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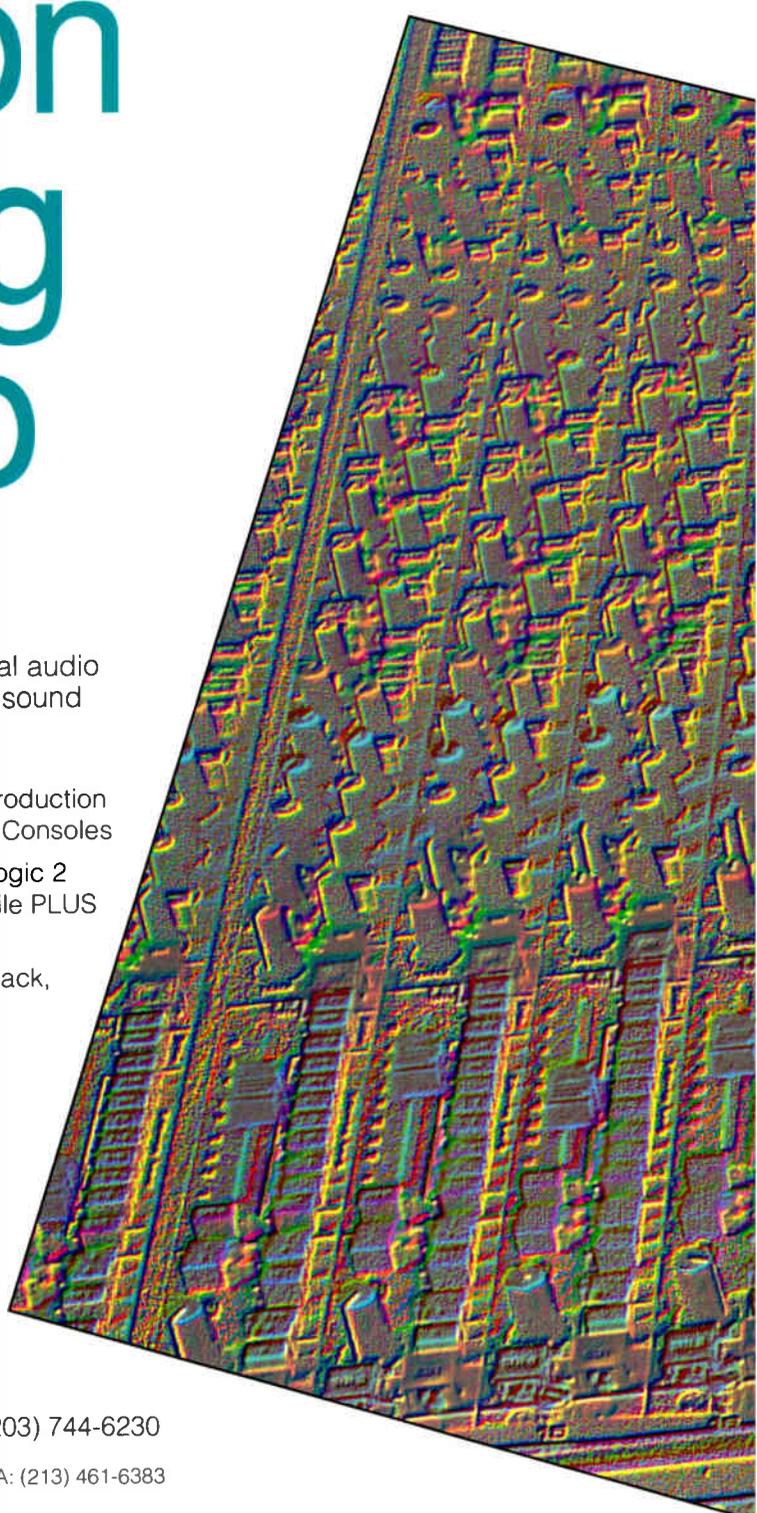
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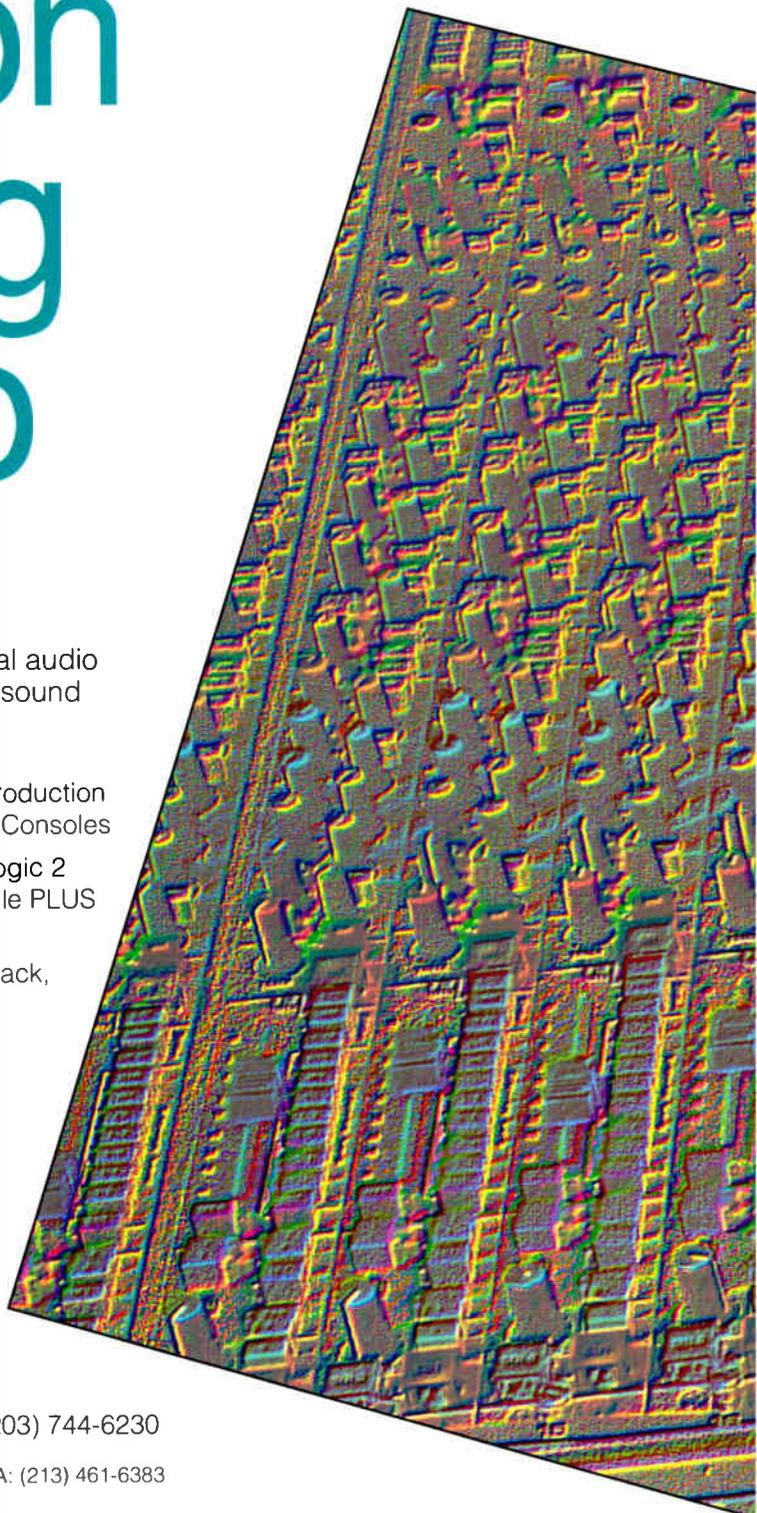
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MIX

PROFESSIONAL RECORDING • SOUND AND MUSIC PRODUCTION

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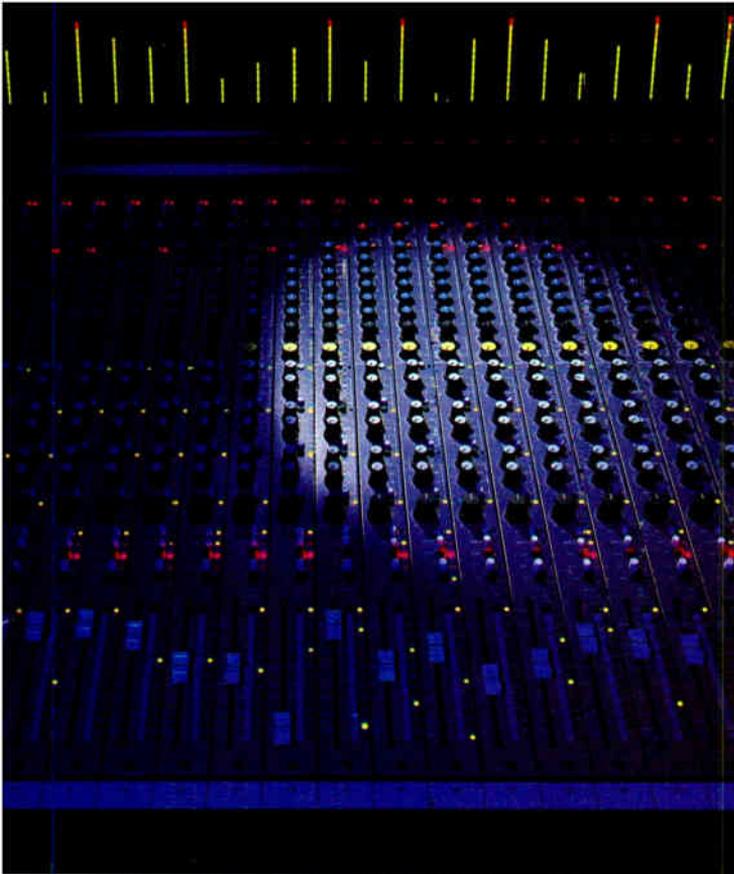
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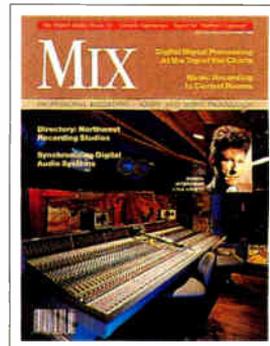
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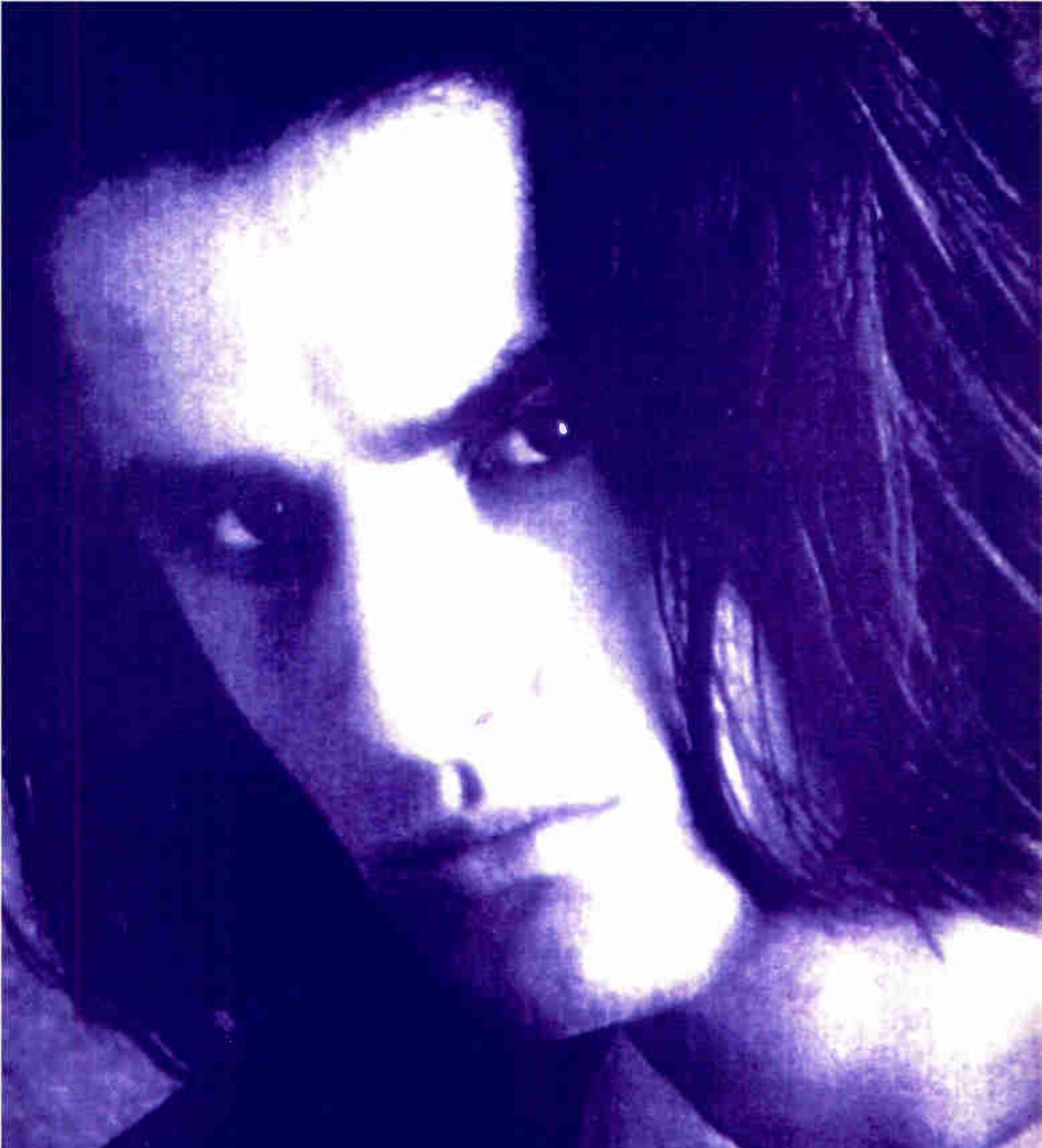
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Cover: Founded 20 years ago, The Plant Recording Studios in Sausalito, Calif., has upgraded its Studio B with a 72-input Neve VR console with Flying Faders automation. Among the first projects on the new console was Peabo Bryson's title cut from *Beauty and the Beast* and the Santana album. The Plant offers 48-track digital and analog recording, as well as two SSL rooms (one with a Synclavier 9600 system), a jingle/media production studio and 48-track remote recording. **Photo:** Michael Partenio.





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FROM THE EDITOR

How long have they been called “project studios”? Three, maybe four years? Before that, people tended to group these non-public operations mainly as home or private studios, or even demo shops. But as more and more master-quality work has come out of these rooms, their importance in the audio food chain has risen a fish or two.

Many small, traditional, commercial recording operations have been crowded off the map by this new breed of studio. Larger, multipurpose rooms have seen a bite taken out of their market, too, and have diversified and/or specialized to ensure survival. Today’s project studios owe their existence to the evolution of small-scale professional audio equipment combined with the growing desire of recording artists to get “off the clock” and work on *their* schedule.

We realize a growing number of *Mix* readers, 59.2% on the latest survey, consider themselves owners of home or project studios. No longer can the big studios hope that these *bête noires* will just go away. They are part of the new order, members of today’s establishment. Rather than oppose each other’s existence, the times demand working together to make the most out of the available recording business.

Alliances between project and commercial studios can benefit both, from providing the private operation with high-level technical assistance, to bringing repair and finishing work into the major facility. It’s not hard to imagine *partnerships* between the two springing up, shuttling clients back and forth between them during major projects as warranted by capability, efficiency and economics.

In issues to come, we plan to explore project studios—this new variety of recording operation—more deeply, including their developing relationships with the more traditional rooms. In this issue, Dan Daley gets the ball rolling with a genealogy of the project studio.



Keep reading,

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Editor-in-Chief

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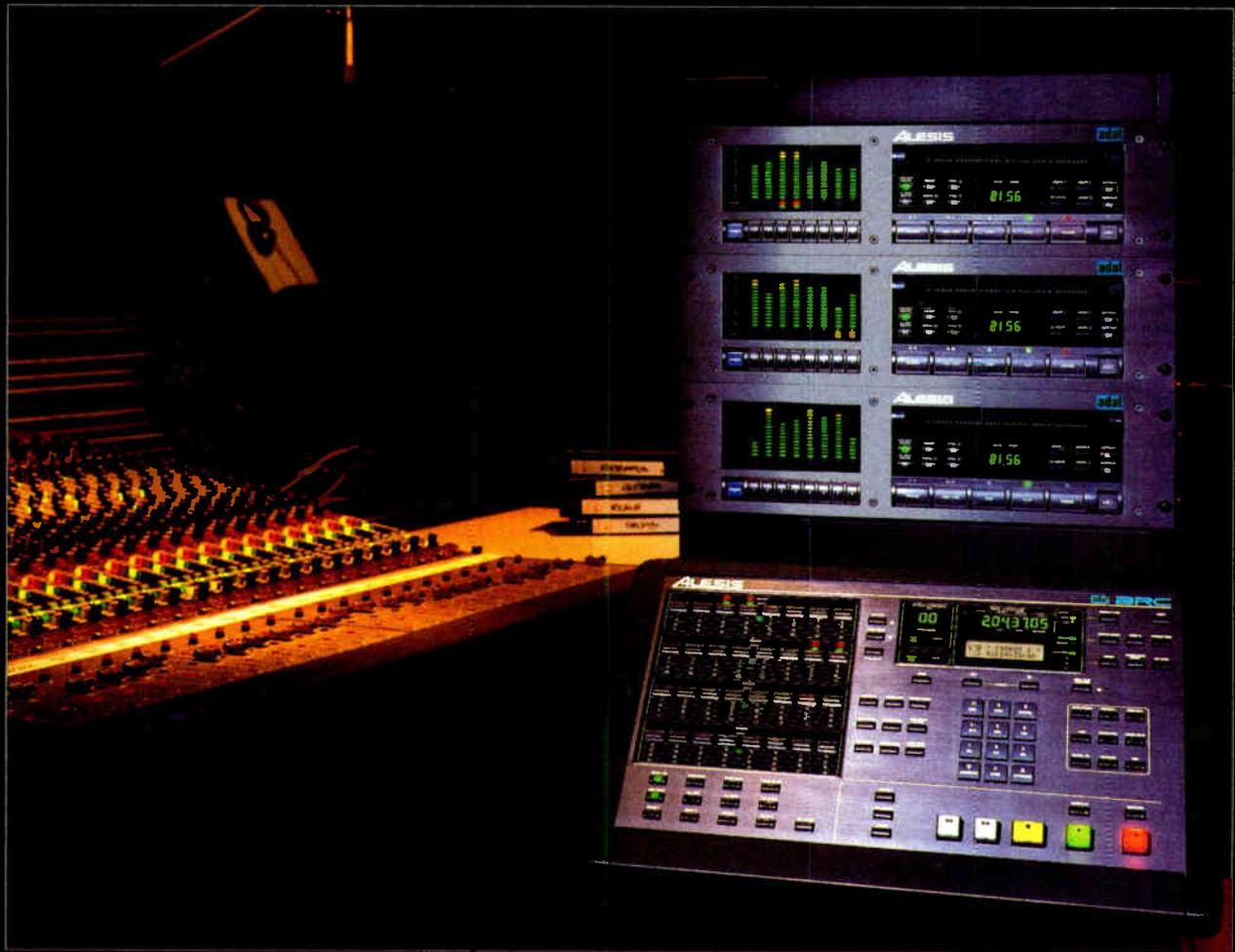
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World Radio History

CURRENT

NAMM 1991: New Markets, New Directions

On January 17, music and audio dealers, manufacturers and retailers from over 60 countries descended on the Anaheim Convention Center for the Winter NAMM convention. We'll report on product developments in next month's *Mix* but in the meantime, several significant trends emerged.

Everyone was talking MIDI machine control. In fact, just hours before the show, the MIDI Manufacturers Association and the Japanese MIDI Standards Committee adopted the MMC protocol for integrating tape recorders into the MIDI studio. Tascam unveiled its MMC-100 interface—which translates MMC to/from its 238, 644, 688, TSR-8, MSR-16 and MSR-24 decks—while across the show floor, a Tascam 238 cassette 8-track obediently followed the whims of Mark of the Unicorn's Digital Performer. Fostex showed its G-24 multitrack under Opcode Studio Vision control and co-sponsored an event with Atari to demonstrate software-based sequencers from Dr. T's, C-Lab and Steinberg/Jones that offer the option of controlling multitracks directly from the sequencer menu. Advance the sequencer to bar 57, beat 3, and the recorder rolls to that point. Neat. Simple. Fun.

Atari has substantially improved its position in the music marketplace over just a year ago. C-Lab software is now distributed by Ensoniq, and new software releases from C-Lab, Dr. T's, Steinberg/Jones and Hybrid Arts should all have an impact on Atari's influence. One factor leading to this is Atari's affordable ST-E line, providing easy RAM expansion via standard plug-in SIMMs, a radical departure from the original ST computers, which were difficult and expensive to upgrade.

Alesis—who unveiled its ADAT

digital 8-track a year earlier and missed its promised year-end delivery schedule by a couple weeks (still a pretty amazing feat, anyway)—showed a video of ADATs being assembled at the factory. Meanwhile, at a hush-hush Tascam sales meeting, a three-rackspace, digital 8-track was unveiled. This 8mm videotape-based digital recorder resembles Tascam's Model 238 8-track cassette deck: straightforward and easy-to-use. Pricing was said to be "competitive." Delivery? Later this year.

Tension in the recordable compact disc trenches is heating up considerably. Marantz unveiled its CDR-600, a stand-alone, rack-mount CD recorder, equipped with S/PDIF and optical digital ports, and analog XLR and RCA inputs/outputs. Retail is a rock-bottom \$7,500; deliveries begin next month. Carver Professional also showed a CD-R design, which outwardly looks similar to the Marantz model, carries the same pricing and should be on the shelves this June.

By far the most noticeable trend at NAMM was mixers, particularly affordable, cost-effective designs. New companies entering the mixer fray are ART, Samson and Samick, with the latter debuting a 24x4 board with 8 sends and 3-band sweep EQ. Over 15 companies unveiled new consoles. Among these were the Alesis X-2 (a 24x8 inline board with 24-track tape monitoring and 64 inputs on remix); Mackie Designs' new 16/24/32-input, 8-bus consoles priced well under \$4k; and Interface, which breaks new ground not in technology, but in marketing. Jointly developed by DDA and Dynacord (two companies in the Mark IV group that also includes Altec Lansing and Electro-Voice), Interface will be sold under a "multibrand" concept. Under this agreement, any

of the above-named companies can market the Interface console, which is identical except for different nameplates. While new to audio, this approach is common in the auto industry, where different manufacturers offer the same car (i.e., Plymouth Laser = Eagle Talon = Mitsubishi Eclipse). But will the concept translate to audio?

As with past NAMM shows, 1992 marks a celebration of milestones. Rane opened its 10th year with the intro of a high-performance rack-mount preamp/processor for acoustic instruments, which is not too surprising, considering the number of players and pickers on that company's staff. Ashly marked its 20th year with two new rack-mount mixer designs. Thirty years ago, Jim Marshall built his first guitar amps, and Marshall commemorated the occasion with a display of historic amp designs. And Remo, leader in drum heads, celebrated its 35th birthday.

Other news? Summer NAMM is back, at least as a "Summer Session" focusing on retailer education, with a limited exhibition area. The event is planned for June 20-21 in Atlantic City. —George Petersen

TEC Distributes 1991 Proceeds

The Mix Foundation for Excellence in Audio has announced the recipients of the proceeds from the 1991 Technical Excellence & Creativity Awards, presented by *Mix* magazine last October 3 in New York City. A total of \$28,247 was distributed to the following organizations: 50% to the Hearing Is Priceless (HIP) campaign of the House Ear Institute, to assist in promoting hearing protection and awareness; 10% each to the AES Educational Foundation and SPARS, to provide financial assistance to students of the audio arts and sciences; 20% divided among the nominees for the 1991 TEC Award

INDUSTRY NOTES

David Angress was promoted to the newly created position of vice president of sales and marketing at AKG Acoustics (San Leandro, CA). Also at AKG, David J. Bierut was named Eastern regional sales manager... Dave Harries is now chairman of the Association of Professional Recording Studios, the UK equivalent of SPARS... Telex Communications Inc. (Minneapolis, MN) appointed John L. Hale chairman of the board of directors, president and chief executive officer... Lyrec UK named Johan von Schultz managing director... TC Electronic, headquartered in Brabrand, Denmark, formed two divisions of the company to sell computer-controlled EQs and digital-delay products factory-direct in the United States. TC Systems West is headed by Ed Simeone, and TC Systems East is overseen by David Portugal. For more information, call (805) 373-1828 (T.C. Systems West) and (800) 451-6032 (TC Systems East)... Ernst L. Ranft joined Ampex Recording Media Corp. as vice president of operations. He will work out of the company's Opelika, AL, manufacturing facility... All business with Alesis' international network of independent distributors will now be handled from the company's Los Angeles corporate headquarters. Personnel changes due to the shift include the hiring of James Roth as international sales manager for Europe and the promotion of Mark Frederick to international sales manager for the Pacific Rim... Alan B. Shirley was named technical markets and strategic planning manager for Shure Brothers Inc. (Evanston, IL)... Apogee Electronics chose three new pro audio sales reps for the U.S.: Steven Strassberg Associates (Manhasset Hills, NY), Wind Over the Earth (Boulder, CO) and Audio Images (Seattle, WA). In Europe, Charlie Day was appointed Apogee's exclusive European rep. He acts as liaison between the company and Apogee's international

distributors... Dr.T's Music Software moved to a larger facility and may now be found at 124 Crescent Rd., Suite 3, Needham, MA 02194. All phone and fax numbers remain the same... HHB Communications Ltd. (London) appointed Chas Rowden to the post of field sales manager, while Tony Musgrove joined as a pro audio sales rep... Atlanta-based Millar Electronics added Neil Conley to its sales staff... Audio Animation (Knoxville, TN) welcomed Crouse-Kimzey Co. to its distributor network. Crouse-Kimzey's offices are located in Fort Worth, TX, and Annapolis, MD... New England Digital of Lebanon, NH, named SASCOM Marketing Group its new Canadian rep. SASCOM will cover the Eastern Canadian provinces with offices in Montreal and Toronto... Korg USA (Westbury, NY) formed a new company, Parker Guitars, after entering a partnership with Ken Parker and Larry Fishman... Joel Heppting was promoted to national sales manager for the musical instrument retail channel of Passport Designs (Half Moon Bay, CA)... Crest Audio (Paramus, NJ) formed a new division for the design and manufacture of low- and medium-priced pro mixer products. The division will be headed by Chuck Augustowski, with John Petrucelli as design engineer... Sweetwater Sound moved to 5335 Bass Rd., Ft. Wayne, IN 46808... Lexicon (Waltham, MA) chose the White Horse Group of Somerset, England, as its new advertising agency... Soundwall Corp. (Fairfield, IA) acquired the assets of Gold Ribbon Sound Cinema. For more information, call (515) 472-2300... Elkhart, IN-based Crown International named Michael Pappas as the company's pro audio liaison, a newly created position. Pappas will coordinate marketing efforts for Crown products to the pro audio and music markets. Also at Crown, Jesse Walsh Communications was appointed as its advertising and public relations agency. ■

—FROM PAGE 9, CURRENT

for Outstanding Recording School/Program, with one-third of this amount going to the winner, Full Sail Center for the Recording Arts; and 10% to a deserving group or program to be determined later.

For information about the TEC Awards or its programs, call Karen Dunn, executive director, at (510) 562-7519.

Convention News

AES Europe, the 92nd convention of the Audio Engineering Society, takes place at the Austria Center in Vienna this month, March 24-27. For information, contact AES at (212) 661-8528.

The National Association of Broadcasters will host the NAB International Expo at the Convention Center in Las Vegas, April 12-16. The HDTV World Conference & Expo will be held in the nearby Hilton Hotel from April 13-16. Contact Rick Dobson: (202) 429-5335.

