Greendell, NJ 07839; (201) 579-5773. Product Name: PLX. **Contact:** John French. **Date Product Introduced:** 1/91. **Product Description & Applications:** JRF Magnetic Sciences has expanded its PLX line of direct replacement magnetic heads to include additional reel-to-reel tape recorders. Features include

premium quality materials and construction. .012 inch tip depth insuring long life, extended high crosstalk shielding and special core laminations designed to optimize efficiency and frequency response. Mechanical construction of all PLX heads holds track location (center-to-center) mounting base to edge of track and consistency from head-to-head within .001 of an inch. Electrical consistency and plug to plug compatibility insure ease of installation. **Basic Specifications & Suggested List Price:** PLX heads are now available for: Otari MTR10/12 1/2" 4-track—\$675, Otari MTR12 1/2" 4-track (low speed mastering)—\$675, Otari MX5050 1/2" 4-track and 8-track—\$675, \$695, Teac 80-8 1/2" 8-track—\$595, Teac Mod 38 1/2" 8-track—\$595, Teac 85-16 1" 16-track—\$1,175. PLX heads also available for MCI/Sony, Studer, 3M, Ampex and other tape recorders.

MARSHALL ELECTRONICS INC./MOGAMI PRODUCTS DIV.; PO Box 2027; Culver City, CA 90230; (213) 390-6608. Product Name: Puroflex II Molded Cables. **Contact:** Leonard Marshall. **Date Product Introduced:** 1/90. **Product Description & Applications:** Mogami's new Puroflex II molded patch cord assemblies have been designed to give superior performance for either audio or video signals. They are being used in many audio/video patching applications and feature a superflexible outer jacket, a 75 ohm nominal impedance available in a variety of colors. Bulk wire is available in 1, 2, 3, 4, or 5 conductors in a flat Siamese construction. **Basic Specifications & Suggested List Price:** 24 AWG OFC, 75 ohm nom. imp. (10 mHz), XLPE insulation DC-200mHz bandwidth, flexible PVC jacket, approx. 70/0.12 OFC shield, 4.8mm O.D. RCA connectors are Gold plate on brass, 1/4" connectors are double molded for extra durability. List prices start at \$6.

MARSHALL ELECTRONICS INC./MOGAMI PRODUCTS DIV.; PO Box 2027; Culver City, CA 90230; (213) 390-6608. Product Name: W2893 Mini-Quad Mic Cable. **Contact:** Leonard Marshall. **Date Product Introduced:** 1/90. **Product Description & Applications:** Due to popular demand, the miniature quad mic cable used in our bantam patch cords is now available in bulk. It can be used in applications which require a small wire but where a quad wire is needed for its superior noise rejection. It features a durable superflexible jacket which is available in several colors. **Basic Specifications & Suggested List Price:** Four conductors; 30/0.08 oxygen-free copper 26 AWG. Insulation: 1.0XLPE. Shield: approx. 74/1.12A served spiral shield. Jacket: 4.80mm flexible PVC. Colors: black, yellow, green, blue. List price: \$0.48 per foot.

MODULOCK INC.; 3960 Laurel Canyon Blvd., Ste. 321; Studio City, CA 91614; (818) 905-9136; FAX: (818) 783-1578. Product Name: Total Height Expansion RACK (T.H.E. Rack). **Contact:** Steve Leonard. **Date Product Introduced:** 10/90. **Product Description & Applications:** T.H.E. Rack is a modular system for mounting 19" E.I.A. rackmount equipment. Constructed of impact-resistant plastics, the basic 6 and 12 space height systems are available in both Standard (basic) and Deluxe models (with doors and casters). The system is expandable at any time with the addition of new sidebar pairs (1 r.u. each). Front and rear mounting surfaces are standard (22" i.d.), effectively doubling equipment capacity. **Basic Specifications & Suggested List Price:** Construction: Copolymer polypropylene & A.B.S. Dimensions: all models are 22"Wx26.5"D. Standard-6: 17.875"H, 28 lbs., \$259; Standard-12: 28.375"H, 38 lbs., \$389; Deluxe-6: 20.875"H, 38 lbs., 700 lbs. caster capacity, \$369; Deluxe-12: 31.375"H, 48 lbs., 700 lbs. caster capacity, \$499; Deluxe-HD: 32.250"H, 53lbs, 900 lbs. caster capacity, \$549.