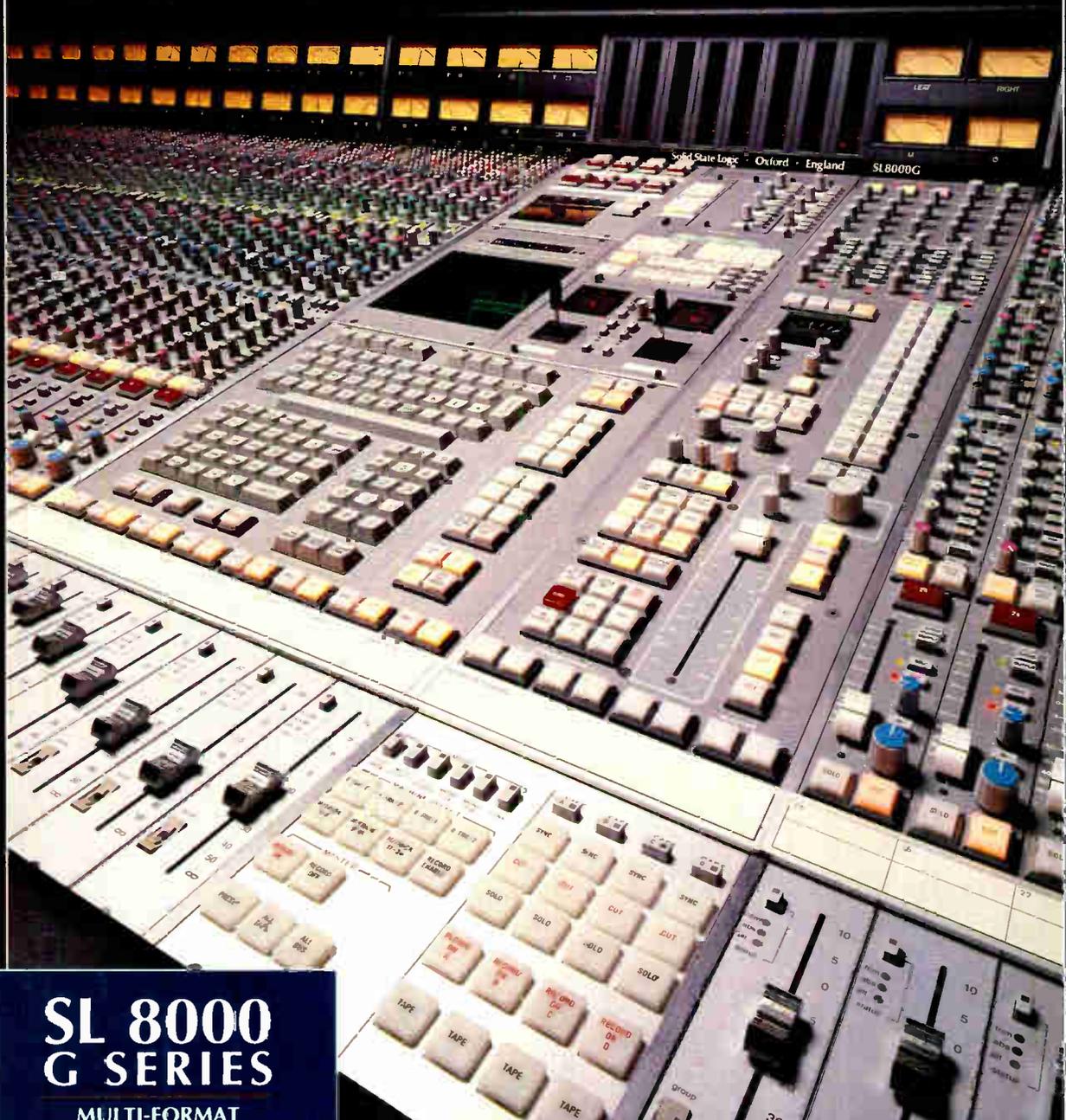
The National Sound & Communications Association will host NSCA '92 Contractors Conference & Expo at the Anaheim Convention Center, April 27-29. Call NSCA at (708) 598-7070.

3M Visionary Awards

Audio tape manufacturer 3M has created the 3M Visionary Awards. The awards will be presented to the recording engineer, artist, producer and primary studio where the work is recorded for those projects tracked or mixed on 3M audio tape. Qualifications for the awards include a predetermined level of success on the *Billboard* charts, with eligibility beginning November 1, 1991.

"3M has tremendous respect for those who have produced new milestones in audio recording," says Don Rushin, marketing director, 3M Professional Audio/Video and Specialty Products Division. "For years we have noted that the contributions of the recording engineer have received far too little recognition. This year we're going to change that." ■

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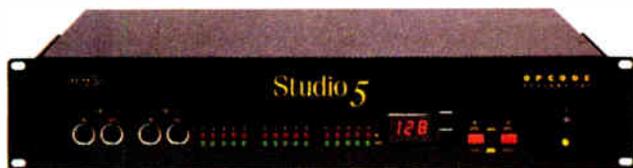
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"The Studio 5 is a true monster... its immense processing power and ultra-hip Macintosh user interface sets a new standard of excellence."

Keyboard Magazine

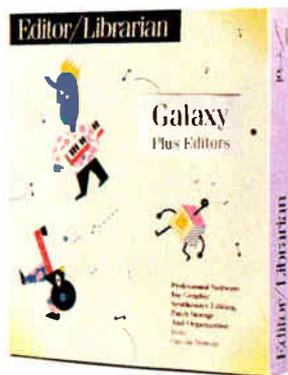
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Studios everywhere use and depend on the standard of Opcode patch librarian and editing software. For the first time anywhere, Galaxy Plus Editors offers an integrated package of universal librarian with compatibility for over 140 synths, effects, mixers, modules and *comprehensive* editors for over 50 of them—and we're always adding new ones. Galaxy—The Universal Librarian is also available. Version 1.2 adds a Find command for databasing and searching sounds, plus the Yamaha SY77/TG77 editor.

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by Ken C. Pohlmann

THE PASC ALGORITHM

Part 1. The reasons why DAT failed as a consumer product probably number in the hundreds, and each of those reasons probably cost Japanese audio manufacturers a million dollars, with Sony achieving the biggest write-off. Although DAT has found open arms in studios around the world, profits from that relatively small market are cold comfort compared to the warm embrace of consumer acceptance that has been denied.

It is the desire for that particular

DCC machine can play back and record DCC cassettes, and play back analog cassettes as well. For example, with a DCC player in your car, you could listen to new DCC cassettes and your old analog favorites. To achieve this, DCC uses fixed heads and a tape speed of 1-7/8 ips. Although an increased number of data tracks (eight audio tracks and one auxiliary track) boost the tape's capacity, it can only accommodate 384 kilobits/second of audio data, about 25% of the compact

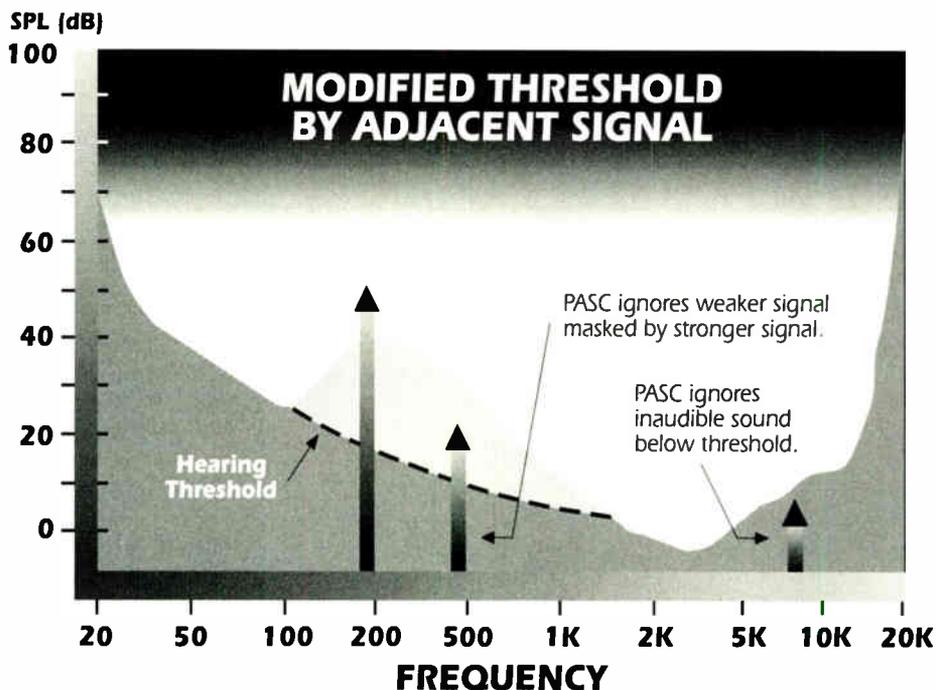


Figure 1: PASC rejects masked weak signals. (All figures courtesy Matsushita)

kind of affection that has stimulated corporations to find a new champion to battle the aging analog cassette, and replace its declining sales with new ardor. The next format to take the field, in the fall, is the Digital Compact Cassette (DCC), a technology sired by Philips and vigorously endorsed by Matsushita. This digital format has the unique advantage of compatibility. A

disc's bit rate of 1.41 megabits/second.

The problem of reducing the recorded data rate by 25% without perceptually degrading the audio fidelity of the DCC medium is solved by the Precision Adaptive Sub-band Coding (PASC) algorithm, a true second-generation digital audio coding method. Whereas first-generation linear codes such as PCM attempt to record and

INSIDER AUDIO

reproduce a waveform that is *physically* identical to the original. PASC attempts to encode one that is *perceptually* identical. With this very different goal, the PASC encoder contains a sophisticated model of the human hearing mechanism to achieve a very efficient coding that is compatible with the way we hear. Because of its efficiency, PASC and PCM coding may sound identical, but PASC requires many fewer bits. Additionally, PASC may in practice actually sound better than PCM when the input signal has resolution greater than 16 bits.

In short, PASC encodes sounds that are audible and does not record those that are not, and the resolution of the sounds it records varies with respect to our ear's hearing resolution. Two fundamental phenomena that govern human hearing are the minimum hearing threshold and masking, as shown in Fig. 1. Sounds below the minimum hearing threshold are inaudible. Clearly, the ear is relatively less sensitive to low- and high-frequency tones; thus, a perceptual encoder such as PASC could safely ignore many low-

Step 1

**AVERAGE LEVEL
CALCULATION
(EACH BAND)**

Step 2

**MASKING LEVEL
CALCULATION
(EACH BAND)**

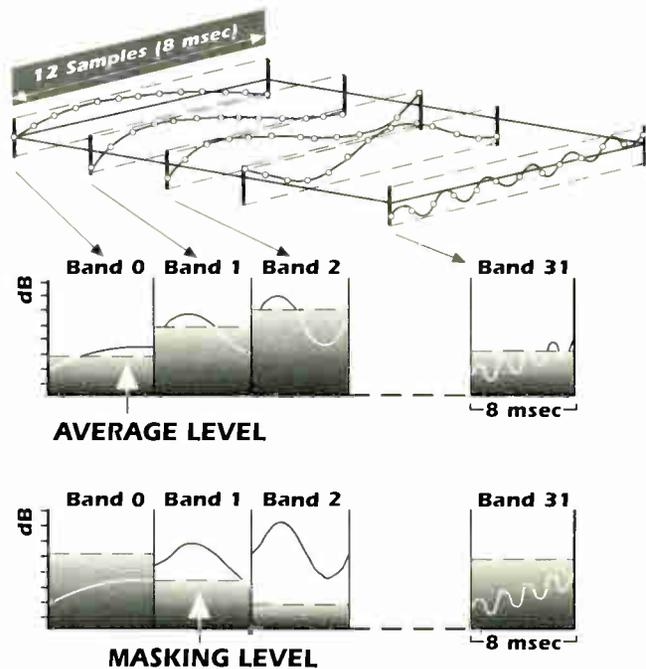


Figure 2: PASC encoding process.

and high-frequency tones. However, audibility varies from person to person, so any algorithm must be carefully tested on listeners with particularly acute hearing. The evolution of PASC required three years of critical listening tests, using PolyGram recording engineers as arbitrators.

Amplitude masking occurs when a tone shifts the threshold curve upward in a frequency region surrounding the tone. In other words, loud sounds mask softer sounds. In addition, the masking curves are asymmetrical: as shown in the figure, the slope of the shifted curve is less steep on the high-

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frequency side. In practical terms, it's relatively easy for a low tone to mask a higher tone, but the reverse is more difficult. In any event, the ROM tables in the PASC algorithm take into account the fact that the threshold of hearing is dynamic with respect to the audio signal, and not static as assumed by linear coding methods. Clearly, this makes PASC much more efficient. Many masking curves have been derived from studies in which single tones are used as the stimulus; relatively little scientific study has been done with music as the stimulus. However, over the three-year development of PASC, it was determined that tone curves are valid models for music coding. Nevertheless, future research may result in better masking curves.

Some audio critics have already gone on record stating that their golden ears are immune to masking, and that any coding method using masking will therefore sound poor to them. Let there be no mistake, even though hearing acuity differs from one person to another just as visual acuity does, audio masking is as applicable to everyone as visual masking. Only a fool would

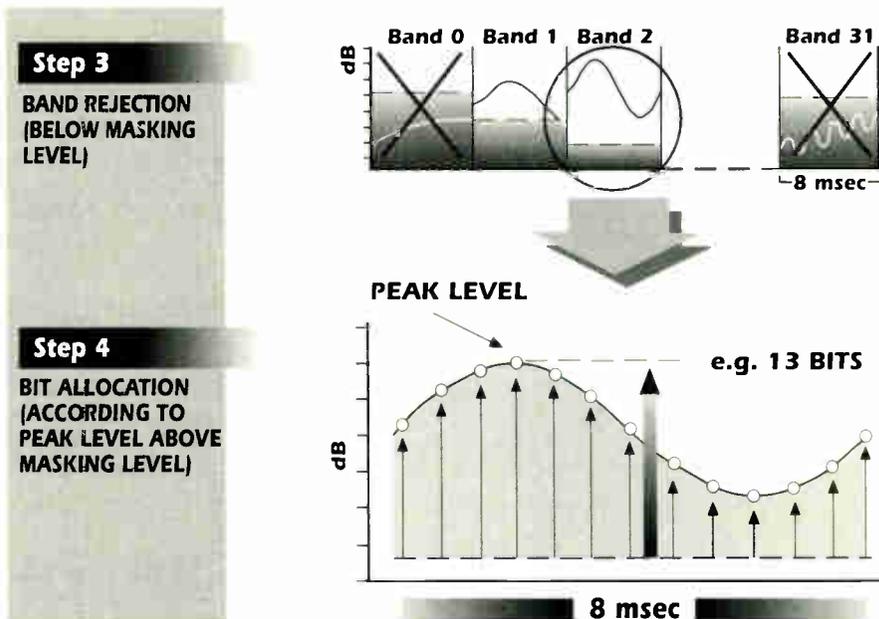


Figure 3: PASC encoding process.

claim that you can see the part of an image behind the car in the visual image of the automobile. Likewise, anyone who claims to be able to hear through audio masking is misguided, indeed.

Signals input to a DCC recorder can be either analog or PCM digital, with

32, 44.1, or 48kHz sampling frequencies. The following example assumes a 48kHz sampling rate. The stereo audio signal is passed to the first stage in a PASC encoder, a 24-bit FIR filter with the equivalent of 512 taps used to divide the audio band into 32 sub-bands of equal 750Hz width. The filter



window is shifted by 32 points so all the 384 samples in the 8-millisecond frame are analyzed, as shown in Fig. 2. In other words, the PASC-input stage is similar to that of the filter bank in a spectrum analyzer. With this filter, the effective sampling rate of a sub-band is reduced by 32 to 1, for example, from a frequency of 48 kHz to 1.5 kHz. Although the channels are band-limited, they are still in PCM representation at this point in the algorithm.

The 32 channels are sent to the PASC encoder, which analyzes the

energy in each sub-band to determine which sub-bands contain audible information. A calculation is made to determine the average power level of each sub-band, carrying data over an 8ms period (12 samples). This average level is used to calculate the masking level due to masking of signals in each band, as well as masking from signals in adjacent bands. Finally, minimum-hearing-threshold values are applied to each band to derive its final masking level. Peak-power levels present in each band are calculated, as shown in Fig. 3, and compared to the masking level. Sub-bands that do not contain

audible information are not coded. Similarly, tones in a band that are masked by louder nearby tones are not coded, and in some cases entire sub-bands may mask nearby sub-bands, which thus need not be coded. Sub-bands with peak levels above the masking level contain audible signals that must be coded.

Calculations determine the ratio of peak power to masking level in each sub-band. Quantization bits are assigned to audible program material with a priority schedule that allocates bits to each signal in order of signal strength above the audibility curve.

The number of bits given to any sub-band must be sufficient to yield a requantizing noise level that is below the masking level. The number of bits depends on this signal-to-mask ratio. In this example, Signal B is loud, and its value would be coded with ten bits; Signal D is coded with six bits, and so on, with the goal of maintaining the quantization noise level below the calculated masking level for each band. A bit-pool approach is taken; a large number of sub-bands requiring coding and signals with large signal-to-mask ratios may exhaust the pool, resulting in less than optimal coding. On the other hand, if the pool is not empty after initial allocation, the process is repeated until all bits in the DCC's data capacity have been used. Typically, the iterative process continues allocating more bits where required, with signals having the highest signal-to-mask-ratio requirements always receiving the most bits. In some cases, sub-bands previously classified as inaudible may receive coding from these extra bits. In such cases, signals below the masking threshold may in fact be coded, but only on a secondary-priority basis.

Bit allocation, according to psychoacoustic principles, is perhaps the essence of the PASC algorithm, but the way in which the data is represented and packaged into frames is equally important. We'll consider those issues next month.

[Some material in this article was presented by Bob Finger in a lecture in Osaka, Japan, on October 15, 1991.] ■

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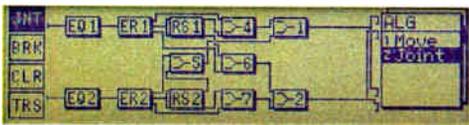
With 20Hz to 20kHz frequency response, greater than 90dB dynamic range, and less than 0.015% THD, the R-880's transparent performance provides natural ambience for acoustic instruments.

the chorus and go into the reverb, maybe with a little compression along the way? No sweat.”

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Form	L1	L2	L3	Dist
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PreDly	T1	T2	T3	T4
10	13	39	108	178

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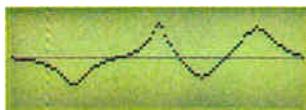
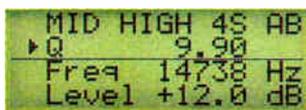
each recallable at the touch of a button. And the “660” is MIDI compatible!

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also an extremely sophisticated, yet easy to operate, single pass unit that works in real-time.

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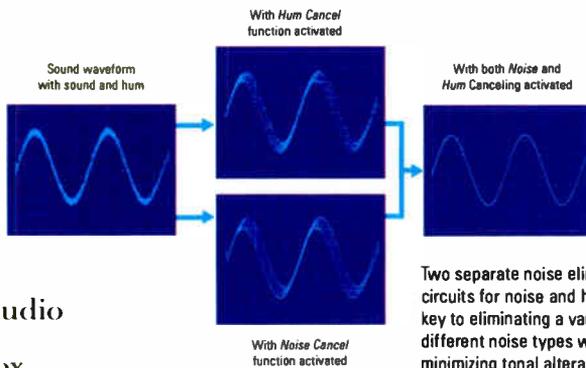
16-bit linear A/Ds and 18-bit D/As with 48kHz sampling frequency gives the SN-550 Noise Eliminator exceptional dynamic range and sound quality.

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CRIME MARCHES ON

It's March, and hidden in March is the day I suddenly get a full year older. This sometimes causes me to think about the past and see what has been accomplished. Here are a few of the unrelated thoughts that came to me this time.

1) Okay, so nobody's perfect. Good old Michael gets hammered pretty bad for beating the hell out of a car with a crowbar. That's fine with me. I found that entire segment of the "Black Or White" video totally useless at best. On the other hand (it's so cool that we have two, so that we can say that), the morphing was so good that it put that video at the head of my If-This-Don't-Make-Your-Jaw-Drop-Ain't-Nothin'-Will list for 1991. It just barely beat out *T2* (but then again, these special effects houses always do it a little better the second time).

Bruce Swedien and the rest of the team must have had a good time on this album; it's evident in the sound. Michael...well. Who do you think actually *told* MJ that it would be all right to spend several minutes trashing a car and testing to see if his underwear is on okay while we are all waiting for the music to

start? Now those of you in the know are aware of what MJ was trying to do with all that, and we are all aware that for a couple of years it has been an accepted trend for artists to do dance segments that copy (honor?) Gene Kelly or Fred Astaire. But I guess that if you're going to do a piece that advocates wanton property destruction, you had better be sure that your target audience is aware of its derivation—and the context in which it originally played.

Well, in any case, it sure is comforting to know that these days you are never too big to get slapped on the wrist for messing up. Of course, it always helps to have a brother releasing songs about what a jerk you are. I always like it when mine do that to me. Or maybe we all need a sister who is at war with our previous choreographer over label support...I *LOVE* this industry!

2) Why does MTV have to sound so incredibly bad? I guess it's our punishment for actually *watching* it. If you think it sounds a bit ragged in California, you should have a listen in Maryland! It hisses and buzzes, pumps and gates, clips and splatters. It's pretty nasty, and, like

by Stephen St. Croix

so many embarrassingly inferior broadcasts, it sounds worse with better playback systems. MTV should air with a permanent onscreen warning (perhaps in the lower left hand corner where VH1 puts its logo): "Warning. Listen to this only with speakers from Radio Shack or DAK." Or maybe this one: "For best results, please leave your power amp unplugged."

This is, in fact, what I do now. I sometimes watch MTV, but *only* watch it. I *listen* to CDs at the same time. This has turned out to be a truly wonderful system. Here is what you do: Load up a ten-CD cartridge with your favorite tunes *du jour*. Set your CD player on "shuffle" for added amusement. Put MTV on every TV in the house, but with the sound turned off, of course.

Go about your day, listening to the music. Whenever you want a good laugh, glance up at the nearest TV. You will be amazed. Almost every time you look, some crazed group of prepubescent 28-year-olds will be pounding *in time* on their instruments and perfectly lip-synching to *your* CDs! Really! Try it. It's just one of those things.

3) How come we (Americans) have the worst television on earth? I don't mean content quality (though I certainly don't mean to say that I think our content has any quality). I'm talking about *technical quality*. Where are those scan lines all the other guys have? PAL and SECAM put amazing pictures onscreen, with *lots* of scan lines and lots of colors, while we, and our wonderful American NTSC broadcast system, put eight or ten lines up, with a few hundred colors. Nice! I say it's about time we filled those empty spaces on our phosphor windows, those vast expanses of emptiness between every pitiful scan line that we do get. Interpolated line synthesis, fuzzy logic... Come on! Fuzzy logic is logic that told us to use our resources to cover up the fact that we don't have any real data onscreen in the U.S.

We don't even make our own TVs! The Japanese give us toys like fake line-fill because we won't let them give us toys like, oh, I don't know, maybe like...resolution?

Private interest group lobbying against the slightly higher RF bandwidth needed to transmit real TV has been very effective, unfortunately. It gets voted down, a vote for the past, every time! We are truly the world leader in low-resolution entertainment.

But PAL and SECAM, that's nothin'. Wanna get sick? Eat sushi in Nebraska, or watch HDTV for ten minutes. Either one should just about do it. Once you have seen a 1,000-line, real, wide picture with real color you can't go back to that Apple II 8-bit, color, raucous romp through the realm of raster reality that we call home. The road to recuperation is rigorous, I assure you.

HDTV, a *very* impressive window to the world, is currently on the air in Japan. And here? It has been voted down *again*. Our very own manufacturer's lobbies even tried to perpetrate

a sort of *fake* HDTV; MDTV ("medium definition," really). Isn't that great? It should be noted that a real digital HDTV standard is currently being hammered out for the U.S.

4) How come we only have driver's side airbags? What, the passenger's life isn't worth saving?

5) Gee, let's see now. Do we have data translation standards for workstations yet?

6) Well, we *do* have IMAX. ■

Stephen St. Croix has a new computer, so you can expect his writing to be even a bit more strange than usual for a while.



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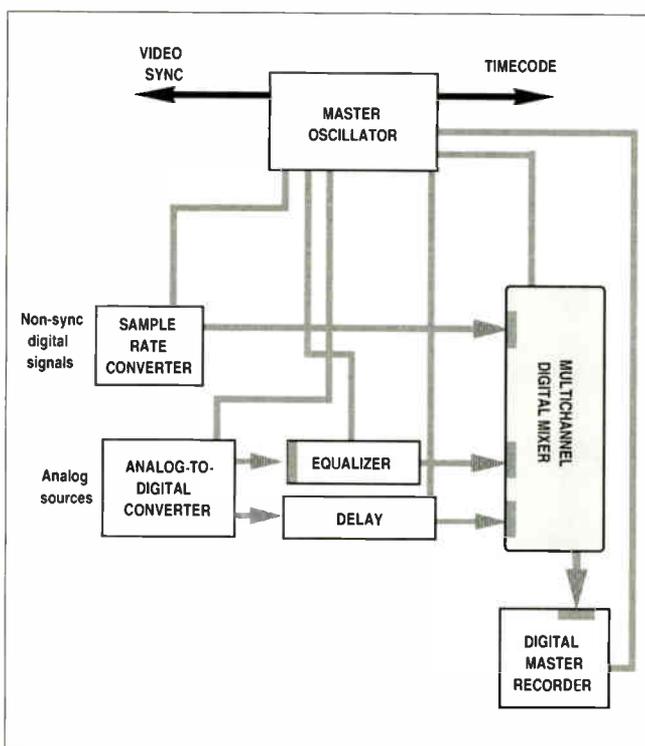
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by Mel Lambert

SYNCHRONIZING DIGITAL AUDIO SYSTEMS

THE FUN BEGINS!

Right: The AES11-1991 recommendation suggests synchronizing digital hardware via a single, highly regulated source that outputs a stable digital audio reference signal (DARS).



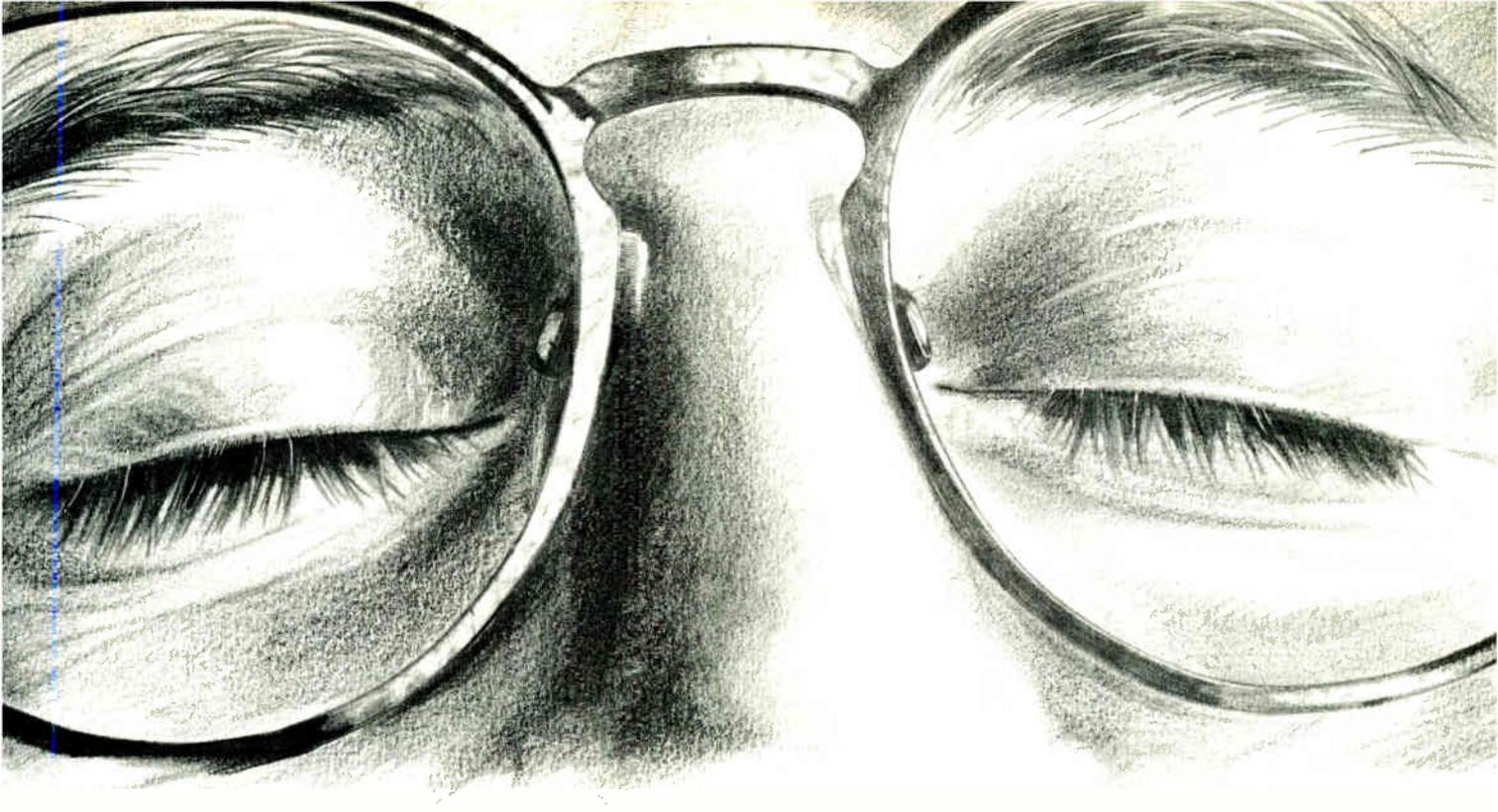
time around; we sometimes have to learn a new level of patience while attempting to fathom the imponderable!

One operational parameter that's becoming increasingly important in larger facilities is system synchronization. While transfers of 16/20/24-bit data from one processor, workstation, DAT machine, CD player or whatever to another can be achieved with an enviable degree of consistency, the same cannot always be

As we saw in the past two issues, interconnecting various items of digital hardware should be a breeze, so long as we pay attention to one or two important ground rules. Many of you have discovered that correctly implemented AES/EBU I/Os, preferably ones that conform to the new AES3-199X Recommended Practice, are the *only* way to go. And, if you encounter any strange anomalies, pester the manufacturer about I/O impedances, Channel Status information, clock stability and level of implementation under AES3-199X. I really don't expect too many service departments to be able to answer your questions the first

said of multiple connections. Consider the simple example of two AES/EBU digital I/Os combined through a digital mixer or some other unit.

For serial connections such as these, not only do the sample blocks containing the digital data words have to arrive at the same time, but each *individual* bit within those blocks must arrive simultaneously to ensure that the appropriate sample values are maintained. At a sampling frequency of 44.1 kHz, a timing error of just 354 nanoseconds [$1/(44,100 \cdot 32^2)$] is equivalent to an arithmetic shift right within the datastream (to use the jargon), which translates in our analog world to a 50%



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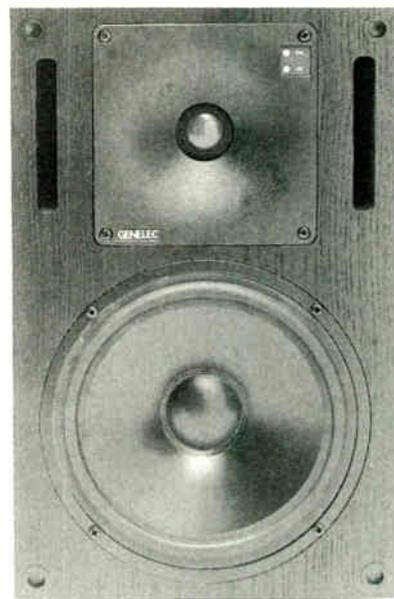
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reduction in signal level. Errors greater than that can mean even more bizarre results.

In practical terms, we can select AES/EBU I/O cable lengths that fall within this tight 35-nS tolerance window. We can still run into difficulties, however, with units that feature different amounts of internal processing delay—maybe a digital EQ or compressor is connected within one leg and not the other. It is certainly possible that digital signal inputs can arrive at the input of, let's say, a digital mixer "out of time" with one another. (Maybe "digital phase error" would be a better way of expressing such a phenomenon.)

To alleviate such technical trouble spots, several solutions immediately present themselves. One would be to buffer each input source through a gigantic ring memory, use a high-speed computer to determine the most reliable source, and then slew everything else to that time datum reference. How to determine which of several digital sources is the carrier of an absolute time stamp might be a touch problematic, but the principle (albeit expensive) still stands.

Turning from fantasy to reality, it makes a great deal of sense to distribute a common digital synchronization signal around a studio, and have every system component—source/transmitter and destination/receiver—lock its processor clocks to this highly accurate "sync standard." Each source that's outputting a digital signal—maybe several DAT machines, or a D2 VTR and some workstation sources, for example—would need to maintain a tightly defined timing accuracy to a master synchronization source, so that you don't need to perform an excessive amount of sample buffering at the destination.

In other words, each separate source will attempt to output left and right digital samples in both channel and bit synchronism, following the accurately defined designations of such events from the digital-sync reference.

Now, if each input to our multichannel digital mixer is provided with an intelligent data buffer, we can arrange for each sample to be bit-accurate compared to our reference. In terms of numbers, one frame of an AES/EBU-format signal represents 22.6

microseconds (at a sampling frequency of 44.1 kHz)—a slice of time that can be easily buffered and adjusted using an off-the-shelf microprocessor. Some inputs might be slightly early or slightly late, depending on path-length differences, but the buffer can take care of bringing each input into perfect sync with the reference.

If you're thinking the description of these and other data formats sounds like a list of specifications for a technical standard, you are correct. Responding to a need to define real-world applications for the current AES3-1985 and emergent AES3-199X Recommended Practices, the Audio Engineering Society has now pub-

At a sampling frequency of 44.1 kHz, a digital timing error of just 354 nanoseconds translates in our analog world to a 50% reduction in signal level.

lished what I would best describe as an "In-use Standard" for studio systems. AES11-1991, subtitled "AES Recommended Practice for Digital Audio Engineering—Synchronization of Digital Audio Equipment in Studio Operations," contains useful definitions of techniques for implementing reliable digital interconnections.

While space precludes me from providing more than a very succinct summary of the new AES11 Recommended Practice, I suggest contacting the AES in New York to purchase a copy.

In essence, AES11 recommends that a Digital Audio Reference Signal (DARS) be generated by all recording and production facilities from a stable, highly regulated source, and used to synchronize all other digital hardware. The format and electrical configuration of the recommended DARS is identical to the 2-channel AES3-1985/199X format, although in reality only the basic

preamble structure is important. (After all, we just need to accurately define the start of each left- and right-channel data signal, and possibly the start of each 192-block Channel Status sequence for systems that carry timing and identification information within the digital bitstream that defines each audio sample.)

A facility has the choice of utilizing a DARS running at any or all of the familiar sampling frequencies of 32, 44.1 or 48 kHz; sample-rate converters would obviously be needed to transcode, for example, a 48kHz source (maybe a first-generation portable DAT machine) with a master system set up to run in sample-accurate synchronization at 44.1 kHz.

AES11 defines the accuracy of Grade 1 (long-term frequency accuracy within ± 1 ppm) and Grade 2 Reference Signals (less than ± 10 ppm, as specified in AES5-1985). A Grade 1 DARS is intended to serve as a high-accuracy signal for synchronizing a large system within a multiroom facility, while a Grade 2 DARS is considered more appropriate for synchronization purposes within a single studio, or in situations where there's no technical or economic benefits to be gained from implementing Grade 1 standards.

At the input port of each item of digital hardware, AES11 recommends that the PPL or sync-lock circuits offer a capture range of ± 2 ppm for Grade 1 equipment, and ± 50 ppm for Grade 2 units, plus other devices of a lower performance.

Although not specified in AES11-1991, it is also absolutely essential that these Grade 1 and 2 Digital Audio Reference Signals be locked to a facility's Video Sync Reference. That way, a multicomponent audio-video system can be locked together in, for example, an editing suite, and frame-accurate edits can be performed on time code-referenced samples.

In next month's column: More handy information on digital synchronization, and a look at audio-video editing anomalies, particularly at video-based sampling rates of 48 kHz. ■

There are days when the telephone, divine inspiration and a crashing Mac II lead Mel Lambert to speculate on the wisdom of our ancestors' decision to climb out of the ocean. On such days, he would welcome your kind ministrations.

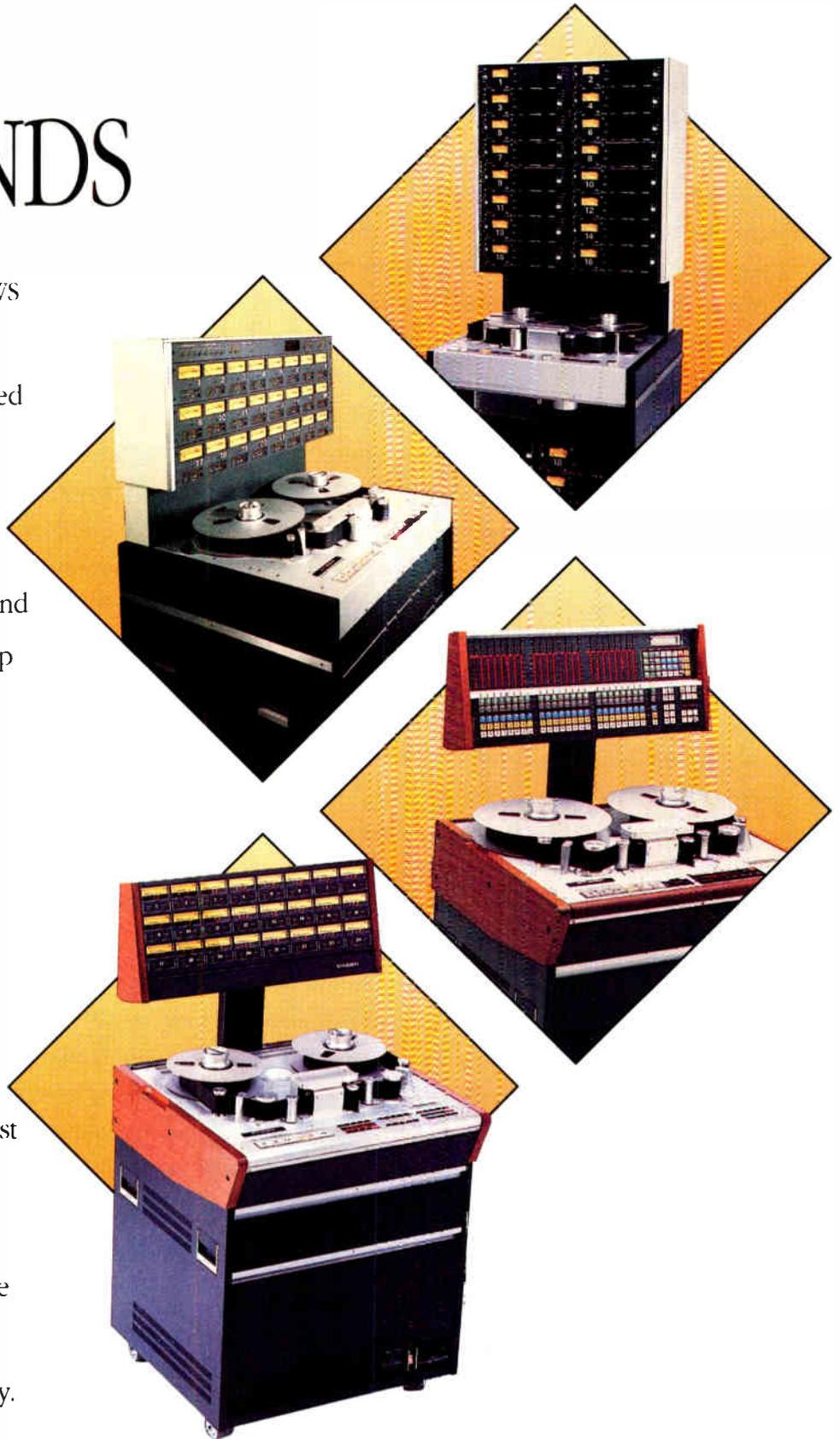
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CONSOLE ERGONOMICS

.....*These*
Are
The
Good
Old
Days <



Those days are gone...

By which, I do *not* mean that we should return to "the good old days."

Nostalgia notwithstanding, *these* are the good old days (and they're getting better), and the old consoles were a royal pain in the patootie. They were a pain before sessions, during sessions and after sessions.

For anything bigger than a rhythm section, the mixer had to spend a good deal of time working out how to get all those players on all those mics through pitifully few channels, and having managed that, spend more time actually mixing the band, as the rotary faders were spaced about four inches apart, allowing two per hand. Things got really busy from time to time, especially as we didn't limit the vocals, which required a half-hand of their own. When the brass went to mutes, the reeds went to flutes and the rhythm guitar went to fills, the mixer went to the *moon*. It is a fact that a mixer can get into the music a little better with rotary faders than with straight liners, but rotaries will work you to death.

To make things even more interesting, the early recording consoles had virtually no equalization, habitually developed noisy tubes (sometimes *during* a session), and engineers had to clean and regrease the faders every morning and sometimes *between* gigs to reduce the switching ticks between steps. We went through about a pound of Vaseline each month keeping the faders clean and still got little ticks on soft passages. Pain.

When you combine the aforemen-



tioned horrors with the absolute certainty of a little hum and an amazing amount of heat from the tubes, you get a working environment suitable for only the very brave or the very desperate. Usually both. I occasionally wonder not *how* we managed to record anything in the good old days, but *why*:

It was a hell of a lot of work just to get through a session, let alone get it good. Probably the only thing that saved us was "good old" monaural. At least nobody could listen to each channel by itself and find out how bad the stuff really sounded.

Actually, the overall sound was generally pretty decent and sometimes terrific, but taken one at a time, some of the mics produced the sort of audio that would get you thrown out of any modern studio.

The bad thing about the old consoles was that there was nothing to them, so you couldn't do much.

The good thing was that you could learn to do it in about ten minutes. With a few knobs and one or two meters, you could see and understand everything on the board at one glance, so the learning curve was a vertical line.

Things change.

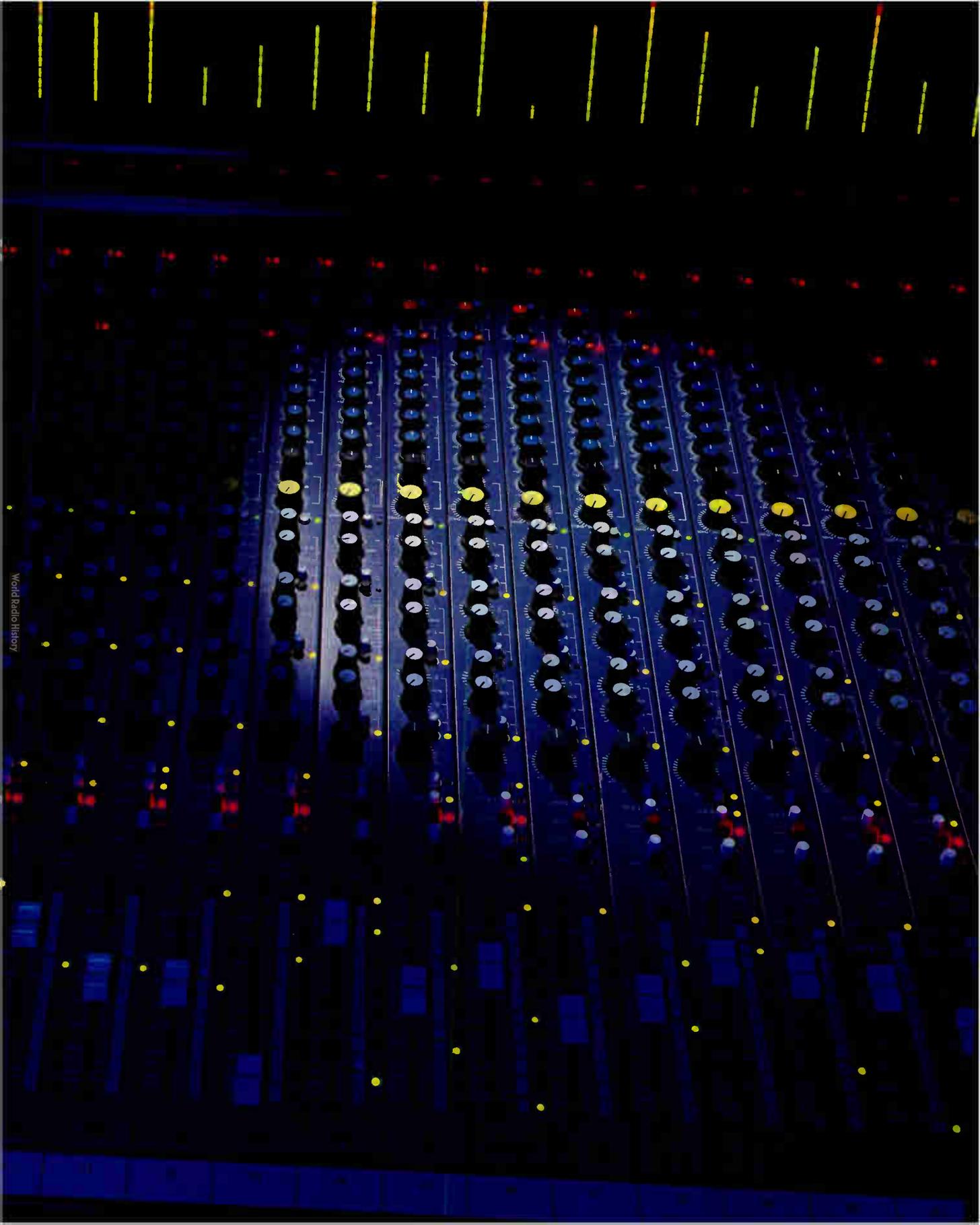
The companies that made tube consoles—and who knew a *lot* about recording practices—tried to convert to solid state in the '60s. By and large they failed, both in design and as businesses, leaving console manufacturing to people who knew a lot about solid state electronics but very little about recording.

There were a lot of really bad consoles on the market for a few years after the transistor evolution, and there are still a few that aren't quite up to speed because the designers don't know as much about microphones as they should. But almost all the units on the market have at least acceptable sound, and the good ones are not only quieter than the mics used with them, but sound very good indeed.

That jazz about tubes being inherently better than solid state is mostly the result of *not* doing direct comparisons between the two types of equipment, *providing* the new stuff is well-designed. The trick here is that it's so hard to make a tube amp work at all that there are virtually no bad designs on



BY MALCOLM CHISHOLM



the market. But it's seductively easy to put together a genuinely terrible transistor amp, which *sounds* genuinely terrible. A well-designed modern console, however, can be accurately described as sounding like tubes without hum. Or heat. You wouldn't believe the air conditioning bills with tube equipment.

We've come a long way, and most of it has been upward. However, there remains the problem that the current manufacturers know very little of what mixers actually do in a session and make some pretty silly mistakes in terms of console layout as a result. It's as though nobody in Detroit knew how to drive. If that sounds overdrawn, try to think of a manufacturer with a competitive recording studio as a test bed.

Give up? Read on.

After designing and building a few consoles and working extensively with both the old and new ones (to say nothing of managing to live through the in-between disasters), I like to think I know something about them. Over the course of time, I've accumulated a long list of complaints about current console design.

Design in general, that is, *not* designs or designers. I know a number of console manufacturers, and they're all good folk who try really hard to make the best product they can. They continually update their lines, and they are very open to user feedback. The trouble is that the feedback mostly comes from studio owners who have grown up with designs that grew like crazy. Because of that, they never seriously thought about the ergonomics of the thing, and typically they don't have the skills to suggest solutions to the problems they communicate. To add to the problem, owners are pretty conservative about buying items on which the future of the business depends. They'll buy something new, improved and different, but not *too* new or different.

To begin the griping, why is channel one at the extreme left of the console? Mixers do most of their work with the first dozen channels, and with number one hard left, the poor devils either have to sit off-center to the speakers or put the board to the right of the room. To add insult to injury, a lot of consoles have the trivia located on the right side, where it is convenient for diddling by the producer. If one through twelve were centered, with monitors, cues, echo returns and all that good stuff hard left to fill the left-

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over space (to say nothing of keeping magic fingers off them), it would make life easier for the mixer. Mixer, that is—not overdubbing second engineer—we're talking live recording here. It is, after all, a major part of the biz.

Meters. If there is anybody on Earth who can read 15 or 20 meters while watching musicians for playing cues, I'd like to meet them. Personally, I can read four and keep vague track of a fifth, and that's it. Light bars work well for keeping general track of the levels, and the yellow flash will get the mixer's attention without interfering with the task of observing the players.

However, since the machine manufacturers have recently taken to using dancing lights on their products (I recently did a session with no meters at all), it would be nice to have a few meters *somewhere* in case the mixer is curious about such things as vocal isolation. Three or four assignable or patchable biggies on the console would do it, but 40 meters not only cost, they're also nearly useless in the heat of battle.

Speaking of the battle, why is the reverb send the third knob in a row of anything from four to twelve? Perspective control is one of the mixer's jobs, and reverb is a quick way to do it. Until quite recently, the reverb send was just above the fader so one could get at it in the normal course of mixing. I seem to be about two bars late when it's hidden in the knob jungle.

Going with the flow, why do I have to stand up and lean over the board to find out where a knob is set, or to set anything short of flat out? All the zeros are at the top rather than at the bottom is why, and it makes no sense, particularly as the majority of settings fall between 9 and 3 o'clock. Gimme a break. Put zero at the bottom so I can see where I am on EQ without getting up every two minutes and (one way or another) losing my balance.

It would also be handy if the track sheet didn't have to cover the knobs. How about a little slide-out board of the kind found on most business desks? And a couple of pull-out automotive ash trays? A lot of mixers smoke. A cigarette lighter is probably too much to ask, but I'll ask anyway. Also, a couple of muffin fans under the console to blow air at the mixing engineer does wonders to keep their tush cool and dry. The difference in personal comfort is amazing.

That damn shelf above the meter bridge is absolutely incompatible with

modern control room designs. A couple of holes for the Auratones would eliminate the problem.

As an addition, rather than revision, I've had very good luck with a set of -6/0/+6 dB switches above the monitor faders. They make the mixer look great when somebody asks for more of something during playback, and they help keep the bass drum and guitar solo levels under control, especially if the manufacturer (hint, hint) has had the good sense to bring the monitor feeds out at about +12. I have never understood why people think a one-volt feed is adequate for monitor amps. It never was. Still ain't.

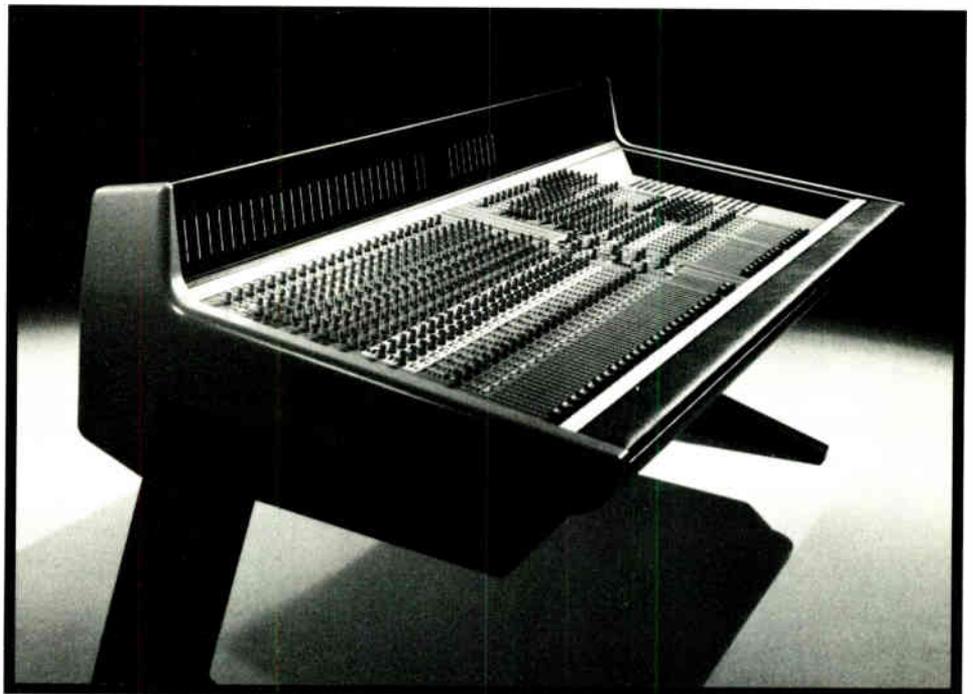
In the higher rent areas, it would be nice to have onboard voltage regulation for each channel. That way, when

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(not if, *when*) a channel develops a supply short, it would stop that channel, not the session. Regulation's better anyway, and onboard regulators would protect the console against the power supply's failing to maximum voltage. There are some terribly sad stories about that.

Next... Why is it that every time I do a session, I assign channels 1 through 24 to buses 1 through 24 and unassign them at session end, only to have the next guy do the same thing when he walks in? We beat the hell outta them little switches, and the rest just sit there mostly doing nothing. If the board uses biFET quads (logical switching), why not put in a pushbutton for the 1-24 initial assignment with a provision for changes if needed? If the board uses switches, a couple of extra rows on the patch bay would get it, and anything that avoided punching up 24 assign switches would save setup time as well as eliminate the occasional double assignment. (Now *that's* embarrassment.)

While patches are being added, a few more per channel would be greatly appreciated by the engineers who know enough to restructure a console. There are a whole lot of them, and the ability to stack EQs, amps and faders allows amazing flexibility in recording. Switches are cute, but a patch bay row amounts to 26 13-position switches, and you can't beat that kind of density.

Finally—and this is really pushing it—the mic amps should be out on the floor, especially with transformerless inputs. That would eliminate the vulnerable mic lines and do away with the crosstalk problems associated with a 132dB level difference in the board. With 23 phantom circuits in 24 balanced lines, remote gain control ain't *that* hard to accomplish, and a zero-level board has some attractions.

No, I don't expect any manufacturers to put all this stuff in their next console, but it would be great if, among all the irate responses, at least one console builder sat down for a minute and thought about the poor, over-pressured schlub who's trying to do useful work with that big glitzy board.

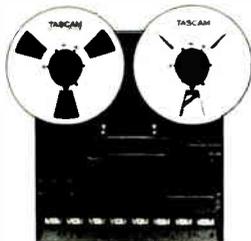
If that happens, we all win. If not, other than maybe a couple of nasty letters, we all break even.

It should be interesting. ■

Chicago-based Malcolm Chisholm has worked as an audio engineer, acoustician and consultant to the recording industry for the past 30 years.

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BY BLAIR JACKSON

these discs: Vince Gill is straight-ahead, traditional country; Nirvana is gritty, alternative rock; Prince's album is all over the map—R&B, rock, rap, pop gospel, you name it; Michael Bolton's a soulful balladeer and R&B enthusiast; The Rippingtons are a bright fusion jazz outfit; Planet Drum is an aggregation of extraordinary percussion giants from around the world; and David Lanz is a new age piano giant.

COUNTRY

Album: *Pocketful of Gold*

Artist: *Vince Gill*

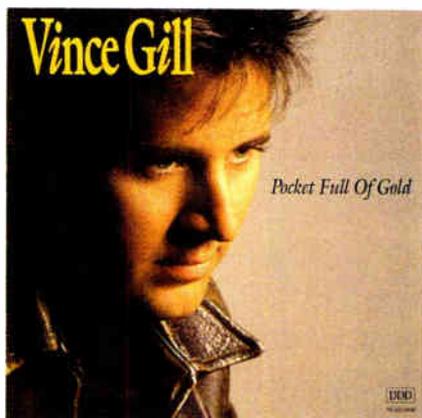
Engineer: *John Guess*

We recorded *Pocketful of Gold* at Masterfonics [Nashville] in Studio 6, which is a comparatively small room, so we had to

make up for that with our own ambience. But it turned out fine; I'm quite pleased with it. We do some sampling just for enhancement on the drums—whatever may be lacking from the room size. I use a fair number of delays. I like the [Lexicon] 480 a lot, and sometimes use the 480 and the 224X at the same time. Then there's the old standby, the EMT 250. I still use a couple of old AMS units and the Publison Infernal machine. I use [Yamaha] SPX90s occasionally, along with a TC Electronic 2290. Basically, I only use one setting on the 2290, because I found something I really like. The studios down here are pretty well-equipped, and they have similar things; if they don't, I rent it.