MUSIC ASSOCIATES INC./SORBOTECH; PO Box 165; Beachwood, NJ 08722; (908) 505-9070. Product Name: Sorbotech. **Contact:** Thomas M. Chaffee, president. **Date Product Introduced:** 10/91. **Product Description & Applications:** Sorbotech Vibroacoustic Damping Barrier (Pat. Pend.), designed to isolate rackmounted electronic equipment from racks, each Sorbotech kit includes a two-foot length of a patented vibration absorptive visco-elastic polymer with holes at standard E.I.A. spacings (5/8", 5/8", 1/2"). Placed between the equipment's rackmounting ears and the rack rail, the strips reduce vibration transmission, ESD (Electro-Static Discharge), RF conduction and eliminate one source of ground loop. A two-foot strap of 16 awg copper braid with three eyelets is provided for grounding to a suitable bus. **Basic Specifications & Suggested List Price:** Sorbotech kit: \$12.75 Mfrs. Sugg'd Retail.

NUMARK ELECTRONICS; 503 Newfield Ave.; Edison, NJ 08837; (908) 225-3222. Product Name: CD 5020. **Contact:** Todd M. Jensen. **Date Product Introduced:** 1/6/91. **Product Description & Applications:** The CD 5020 is a dual compact disc player featuring +/-8% pitch control on each of the manual transports packaged in a 19" rackmount unit. All functions are utilized in the 19" rack-mount remote unit (all cables included). This is independent of transport for mounting about your mixing console optional CDX 4.5 14-foot cables are available for mounting the remote even further away for custom installations. **Basic Specifications & Suggested List Price:** \$1,275.

OPTICAL DISC CORPORATION; 12150 Mora Dr.; Santa Fe Springs, CA 90670; (213) 946-3050. Product Name: Series 500 Mastering Modules for Laser Disc & Compact Disc. **Contact:** John Browne, VP sales. **Date Product Introduced:** 9/90. **Product Description & Applications:** The Series 500 is

a fully integrated turnkey system, providing all the equipment, functions and tools necessary to master compact discs and laser discs, a complete mastering operation that includes glass recovery, final glass cleaning, NPR spin coating, mastering, metalizing and final inspection. The Series 500 use non-photosensitive (NPR) technology and Direct Read After Write (DRAW) systems to produce the finest masters systematically and cost-effectively. **Basic Specifications & Suggested List Price:** ODC's specifications require sufficient floor space, smooth ceiling, washable painted walls and a hard floor. Environmental and clean room requirements are "built into" workstations. Suggested list price—\$1.5 million (CD mastering), \$1.7 million (LaserDisc mastering).

PENNY & GILES INC.; 2716 Ocean Park Blvd., Ste. 1005; Santa Monica, CA 90405; (213) 393-0014. **Product Name:** Faders Motorized. **Contact:** Neal Handler. **Date Product Introduced:** 10/91. **Product Description & Applications:** A cost-effective controller for today's automated audio consoles. Offered in 2-stroke lengths with a variety of audio, VCA or linear outputs. This product complements our range of manual and motorized linear and rotary-quality faders. **Basic Specifications & Suggested List Price:** Conductive plastics, track technology twinned with Swiss-motor performance provides the best motorized fader but at a realistic price.

PLASMEC SYSTEMS LTD.; Weydon Lane; Farnham, Surrey, GU9 8QL UK; +44 (0)252 721 236; In USA, call (213) 393-0014. **Product Name:** Flexpatch. **Contact:** Simon Stannard-Powell, applications manager. **Date Product Introduced:** 12/90. **Product Description & Applications:** Flexpatch jackfields are built with Mosses and Mitchell professional jacks in both standard and mini versions. PCB technology provides reliable and consistent wiring between jacks and connectors at a lower cost than conventional wiring. There are connectors on the flexible PCBs for "pop-on" pods. These can be simple units to permit rapid configuration, or they can exploit Mosses and Mitchell Active Technology to incorporate high-quality active circuitry inside the jackfield. **Basic Specifications & Suggested List Price:** With EDAC connectors at rear as standard; 2 rows of 48 miniature jacks in 1 U; 2 rows of 24 standard jacks in 1 U; jackfields and pods can be manufactured to custom requirements.