I go for a live sound as much as possible, and I think we achieved that on Vince's record. In country music we generally go for more of a performance feel and consistency from track to track than in pop music. But you'll find most of the engineers in Nashville are using quite a bit of [DSP], certainly more than they did ten years ago. I've done Rod Stewart, Christopher Cross, Donna Summer and people like that, and I'm using as much stuff on the country music as I ever did with them.

I try to know as much as I can about the artist and the kinds of venues they perform in, and then try to go for a little of that sound. I like a fairly up-front vocal sound. Vince has such a pure voice, I wouldn't do as much as I might to a singer on a pop record. With Vince, the more natural, the better.



I don't like effects to be obvious; they should help color the overall picture, rather than stand out: "Wow, that's a real gated reverb there." I'd rather have it enhance what's happening naturally. On Vince's sessions, we basically had a drummer and a bass player [in the main room] with a couple of room mics, which I distanced with delay. We had

three iso booths for the piano player and guitarists. I printed some effects on my room for the drums; that's about all, though. I like to maintain the control later on.

POP

Album: *Nevermind*

Artist: *Nirvana*

Engineer: *Butch Vig*

One of the songs on the album was done here at my studio [Smart, Madison, Wis.], but most

of it was done at Sound City in Seattle. We cut [tracks] on an old Neve board because they wanted that good, fat sound. This is a band that specifically didn't want things to sound "digital." I think it's a dirty word to them! In terms of tracking and overdubbing, we used tube amps and ran the stuff through tube preamps and tube limiters going to tape. The band is really into spontaneity and first takes, and they weren't very good at doing things over and over again. So every time they were warming up, I'd be recording. After I felt they had some good performances, I'd use an Akai sampler to take things and move them around.

Whenever possible, the band likes to track live and so do I. If there's an effect I like on a lead, I'll print it to tape, but I rarely do this on vocals, although I might print the effect on another channel so I can bring it in

later. In terms of [DSP], we used a 480 and some SPX90, mainly. We had a couple of Eventide [Harmonizers], and we used those mainly for subtle things on the vocals, like real tight stereo patterns or a little bit of harmonizing. The vocals



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don't have a real wet sound; we wanted them fairly up in your face, so all the delays were pretty subtle. In my studio, we've got Lexicons, an Eventide 3000 and the Korg 3000, which is cool for some things. I used that on the one song we did here.

I try to make it so you don't really hear [the DSP]. I wanted the record to stay true to the band's live feel and spontaneity, and there were certain things that I probably could have made slicker or tighter, but we said, "This is cool; we're not gonna screw with it." There's a danger when you have so many tools at your disposal, trying to make everything real, real perfect—even though it's a punk band. I think alternative bands are more suspicious of technology than other bands. I usually try to keep them out of the control room. I'll say, "I'm just gonna tweak some stuff; why don't you guys get out of here?" They don't want to know about it. I don't think it's naive, but more of a purist thing; they don't want it to feel like it's been heavily manipulated.

R&B

Album: *Diamonds & Pearls*

Artist: Prince

Engineer: Mike Koppelman

We used quite a bit of [DSP] on this album. Our basic tools were the 480L, the H3000, PCM70, some SPX90, a couple of PCM42 digital delays and the 224XL. Lately, Prince has been getting into recording live in the studio—or more so than he used to. We recorded a lot of *Diamonds & Pearls* in London. Some of the rooms we used were really live, with really nice drum ambiences; we didn't have to add much to them. The room that really impressed me was Metropolis. We were also at Townhouse and Olympic, and they sounded really good, too. Unfortunately, when you pack as many people into the studio as we did for these sessions—sometimes we had keyboards and horns and piano all in the same room—it wasn't logical to have a lot of room mics, so most of our ambiences were created.

Prince loves coming up with weird sounds, and he likes treating them in what I guess you'd call non-traditional ways, so we get to experiment a lot. Like the way he uses samplers is very different. And he makes ambiences out of things that aren't really ambiences—he'll play a weird loop or something and twist things around

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ADULT CONTEMPORARY

Album: Time, Love and Tenderness

Artist: Michael Bolton

Engineer: Dana Jon Chappelle

We did most of that at The Plant [Sausalito, Calif.], with some stuff being done at a few other studios, too. I used quite a bit [of DSP] on it: PCM70s, PCM42, AMS reverbs, Yamaha REV5s and SPX90s. I carry a rack with me with reverbs and delays. There's a Sony digital reverb I like, the MUR 201.

As each song comes up, it sort of dictates how it wants to be, effects-wise. The devices that I use are similar from song to song; but the parameters and settings change, of course. One other device I use a lot is the [Eventide] H3000SE. I have a couple of BBEs that I use for keyboard enhancement. I have one or two particular reverb programs that I use more than others. I like the AMS's ambience program. Sometimes I'll use the Sony, or one of the programs on the H3000.

We do a lot of slow ballads, and that dictates more of an airy hugeness that we try to bring to it. On the up-tempo stuff, I want a tighter, punchier sound, so I'll use shorter settings on reverbs, shorter ambiences. On Michael's album, there's only one live track—"When a Man Loves a Woman"—that was a live band. Everything else is synthesized and programmed. Same with Mariah's last record. The room still matters to me, especially when I'm working with live drummers and guitar players. I need a room to complement what they do. But we can make up for a lot now with good programming; it makes the room a little less important, I suppose.

CONTEMPORARY JAZZ

Album: Curves Ahead

Artist: The Rippingtons

Engineer: Bob Margouleff

For me, analog or digital, I use whatever works and whatever the budget can withstand. Most of the jazz fusion records I do have a limited budget, so the records are usually hybrids—we use all kinds of stuff on them. *Curves Ahead* was all-analog. The basics were recorded on a 1-inch Tascam 24-track with dbx noise reduction at [band-leader/producer] Russ Freeman's house. He wrote and composed and laid out his keyboard tracks and some guide drum tracks off his IBM sequencer. Then, after those tapes were

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* Total Harmonic Distortion + Noise: too low to measure. Keyboard Magazine July 1990.

brought along to a certain degree, we took the tapes over to Alpha Studios and worked with a wonderful Calrec console over there.

We used a lot of effects—480L, H3000 with the expander card in it, two SPX90s. I don't own a rack personally, because then you're compelled to use the same stuff over and over. Then in five years it's outdated, and you can throw it away. I like to use whatever's the latest thing around. Because I'm an independent producer and engineer, I move around a lot from studio to studio and see what everybody's using. Plus, companies

submit things to us for evaluation, so we hear things that way.

The SPX900 is a wonderful box; a nice digital processor. It's basically like two PCM70s in a box with a mutual control. I like it because I like to create proprietary stereo effects stacks for the left and right speakers. There are a lot of boxes that create reverb, which are mono in and stereo out, so if you have an effect that's all the way over on the left and you use one of those boxes for reverberation, the reverb program is going to also bring back information on the right, because it's not true stereo. If I want to use a reverb, I want

to be able to pan the echo along with where the sound is coming from in certain cases. If I have true stereo reverbs and echoes, then my effects come back exactly behind the images, behind the sound. Or if I want to put it opposite, I can; but I have control over where it's going.

WORLD MUSIC

Album: Planet Drum

Artist: Mickey Hart

Engineer: Tom Flye

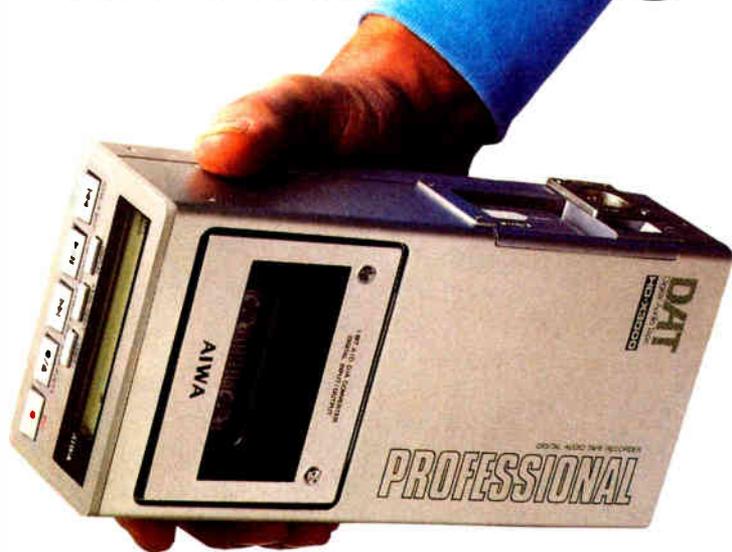
Because I grew up using live rooms and EMT plates, devices like that became my standard for reverberation. There's something about that analog reverberation that sings, that's musical. The Quantec Room Simulator is one of the few devices where I can put just about anything into it, and it sounds like natural reverberation. It has something to do with the bottom end, because the top end doesn't sound that way—I have to turn down the top end. But there's something about the bottom end and the little phase game they play to get the left and right that actually gives you depth without it wobbling.

Nearly the entire CD was done at Mickey's house. He has a Neve 8058, a separate Neve mixer, Studer A80s, and 24- and 16-tracks with SR. As far as [DSP] goes, we used a lot of H3000, PCM70 and TC delays. The H3000 is a really handy device. It's pretty clean, and you can get it do a lot of different things.

All of the melodic sounds on the recording that some people might think are synthesizers or string lines or something are actually just resonant programs. Mickey wanted all the sounds to come from the percussion. This is a technique we've been developing for some time: coming up with resonant programs to make things more melodic. One of the challenges of a percussion album is to make it more interesting by doing a combination of recording and sound design. Some of the songs actually came from an effect: We'd set up a delay system, and somebody playing through that would determine the tempo of the song. On other songs, we'd put down something and say, "Oh, this is a neat groove, but it's not really going anywhere," so we started adding spatial effects and resonant programs.

To me, effects and spatial things are that something extra you put on there to make up for the fact that it's not a live performance. The first few years of

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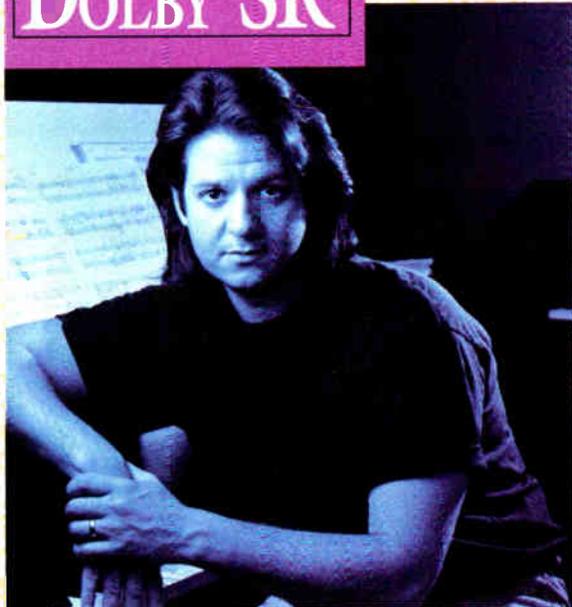
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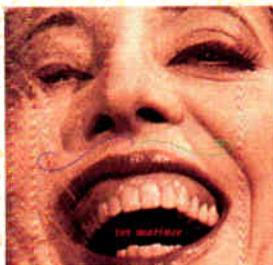


Alan Gilleri

“With Dolby SR, the music comes back the way I’m used to hearing it, but without the noise.”

- Occupation** Producer, keyboardist, songwriter.
- Recent credits** Produced and/or co-wrote albums for Madonna, Julian Lennon, Bryan Ferry and many others. Composed film scores including “At Close Range”, “Nothing in Common”, and “Nameless” (due in early ’91). And recently released “Toy Matinee”, his own band project.
- On what he does** “I like it all, I have to do it all. I feel a need to challenge myself in areas I haven’t entered before.”
- On his technique** “I find the air and space around the principal elements in a recording are becoming more important to me. The music becomes more centered, with less need for effects and layering.”
- On Dolby SR** “I prefer and am accustomed to recording on analog tape. But I don’t like tape noise - who does? Dolby SR assures a quiet, transparent recording.”

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“The first few years of digital delays were noisy and grainy; now I don’t hesitate to use them.”

—Tom Flye

digital delays were noisy and grainy; you could really mess yourself up with them. But they’ve gotten good, and I don’t hesitate to use them.

NEW AGE

*Album: Return to the Heart
 Artist: David Lanz
 Engineer: Paul Speer*

To be honest, we didn’t use any digital signal processing on this one at all. And that’s unusual for me. We recorded it directly to DAT, then ran it through Massenburg EQ into Sound Tools to do the editing. But we only used the Sound Tools for editing; we didn’t do any compression or EQ in the digital domain. And there’s no reverb on there, either. The whole idea of this album was to use omni mics and mike it sort of classical-style to get the sounds of the rooms. We recorded at four different places in Europe—a church in Amsterdam, a small palace in Madrid, a little opera house near Bologna, Italy, and a performance hall at the University in Munich. It’s neat because each place really sounds different. Two places had Steinway pianos and two were Bosendorfers, so that added to the difference between the places, too.

Normally, I’d probably use [DSP], and I have some stuff in my studio, of course. I have the basic complement of effects devices: a PCM70, an SPX90, two LXP-1s, two Roland SDE-3000 delays. In general, I try to be very organic on records. I try to stay away from heavily sampled sounds and sequenced stuff. Typically, I have four or five reverbs online when I’m mixing—like anyone doing a pop record. So even though what we’re doing has a different feeling than most pop records, we tend to use the same tools. ■

Mix managing editor Blair Jackson likes his music like his favorite cheese: digitally processed. Pass the Velveeta.



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World Radio History



MUSIC RECORDING IN CONTROL ROOMS

NORTHWEST STUDIOS SPEAK OUT

From the 1920s through the 1960s, control rooms were probably better described as “booths,” with barely enough room for the equipment and an engineer or two. During the recording excesses of the 1970s, control rooms evolved into larger, sometimes luxurious—and occasionally extravagant—environments. With the advent of MIDI in the 1980s, control rooms grew even more to accommodate the onslaught of keyboards and drum machines that sought refuge in the engineer’s realm.

Today, control rooms continue to expand, and musicians cutting tracks in the control room itself has become a common practice on many pop sessions. The use of direct boxes, samplers, electronic instruments and improved guitar preamp/processors has also contributed to the expansion of control rooms. We talked with a number of studios listed in this issue’s

directory of Northwest recording facilities about this phenomenon, and, not surprisingly, found a divergence of opinion on the topic.

Avalanche Studios Northglenn, Colorado

Just 15 minutes outside of Denver, Avalanche combines quality recording services with a comfortable atmosphere. Over its 12-year history the studio has played host to a variety of artists, ranging from local to major acts, including Quiet Riot, Kenny Loggins, Pretenders, the Four Tops and Nelson. Chief engineer George Counnas adds that Avalanche also does a lot of sessions with artists from Denver’s strong jazz scene and recently completed an album featuring Art Lande, Ron Miles and Fred Hess.

Counnas: “Except for acoustic instruments—horns, acoustic guitars, whatever—I like having musicians perform in the control room. With a bass overdub, I might mike the amp in the studio and use feed-throughs in the walls, so the musician could be in the control room. So without headphones on he could hear the music with all the variations [mic, direct feed, mic + direct feed].

“Different direct boxes are suited for different instruments. Without get-

BY GEORGE PETERSEN


ILLUSTRATION BY CHARLIE POWELL

ting into details, I like transformer-type boxes for certain high output, intense instruments. I personally haven't had much luck with active direct boxes. For one reason or another they just create a strange distortion—it's really subtle, but I prefer the transformers: They seem to round out some of the edge. But there's no one make or model of direct box that I'm particularly in love with.

"We use a variety of processing on direct guitar tracks—some Pultec tube EQs or TC Electronic 2290. We had a SansAmp in recently—it sounded pretty good—and we've also had good results with some of the BBE and Scholz Rockman stuff; it just depends on what sound you're going for. Ultimately, it's the amplifier, the speakers, the microphone, the room, the guitar and, of course, the guitar player that makes the sound. Guitar preamps are handy for getting a quick sound or for enhancing a sound that already exists, but I don't rely on them for the primary tonal aspect of a guitar's sound."

Bad Animals Seattle, Washington

A joint venture between Seattle record-

ing maven Steve Lawson and sisters Ann and Nancy Wilson of Heart. Bad Animals is a multistudio complex located in the historic 15,000-square-foot Kaye-Smith soundstages, offering two 24-track/API-console rooms, a MIDI production studio, two NED PostPro video post suites, a 1-inch 8-track post room, jingle/scoring production house and a huge sound stage. At press time, construction was underway on Studio X, a state-of-the-art facility designed by Studio Bau-ton and featuring a 64-input SSL G Series console with Ultimation. According to engineer/studio manager Steve Smith (former owner of L.A.'s Take One Studios), recent clients at Bad Animals include Steve Miller, Faith No More, Pearl Jam, The Poseys, The Walkabouts and, of course, Heart.

Smith: "I've done a lot of sessions with the guitarist standing in the control room, with a mic on his amp cabinet right outside the door.

"We've got all kinds of direct boxes we use on basses, like the Simon Systems direct box with the line level output. The bass player plays in the control room, and a lot of times we'll take that direct and put it through a

UREI LA-2A, or maybe some tube preamps to give it that warm 'amp' kind of sound.

"One thing that's important whenever you record anybody in the control room is the feel capability, especially when you might have the bass player in the control room, the drummer in the main room and the other players scattered hither and yon. When they can play at a volume level close to that when they play together as a band, it translates into a good feel.

"Everybody is always trying to warm synths and samplers up, to get them less 'digi' sounding, so a lot of the tube processors here get used quite a bit, either the LA-2As or Summit TLA-100s [tube limiters] or Pultecs, because everybody wants everything warm and round and smooth sounding."

Different Fur Recording San Francisco, California

Featured on the cover of the first issue of *Mix*, this studio is no stranger to direct recording, as the facility was founded by synth artist/pioneer Pat Gleason. Later purchased by long-time employees Susan Skaggs and Howard Johnston, Different Fur has since un-



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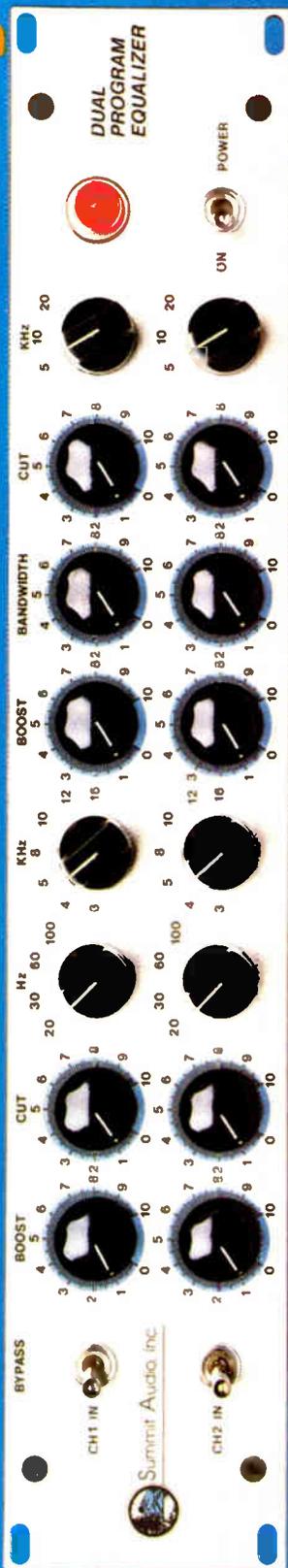
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dergone major upgrades (including the installment of an SSL G Series board and large Synclavier system) and now caters to an extraordinarily wide range of clients. Recent sessions include Primus, Mr. Bungle, Penelope Houston, Buckethead and Susan James, with the latter co-produced by Johnston and the Grateful Dead's Bob Weir.

Johnston: "We did one band here with acoustic drums, and everybody else was in the control room. Nobody wants to use headphones—they'd rather monitor on the speakers—loud. And communication is a lot easier in the control room, so I like to do as many overdubs as I can in the control room.

"We haven't done any acoustic drums in the control room—yet [laughs]. We've done a lot of electronic drums in the control room, although the stick noise on the pads is distracting and can be somewhat of a problem.

"We usually take keyboards direct. We have an SSL, and we've tried it both ways—sometimes its better to take keyboards through the mic preamps and sometimes its better through the line trims. Unless we're using a tube direct box, we try not to use direct boxes on keyboards if we can get away with it. I like the Summit tube compressor/limiter and EQs and use them when I can."

Ironwood Studios Seattle, Washington

Now 16 years old, this mid-level facility boasts two 24-track rooms, kept busy 70% of the time with album work, the remainder being spent on soundtracks for entertainment and on documentary videos for clients such as CNN. Owner/engineer Paul Scoles also reports a flurry of jazz activity, with recent albums for guitarists Bill Frisell and Larry Coryell (the latter being an all-acoustic project) and a CD for avant-garde pianist Wayne Horvitz.

Scoles: "We've got two large, good-sounding studios, and people like being in the studios where the ambience and reflections of the rooms excite them into playing better. From time to time, somebody wants to cut a vocal or guitar part in the control room, and although bass and keyboards are frequently done this way, I don't see this happening as a trend. It's just not that common, except for MIDI keyboards, which we do every day.

"Occasionally a guitarist will put the amp in the studio and sit in the control

room to hear on the speakers like the engineer does. A lead guitarist who just can't tolerate headphones will sit in the control room, and we'll run a line to the amp, which is miked in the studio. When we designed the studio we anticipated this and installed mic-line and tieline panels that also handle video or multiple cue lines on the front of the control room wall.

"We've got a tube direct box and a half-dozen or so direct boxes we built using Jensen transformers. Other than digital signal processing, about the only thing that seems to improve keyboard tracks is the stereo [Aphex] Compellor, which we have a couple of, and we've got a couple of UREI LA-2 tube limiters that seem to fatten some of the patches. For example, bass patches on the Korg M1 going through an LA-2 seem to take on a warmer, more realistic characteristic."

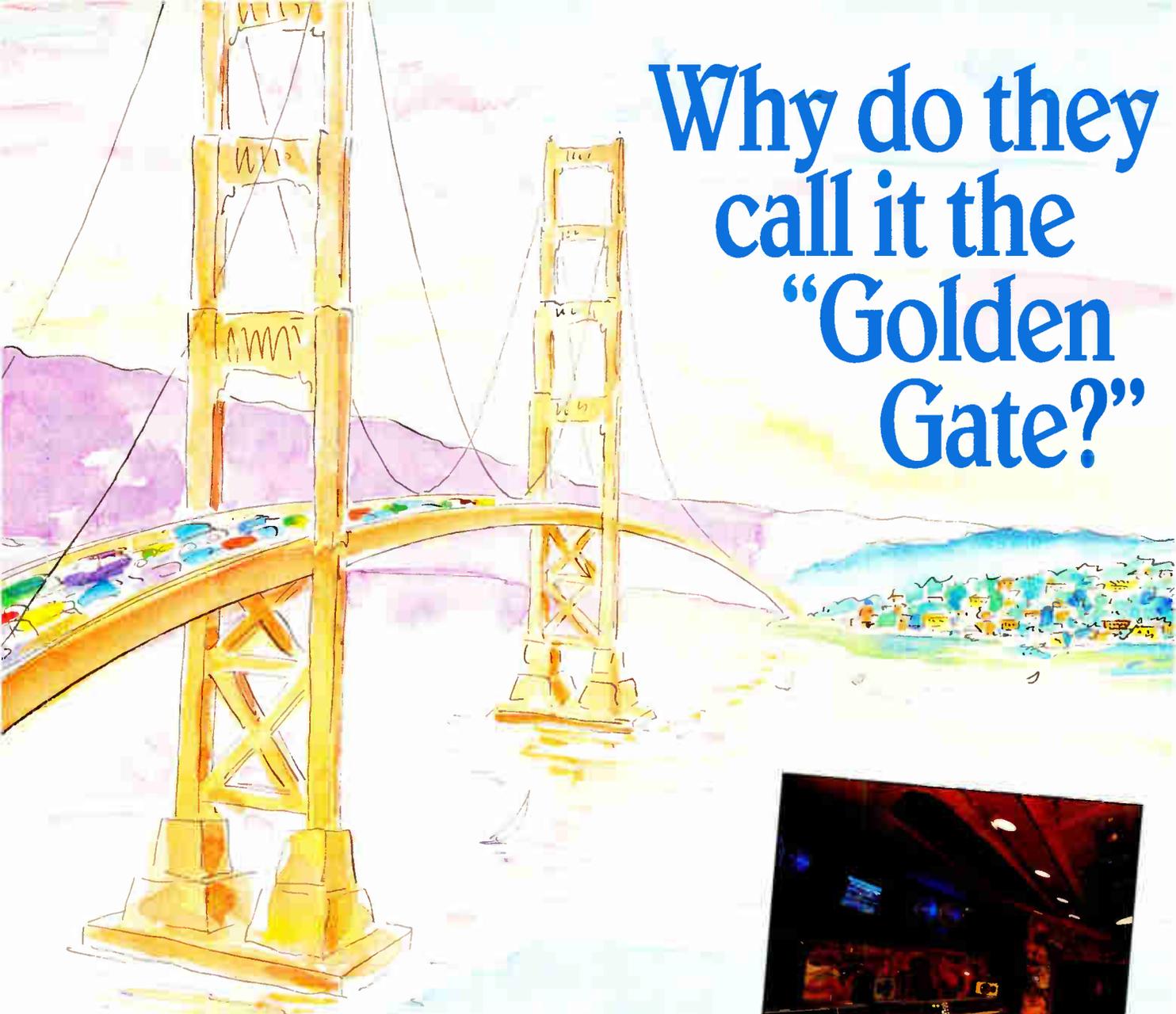
Musicon Wilsonville, Oregon

Just 15 miles south of Portland is Musicon, a 24-track recording facility that actually began as a cassette duplication plant, and later expanded into studio operations. According to engineer/studio manager Duane Scott, Musicon was designed by Russ Berger and opened in June of last year. Since then, they have attracted both local and national clients such as American Gramophone artist Doug Smith, The Cowboy Orchestra and Warner/Chappell publishing act Harder & Faster. Other work has included scoring dates for Nike, the Portland Trailblazers theme and music sessions with actor Michael Lynch that were featured on *General Hospital* last summer.

Scott: "I've been making records since 1969, and I've always recorded instruments in the control room. Through the '80s and '90s, with MIDI and electronic instruments, almost everything was cut in the control room. In fact, here at Musicon, we've taken the notion one step further and have an isolation booth right off the control room so the vocalist doesn't even need to leave the control room. At 12 ft. x 8 ft. it's our largest iso room, and it has a 12-foot ceiling, and it handles four or five background vocalists, a horn section, strings or large percussion setup.

"Jim Rogers, our tech here, took a bunch of Pro-Co DB-1 direct boxes and upgraded them with Jensen transformers, and they sound really nice—I've had good results with them. Jim

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also built a 16-input direct box panel that routes from the producer's desk area to the patch bay. Each of the direct lines has a ground lift switch and a pad, and keyboard or electric guitar players can plug in and go directly into the console. There are eight inputs on each side of the producer's desk, and it's really nice when a keyboardist brings in a huge rack of synths and electronics for a session.

"The comfort [of recording in] the control room is in the communication—you don't need to be turning a microphone in the studio off and on to talk to the guitar player. Also, musicians like the power of the big speakers in the control room—it moves the music and they're inspired to play, as opposed to playing through headphones. The power of the control room monitors really re-creates the feeling of playing live."

Tarpan Studios San Rafael, California

Home of Narada Michael Walden, Tarpan also hosts outside clients when the superproducer is between projects. At press time, projects cut by Walden and engineer Dave Frazer for Shanice Wilson and Tevin Campbell occupied the #1 and #6 slots (respectively) on *Billboard's* R&B chart. More recently, Walden and Frazer have been working on an upcoming album for Al Jarreau.