SEAM TECH; PO Box 77394; San Francisco, CA 94107; (415) 543-0170. **Product Name:** Rip-Tie. **Contact:** Michael Paul Fennell, owner. **Date Product Introduced:** 10/90. **Product Description & Applications:** Keep cables coiled, unknotted and neat. Use our Velcro brand Rip-Tie cable wraps to secure and release cables quickly and safely. One end permanently attaches a Rip-Tie to the cable with an enclosed locking nylon tie. A handy pull tab on the other end lets you free the Rip-Tie with one hand, saving valuable time. This patented durable design is made to last and the Rip-Tie is re-useable again and again. **Basic Specifications & Suggested List Price:** Rip-Tie cable wraps are available in 6 sizes and 10 colors. They come in small packages for resale or in bulk for large industrial users.

SELLMARK ELECTRONICS; 96 Dudley Rd.; Sudbury, MA 01776; (508) 443-8033; FAX: (508) 443-4844. **Product Name:** Sellmark. **Contact:** Richard Vanderslice, VP. **Date Product Introduced:** 6/91. **Product Description & Applications:** Range of high-quality, competitive-priced, conductive plastic faders. Also the new Omnitrac motorized fader for console automation. **Basic Specifications & Suggested List Price:** 60mm, 100mm and 104mm travel, log, lin and VCA laws. Various resistance values. Can be supplied with over press and microswitches. Audio leads or sockets. Approx. price: \$16 in quantities of 1,000.

SHARP ELECTRONICS CORPORATION (INDUSTRIAL LCD PRODUCTS); Sharp Plaza, Mail Stop One; Mahwah, NJ 07430-2135; (201) 529-8731; FAX: (201) 529-9636. **Product Name:** XG-2000 High-Resolution LCD Color Video Projector. **Contact:** Joe Gilio, product marketing manager. **Date Product Introduced:** 9/91. **Product Description & Applications:** High-Resolution LCD Color Video Projector incorporates over 650,000 total pixel elements for a horizontal resolution of better than 400 TV lines. Solid state LCD technology insures non-technical, convergence-free operation, superior image quality and ultra-reliability. The XG-2000 incorporates two BNC-type video inputs, two S-video (Y/C) terminals, as well as analog RGB. Weighing under 30 pounds, the XG-2000 also is portable and lightweight. Additional features include a built-in 20" to 150" zoom lens, reverse scan switch, comb filter, and long-life metal halide projection lamp. The XG-2000 comes complete with a back-lit wireless remote control. **Basic Specifications & Suggested List Price:** The XG-2000 incorporates three 3" active matrix TFT LCD panels, for a high-resolution video image in excess of 400 TV lines. The projection size is 20" to 150", and because the projector is solid state LCD, the projector is extremely portable and lightweight (29 lbs.), and sets up virtually instantly with absolutely no technical convergence adjustments required. For commercial use, the XG-2000 incorporates a 3-wire (grounded) AC line cord. Suggested list price: \$7,495.

SONY BUSINESS & PROFESSIONAL PRODUCTS; 3 Paragon Dr.; Montvale, NJ 07645; (201) 930-1000. **Product Name:** CDP-2700 Professional CD Player. **Contact:** Courtney Spencer, VP audio. **Date Product Introduced:** 4/91. **Prod-**

uct Description & Applications: The CDP-2700 professional compact disc player offers superb sound quality and reliability. Its digital outputs conform to AES/EBU and EIC-958 Type II formats to enable it to interface directly with professional and consumer digital audio products, including the Sony PCM-7000 Series timecode DAT and the PCM-2700 Professional DAT recorder. It provides operational features including fader start/stop control, rapid start using and autotune function and variable speed playback.