Frazer: "Except for live drums, vocals and string dates, we do most of our recording in the control room here. With the player in the control room, communications become immediate. Getting a sound is much easier when the person is two feet away in the control room. Besides, nobody really likes working on headphones.

"Guitarists often play in our control room. We work with a lot of top players like Steph Burns and Vernon 'Ice' Black. They've got their own racks and processing. Their sound is almost ready-made—just run a speaker into the studio and go. We use DI's on most of the keyboards. The Countryman direct boxes have a clear sound and really add some life, although we also have some tube direct boxes when we want to warm something up.

"It seems that control rooms are too small. These days, a two to one ratio of control room to studio space seems about right. And even when we're cutting live tracks, sometimes it's just Narada and a bass player out in the studio, with the rest of the band here in the control room." ■

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World Radio History

MEGAS STUDIO

by Richard Maddox

HOLLYWOOD NORTH

EAVESDROPPING ON "NORTHERN EXPOSURE"

Northern Exposure, shot entirely on location in the Pacific Northwest, does audio post-production at LucasArts Entertainment's Skywalker Sound South in Santa Monica, Calif.

PHOTO: RICHARD MADDOX



Exterior filming for Northern Exposure in Roslyn, Wash.

A nondescript industrial warehouse in Redmond, Wash., 20 minutes (depending on traffic) from downtown Seattle, is home to the three main sets and physical production offices for the hit CBS TV show *Northern Exposure*.

Northern Exposure began life as an eight-episode summer 1990 replacement series that was successful enough for CBS to order up 13 more episodes for the 1991-92 season. Since then, CBS has picked up the "back nine"—nine more episodes of the show to round out the season.

With three Emmy Award nominations last year (for Outstanding Series, Outstanding Sound Mixing and Outstanding Writing, all in the drama series

category), in addition to numerous critical accolades, *Northern Exposure* is recognized as quality programming. With a lead-in of *Murphy Brown* and *Designing Women*, the show has managed to win its time slot and sit near the Nielsen Top 10 ratings all season.

Northern What?

Northern Exposure takes place in the fictional town of Cicely, Alaska. The main indoor action takes place in the town tavern/restaurant, a well-appointed home in the woods and a funky lakeside cabin. These interior sets are the centerpiece of the warehouse in Redmond. They're surrounded by a maze of partial walls and props for the

one-shot and occasionally appearing interior sets.

Turning an industrial warehouse into a soundstage required a few additions, including heavy sound-deadening door treatments, nursery mesh stretched across the roof (to cut down on rain noise) and lots of old carpets hung around the top of the cement walls to reduce the reverb time.

The town of Roslyn, Wash., (population 860) stands in for the fictional town of Cicely. Roslyn is located more than two hours from Redmond, across Snoqualmie Pass on the eastern slope of the Cascade Mountains. Most exteriors are shot in and around the town, as are some interiors—the general store, the radio station and the waiting room for the doctor's office. It takes an average of four days to shoot the exteriors for one show, with the crew and actors staying in nearby Cle Elum for the duration.

The Production

Northern Exposure is an hour-long show, which means that about 44 minutes of actual program are needed for each episode. To get these 44 minutes ready to air on network TV takes almost \$1.1 million and roughly eight weeks from start to finish.

The script is typically delivered two weeks before production begins. The production phase, when the program is actually filmed, takes about eight days (typically running 14 to 16 hours each) to shoot in and around Redmond and Roslyn.

The videotape editor then has four days to assemble a cut of the show before the director fine-tunes it for another four days. The producers then take about a week to ten days to refine the director's cut. Once the executive producers (Joshua Brand and John Falsely) are happy, the picture is locked, and post-production audio work begins in earnest.

Audio post then takes another week or so to complete, typically finishing up the Thursday before air date. Since the show must be sent back to New York via satellite on Saturday morning, there is often a lot of midnight oil burning toward the end of post-production.

Sound Production

Two sound engineers (credited as production sound mixers in TV-land, even though most scenes are recorded using a single boom mic) trade off recording the show. Glenn Micallef, based out of Portland, Ore., and Bob Marts, a Seattle-based soundman who mainly does commercials and industrials, share the job. Marts, who's known Micallef for more than 12 years, did the first two shows as a boom operator, and has since done a half-dozen or so shows this season as the production mixer.

For TV/film audio engineers, most jobs are BYOG—bring your own gear. Both Micallef and Marts own fully stocked recording carts, which are rented to the show. The mixer also usually brings along his or her own boom operators as well. Becky Revak boom-ops for Micallef, and Paul Stroh boom-ops for Marts.

Micallef's and Marts' recording setup consists of an industry-standard mono Nagra 42L, a Sonosax SX-S8

mixer and a full complement of mics (Schoeps are most often used) and wireless systems (Lectrosomics and Cetec Vega). Monitoring is handled by the almost-industry-standard Sony MDR-V6 headphones. The equipment, all loaded onto a portable sound cart, is pretty typical for TV and film production.

What a mixer encounters on an exterior set is exemplified by a seemingly simple exterior scene of the main character, Joel (Rob Morrow), driving his truck into town. A hidden Schoeps 41 mic, clipped to the driver's sun visor, was used to record Joel talking to himself as he "drove" the truck. The

truck was actually being pulled by a ShotMaker tow truck that held the camera crew and Marts. Marts was squeezed, with his equipment, into the cab of the ShotMaker truck.

The next scene, a close-up of Joel stopping the truck, saying his line and then driving off again, required re-miking because a different truck was being used. Marts covered himself for this shot by putting a body mic on Morrow in addition to using a boom.



The cast of Northern Exposure.

Since the shot was through the passenger window, he didn't know if the boom could get in tight enough to get good sound beforehand. In the end, Marts used the boom mic over the body mic for the recording.

The dialog track must be kept as clean as possible since the show is also sent to MCA-TV/Universal (the distributor) as an M&E (music and effects only) for foreign sales. Multiple foreign languages can then be dubbed from the M&E master.

Ideally, every sound, except for the dialog, will be created during post-production. This includes subtle performance sounds such as chair and floor

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squeaks and utensil noises, as well as larger-scale sounds such as crowd noises, ambient effects, car engines and door slams.

As in all analog recording, alignment/level tones (1k and 10k at -8dB) must be laid down at the head of each new reel of tape (typically 3M 808). Each take must be well-documented on a take sheet as well as through a sound cue on the tape.

At "cut," the sound mixer notes whether the take was a keeper or not and may audition the take if any questionable sounds occurred. It's the mixer's responsibility to have pristine dialog tracks, letting the director know if another take is required for sound.

Post-Production

With the new season came a new location for post-production. Formerly done at Todd-AO, *Northern Exposure's* audio home is now Stage 4 at Skywalker Sound South in Santa Monica. Currently the only TV show completely digitally mixed in "CBS stereo surround" (i.e., Dolby Surround), *Northern Exposure* has some of the highest-quality TV sound available.



PHOTO: RICHARD MADDOX

Handling Northern Exposure post-production at Skywalker Sound South is the team of (l to r) Miguel Rivera, Bill Angarola, Martin Brustle, Gary Gegan, Peter Cole and Tony D'Amico.

Supervising sound editor Bill Angarola oversees some of the best ears in the industry, including the re-recording team of Peter Cole (production dialog and ADR), Tony D'Amico (Foley and music) and Gary Gegan (effects), who mix in a THX environment. Of course, their life is simplified by the sound editors Miguel Rivera

(dialog editor), Brian Risner (ADR editor) and Mike DePatti (sound effects editor) who clean up and prepare the sound for placement into the sound mix.

The film and audio tapes from each day's production are sent down to L.A. for overnight processing. The film is developed and then transferred to 1-

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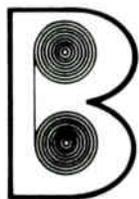
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inch videotape using a Rank Cintel telecine at Laser Pacific. The 1/4-inch audio tape is first transferred to 3/4-inch PCM format (Sony 1630). The PCM digital tape is used as the source for the audio transfer to the 1-inch videotape (called the daily reel). DAT backups are run at the same time.

Once production is complete, the videotape editor and director work with the Montage system to develop their cuts. At this point, raw dialog tracks are used in sync with the picture. Music and sound effects locations then are spotted by associate producer Martin Bruestle and Angarola, although final decisions must be postponed until the producers do their final cut and the picture is locked.

Music is an integral part of *Northern Exposure*. An audio framework for the show is formed by Cicely's AM radio station KBHR and its lone DJ, Chris (John Corbett). The station, used as background music in many scenes, certainly follows no known format, blending an eclectic mix of original artist show tunes, country, blues, jazz and rock. Transitional original music for the show is written by David Schwartz.

The show's theme song, also written by Schwartz, is a blend of Latin, Caribbean and Cajun rhythms and tonalities that fit perfectly with the funky in-the-middle-of-nowhere atmosphere of fictional Cicely. This feeling is carried over into Foley and sound effects as well, as the sound editing crew strives to sonically make the show sound rusty and a bit worn around the edges.

Dialog and FX

Once the picture is locked, a list of dialog replacement points and line additions are used to determine which actors have to come in for ADR (Automated Dialog Replacement) supervising or looping. Most ADR is done at the Music Source, a Seattle recording studio. Peter Barnes engineers the sessions, which typically last two days. For guest actors based in L.A., ADR is done at Skywalker.

Looping a line or word is necessary for three reasons: to punch-up or accent the performance, to add off-camera or over-the-shoulder words or lines or to cover a defect in the original production sound. Since executive producer Josh Brand is also a writer, the majority of ADR is done to polish up and tie the scenes together through script additions.

ADR in Seattle is done using the AudioFile digital recording and editing system. Timing reference comes from a 3/4-inch videotape workprint with window time code. At the end of the looping session, the AudioFile edits are recorded onto 1/2-inch, 4-track tape with time code (1/4-inch and DAT safeties are also made). These are then sent down to Skywalker where they are pieced together with the edited production dialog and transferred to the dialog 24-track.

Sound effects for the show are most often original, field-recorded by the sound editors using a stereo DAT, although standard sound effects sources are also used. As an example, many car and truck sounds used in the show were recorded using Angarola's '64 Dodge Dart (especially popular is its squeaking door sound).

It takes three analog 24-track machines using Dolby SR to hold all the bits of dialog, music and effects for the show. The 69 or so analog tracks (many of which are alternate sounds), music cuts and dialog are submixed in groups (dialog, music, Foley, sound effects) onto a 32-track digital recorder. This then becomes the master tape for the audio portion of the episode.

The final stereo mix is transferred to the edited 1-inch videotape master and to a D2 master. A second pass, minus the dialog, is used to generate the M&E master tape.

You certainly won't find the weekly car chase/explosion/shootout sounds or the stock CD effects on *Northern Exposure*. You will, however, find a well-paced, atmospheric show that captures natural-world ambience through the use of the latest high-tech audio toys. If you find yourself getting caught up in the quirky goings-on of Cicely, Alaska, don't be surprised. After all, the dialog and acting are a complement to the sound production. ■

Richard Maddox, who stars in his own sitcom, is the electronic service manager for Band Aid Music in Lynnwood, Wash.

POST NOTES

Lyon Lamb Introduces VASTOOLS4MAC

Lyon Lamb Video Animation Systems Inc., of Burbank, Calif., recently introduced VASTOOLS4MAC, a new software package for recording Macin-

tosh-generated computer graphics onto videotape or videodisc. VASTOOLS4MAC is a multimedia application program that controls Lyon Lamb's MicroVAS, MiniVAS-2 and ProVAS field-accurate video animation controllers. The new package is a versatile scene editor, image file compositor and animation-production control system, and Mac users can now take advantage of Lyon Lamb's computer-to-videotape transfer technology.

PICT, PICS, TGA and RIB file format images can be composited in any sequence, assembled in the desired order and automatically laid to tape. Sequences can be generated from a broad range of 2-D and 3-D paint, draw and graphics packages. Typically, frames are pre-rendered and stored on Macintosh hard disk. The VASTOOLS4MAC program transmits a command sequence to the Lyon Lamb animation controller via the Macintosh RS-232 serial port, and, upon receipt of the command sequence, the animation controller creates a frame-by-frame recording of the VTR. This time-consuming process is performed without operator involvement.

Case Edit Intros Version 3 Software and MAX Editor

Case Edit Controllers (North Hollywood, Calif.) unveiled its CASE Version 3 software and MAX editor. Both systems use inexpensive, off-the-shelf PC-AT hardware, V-LAN machine control technology and industry-standard, color-coded keyboards and screen layouts. They are also the first edit controllers to offer sophisticated online manuals and tutorials as a low-cost option. Written by Norman Strassner, the CASE software package includes "point and shoot" menus, shortcuts for complex EDL operations, formatted time code and frame entry, and multiple levels of online help. The MAX editor takes PC-based editing into the online bay and adds sophisticated motion control, GPI, time line and multiple EDL BIN operations for editing flexibility and control.

Musifex Video Goes Digital with SSL ScreenSound

Musifex Video (Arlington, Va.) has installed Solid State Logic's ScreenSound digital audio-for-video editing/mixing system and SoundNet digital audio network for its range of commercial and post-production work. According to VP

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"A lot of engineers and producers want to really be able to slam levels to achieve a certain sound. 3M 996 gives them more options and opens more doors, sonically speaking." —Barry Bongiovi, Power Station

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and chief audio engineer Craig Maniglia, Musifex analog clients "originally didn't want me to look into digital, but when I showed them ScreenSound, they said they couldn't work without it." Musifex chose ScreenSound for its "machine control and operator flexibility," Maniglia says. "The system's user interface lets our clients follow the sound editing process through every step." Musifex's eight suites offer CMX online editing, Velocity 3-D animation and 2-D Paintbox graphics.

POST BRIEFS

You don't see grown men dressed up in fly costumes every day—at least not around the offices of *Mix*. But in one of its videos, Communications Briefings of Blackwood, NJ, is counting on humor to sell its message. NFL Films Video used Beta SP to shoot a five-part video series. Post-production included editing by NFL's John Heagy and Paintbox graphics by Penny Ashman...Audio editor/sound designer Mitch Hill recently joined Stewart Digital Video of Philadelphia as audio services manager and senior audio editor. Prior to joining Stewart, Hill owned and operated Coast Digital in Wilmington, DE, for 13 years. Hill will work out of "Audio One," which features an AMS AudioFile digital workstation...Los Angeles-based 21st Century provides design services for post-production facilities and has completed 525 Post in L.A., three audio post suites for General Television Network in Detroit, and the installation of Audiomation moving fader automation systems in five dubbing theaters for Warner Bros., Hollywood. 21st Century is also the exclusive U.S. distributor for Lightworks, a non-linear, random access video editing machine; Audio Kinetics synchronizers; and Dynaudio Acoustics and USCO studio monitors... Speaking of Lightworks, the company recently received its first UK order from London-based production and post facility Rushes. Delivery will make Rushes the first leading post house to use the innovative random access editing system. Lightworks also announced the sale of two systems to Duran Post Production Video of Paris, one of the top five facility houses in France...Videomix, a 10,000-square-foot audio-for-video facility in Manhattan, just built a new digital editing suite

and installed Tannoy's System 12 DMT studio reference monitors. Videomix's clients include ABC, MTV, PBS, TNT, Sony and IBM...The Big Apple's National Video Center recently posted and scored two 15-second Nissan spots for agency Chiate/Day/Mojo...Modern Videofilm of Hollywood, CA, installed 167 JVC BR-S777U S-VHS duplicators. The post house now offers both full editing and duplicating services. Clients include most of the major West Coast film studios, and, according to president Moshe Barkat, some projects require the company to make up to 10,000 duplicates at a time...Post Pro Film and

Video of Chicago named Pat Quirk and Michael Opager director of production services and director of operations, respectively...General Television Network of Oak Park, MI, recently announced the opening of a multimillion-dollar audio post-production facility. Under the direction of GTN director of operations Doug Cheek, the expansion team consisted of the same engineers who helped design the LucasFilm, Warner Bros. and Todd-AO digital audio studios. The new layout includes two mixing suites, an offline transfer room with optional satellite downlink, and recording studios. ■

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PROJECT STUDIOS

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get tons of paper at this place. I'm talking deforestation of entire sub-continent. If I don't collect my mail for two days in a row I get cited by the fire department for creating a hazard. It's a blizzard of press releases, all vying for my attention, and my eyes glaze over until I can barely find the rum and ice cubes.

So it takes a certain type of press release to get my attention. They usually start out with something like, "SSL Names Venusian Sales Representative" or "Dear Taxpayer..." But one with a slightly less hyperbolic head came over the transom (I don't really have a transom, but I do have an affinity for James M. Cain imagery) a few weeks ago that caught my eye. It was from the Audio Engineering Society, otherwise known as the AES, the guys who put

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UP



on the big show on alternating coasts each year. The lead went, "The 91st Audio Engineering Society convention...in early October welcomed a record number of attendees, with an especially significant increase in the musician enrollment in the AES internationally."

Now, it wasn't like a NAMM show or anything, with gaggles of jingle-jacketed dudes speed-riffing Washburns and testing the tensile limits of Celestion speaker cones. It was, though, a reference to a lot of people who many in the industry a few years ago wished would just go away, for whom the recording studio experience—the very experience of recording itself, forget the studio part of it—has been very, very different from anything that has gone before, Les Paul excepted. They are the new generation. They did not learn their trade emptying ashtrays; they do not even smoke, most of them.

They began as all musicians do, learning their instruments. But during

their formative years technology went wild. Digital technology. Things were already small; transistors kicked off that trend 35 years ago. But the zeros and ones permitted extremely high-resolution audio electronics to exist in ever-less expensive incarnations. Digital synthesizers, such as Yamaha's benchmark DX7, made a huge range of sounds and additional programming of those sounds accessible, and the

development of MIDI—most significantly as a language and protocol outside of the traditional audio establishment—made those synthesizers multitimbral and exponentially more powerful.

Hole in the Dike

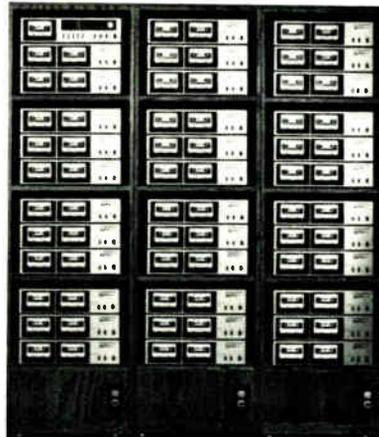
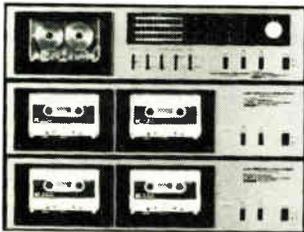
Now comes the tale of the tape. The Philips cassette, the first convenient, standardized recordable medium

available to consumers. Small 4- and 8-track decks had been available for some time from several companies, most notably TEAC. But they were relatively expensive and required consoles and an understanding of level interfaces and such.

Then came the PortaStudio™, Tascam's seminal cassette multitrack, which in retrospect can now be seen as the hole in a dike that no one's finger was able to plug. Providing a simple, idiot-proof system of multitracking, requiring little or no real professional audio background (and accepting the line-level instruments that the new generation were accustomed to), the PortaStudio marked the beginning of a new era in the professional recording industry. Just as 25 years ago anyone with enough wherewithal to buy a guitar and amp and learn enough chords had as much chance for a record deal as anyone else, the same held true for those who wanted to take the same instruments and invest in multitrack gear. The resulting studios were enhanced by a new breed of inexpensive digital signal processors, and entire recording projects could be accomplished by a single person, using drum machines and synths to replace rhythm sections, with sequencers and other computer-based aids to achieve note-perfect performances.

This was an incredible confluence of events to have occurred on a large scale in a relatively short period of time. And once truly talented people got hold of the equipment and began pushing it to its limits, it changed the professional recording industry. Forever.

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All Quiet on the New Frontier

Two years ago in this space I referred to the "New Middle Class." The first inkling of their power came about as traditional commercial recording studios, most notably in Southern California, began reacting to them, citing very real concerns about zoning and bureaucratic regulations that project studios weren't liable for, or were evading. In some cases, zoning rules were changed, with the situation addressed on a municipal or regional level.

Presently, that particular rampart seems to have lost its appeal. In fact, I haven't heard of any organized opposition to the new wave for some time. That, combined with AES press releases, which seem to literally welcome the project people into the ranks, could lead one to say that the second stage of the revolution is now over. It's analogous to immigration patterns in the U.S.; the strangers arrive, bearing tools that are different yet vaguely familiar. The next stage is integration into the mainstream, an act that implicitly changes both the new arrivals and the old order.

And this is exactly what has happened to this point. The level of professionalism in project recording grew exponentially as it moved into more professional recording situations, abetted by new and growing markets. Independent record labels and pirate radio encouraged and exposed homemade records, and a proliferating cable industry had a voracious appetite for audio and low budgets perfectly suited for downsized recording studios. Additionally, the advertising industry began looking for the audio complement



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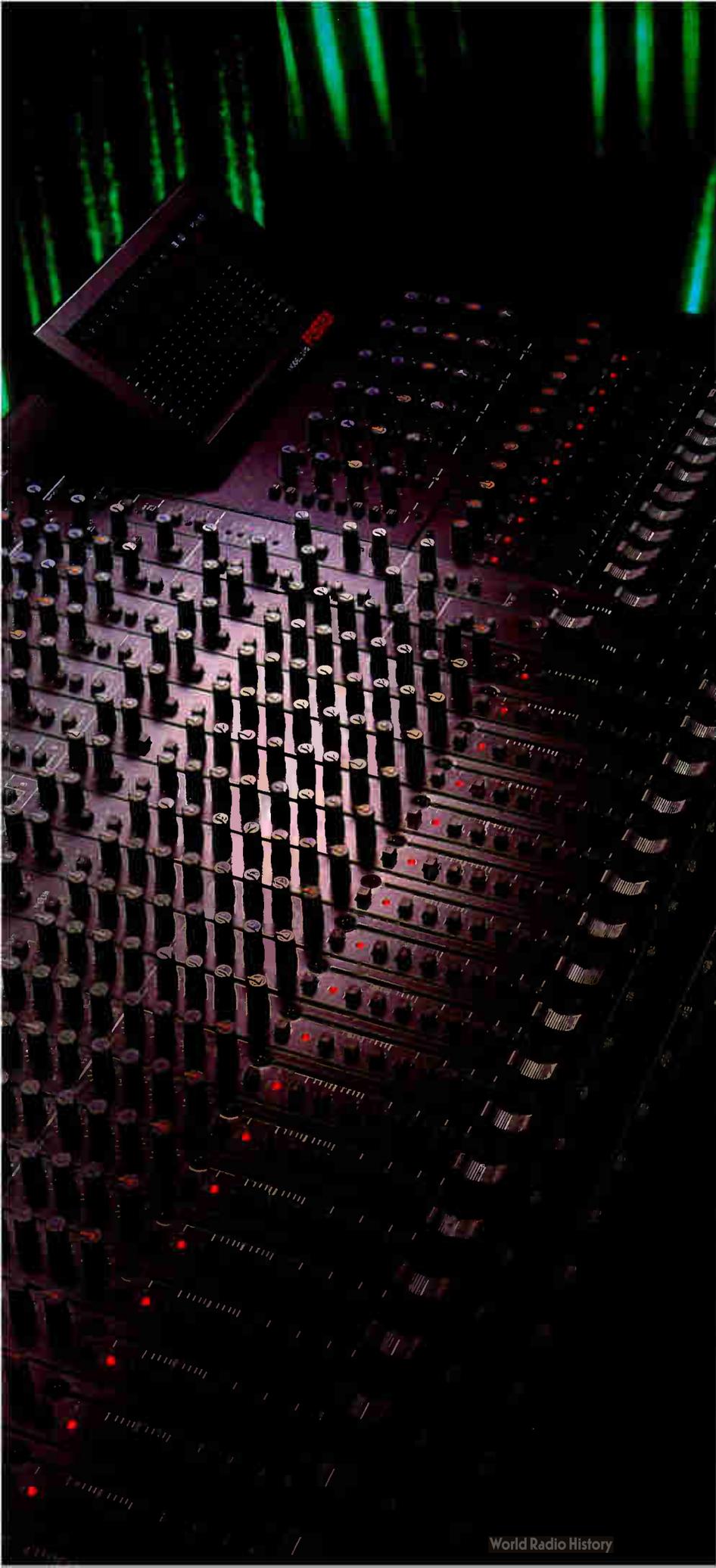
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to "edgy advertising" (a term coined by Bill Hamilton in *Advertising Age* in 1988) and started to realize that much could be accomplished for less than the traditional sum of \$250 per hour.

The old order changed as well. Squeezed by both the lower-overhead project studio competition and a crumbling economy en route to a dustbowl mentality, it adapted many of the tenets of the project phenomenon, including expanded MIDI capability; less expensive, high-resolution signal processing and other project gear to build alternative rooms within existing facilities; new symbiotic relationships with composers who had the tools for the new wave and who were beginning to realize the need for both acoustic space and a more professional business atmosphere; and, in general, interaction with project studios, using them as feeders to access a wider array of clients.

Through A Glass, Darkly...

So that's what happened, and how it happened. So what's next? *Plus la change, plus c'est la même chose*, babe. Take away the modifier and a project studio is simply that—a studio, subject to all the same market and economic forces that any other studio—or business, for that matter—is subject to. The former cadre has grown into an industry, and, as such, it feels the pinch the rest of the industry does. Last week, I called one of many project studios that I've referred to before to get compass bearings on this matter. The phone had been disconnected and no forwarding number was given by the recording. It's not the first time.

What's happening is a combination of a prolonged recession that affects everyone and a natural settling, an expected part of a boom cycle that is fundamentally Newtonian in its effect: what goes up must come down. Not all the way, but enough to match the market demands of the time.

As project studios attain a plateau of conventionalism, and as traditional studios compete by embracing aspects

of the same technologies that made project studios possible in the first place, the level playing field that both sides desired a few years ago will be reached. The situation may be complicated in the coming years as digital electronics combine audio and video into a single domain. Wait and see.

MIDI's proliferation into previously pro-only units—such as large con-

—CONTINUED ON PAGE 169

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by Dan Daley

ROCKY MOUNTAIN VALENTINE

After a few months of analysis in this space, it's time to hit the road again. And the roads that lead to the recording business are certainly strange and twisting, indeed.

This applies to the project studio as much as it does to the recording industry at large. While the recording industry overall was born of a need (to record audio), project studios were spawned by technology that made it possible to create, record and ma-

nipulate audio in a more independent environment. MIDI and other digital creations have opened doors previously closed to those without access to either the financial keys or the more traditional passwords used to open them.

Sam Beaman, co-owner of Valen-



old and inexperienced. "I looked at that Casio keyboard and thought about everything I had read in the magazines and realized that there was a shortcut to getting into the recording industry through the new technology," Beaman recalls. "There was a niche in the industry, which was being created by

Beaman tried to get work as an intern at a local studio but was told he was too

**Sam Beaman
(at console) at
work in his
Denver-based
Valentine
Studios.**

PHOTO CAROL CONWAY

MIDI and other technologies."

That niche we now call the project studio, and that Casio keyboard has grown into Valentine Productions, seven years old and growing. Beginning with a 4-track cassette deck, the facility now uses tape almost as a backup; a Fostex Model 80 8-track competes with an Atari 1040ST, running Hybrid Arts SMPTE software and an interface for sequencing. The new console is a 40-input AMR Series 800. Keyboards include a Casio FZ-1, Roland D-10, Ensoniq SQ-1, Akai AX-80 and Korg DSM-1 and Ensoniq Mirage samplers. Recent additions include a Kawai 16-channel MIDI mixer for automated mixing and the Alesis SR-16 drum machine.

The equipment list is heavily weighted toward MI, with a preponderance of mid-level effects such as Lexicon's LXP-1 and a Yamaha SPX90. What marks Valentine as a project studio rather than a well-equipped home studio is its impressive and growing list of clients whom Beaman and creative collaborator Ian Gilchrist have done music and audio for: United Artists' new animated logo, Met Life Resources, Perrier, the State of Colorado, DDB Needham Worldwide, Consolidated Edison and Coors, to name a few. In addition, Valentine has completed its first feature-film score and sound effects/Foley tracks and its first record, a radio remix for the Gemini label.

Rocky Mountain Lows

It has been an uphill battle much of the way. While Colorado once had a cachet of hipness when it came to record production (due largely to the late Caribou Ranch studio), it's hardly a mecca for commercial audio and audio-for-video production these days. Beaman does not flinch at the term "secondary market" as a description of Denver. Early into the game, he realized that Valentine had to go outside the region if it hoped to prosper. But any studio operator, commercial or project, will tell you that studios are beholden to the same three fundamental laws of real estate: location, location and location.

"There's an attitude problem," Beaman says. "The top agencies here tend to do their lower-budget jobs locally and go out of town for the higher-budget productions." As an example, Beaman cites a prospective client in Houston. Gordon had cold-called the

client, who was polite but firm in his attitude that he didn't use out-of-state production companies. He liked their tape, though. Awhile later, the Houston company's owner was passing through Denver and stopped in to meet with Beaman and, though impressed with Valentine's capabilities, still maintained that he wasn't planning on using out-of-town production facilities. The Beamans persisted and finally landed a four-spot radio and television project with the Houston company, which went on to win two awards at the Houston International

Film Festival.

It's a lot easier convincing clients of your capabilities and even your legitimacy when your stationery has a Manhattan or Sunset Boulevard ZIP code. Gordon estimates that Valentine sent out upward of 600 demo reels in 1990, along with buying a considerable number of out-of-town phone directories and listings. Beaman expects that at some point in the future Valentine will retain a rep in another city, probably Los Angeles, to pursue another long-range goal: getting network television scoring and SFX jobs.

Valentine, like many project studios outside of the main commercial pro-

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duction centers, is singular in its neighborhood, and its main competition is traditional commercial recording facilities, many of which are beginning to include some degree of creative production capacity as a means to widen their client base. "One of the problems in this area is a general lack of sophistication," Beaman asserts, which he says helps him stay ahead of the competition but at the same time keeps the overall technological profile of the region below par, provincializing it and reinforcing the "attitude problem" he finds with many agencies.

"One studio put in MIDI but doesn't really know how to get the most out of it," he says. "They put it into a separate building and wheel it in and wheel it out. It never becomes an integral part of the production process. On the other hand, we do many projects without ever going to tape until the final mix. There aren't a lot of studios around here operating like that, and so clients don't get used to it and want it."

Eighty percent of Valentine's business is locally generated; twenty percent comes from out of town. Beaman wants to see that equation reversed in the next couple of years. For starters, he wants to get the jobs that have been going out to the coast, which means chipping away at the image problem. Continuously upgrading equipment is the other prong of the strategy, although Beaman tends to be conservative about his capitalization. He's proud of the fact that no one handed him a million dollars to get started, and that he won't buy a piece of gear until he can afford it or until he sees a clear demand for it. "Everything has to pay for itself," he notes. "If I bought a Proteus, I'd have to make \$1,000 off it right away."

A tight fiscal policy in an industry niche that's driven by technology could present a conflict. Beaman responds by saying that there's ample equipment at reasonable prices out there if one is willing to spend some time researching. He cites the Fostex 4030 synchronizer Valentine now uses. "I took the down payment on a job and bought it because I read a number of reviews on the unit," he says. "It may not be as popular as other models, but from what I read it fit my needs and my budget. I wanted a system that we could start working with immediately.

We read the manual in half a day and haven't lost a frame since."

Valentine has one problem that most project rooms encounter and one that local commercial rooms can solve: recording space. While clients are generally impressed with the studio's layout, the small iso booth causes some hesitation. "It's a chance for places like us and commercial rooms to work together," Beaman comments, "which is something that the industry is going to need a lot more of as it keeps evolving." Along those lines, Valentine recently completed the final mix for its first feature film at nearby Colorado Sound, transferring and syncing sound effects and music tracks from 1/4-inch tape to 24-track and using the automated Trident console. Colorado Sound was also used for posting Valentine's contribution to a special broadcast on NBC-affiliate KCNC.

Get Out of Denver, Baby

"I don't plan to move out of Denver; I plan to expand out of Denver." Beaman's assertion is based on a sanguine vision in which location and proximity to the power centers become less of a factor in commercial audio. Aside from using reps in other cities to bring in business and trying to raise the technological consciousness of his own region to keep more work from going out to the coasts, Beaman also contemplates the project studio of the future.

To that end, Valentine purchased the Ensoniq SQ-1 workstation, placing it in a separate suite. "We use it as an offline composing room, similar to offline suites at video facilities," he says. "You work up ideas in them along with the client and then bring the floppies into the main room for layering, voice-overs and mixing. This approach serves dual purposes: Video-oriented clients find the concept more familiar, and it allows for a modular studio approach that can be readily expanded. If it gets to the point where you need another main room, you could conceivably support another couple of offline suites," he explains.

"I'm just glad I read the magazines as closely as I did," Beaman concludes. "I was simply too old to start out emptying ashtrays to get into this business." ■

Dan Daley is Mix's East Coast Editor. Any state that domiciles Hunter S. Thompson is okay by him.

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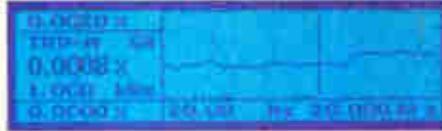
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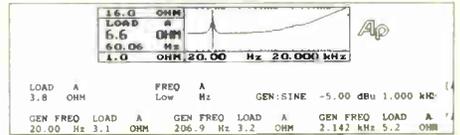
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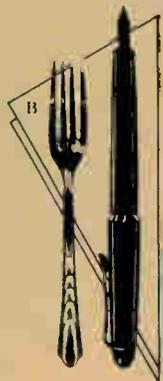
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by Mr. Bonzai

LYLE LOVETT

LARGE COUNTRY



Like many folks watching the 1989 Grammys, I was surprised by nominee Lyle Lovett's performance of "She's Hot To Go." It's a snappy song about a gal who's lots of fun: "You can stop by in the morning/You can stop by late at night/You can stop by if you're ugly, friend/Or if you look all right."

He sings about the abundance of feminine pulchritude when viewed from the rear, but when he catches a frontal view, he says, "This girl was so ugly..." A woman vocalist looks him straight in the eye and says, "Well, you're ugly, too."

I was knocked out by Lovett and his Large Band, fascinated with his chiseled features and luxurious hairstyle.

and further impressed when he walked away with a 1990 Grammy. As I dug deeper, I discovered a maverick quality in Lovett's work that bucks the mainstream as he slides easily from folk/country stylings and heart-hitting ballads to honky tonk/swing and jazzy blues.

Lovett was born and raised in Texas, where he cultivated his remarkable vocal abilities and distinctive brand of storytelling. While earning a degree in journalism, he sang his originals in the local bars and coffee houses. After graduating in 1980, he branched out from Houston to Austin and Dallas, finally making it to Nashville, where he cut a demo that resulted in his 1986 debut album. *Pontiac* was released in 1988, and 1989 brought us *Lyle Lovett and His Large Band*.

I was introduced to Lovett by Leo Kottke (quite an honor). At the time, Lovett was just beginning to record basic tracks at Ocean Way (L.A.). Months later, we finally met up at Conway Recording. The new album features guest performances by Kottke, Rickie Lee Jones and Emmylou Harris. While George Massenburg was setting up a mix, Lyle and I had cappuccinos on the porch outside the studio, overlooking the gardens.

Bonzai: So, this is the final day of the mix—are you happy?

Lovett: I *am* happy. We've taken the weekends off, but we've worked every day for a couple of months. We're going to take a week off and then listen to 'em before we master.

Bonzai: You wrote all the songs?

Lovett: Yes. I've been very lucky to have been able to do my own songs all along. I did co-write one song on this album, however, with one of my favorite Texas singer/songwriters, Willis Alan Ramsey.

Bonzai: Do we have your Large Band on this album?

Lovett: We do, but this record is different than the last album. There aren't as many swing tunes, and we didn't use the horns in the same way. This time the Large Band material has more of a gospel vocal feel to it—more blues than swing.

Bonzai: Who's producing?

Lovett: George Massenburg, Billy Williams and me. I've worked with Billy on all of my albums, beginning with the demos that got me my original record deal back in 1984. George and I first worked together on "Friend of the Devil" for the collection of Grateful Dead tunes done by various artists [1991's *Deadicated*].

Bonzai: You've done some rather unusual songs on all of your albums—did you have any of those zingers on your demo?

Lovett: In 1984, we recorded 18 songs. Ten of those tracks were the first album, with some overdubs and remixes with Tony Brown in Nashville. All the rest of those 18 songs ended up on my second album, *Pontiac*, and the third, the *Large Band* album. Last year we recut "You Can't Resist It" for the movie *Switch*, with Don Was producing and Ed Cherney engineering. We released that on a five-song CD with some remixes—it was fun to go back in and noodle around.

Bonzai: Who taught you how to sing so well?

Lovett: Gosh—I'm untrained, for sure. I did sing when I was growing up. I went to parochial school and sang in the choir. Here's how you found out if you were in the choir or not: They would line us all up in class, and we'd sing a hymn. The choir director would walk by and put his ear in front of each of us. You were either in or out.

Bonzai: I understand you had a band when you were in the Future Farmers of America.

Lovett: Yes, a lot of the activity in the FFA is geared around contests. For instance, every year there is a show and you present the animal you've raised.

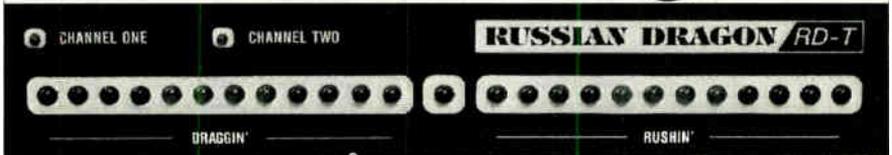
Bonzai: What was your animal?

Lovett: I had a steer.

Bonzai: You grew it from a baby?

Lovett: Yes, from a pup. [Laughs] Anyway, there was another contest—the FFA band contest. Our chapter of the FFA didn't have a band, so they decided to put one together, and I was recruited because I had a guitar. That was about the only qualification. We

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were pretty awful.

Bonzai: What kind of music did you play?

Lovett: We learned five songs altogether. "Mama Tried" was one, an old Merle Haggard song; another was "The Green Green Grass of Home." I didn't sing, I just played guitar. This was in the ninth grade.

Bonzai: When did you go pro?

Lovett: The first playing I did for money was when I was 18, in a little restaurant close to home.

Bonzai: Was this solo?

Lovett: No, I had a duo with Bruce Lyon, a high school buddy of mine. Two guitars. We did the hits, songs we liked—mostly by Texas singer/songwriters like Guy Clark, Townes Van Zandt, Willis Alan Ramsey, Steven Fromholz and Willie Nelson. Bruce even sang a couple of songs by Kinky Friedman.

For the first couple of years, I performed other people's material until I had enough songs of my own to play a set. Then I began to play in original music clubs. In Houston there is a little place called Anderson Fair that featured original music. I played there awhile, and then branched out to Austin and up to Dallas. This was around '78-'79, when I was going to school studying journalism.

Bonzai: Was it your goal to be a reporter?

Lovett: I really wanted to play music, but I didn't think it was something that would work out in the long run.

Bonzai: When did you realize it would work out?

Lovett: I'm still hoping. It really is like that. When I met Billy Williams back in 1983, he was playing in a band that mostly ended up as my Large Band. I went into the studio with them. I had been playing the same clubs in Texas for some time, and it got to the point where I wanted to find out about the business and see if I could go beyond what I was doing—or do something else, like getting a job. I went to Nashville to pitch my songs, with just enough encouragement along the way to keep going.

Bonzai: There are more than a few rather surprising moments in your songs. For instance, "This Old Porch," from your debut album, is such a bittersweet bit of nostalgia, but then there's the final line, "The laughter from those sons of bitches who said

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we'd never get back up." Have songs like this helped you or hindered your progress?

Lovett: You know, I really have been lucky to record pretty much whatever I write. I haven't been on the radio very much, so my songs don't have to fit into an acceptable formula or format. Doing the singer/songwriter thing you can pretty much get away with whatever you want to, or whatever your audience will put up with.

Bonzai: Let's talk about another unusual song, "If I Had a Boat." Very funny when Tonto tells the masked man, "Kemo sabe, kiss my ass—I bought a boat / I'm going out to sea."

Lovett: It's one of my favorite songs to play live. It's really just a silly song—I had a pony when I was growing up and the idea of the song was about a child wanting to be everything, a cowboy and a great captain at the same time.

Bonzai: You dedicated your first album to your Mom and Dad...

Lovett: I'm an only child and very close to my folks, and they've always been very supportive. Never gave me a hard time about playing music.

Bonzai: What were your musical in-

PHOTO: MR. BONZAI



George Massenburg, Billy Williams and Lyle Lovett at Conway Recording.

fluences when you were growing up?

Lovett: Well, I learned songs by people I could go out and listen to, those people I mentioned, plus folks like Michael Murphy. I was trying to learn how to play the guitar, and I enjoyed the Texas progressive country scene, as it was called, combined with elements of folk and country and blues. These guys were real singer/

songwriters, and they always had interesting acoustic guitar parts. I'd learn the songs just to figure out what they were playing. Ramsey always had great acoustic guitar parts, and Murphy did lots of alternating bass, thumb-style stuff. The other thing I liked was the narrative—they always told stories in their songs.

Bonzai: I enjoy the stories in country

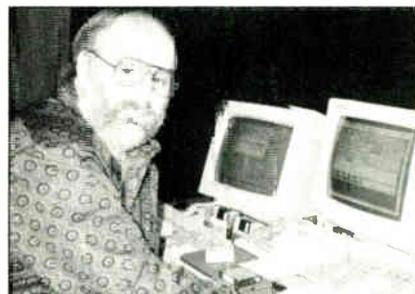
Hey Glenn, what do you do with your 56K?

Glenn Meadows is the president of Masterfonics Inc. in Nashville, Tennessee. His mastering credits, 350 of which have achieved Gold/Platinum status, include: Alabama, Hank Williams Jr., Dan Fogelberg, and Reba McEntire. Recent 56K projects include: Steely Dan Gold Extended/MCA, Reba McEntire/MCA, and Sawyer Brown Curb/Capitol. He has been mastering since 1973.

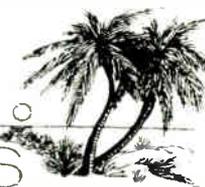
"The 56K has made my life much easier. In an effort to find a digital mastering system suitable to my needs, I evaluated several other systems on different platforms. The 56K proved significantly easier to use and faster to learn, as well as very quick to do the type of edits I normally did with analog tape.

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music, too—especially the specificity of the lyrics—getting down to the details that most songwriters overlook, the little wrinkles that we may not want to look at.

Lovett: And sometimes looking closer than you want to. Country songs have always been narrative, the words have always been important.

Bonzai: Do you fit into a tradition, or are you winging it alone?

Lovett: I'm definitely not winging it alone. It's impossible not to be influenced by what we've heard.

Bonzai: Let me mention a few artists and you tell me what comes to mind—Kinky Friedman.

Lovett: Well, with Kinky Friedman it's the sense of humor he has in his songs. I always found his biting sense of humor very enjoyable. He's funny, and not always in a good-natured way, which is attractive.

Bonzai: How about Leo Kottke?

Lovett: Leo is wonderful, and I was so excited with his last record where he sang on every song. He is a great songwriter, and I've always appreciated his voice. His guitar playing is beyond belief, but people who only

appreciate his guitar playing are missing a lot. The first time I saw Leo I was in high school, and he was on the *Midnight Special*.

I sang on his last album, and it was really something to work with him. We did a tour with Leo, and he rode on the bus with us for three months. It was so great. He couldn't sleep on the bus, so he would sit up front in the lounge all night and play guitar. I could go up front for a guitar lesson and just listen to him. Leo worked on this record of mine, and that was pretty exciting for me.

Bonzai: Bob Dylan?

Lovett: Dylan is one of the greatest influences on acoustic music and singer/songwriters. When I was going to college, I used to book the talent for the coffee house. Most of our performers were students, and everybody played Dylan songs. The Dylan songs that I know, I heard from other people, in the oral tradition.

Bonzai: John Lennon.

Lovett: John Lennon is one of the truly great songwriters and certainly one of the more influential ones not only in terms of music, but for songs that are still touching people. I've never played a Beatles' song in my life.

Bonzai: What music would you like played at your funeral?

Lovett: [Laughs] Gosh, I don't know. I played at a memorial service once, for the boyfriend of my girlfriend's sister. It's interesting that you brought this up, because this new album of mine is my death album.

Bonzai: Really?

Lovett: Well, not really, but there are some death songs on it. There is a song about a funeral, from the point of view of the dead person. And there's another song that talks about people and the ways they died. This fellow whose memorial service I played at—he was at a party and tried to jump into a swimming pool from a balcony and he missed. He's in the song.

Bonzai: Can you imagine what kind of songs you'll be writing when you're 80?

Lovett: I hope I can still make something up. I find writing difficult, and I hope I can still think of something.

Bonzai: Do you have any business tips?

Lovett: You've got to constantly try to figure things out, because things are never the same. This is my fourth album, but it's different than any other album I've done. You can never completely rely on experience.



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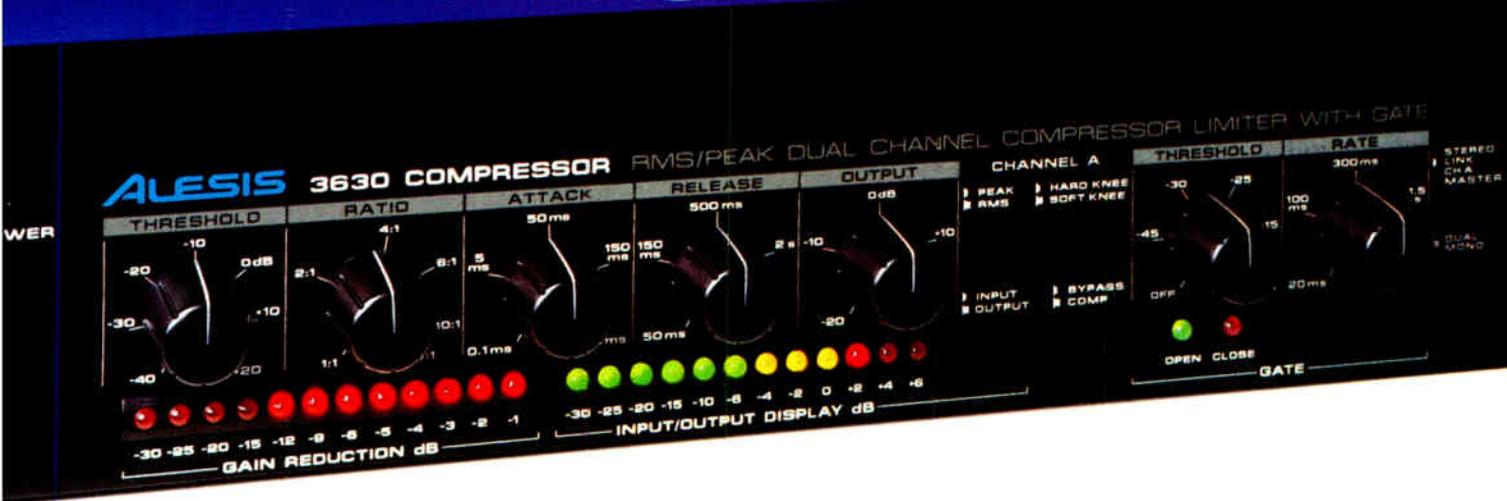
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LUNCHING WITH BONZAI

Bonzai: On this pinnacle you've created for yourself—do you ever feel lonely?

Lovett: Oh, sure. I'm very lonely.

Bonzai: Does this loneliness boost creativity?

Lovett: No. I don't think so. Sometimes. I think creativity is having a good idea, or just figuring out a way to get to a good idea.

Bonzai: You sing about women in an interesting way, as in "She's Hot to Go," the song you performed on the Grammys. Do you ever get any shit from feminists?

Lovett: Not in a serious way. Occasionally. But for the most part it's just a joke. Maybe a bad joke, but it's supposed to be funny.

Bonzai: How long does love last?

Lovett: Fourteen to 16 months.

Bonzai: Do you have any aspirations beyond being a musical superstar?

Lovett: I've really never known exactly what to do with my life, but I do like playing music. The whole thing is just to keep doing what you're doing. The most enjoyable thing that I get to do is to make up a song I like—I hope

I can keep doing that. If you can do that, everything else works okay. You get to go into a studio and record, which is great fun. And I really like playing live, too.

Bonzai: What has George Massenburg brought to the table?

**"Doing the singer/
songwriter thing you can
pretty much get away with
whatever you want to, or
whatever your audience
will put up with."**

Lovett: George is so smart, and he invented half of the gear that's here in the studio. George lets you perform naturally, and he can get it on tape and make you sound as good as you can. The clarity of his recording technique—it just doesn't get in the way. I feel that George has gotten me on tape, for better or for worse, better than ever before.

Bonzai: Who does your hair? No, for-

get it, that's a stupid question.

Lovett: That's okay. The same person has been cutting my hair for several years at home, but when I stay out here—well, it takes a few times to get it right.

Bonzai: Well, the cappuccino is almost gone. Do you have a final thought? Can we leave the folks with something inspirational? What looks good to you about the world these days?

Lovett: The good things about the world are the great people. There are lots of good people, but somehow good things are losing out.

Bonzai: We're not going to give up, are we?

Lovett: No, we can't give up, but I think it's possible for good things to lose out to the bad.

Bonzai: Does your music bend things in the right direction?

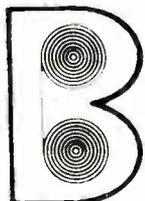
Lovett: I don't think my music makes any difference in the big picture. I just hope that my music is appreciated by some people as a good thing, whether it makes any real difference or not. ■

Roving editor Mr. Bonzai wishes he had Lyle Lovett's hair.



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EUPHONIX

In the rear of its new headquarters in Palo Alto, Calif., a group of Euphonix technicians is finishing a series of burn-in tests on a 96-input console prior to its being shipped to Japan. The small control surface is linked to a pair of 4-foot tall audio racks and a patch bay via a simple coil of multiway cable. Audio tones and test signals fill the room, as the hundreds of digitally controlled audio amplifiers, mic preamps, EQ sections and routing elements are put through their paces one more time.

This is no ordinary design. The longest signal path from mic input to

SCOTT SILFVAST ON DIGITALLY CONTROLLED CONSOLE DESIGN

by Mel Lambert

group/multitrack output within the audio racks is no more than a couple of feet—including the comprehensive patch bay—resulting in extremely low signal-to-noise ratio and crosstalk, coupled with wide dynamic range and headroom performance. Every gain and switch element throughout the console's distributed intelligence can be reset within a single video frame, all snapshot and dynamic automation data being stored within each channel module. The external PC simply provides a familiar graphics interface for the EQ display and the system functions, plus permanent hard disk storage for mix and recall data.

Scott Silfvast (Euphonix's president and primary system designer) sits at the CSII—the company's newest console offering—and makes a few last-minute checks of the assignable control sections. Silfvast isn't a big guy, yet he practically dwarfs the narrow panel.

Mix: How would you summarize the Euphonix console project?

Silfvast: I intended to build a console that simplifies the various control- and level-adjust functions that a producer, engineer or musician has to handle during a recording or post session. And, at the same time, offer a dramatic improvement in audio quality. By merging comprehensive microprocessor control with good electronic design, this new generation of console can offer complete recall and reset of all functions. The design also dramatically reduces the amount of signal routing necessary to bring the audio to the control element, by letting a computer control all of the switching and level adjustments.

Mix: Getting down to basics, how did the original design concept originate?

Silfvast: The real need for this console sprang from frustrations that my band and I encountered when we first went into a studio. We'd go into a rehearsal space, write the music and try to memorize it. Then we'd go into the studio and hope that we could find somebody to run the console and get the mix that we had inside our heads. We'd go home, listen to the mixes and hate them. So, we went back to the studio to fix it. But half the time was spent trying to re-create where we were at the end of the last session, and then moving on to develop our new ideas.

I finally concluded that the main focus was the console. It takes so long

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TCD-D10 Pro II **Portable DAT Recorder**

The TCD-D10 Pro II is the smallest professional DAT recorder from Sony. Yet, while it weighs only 4 lbs. 7 oz., the TCD-D10 Pro II is no lightweight when it comes to performance.

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multi-display with a combination of safety/warning indicators to help insure fail-safe operation. And when combined with one of Sony's high quality microphones, you're fully equipped to meet the most demanding challenges in the field.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 85 dB
FREQUENCY RESPONSE: 20 Hz-22 kHz
THD: 0.06%
I/O: ANALOG—MIC/LINE BAL, DIGITAL—AES/EBU

ACCESSORIES: BATTERY (X2), CHARGER, REMOTE, AC SUPPLY, CASE

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PCM-2700 **Studio DAT Recorder**

Taking advantage of Sony's latest innovations in digital technology, the PCM-2700 is the first affordable professional 4-head DAT recorder.

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motor direct drive transport to insure tape stability, accuracy and reliability. Its 4-head design provides off-tape monitoring to verify your recordings.

There's even a duration adjustable digital auto fader for fade-in and fade-out times as well as an A-time search function for rapid access to any recorded A-time location—all giving you the utmost in professional performance.

KEY SPECIFICATIONS

SIGNAL TO NOISE RATIO: MORE THAN 90 dB
FREQUENCY RESPONSE: 20 Hz-22 kHz
THD: < 0.045%
ANALOG I/O: +4 dBs (+24 dBs MAX.) ADJUSTABLE
PARALLEL REMOTE: TTL COMPATIBLE, D-SUB 37

DPS-D7

Digital Hyper Delay

If you want to take your creativity in exciting new directions, Sony's DPS-D7 Digital Hyper Delay is the way to go.

Featuring seven sophisticated algorithms, there's virtually no limit to the number of unique and complex digital delay effects you can create. The DPS-D7 incorporates an 18-bit over-

sampling A/D and 1-bit HDLC D/A converter system with digital filters for excellent linearity, ultra low noise and wide dynamic range.

Second generation LSI's allow for high-speed 32-bit digital signal processing. And with its large graphic display and help button for assistance on any function, the DPS-D7 is always simple to use.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 94 dB
FREQUENCY RESPONSE: 10 Hz-22 kHz
THD: <0.0035%
ANALOG I/O: BALANCED +4 dBs (+24 dBs MAX.), UNBALANCED -10 dBs (+10 dBs MAX.)
MEMORY CAPACITY: 100 FACTORY PRESETS, 256 USER LOCATIONS

DPS-R7

Digital Reverb

If you want to add even more power and versatility to your audio system, Sony's DPS-R7 is right on the money.

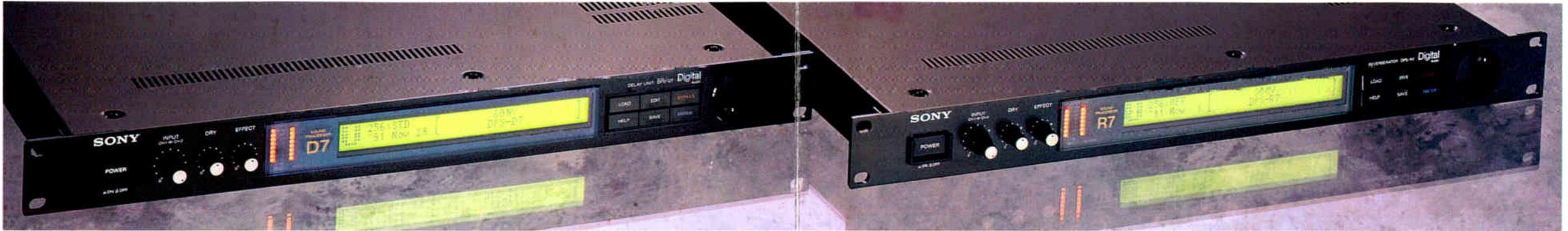
Offering two discreet channels of advanced digital reverb effects, the DPS-R7 is an invaluable tool for the audio professional. As with the DPS-D7, the DPS-R7 employs HDLC D/A con-

verters for superior sound reproduction as well as high-speed 32-bit digital signal processing, which deliver sophisticated, multiple reverb effects.