SOUND DESIGNERS STUDIO; 424 W. 45th Street; New York, NY 10036-3565; (212) 757-5679. **Product Name:** Fox's Rack 'n Roll. **Contact:** Bernard Fox. **Date Product Introduced:** 1991. **Product Description & Applications:** The simplest, lightest, most affordable and expandable way to hold rackable equipment safely together. 2 rail systems may be stacked in eye-catching shapes and quickly made ready to roll. The basic 8-space, 2-rail system fits easily into an automobile's trunk. Made of the finest U.S. steel and tapped on 3 sides, a single rail provides to sound designers and contractors a clean, simple technique of recessing, or custom displaying, musical, video and/or audio gear. **Basic Specifications & Suggested List Price:** 7/8" square, tubular steel measuring 14" by 20", weighing 2 lbs per pair which conform to the standard 19" and other rack widths. List price is \$99.95. The display carton, which contains 2 rails, 1 single space blank rack panel, and eight rack screws, measures 2" by 14" by 20". Accessories available: casters, connecting bolts, panels, flight cases, other. USA made.

STUDIO TECHNOLOGIES INC.; 5520 W. Touhy Ave.; Skokie, IL 60077; (708) 676-9177; FAX: (708) 982-0747. **Product Name:** IFB Plus Series Model 1. **Contact:** Gordon Kapes, president. **Date Product Introduced:** 3/91. **Product Description & Applications:** High-performance talent cueing (interrupted foldback) system that provides two channels of IFB within a single rackspace unit. It provides power and ground for talent amplifier assemblies and connecting to central office telephone lines. The IFB Plus Model 1 provides excellent sound and is perfectly suited for television and radio stations, broadcast production houses and educational audio/video facilities. **Basic Specifications & Suggested List Price:** \$1,295.

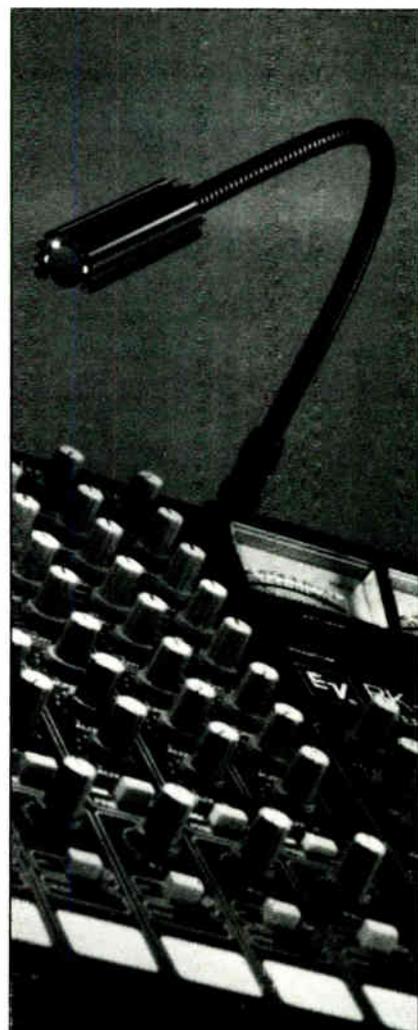
STUDIO TECHNOLOGIES INC.; 5520 W. Touhy Ave.; Skokie, IL 60077; (708) 676-9177; FAX: (708) 982-0747. **Product Name:** IFB Plus Series Model 2. **Contact:** Gordon Kapes, president. **Date Product Introduced:** 9/91. **Product Description & Applications:** A highly integrated two-channel talent cueing system contained in a single rackspace unit. It is designed expressly for use in ENG, SNG and mobile production facilities. Features multiple program inputs, telephone interfaces, voice-operated interrupt, level meters and internal interrupt microphones. **Basic Specifications & Suggested List Price:** Approx. \$1,295. TBA.

TAPEMATIC SPA; Via Vimercate, 32; Omago (Milano), Italy 20060; 39-39-6010145. **Product Name:** SAM II (Static Audio Master). **Contact:** Ron Goodwin Marketing Manager. **Date Product Introduced:** 1/91. **Product Description & Applications:** A true 16-bit static memory master (loop-bin) for the duplication of audio musicassettes. The double memory feature allows low-cost loading from R-DAT cassettes with zero down-time at change over. **Basic Specifications & Suggested List Price:** \$150,000(US) to \$200,000(US) depending upon C-length.

TAPEMATIC SPA; Via Vimercate, 32; Omago (Milano), Italy 20060; 39-39-6010145. **Product Name:** Tapecentre. **Contact:** Ron Goodwin Marketing Manager. **Date Product Introduced:** 11/91. **Product Description & Applications:** Audio analog and DCC musicasset cassette loader. Incorporating automatic pancake loading and threading from a central magazine of 16 pancakes. Four extractable loading modules with one cabinet reduces floor space required up to 50%. Infeed magazine and exit stacker form parts of the whole system. **Basic Specifications & Suggested List Price:** \$120,000 US, over 10,000 C60 cassettes per shift.



TICE AUDIO PRODUCTS INC.
Power Block Power Line Conditioner
—LISTING CONTINUED ON NEXT PAGE



Could
you
see...
having
a
mixer
without

Littlite
Gooseneck Lamps and Accessories

Littlite/CAE, Inc.
P.O. Box 430
Hamburg, MI 48139
313-231-9373
FAX 313-231-1631



—LISTING CONTINUED FROM PREVIOUS PAGE

TICE AUDIO PRODUCTS INC.; 2140 Pond Rd., unit #3; Ronkonkoma, NY 11779; (516) 467-5254. **Product Name:** Power Block Power Line Conditioner. **Contact:** Francine or George Tice. **Product Description & Applications:** The Power Block is a phase-corrected AC power line conditioner specifically optimized for audio equipment. The Power Block incorporates feedback and feed forward for superior noise cancellation with its 50-pound isolation transformer. The Power Block improves clarity, harmonic accuracy and overall sound reproduction through the elimination of EMI and RFI. The Power Block has been acclaimed by consumers and reviewers alike, as "The Absolute Best Power Conditioning System for use with audio equipment." **Basic Specifications & Suggested List Price:** Input voltage: 120VAC 60 Hz. Output voltage: 122 VAC 60Hz. Wattage capacity: 1875 watts. Voltage correction: +/-10%. Blocks spikes within 4 nanoseconds. Common-mode noise reduction 152dB. Weight: 66 pounds. Dimensions: L 18 1/2" x W 10 1/2" x H 9 1/2". 240 VAC -50Hz available.

TNA CASE COMPANY; 1701 Valley Rd.; Ocean, NJ 07712; (908) 493-3979. **Product Name:** Musician Series Flight Cases. **Date Product Introduced:** 9/90. **Product Description & Applications:** Economical line of cases for keyboards, small mixers, recorders, etc. **Basic Specifications & Suggested List Price:** Features include 1/4" construction, 1/2" polyester foam interiors and medium-duty, surface-mount hardware.

TRANSPARENT AUDIO; Rt. 202 Box 117; Hollis, ME 04042; (207) 929-4553. **Product Name:** MIT (Music Interface Technologies). **Contact:** Douglas Blackwell, VP sales. **Date Product Introduced:** 12/90. **Product Description & Applications:** Fully balanced microphone cables, phase correct and patented. Industry-standard interconnect and speaker cables

used by the top studios (Telarc, Taj Soundworks, etc.) in the world. Improved sound for your studio, sound system or home audio systems. **Basic Specifications & Suggested List Price:** Balanced cables and interconnects available in lengths of 1 meter to 25 or above. Speaker cables available in all lengths above 8 feet (the minimum for phase coherency). Cables start at \$35 and run all the way to \$6,900.