It also includes 100 factory presets as well as 256 memory locations for your own presets. In addition, the DPS-R7 features an ingenious "data wheel" and large graphic display for easy operation.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 90 dB
FREQUENCY RESPONSE: 10 Hz-18 kHz
THD: <0.004%
ANALOG I/O: BALANCED +4 dBs (+24 dBs MAX.), UNBALANCED -10 dBs (+10 dBs MAX.)
MAXIMUM SIMULTANEOUS EFFECTS (YEM): 4 PRE EFFECTS (2 PER CHANNEL), 2 REVERB (1 PER CHANNEL), 4 POST EFFECTS (2 PER CHANNEL)



PCM-2300

Studio DAT Recorder

As Sony's most affordable professional DAT recorder, the PCM-2300 is ideally suited for a wide variety of applications where high quality recording and playback are necessary.

Like the PCM-2700, the PCM-2300 incorporates the latest conversion devices—1-bit delta Σ A/D converter and HDLC 1-bit

D/A converter—for outstanding sound quality. The PCM-2300 also incorporates a sophisticated 3-motor transport design for solid reliability. And in 32kHz long-play mode, it delivers twice the normal recording and playback time—a full four hours.

Plus, its analog and digital I/O's provide a wide range of flexible interfacing possibilities.

KEY SPECIFICATIONS

SIGNAL TO NOISE RATIO: MORE THAN 86 dB
FREQUENCY RESPONSE: 20 Hz-20 kHz
THD: <0.05%
ANALOG I/O: +4 dBs (+24 dBs MAX.) ADJUSTABLE
SUPPLIED ACCESSORIES: WIRED/WIRELESS REMOTE, 19" RACK MOUNT, POWER AND REMOTE CABLES



CDP-2700

Compact Disc Player

The CDP-2700 compact disc player delivers a multitude of professional features for a very compact price.

Like all Pro Standard equipment, the CDP-2700 is rugged and reliable while delivering superb sound quality. Ideal for on-air applications in radio broadcasting and sound sweet-

ening in video post, the CDP-2700 includes important features such as variable speed playback, fader stop/start control from a mixing console and an auto cue function for instant start.

And because its digital output conforms to both the AES/EBU and IEC-958 formats, the CDP-2700 directly interfaces with other professional equipment for flexible system expandability.

KEY SPECIFICATIONS

DYNAMIC RANGE: MORE THAN 110 dB
CROSSTALK: 100 dB
THD: 0.04%
VARI-SPEED RANGE: $\pm 12.7\%$ (0.1% STEPS)
D/A CONVERSION: DUAL 18-BIT 8X OVERSAMPLING

to set up and adjust a complex recording board, that my first instinct was that there had to be a better way. I went to the AES convention in 1987 and looked at all the console designs. I couldn't believe it: \$500,000 consoles that couldn't even reset! Our group had the ability to handle the technology, so we raised a little bit of money, built a garage-type operation, and went to Los Angeles AES in 1988 with a small prototype.

Originally, we targeted the product at the lower, project-studio and musician-owned end of the console market—less than \$50,000—and weren't thinking of the big facilities at all. What happened during the AES demos was that all the big studios got very excited at the concept of total, computer-controlled reset. We soon realized that the "cutting-edge" guys at the top are successful simply because they think successfully, using the right technology. So we re-targeted this console at top-end studios and better-equipped project facilities.

Mix: How did you develop the control-surface layout?

Silfvast: We decided to use faders, rotary controls and pushbuttons—rather than toggle up/down switches and other such elements—simply because people are familiar with them. Flexible routing was the key to our design; the block diagram/architecture of the channel is very flexible, without hardware limitations. We included two fader blocks, a dual EQ section, mic preamps, aux sends and so on, and then developed a very flexible, digitally controlled signal path that would link them together.

We still use the same basic panel layout we came up with back in 1988—we only ended up moving the central EQ assign/adjust section closer to the operator.

We then went back and asked users for their reaction, and the basic design matured. It turned out that, in almost every case, our basic signal architecture was flexible enough so that it could be used for a variety of applications—surround-sound mixing for video post, for example, or film scoring mixes, as well as more traditional tracking, overdub and mixing-for-music sessions.

Mix: The input/output of each block is freely assignable, so that EQ can be dropped into the signal path at any number of locations, while monitor,

group and tape machine outputs can be developed as necessary. In basic terms, was the idea to mimic an in-line design, with two faders per channel, etc? **Silfvast:** In reality, the design was based more on offering plenty of flexibility rather than defining the way an engineer should work. It does look like an in-line style of desk, but that's just because we've placed the control elements in a logical pattern.

Two channel faders are great if you're tracking and need a separate monitor mix. But studios are now seeing more and more instruments being used on the session—the engineer also needs to handle an increasing number of input channels during the mix. If you have a fader sitting there, why not add solo, full assignability and EQ, so that you can really use it.

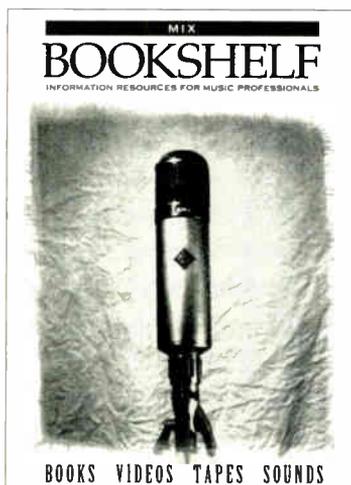
With a hardware-based console you have a good excuse for not offering those sorts of features—simply because you couldn't jam them into the front panel. Also, if you want the audio to flow from one section to another, you have to provide a wire to route it there. An assignable design, on the

other hand, can be reprogrammed under digital control to be anything.

We made the control surface look simple-to-use, but with everything laid out close to the operator in a reasonably familiar presentation. For manufacturing reasons, we lay the board out in increments of four channel blocks, each of which has its own microprocessor and onboard memory. Each computer "talks" to the master section via a high-speed bus, and hence to the external audio rack. Most functions on the board are entirely "soft" and can be freely programmed.

The number of switches and faders we placed on each channel block was based on how much processing power would be needed for high-speed Snapshot Recall and dynamically automated mixes, versus how many functions we were controlling. We reduced the design until we had local processing power that was proportional to the amount of work it had to do. Now, no matter how many channels we put into a mainframe, it will always reset in the same amount of time.

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Mix: Was distributed intelligence a natural choice for this design, given the amount of processing power you needed?

Silfvast: We could have done it all with one huge processor, but then you end up with a maximum throughput limit. That limit might be very high—and you might be able to design a big console—but it wouldn't be something that a start-up company like ours could afford to develop. With distributed processing, there's no limit to how much power you have—just add more processors onto the high-speed bus.

The key is to design a console with

enough power so it can grow with your customers' needs. The only way we could develop such a console was to use distributed processing. The modules have a lot of additional power that we could tap into. They only have a limited amount of tasks to do—and that's not going to get any greater—but the user might want to store bigger mixes, or more automation features. Those additional functions don't require more hardware, just more processing power.

Mix: All primary storage and recall of snapshots and dynamic data are handled by the onboard master com-

puter. What specific role is played by the external PC?

Silfvast: The PC doesn't handle any of the processing; it provides keyboard input to label mixes and file names, etc, plus graphics display, mouse input and hard disk storage. Other companies have spent millions of dollars developing automation computers for themselves—while we can just use an off-the-shelf system for a couple of thousand bucks. We're currently looking at 486-based systems for faster graphics, and removable magneto-optical drives so more data can be stored in the system.

SnapShot and dynamic automation are available directly from the control console—you don't need the external PC. There's enough onboard memory to handle 600,000 mix events per channel—a long mix can be held onboard and then off-loaded to the PC for permanent storage to hard disk. We can add more memory as mixes become more complex.

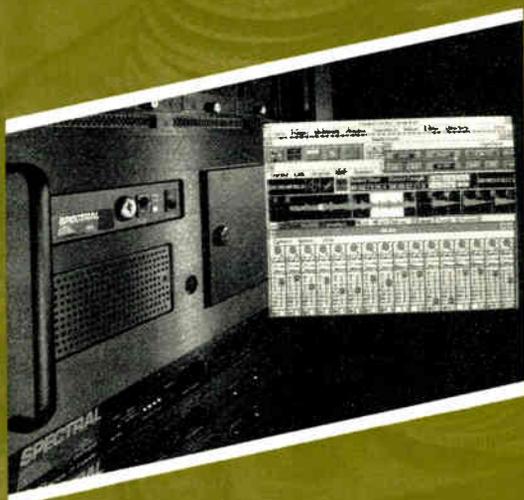
We'd like to see a system developed that allows MIDI sequencers to coexist on the same control computer—using a standard communications protocol to pass information between the various software programs. We're working on a protocol with various manufacturers to provide these and other functions.

Mix: Did you use standard designs for the dynamically changeable gain elements?

Silfvast: There are several ways they could have been designed: VCAs, voltage-controlled FETs and others, including optical techniques. We tried to build our own high-speed, J-FET switching ladder—and examples of every dynamically controllable gain element we could find. All of these solutions helped us develop our patented DCA circuit, which is now mass-producible, and requires no calibration.

The DCA allows input, bus and output levels to be reset to within 0.01 dB using a 12-bit control word. Audio discontinuities or jumps are also controlled, so that if the system recalls a value that's way off from the current value, it will ramp between the two seamlessly.

Our aim was to develop the lowest noise, lowest distortion, most transparent sound as possible, with as much dynamic range and natural bandwidth as possible. Because we don't have a large area of circuit boards, wires and components through which the audio flows, we can place audio compo-



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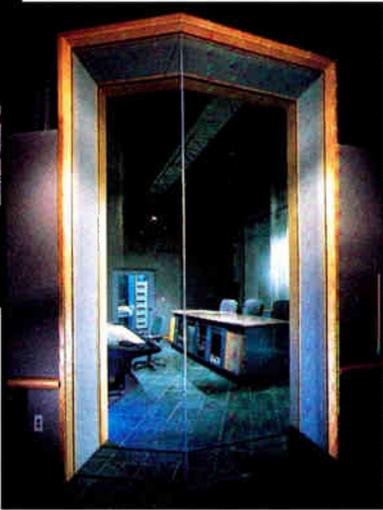


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nents on the board where it makes sense from a sonic standpoint—not for signal-flow requirements.

Mix: What was involved in designing the assignable, digitally controlled equalizer section?

Silfvast: We started with a mathematical model of the way we wanted it to sound, and then implemented it in silicon. We match the theoretical response of a pure equalizer—one without the phase response anomalies you get with traditional EQ designs. We can reset each 4-band EQ section to within 0.25 dB of our ideal, mathematical curve, using the ten parameters: four cut/boosts, four center frequencies and two Qs.

Currently, we only provide a single, assignable-EQ control panel for setting up the equalization profile on each channel. This means that you cannot, at present, change level and center frequency simultaneously. What we are finding, though, is that people end up using the EQ section a little differently, but our first customers haven't found that to be a problem.

Our new Universal Control Module will offer assignable rotary controls and buttons that can be mapped to simultaneously control a variety of console functions: EQ, dynamics, MIDI controllers and other functionality still being developed. Having a central assignable section not only gets rid of a lot of duplicated knobs on the console, but also forces you to work from the sweet spot while making critical adjustments. We will also offer the new TimeLine transport controller, which drops into the same central section and provides full serial control of audio and video transports. Our automation system will simply slave to the time code data being output from the master machine and tie the whole studio together.

• • •

Without a doubt, the future of compact, flexible console design lies in the realm of digitally controlled gain, EQ and signal-routing elements. As a central focus of recording, broadcast and production facilities of the '90s, such topologies have a great deal to offer in terms of creative potential, integrated functionality and enhanced sonic quality. I predict the CSII will be the first of many such design alternatives appearing on the market within the next couple of years. ■

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by Paul Potyen

THE CARE AND FEEDING OF YOUR COMPUTER

The personal computer has become a critical component in today's audio recording facility. As computer software developers continue to create more sophisticated tools for managing audio, those tasks previously performed by tape-based recorders, mixing consoles, patch bays, signal processors and even conventional sound sources are now also the domain of the personal computer. Indeed, for some it is the heart of an integrated studio system.

It makes sense that special attention be given to the maintenance and optimization of such an important component. And with that in mind, I'd like to offer a few tips for avoiding slowdowns, crashes and other mysterious maladies that can crop up from time to time in a computer-based studio.

Over the last few years, professional engineers, producers and musicians have demonstrated a clear preference for Macintosh-based computers for audio-related tasks, leaving their MS-DOS counterparts free for bookkeeping, accounting and word processing chores. While some of the following information is useful for us-

ers of PCs in the generic sense of the word, I'm really talking primarily to Mac users. (Users of IBM and other systems are free to write or call me to lobby for equal time.)

Back up Your Work

In March, 1990, I devoted some space in this column to the importance of backing up your data, and most of what was said then is still true. However, as hard drives get larger and less expensive per megabyte, backing up to floppy disks becomes a time-consuming and unnecessary option. For modest sized systems, Syquest removable media (the 45MB cartridges retail about at \$70, a 90MB at \$120) offer attractive alternatives.

Other comparable removable media storage technologies are Bernoulli drives from Iomega (Roy, Utah), which also take 45 or 90MB disks, and 20MB 3.5-inch floptical drives that can also read conventional floppy disks. For larger systems, 128MB and 650MB recordable optical discs are a good bet, but you will pay accordingly for the conve-

—CONTINUED ON PAGE 88



ILLUSTRATION: TANA POWELL

Chip Shots

Rempe AUDIO-BASE System

AUDIO-BASE, from Rempe Audio Services (Pella, IA) is an electronic information and communication service exclusively for the pro audio



industry. Users can send and receive E-mail (along with files) to any and all other system users. Other features include a Manufacturer File Library program, which can be used to distribute product information as well as software programs through the use of a royalty structure; manufacturer, dealer and rep database listings; and dedicated business forums. Interested first-time users are awarded 90 minutes of free usage by dialing (515) 628-8999. (Maximum baud rate is 2400.)

Circle #250 on Reader Service Card

Tripp Lite AC Line-Regulated UPS System

The newest in its line of voltage-regulated UPS systems is Tripp Lite's (Chicago, IL) OMNI 1350LAN, which provides AC voltage regula-



tion of up to 1,200 watts in a network-compatible UPS system. The device corrects low-voltage brownout conditions without switching to battery power. Other features include spike and line-

noise suppression and automatic network shutdown during power failures.

Circle #251 on Reader Service Card

ARDAT Archive Python DAT Drive

The Archive Python DAT drive features up to 2 gigabytes of data storage in a small, half-height 3.5-inch or 5.25-inch internal unit, or as a compact external unit with an integrated power supply. In standard mode, backup and restore speeds yield 183 KB/sec (11 MB/min) with an average file access rate of less than

30 seconds. With a data-compression option, typical backup speed increases to over 22 MB/min. Drives can be configured for IBM, DEC and Apple computers.

Circle #252 on Reader Service Card

Anatek SMP Update

Creation Technologies (North Vancouver, BC), manufacturer of Anatek music products, announces the addition of new features to its SMP Series of patch bay/synchronizers.

Among the enhancements are patch mapping, a patch table, SMPTE free-wheeling, and editing of SMP-preset parameters via Atan and Macintosh software. The update package containing a new EPROM and editing software is available for a nominal fee.

Circle #253 on Reader Service Card

PLI 21MB Floptical Drive

PLI has introduced its Infinity Floptical 21MB drive, which reads and writes Macintosh-formatted, 1.44MB floppy disks and 21MB Floptical disks. The drive is twice as fast as a standard floppy drive, and is said to offer increased reliability. Suggested retail

price of the drive is \$699, with PLI Floptical media priced at \$49.

Circle #254 on Reader Service Card

Digidesign Video Slave Driver

Digidesign is shipping its Video Slave Driver, a peripheral device for its Pro Tools Multitrack Audio Production System. The rack-mount unit allows the user to calibrate the system to an external video black burst signal. Intended for use in music and post-production facilities where black burst is used as a central reference clock, Video Slave Driver is priced at \$995.

Circle #255 on Reader Service Card

Ariel DAT-Link

New from Ariel Corp. (Highland Park, NJ) is DAT-Link, an intelligent device that allows any Macintosh- or UNIX-based computer with a SCSI interface to communicate



with and control a DAT recorder as well as many CD players. The rack-mount unit is designed for anyone who wishes to transfer audio to and from a hard disk for archiving, analysis and editing.

Circle #256 on Reader Service Card

SpeakEasy Low Frequency Designer Upgrade

Low Frequency Designer 3.0 is the latest version of SpeakEasy's (Newton, MA) software for analyzing and optimizing the low-frequency performance of loudspeakers. The IBM-compatible program now includes mouse support, CGA support, highpass, bandpass and multidriver system modeling, and improved user interface. Suggested retail price is \$195.

Circle #257 on Reader Service Card

—FROM PAGE 86

nience of such large backup formats. Finally, you can take advantage of DAT technology in purchasing a modified DAT archiving system from ARDAT Inc. (Costa Mesa, Calif.), La Cie Limited (Tualatin, Ore.), Microtech International (East Haven, Conn.) or any number of other manufacturers.

Other solutions for storing digital audio files onto your existing DAT recorder include Digidesign's (Menlo Park, Calif.) DATA and Ariel Corporation's DAT-Link (see this month's

"Chip Shots"). The biggest disadvantage of this tape-based archiving technology is the lack of random access to files.

Virus Protection

Much has been said and done about the problem of computer viruses. Dealing with an infected system is not fun—it's time consuming, and it invariably happens when you're operating under ridiculous project deadlines. Your computer can become infected from media (floppies, Syquests, etc.) that have come from another computer, or from downloading

infected files from a BBS via modem. In any case, protection is provided by programs such as Microcom's (Durham, N.C.) Virex 3.5, which is available both as an INIT and an application.

The downside to installation of a virus INIT (which is placed in your system folder) is that in order to install or remove any copy-protected software from your system, you must first remove the INIT and then restart your computer. I find that a nuisance.

My general advice is this: If you need to exchange data with other people either via modem or disk, you should use a virus INIT. If you rarely have such a need you should opt for a virus *application* to check the occasional floppy that you come across. You can also use it to check the contents of your hard drive(s), if you run it from a locked floppy that you know is not infected.

Troubleshooting a Sick System

If your Mac has never died on you, don't worry, it will. And if it has, you can be fairly certain it will again. As the number of applications and INITs increase, the likelihood of crashes increases. It's a fact of life.

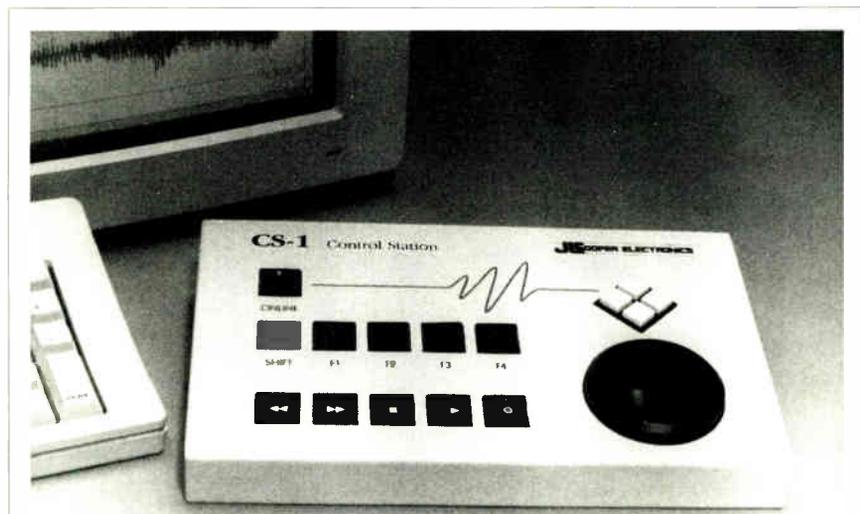
Lots of things can go wrong when you use a computer: Files become corrupted or wind up missing, hard drives won't mount, your machine can get stuck in some bizarre mode or even refuse to boot.

Fortunately there are ways to guard against crashes and other problems: One way is to obtain software that will diagnose and fix problems when they occur. Here are a few.

Heap Fixer is a utility that allows you to change the amount of memory available for your operating system. Even if you're using 8 MB of RAM (Random Access Memory) it's possible that as your system grows in size (usually because you've added lots of INITs and CDEVs to your system folder), it "outgrows its living space." Common symptoms of this condition are unexpected quits, freezes, error messages and slow-downs. Heap Fixer, available from CE Software (West Des Moines, Iowa) or from BMUG (Berkeley Mac Users Group), is an easy-to-use solution.

Disk First Aid comes with Apple's system, and is a quick way to fix minor problems on floppies. But for anything

—CONTINUED ON PAGE 142



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MacroMaker™, the CS-1 can initiate any click, drag, or key sequence. It lets you to create a personalized control station for virtually any Macintosh program.

The CS-1 (Macintosh version) comes factory configured to control Sound Tools™, Vision™, and Performer™. The CS-1m (MIDI version) works with the Atari, and the CS-1rs (RS-232 version) works with IBM compatibles.

Get the input device that lets you concentrate on your project, not your computer. The CS-1 is so fast and easy to use you'll wonder how you ever got along without it.

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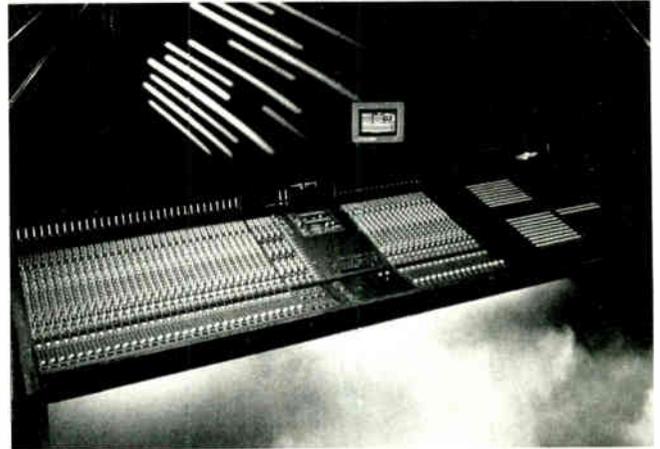
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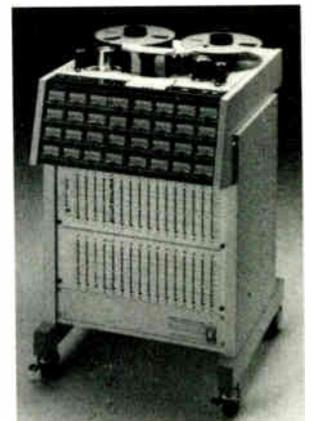
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World Radio History

by Bob Hodas and Paul Stubblebine

A/D CONVERTERS



Part II. We are back at Rocket Lab Mastering in San Francisco to listen to a new round of A/D converters. The contenders include the Apogee AD-500, Drake PD 5050 and Vacuum Tube Logic. We also brought back updated versions of the Pygmy and DCS (900B) from the first round of tests.

Listening procedures and material were the same as for the last test (see *Mix*, May '91), with a couple of exceptions. This time, all material was recorded to a Sonic Solutions hard disk system, because it is capable of recording up to 24 bits without truncation. The Sonic was set up with no DC blocking, de-emphasis or dither. Necessary truncation occurred at the D/A side. For the D/A we used a VTL (20-bit UltraAnalog). Converters were recorded at the following bit rates: Apogee, 18 bits dithered to 16; Drake, 20 and 16 (w/dither) bits; VTL, 20 bits; Pygmy, 16 bits; and DCS, 24 and 16 bits.

Let us reiterate that these are blind listening tests. Each participant was assigned a letter of the alphabet during recording and identified only that way throughout the listening. Converters were compared for accuracy to the analog tape and not to each other. To make sure there were no level differences, all units were calibrated to within 0.1 dB on a Sony digital meter. We also tested for polarity to make sure they all matched up.

Apogee

The Apogee AD-500 is the smallest and most versatile unit tested. It is smaller than a half-space rack package, making it easily portable. A rack adapter kit is available. The AD-500 uses sigma-delta conversion technology. The front end is DC Servo, direct-coupled discrete with no feedback and will accept levels from below consumer standard to +27 dBu.

The front panel is packed with controls but is easy to read and operate. A three-position switch selects power, AES and S/PDIF functions. Separate left/right pots control input gain, and individual L/R multiturn screwdriver calibration pots allow precision level control. Signal may be routed to one or the other or to both using internal jumpers. Two LEDs on each channel indicate levels of 12 dB and 2 dB below converter clipping.

The input selector gives the same options for normal recording or recording with emphasis. Positions are off (digital black, all 0s), mute (automatically calibrates the converter), on (normal conversion), soft limit (peak limiting), and soft saturate, which emulates analog tape saturation. An LED indicates if you are recording with emphasis. Our listening tests were performed with this switch in the "on" position—no emphasis.

A sync source selector switch offers



Drake PD 5050AD. Inset shows detail of converter card.

Apogee operates pin 3 hot.

The Apogee AD-500 retails for \$1,995, including a small bag containing an Allen wrench, jumper pulling tool, jumpers, extra feet and BNC-to-RCA adapter.

Apogee Electronics, 2103 Main Street, Santa Monica, CA 90405; (310) 399-2991.

Drake

The PD 5050AD is a single-rackspace unit housing a single A/D converter card (AES/EBU format). The rack is wired to hold a total of three cards and may be supplied with an optional D/A card and SDIF-2 card. The unit operates in 20-bit mode utilizing 128-times oversampling. When the 16-bit mode is selected, dither is applied to the input at the 16-bit level. Drake uses the newest UltraAnalog "A" version converter. Analog inputs are electronically balanced with a maximum input level of +18 dBu.

numerous options while recording. Crystal selects an internal crystal clock accurate to 10 PPM. Word clock locks to an external clock reference and is capable of following from 32 kHz to 54 kHz thus providing full varispeed operation. The Apogee slaving clock is designed to have low jitter (timing irregularities). AES/EBU selects AES/EBU sync and termination with variable rates from 32 kHz to 54 kHz as well. The "optical" position selects the fiber optic input with the same capability as AES/EBU. S/PDIF selects that input with the same features as above (a 75 terminator is provided). Positions are selectable for both PAL and NTSC video, and sync—all are tied to the sample rate switch.

The sample rate selector lets the user select 32, 44.056, 44.1 and 48kHz sampling rates. Three LEDs indicate lock to 32, 44 and 48 kHz. Also provided are positions to multiply and divide the incoming sync by 1.001 (the ratio between CDs and NTSC video).

The rear panel houses the analog left and right XLR inputs, XLR AES/EBU digital output, and optical in and out, as well as two BNC connectors for various sync sources. The 15-pin HDD sub connector contains power as well as S/PDIF and word clock access. Internally, jumpers allow a variety of grounding options as well as terminations for the BNC connectors. The

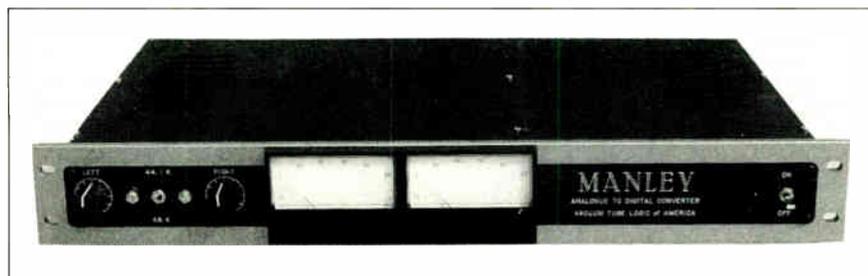
calibrations. On the PD 9375, LEDs indicate power on, AES/EBU input signal present, signal errors, and signal close to failure (for AES/EBU external synchronizing signals). Two screw-driver-calibration pots can be adjusted for left/right input levels.

Jumpers on the card let you set AES/EBU delay equalization from 0-200nS, in 20nS increments, in order to compensate for cable length (broadcast-style runs). The PD 5050AD is capable of varispeed operation within $\pm 12.5\%$ of the sample rate.