TROUPER INDUSTRIES LTD.; 20960 Brant Ave.; Carson, CA 90810; (213) 639-8281. **Product Name:** Cable Crossover. **Contact:** Cynthia Claypool, VP. **Date Product Introduced:** spring 1990. **Product Description & Applications:** Trouper industries manufactures industrial cable protectors for safely running cables in a variety of indoor and outdoor venues. Highly visible in black and safety orange, both top and bottom are non-skid even when wet. The lid hinges to expose three 2x1 7/8" cable troughs, enabling many large cables to be accommodated. Sections may be interlocked to make continuous lengths. Safer and easier to use than traditional metal or wooden designs. **Basic Specifications & Suggested List Price:** Trouper industries cable crossovers are manufactured from UV-resistant, high-density, pressure-molded polyurethane. The lid is made from low-density polyethylene. Each crossover measures 30"x24" and weighs 22 lbs.

VIDEO I-D INC.; 105 Muller Rd.; Washington, IL 61571; (309) 444-4323. **Product Name:** Role Prompter. **Contact:** Gwen Wagner, dir of mkr/Lynn Coverstone VP sales. **Date Product Introduced:** 8/91. **Product Description & Applications:** Fully portable and easily assembled teleprompter. At home in a corporate boardroom, studio or a remote field location. This unique design allows mobility and balance while providing full dependability and control. Script editing accomplished with easy-to-learn word processing software. Features include variable-speed scrolling, keyboard or talent hand control, reverse imaging, programmable stops and timed pauses, excellent readability and fast set-up time. This reliable teleprompter is truly your "Field Assistant". **Basic Specifications & Suggested List Price:** 286 AT class portable computer with 5 1/4 & 3 1/2" drives (40 MB hard drive optional) PC Prompter software with full-edit and display, guides, manuals, talent hand control head assembly and 12" monochrome monitor. Fully portable capability. Batteries and travel cases optional. System price complete \$5,875. 15% introductory discount good thru 1/1/92 bringing price to \$4,995.

WHIRLWIND; 100 Boxart St.; Rochester, NY 14612; (716) 663-8820. **Product Name:** 56-Pair Audio Cable. **Contact:** Ron

Long. sales. **Date Product Introduced:** 9/91. **Product Description & Applications:** 56-pair audio cable with balanced pairs, for large concert systems and installations. Presspower—press conferencing mixer with distribution amp all in one. For broadcast and install applications. **Basic Specifications & Suggested List Price:** Small o.d. and highly flexible. Presspower—2-ch. max mixer with 24 outputs, A/C D/C or battery-operated.



ZERO STANTRON
Video Duplicator Racks

ZERO STANTRON; 777 Front St.; Burbank, CA 91502; (818) 841-1825. **Product Name:** Video Duplicator Racks. **Contact:** Brenda Sabin, nat. sales mgr. **Date Product Introduced:** 7/15/91. **Product Description & Applications:** Zero Stantron introduced a new line of all-steel, vertical rack assemblies specifically designed for Panasonic and Sony high-speed professional recorders. Available in two standard configurations, will hold either 16 or 24 recorders. It will meet the specific need of video professional utilizing Panasonic AG6840, AG6850 and AG5200 or Sony SV0960. **Basic Specifications & Suggested List Price:** Prices start at \$514, for delivery in three weeks or less, 22 standard colors at no extra cost, or custom colors at additional expense.

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November 1991**

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A Look at Consoles for Audio/Video Post-Production

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• **PRODUCER'S DESK**

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Sound Reinforcement News & Features; Field Test: Yamaha DAW; Artist's Studio: Jon Bon Jovi; Chicago Recording Company

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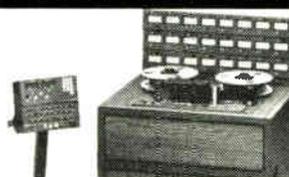
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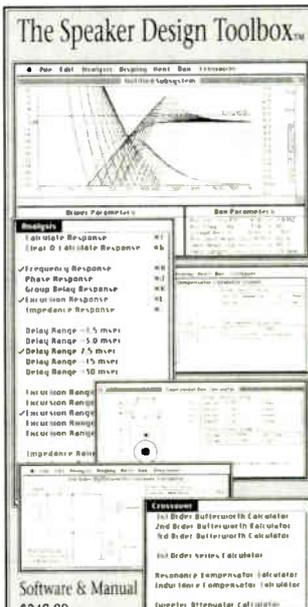
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FEEDBACK

CSI Clarification

The "Reference Monitor Buyer's Guide," in the June 1991 issue, contained an error regarding the CSI MDM-4 and MDM-TA2. Their sensitivities are listed as 80 and 78 dB, respectively. This is true for the "dB SPL/1 volt/1 meter" rating, which I wish everyone would adopt, but it should be 9 dB higher if the CSI monitors are to be treated on an equal basis with the other monitors that use the "dB SPL/1 watt/1 meter" rating method. This method assumes an 8-ohm impedance and the input voltage is therefore 2.83 volts.

The MDM-4 sensitivity should be listed as being 89 dB SPL/1 watt/meter, and the MDM-TA2 sensitivity should be 87 dB SPL/1 watt/meter.

Edward M. Long
E.M. Long Associates
Oakland, CA

Whatever Works

I find it odd that Mr. Morrison would claim that a control room "must be designed such that..." anything ("Staggered Geometry Designs," August 1991). Although his approach is interesting and legitimate, there are certainly many others that are also very useful. There are several options provided by books listed in the Mix Bookshelf, for example. Many of them work quite well, although they don't conform to what Mr. Morrison claims they must.

I wonder if Mr. Morrison has high regards for the numerous control room designs in which classic recordings have been mixed. Certainly most of these do not conform to the characteristics he claims are necessary.

Perhaps in this age of classic mic/EQ/compressor worship, we should also consider classic acoustics as well as newer, computer-

generated designs. For example, I have read that Bruce Swedien took the design of his new "home studio" out of his college acoustics text.

Lest we become divided over preferences of acoustic environments, then suffice it to say that if it works, and it reproduces over a broad spectrum of other environments, then a control room's acoustic signature is a good one.

Keith Keller
Chez Flames Recording
"Gnarlins," LA

More on the A/D Tests

We would like to address the points that Yamaha made in a recent letter to *Mix* concerning the article we wrote, "A/D Converters," in May 1991.

Re: Clipping—Regardless of the unit's headroom, the fact remains that it is possible to clip the input stage without indication if the input control is set too low.

Our listening tests were conducted as "blind tests." Each converter was assigned a letter of the alphabet. Throughout the listening, converters were identified by their code letters only. We feel the listening environment is quite accurate as described in the article. All converters were indeed exposed to the same set of conditions, so if there were any non-linearities, each converter would have been affected with no advantage to any one unit. This is called a control, and everyone gets the same treatment.

The listening tests were primary. The measurements were only an effort to find some identification as to what those differences may be. Our alias measurement tones were indeed higher than the proposed AES standards (-6 dB Full Scale, as opposed to 20 dBFS) but not as high as Yamaha. Did they indeed measure the exact same unit that we did? Even with our elevated levels, only

the BTS and Yamaha exhibited the reported "unusual" behavior on alias level. All of the other units had no problem with this level. No specific conclusions were drawn, because it seems that we as an industry are exploring what significant measurements in digital are. Otherwise, why would the AD2X exhibit better sound than DAT converters, which also measured better than the AD2X? We found only indications that may be useful for manufacturers to address.

The fact still remains that AD2X did not fare well in the listening tests. I should reiterate that the test compared the converter to the source, not to other converters. We would never intend our test to substitute for people's own listening. Each person should indeed do his/her own comparison, and we hope the people who use the AD2X have also done comparisons instead of choosing by name value alone. We do not have endorsements or consulting arrangements with any of the manufacturers reviewed. Therefore, we feel that our tests were impartial and unaffected by any knowledge of who made what or which used whose new technology.

Bob Hodas, Paul Stubblebine
Berkeley, CA

Digital Copying Conundrum

I have been following your reports of digital/analog avidly for the last few years (particularly the 20-generation DAT comparison—"Multiple DAT Copies," March 1991—excellent work), trying to put into words the differences. Just noticed something in *Science News*, which explains it (maybe) and suggests a cure: "Stochastic resonance" is a fancy word for the deliberate introduction of noise in order to enhance weak signal detection.

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New Haven, CT

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