The rear panel houses all necessary connectors for the A/D, as well as the optional cards. On the power side are an IEC AC receptacle, fuse and voltage selector. Three BNCs are supplied for SDIF-2 word clock and left and right out. XLRs are standard for left/right analog in and out, the two AES/EBU outs, AES/EBU sync in and the AES/EBU input. A "D" connector for a remote control is tied to a local/remote switch. Other back-panel switches tied into the remote are a 48 or 44.1kHz sample rate selector, 20-bit/16-bit selector and a sync/repeat selector (allows sync input to be repeated on the digital output connectors). Although the Drake manual states that it operates pin 2 hot, we found that it was actually pin 3 hot.

The Drake PD 5050AD retails for \$5,089; the optional SDIF-2 card is \$1,190 and the D/A card is \$2,900.

Drake is distributed by Redwood Marketing, Box 27007, Nashville, TN 37227-0007; (615) 254-7400.



VTL Manley A/D

The removable, smoked-gray, plastic front-panel cover allows you to view the PD 9375 converter card indicator lights. It is easily removed for

Vacuum Tube Logic

Contrary to other products in the VTL line, the Manley A/D does not contain tubes. It is a two-rackspace unit offer-

ing 20-bit, 128-times oversampling, using a modified version of the original UltraAnalog converter. Three input stages are provided: an electronically balanced input, an unbalanced input and an unbalanced -20dB low-Z input.

The front panel is nicely laid out, clean and uncluttered. There is a power switch with LED, a pair of peak program meters (PPM), left/right input level pots for the unbalanced input stage, left/right DC offset trims, and 44.1/48kHz sample rate selector.

The rear panel houses the IEC

power receptacle, fuse and voltage selector. A switch selects AES/EBU or S/PDIF output formats. There are two S/PDIF output connectors (UHF-style) and two XLR AES/EBU outputs. The Manley may be ordered with different output combinations if desired. Analog audio connections include XLRs for both balanced and unbalanced inputs and RCAs for the -20dB inputs. A switch selects balanced or unbalanced operation. The VTL operates pin 3 hot.

A couple of things stood out about the Manley unit, the first being the nonstandard S/PDIF connectors. VTL claims the UHF connector is more ro-

bust and better shielded, but everyone in the real world is going to have to buy adapters to get into it. We also found that the PPM meters were not properly calibrated. The left channel showed 90 while the right showed 100. VTL calibrates its meters to a Panasonic 3700 DAT, which is only accurate to about 1dB. Fortunately, the meters are easy to calibrate, and instructions are provided in the manual.

The final unusual item is that the Manley A/D uses a different operating reference level than the other converters. As supplied, the unit gave a digital output of 9 dB below full scale with an input of +4 dBm, while the others are set for a digital level of -14 dBfs. This level can be internally adjusted, though, and VTL will set it up any way you request. In order to keep all units at the same level for our tests, we used the unbalanced input and calibrated the VTL using the front-panel level pots.

The Manley A/D retails for \$7,000 and may be ordered without the sample rate switch, hard-wired to 44.1 kHz. The converter can also be purchased without the meters.

VTL/Vacuum Tube Technology of America, 4774 Murietta Street #9, Chino, CA 91710; (714) 627-5944.

Listening Tests

We chose mostly the same performances that we used on the previous listening tests. Since there were seven converter configurations (counting the converters that can be switched for different-bit lengths), for the sake of space we will only look at the top three contenders in any category.

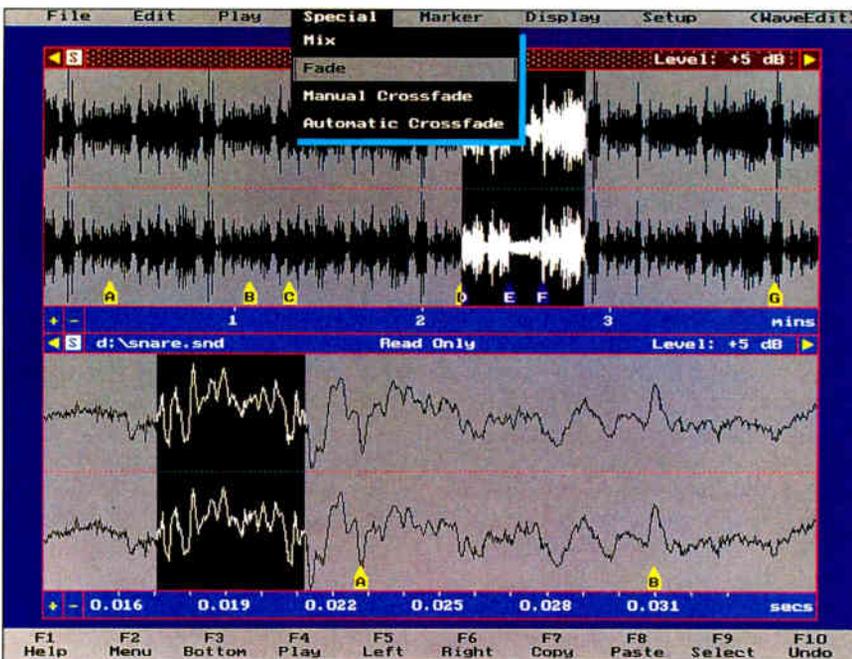
The first piece was "Waiting Song," a current folk-pop release by Barbara Highbie. Instrumentation is piano, vocal, electric bass, drums, congas, acoustic guitar and percussion.

Apogee

The sound of the piano was harder and cooler than the original. The voice and the room sound also were cooled off. Bass response had power and extension, but the bass and kick drum sound blended into one instrument. The shifting harmonics in sustained piano chords were not as well-defined as the original. Cymbals sounded very close to original. Soundstage and reverb tail were good.

Drake (20-bits)

The low bass, even a bit of the mid-bass, were definitely recessed. The top



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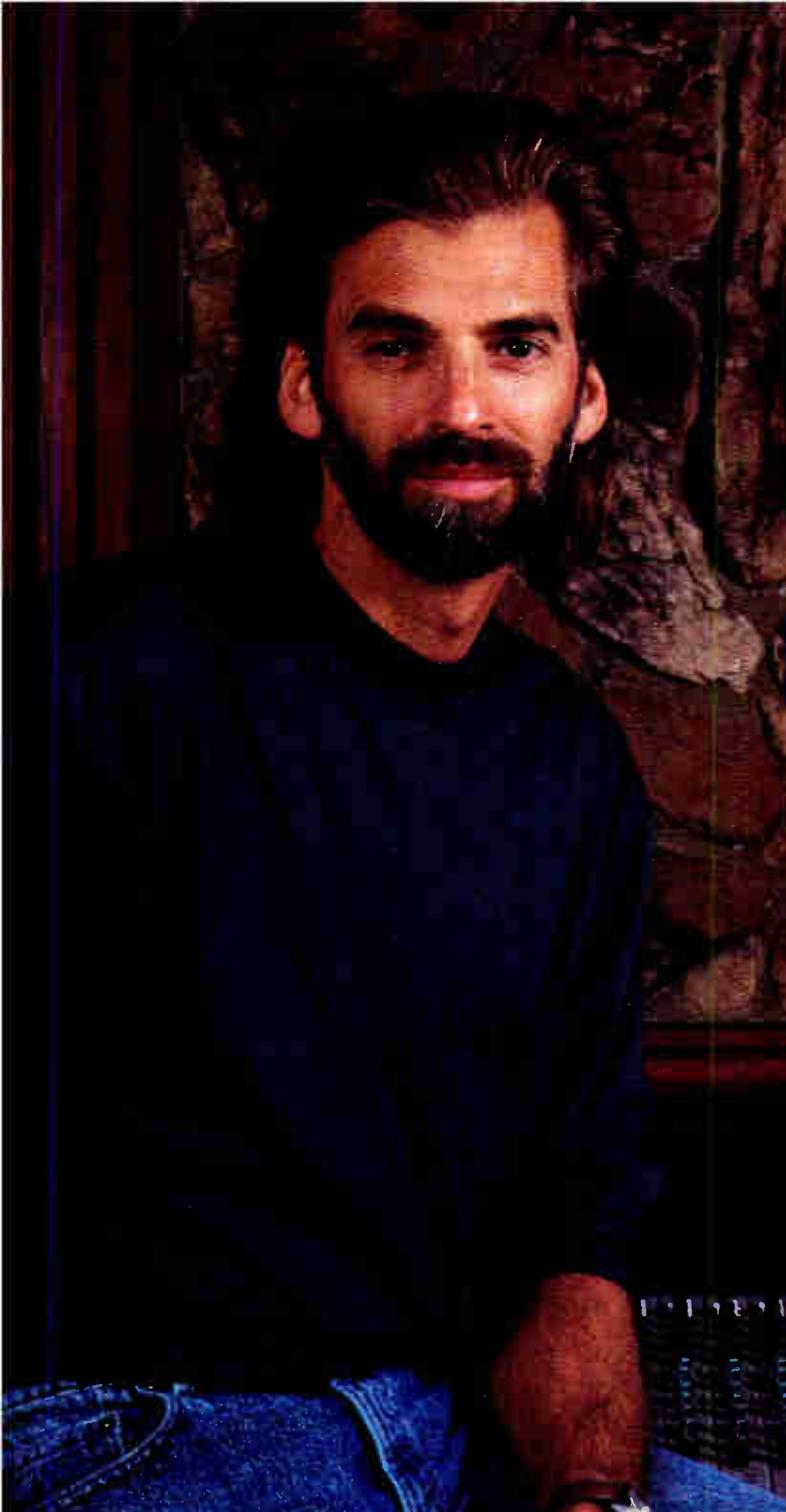
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Another Day, Another Deadline.

Its almost dawn. Again. And every nerve ending in your body is on fire. The phone keeps ringing. Like you need to be reminded of your deadline one more time. One hand reaches for your tenth cup of coffee, the other hits rewind. By now, both movements are involuntary reactions. You think to yourself, "I'm at the end of my rope."

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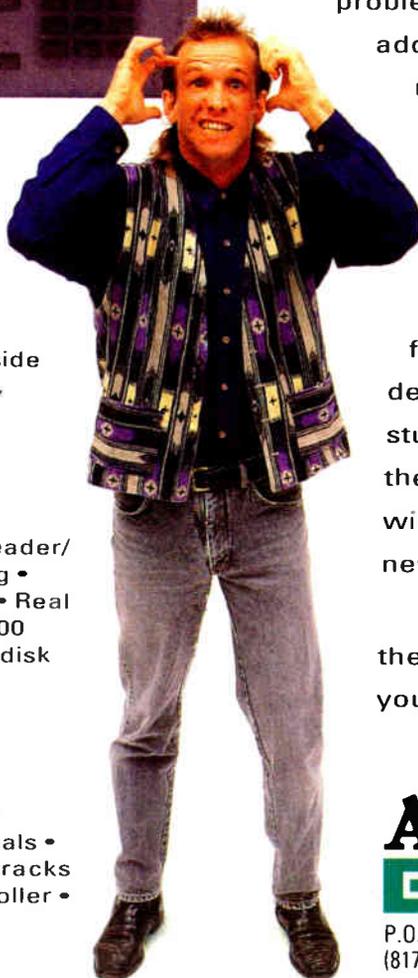
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12 track digital multitrack modules • Analog auxilliary track for sync signals • 3 modules can be interfaced for 36 tracks and controlled by one DL1200 Controller • 44.1 and 48 kHz sampling rates.



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seemed smoothed off a bit and could be characterized as a "polite" sound. Good low-level resolution and soundstage. Fairly close to the original.

VTL

The bass sounded a little woolly compared to the original, and the kick drum had less apparent impact. The midrange had a lively, dynamic quality, and the voice had a "believable" quality but was a touch fuzzy. There appeared to be less reverb, creating a slightly drier sound. Sounded alive.

The second piece was a mono narrator reading copy from a magazine. Half of this selection included some background room noise that added dimension and demonstrated low-level resolution.

Apogee

The low-frequency balance was correct. (A plus! Very seldom did we hear playbacks with bass that resembled the original.) Low-level resolution was good. This selection had sibilants that were hard for some converters to handle without smearing. The Apogee exhibited only slight smearing on these sibilants. Overall, the original had a sense of "natural presence" that was absent in the Apogee.

Drake (20-bits)

The top end sounded slightly rolled off, but it handled the sibilants well nonetheless. Low-level resolution was good. Good overall.

VTL

Tonal balance sounded lightened on the low end (voice pops were reduced a bit) and gently rolled off at the top. Sibilants were slightly less distinct than on the original and a little fuzzy. Resolution of the low-level sounds was somewhat diminished. Generally accurate.

Next came the Slavyanka Chorus, a choir of 25 male voices, recorded with a Blumlein mic technique in the chapel of Saint Vincent's School, San Rafael, California.

Apogee

This recording (in the original) had an ability to nearly surround the listener, and the Apogee approached that same ability very closely. Unfortunately, there were drawbacks in two other departments. The low bass was noticeably reduced. And the reproduction of small dynamic shifts near the quiet end of the spectrum was not as

fluid as the original. There was a slight loss of air resulting in a softer sound.

Drake (20-bits)

Overall, this came close to the original. There was a slight reduction in detail.

A Few Experiments On The Side

During our tests we took a side path for a little experiment. We recorded the DCS and Drake at their maximum and minimum bit rates to a Panasonic DAT. We discovered that in both cases, using maximum bit rates and letting the DAT do the truncation sounded preferable. These were the same results we got during the first A/D tests when we let the Dyaxis do the truncation.

Another test compared the sound of a manufacturer's A/D combined with its own D/A. We wondered if one manufacturer would have a sound advantage when covering both ends of the conversion. Did manufacturers who cover both ends tweak their boxes to operate optimally together? It seems not! We found that double-teaming did not offer any particular advantage. The best-sounding D/A gave a boost to all the A/Ds regardless of manufacturer. Our recommendation is to go for the best D/A you find regardless of who made your A/D.

—BH/PS

a slightly diminished sense of the texture of the sound. The low bass was very close to correct, just slightly less dimensional. It handled dynamic shifts pretty well.

VTL

The very low frequencies and the very high frequencies were missing. The texture is harder to make out, noticeable on both a solo voice and the hall sound. Low-level dynamics were not handled well. Not exceptionally accurate, but pleasing.

Finally, we listened to a Mozart piece

for full orchestra recorded with a stereo pair at the Oklahoma Mozart Festival. This was a very good test for resolution. The segment often had three or four interweaving lines, which were quite easy to follow in the original. It was instructive to notice how well we could follow them in the various transfers.

Apogee

Resolution was moderately good; we could usually follow three lines. Reproduction of the hall sound was pretty good, too. Unfortunately, it came at the expense of some added edge on the strings. There was a bit of deep bass loss.

Drake

Resolution was moderately good here, too, and the high end was close. The image was slightly smaller than the original, but otherwise a good representation. The bass, however, was noticeably diminished.

VTL

A little light on the low end, plus some added edge in the upper midrange. The image shrank a bit in all directions. Not as easy to follow the interweaving lines.

★ ★ ★

As mentioned above, the Apogee, Drake and VTL were the top three choices in the group of seven. Even though we have some negative comments, one should not let that obscure the fact that these converters came close to the source. We would select the Drake as the most accurate of the three. It would be very hard to make a decision as to who placed second and third. Both the Apogee and VTL have different merits and drawbacks, so, as always, we would encourage individual listening for your specific needs. We do not believe that any one converter fits a particular style of music.

Based on features, the Apogee clearly offers more. For audio/video work, all the options seem to be covered. For strictly audio, this box looks like a problem-solving tool for many important issues.

In our next round of listening, which should be near this article's publication time, we will look at the Sony, Wadia, Neve, new boxes from Pygmy, Apogee and possibly others. ■

Mix contributing editor Bob Hodas is a recording engineer based in the San Francisco Area. Paul Stubblebine is the chief mastering engineer at Rocket Labs in San Francisco.

NEW PRODUCTS

E-MU EMULATOR III EXPANDER

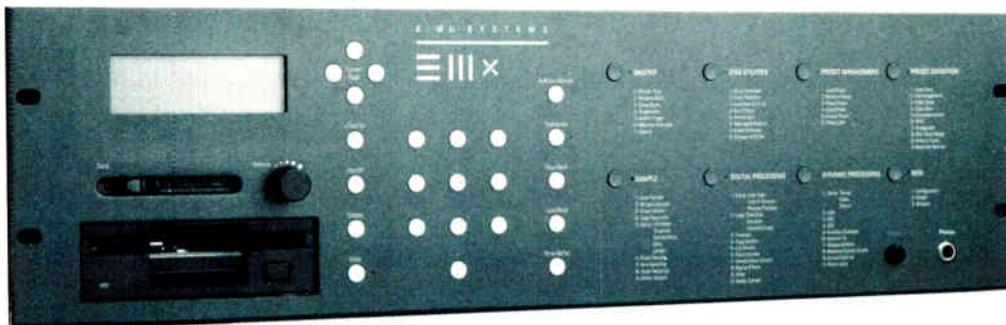
Priced at \$7,995, the Emulator III Expander is a rack-mount, 16-bit sampler from E-mu Systems (Scotts Valley, CA). The E-IIIx includes 8MB RAM (expandable to 32 MB) and features 16 stereo or 24 monophonic voices, sigma-delta A/D converters with 64-times oversampling, 44.1/48kHz sampling rates, ten-octave range transposition, AES/EBU digital I/O, eight polyphonic outputs (18-bit DACs), with integral send/return patch points on each. Onboard signal manipulation is extensive: 32 digital filters provide "analog style" timbre control, while DSP functions include EQ, compression, delay, sample rate conversion, gain change and "cut and paste" editing. A SCSI port connects to Mac-compatible devices, such as 600MB rewritable optical and 45MB removable drives.

Circle #275 on Reader Service Card

STEWART D/A CONVERTER

ProDAC, a rack-mount digital-to-analog converter from Stewart Electronics (Rancho Cordoba, CA), uses a hybrid design to split the signal into two converters per channel. According to Stewart, this provides the low noise of multibit DACs with the low distortion of 1-bit systems. Features include an all-discrete, Class-A amplifier in the analog section, fiber optic and phono jack S/PDIF digital inputs, RCA analog outputs and automatic switching for 32/44.1/48kHz sampling rates.

Circle #276 on Reader Service Card



M&C AUDITION MONITORS

M&C Speakerworks (San Diego, CA), has unveiled The Audition, a two-way monitor system combining a 6.5-inch polypropylene woofer and 1-inch aluminum dome tweeter. Stated specs include a maximum power handling of 100 watts and a stated frequency response of 52-21k Hz. Audition's tweeter is placed in a separate housing, mounted on top of the front-ported woofer enclosure, which is said to improve stereo imaging and reduce high-end distortion. The system is priced at \$500/pair, in oak or satin black finish.

Circle #277 on Reader Service Card

3M IMPROVES 275

The 3M Company (Minneapolis, MN) has unveiled an enhanced version of its 275 digital audio mastering tape, compatible with all DASH, PD and DMS (3M format) digital recorders. Available in 1/4-, 1/2- and 1-inch widths, the new 275 offers lower dropout rates, improved windability and is packed in 3M's Tape Care™ library box, which is said to eliminate dust and humidity problems.

Circle #278 on Reader Service Card

PIONEER REWRITABLE VIDEODISC

Said to provide nearly instantaneous (0.3 seconds) access with precise frame-accurate editing capability on rewritable videodiscs is the VDR-V1000 LaserRecorder™ from Pioneer (Upper Saddle River, NJ). Priced at \$39950, the VDR-V1000 uses analog-component recording to store 57,600 frames or 32 minutes of full-motion video on each side of 12-inch, magneto-optical discs, costing \$1,295. Audio or video can be recorded simultaneously or separately. An RS-232 control interface is standard, and a play-only version will be released this spring.

Circle #279 on Reader Service Card

EMT 140 UPGRADE

The Martech division of Martinsound (Alhambra, CA) offers a complete electronics upgrade for the EMT 140 plate reverb. This stereo upgrade features all new electronics, with low-noise, low-distortion components, while retaining the character of the original units. The highpass filter now has five half-octave steps, with a 10Hz step for flat response. Improved transducers minimize the metallic character of the plate, and an internal oscillator simplifies balancing and calibration. Inputs and outputs are electronically balanced; transformers are optional. Also available is a kit for converting mono EMT plates to full stereo operation.

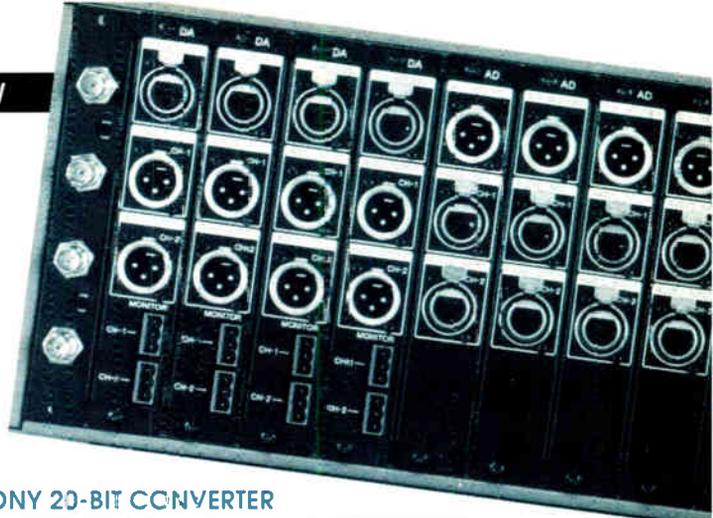
Circle #280 on Reader Service Card



HOT OFF THE SHELF

Mytek's Little Black Box (\$395) is a compact transport interface for connecting SSL G and E Series consoles to Sony PCM-3324, 3324A and 3348 digital multitracks. A version for use with Lynx synchronizers is also available. Call (212) 388-2677. **World Audio's Multiamp** is a universal gain-block amplifier circuit, suitable as a summing amp, differential amp, inverting/non-inverting amp and as a transformer replacement. It's also pin-compatible with MCI tape recorder transformers. Call (213) 876-9535 for specs and free applications notes. **Uniprise Goose-necks** are available in .25- to .675-inch diameters, and lengths from three to 48 inches. Call (516) 674-8330 for details. **Manhattan Production Music** has released four new volumes: *Guitar Moods*, *Ethnic Music of the World*, *A Morning Ride* (pastoral and up-tempo moods) and *Inside the Machine* (modern up-tempo sounds). Call (800) 277-1954 or (212) 333-5766 for info. **Drum Workshop's "Pro-Cushion"** (\$39.50) is a kick-drum pad that muffles only a portion of the head, reducing undesirable frequencies while providing a full-bodied sound. Available at your dealer or call (805) 499-6863. Due to reduced production costs, the RD-T tabletop version of the acclaimed **Russian Dragon** has a new low price of \$175. To order, call (800) 880-8776; for info, call (512) 525-0719. **"The Best of Analog Dialogue"** is a 224-page collection of most-requested articles and applications from the com-

pany journal of Analog Devices, a manufacturer of high-performance ICs used in analog and digital signal processing devices. For a free copy, write Analog Devices Literature Center, 70 Shawmut Road, Canton, MA 02021. **The "Neumann Field Guide"** is a pocket reference to all current Neumann mic products. Get yours by calling Neumann USA, (203) 434-5220. **Ariel's DatPort™** (\$895) is a self-contained digital interface, usable with any computer having serial I/O capabilities compatible with the NeXT DSP port. DatPort offers AES/EBU and S/PDIF (RCA and optical) digital formats with 32/44.1/48kHz sampling rates. Call (908) 249-2900 for details. **Esoteric Sound's Professional Restoration Deck** (\$475) is a modern turntable that plays at 33, 45, 71.29, 76.59, 78.26 and 80 rpm. Write Esoteric Sound, 4813 Wallbank Ave., Downers Grove, IL 60515. Produced by noted film/music sound designer Arne Schulze, is **Northstar's "The Wizard,"** with 546 presets and 1,891 samples for the Emulator III on CD-ROM or magneto-optical formats. Call (503) 760-4342. **Le Cover** offers a full line of portable and fixed-installation air filtration systems for eliminating dust, smoke and other pollutants from the studio or control room. Prices begin at \$179. Call (800) 228-DUST or (708) 790-9249 for info. **Encore Electronics' JP8-MK** is an upgrade for Roland Jupiter-8 synths, adding 64 additional memory slots, dual-MIDI-channel response for split presets and more. Call (510) 820-7551.



SONY 20-BIT CONVERTER

The DAF-4000 from Sony (Park Ridge, NJ) is a 20-bit A/D and D/A converter system built into a modular rack frame that accommodates up to eight A/D or D/A cards. Besides 4-bit sigma-delta A/D conversion and 8-times oversampled, 20-bit D/A converters, the system features AES/EBU digital I/O, balanced XLR analog inputs/outputs, word clock sync and selectable 44,056/44.1/48kHz sampling rates; phase sync to NTSC or PAL video is optional. Photo shows rear panel connections.

Circle #281 on Reader Service Card

PEAVEY MIDI CONTROLLER

The DPM C8 from Peavey (Meridian, MS) is an 88-key, weighted-action, programmable MIDI keyboard controller, with aftertouch, four programmable sliders, two mod wheels, pitch wheel, X/Y/Z touchpad controller and three CV inputs. Eight keyboard zones/layers can be stored in RAM or via the internal 3.5-inch floppy drive. MIDI ports include two merging inputs and four outputs.

Circle #283 on Reader Service Card



SYMETRIX 425 COMPRESSOR/LIMITER/EXPANDER

New from Symetrix (Seattle) is the 425, combining RMS compression to smooth out dynamic extremes, downward expansion to reduce hiss, hum and noise, and peak limiting to protect from overload distortion—all in a single rackspace. The 425's two channels operate in stereo or dual mono modes, and specs include a 115dB dynamic range with distortion said to be in the 0.01% range. LED metering is provided for each dynamic processor and for overall operating level.

Circle #284 on Reader Service Card

NADY MIDI LINK

The MIDI Link™ from Nady Systems (Emeryville, CA) converts any wireless system into a MIDI wireless. MIDI Link consists of transmitter and receiver modules that connect to existing wireless systems with simple patch cords. Besides offering freedom of movement for MIDI performers, MIDI Link also provides a means of overcoming the 50-foot cable length limitation when transmitting MIDI sequence and effects automation data. Price is \$499.95.

Circle #282 on Reader Service Card

by George Petersen

PRODUCT

CRITIQUES AND COMMENTS



Otari DDR-10 Digital Recorder/Editor

Several years ago, when Otari began researching the feasibility of producing a 2-channel, disk-based digital audio workstation, there were numerous decisions to make. Among them: the choice of a computer platform (IBM, Apple, Atari, NeXT, Amiga or some proprietary system); the system control approach (via software commands or some hardware controller); and the development of the software itself.

Rather than reinvent the wheel, Otari enlisted the cooperation of two companies (Digidesign and JL Cooper Electronics) in the DDR-10's development. By combining Digidesign's proven Sound Designer II™ software, in a hardware package that improves upon the best aspects of Cooper's acclaimed CS-1 controller with the Otari tape recorder/autolocator-style buttons/displays, the DDR-10 offers the flexibility of disk-based recording/editing operations in a familiar control environment.

The computer platform is, of course, Apple Macintosh, namely an accelerated 25MHz Mac IIci, with 5 MB of RAM (expandable to 32MB) storing onto a 345MB hard drive. The standard drive can hold over 30 minutes of CD-quality stereo audio; larger drives are optional, with up to 400 minutes of audio storage capacity. Rounding out the package is a 19-inch, high-resolution monochrome monitor and a slide-out drawer, which conceals the standard Apple keyboard and mouse.

The beauty of the system is in its simple, straightforward operation. The top surface contains the function

controls, illuminated recorder-type transport buttons, along with LED bar graph meters, two bright LED-autolocator displays for cue and time functions, numerical keypad for entering time addresses, a large jog/shuttle wheel, and two 5-inch JBL cue speakers. The high-tech control panel



is designed to simulate a modern 2-track deck more than a computer system. Also incorporated into the top surface is an "Unmouse," a compact glass tablet controller, which—after a brief period of getting used to—provides fast, accurate system control. Of course, those who prefer traditional mouse control can access the Mac mouse at any time by opening the keyboard drawer.

The rear panel contains all necessary input/output connections: balanced +4dBm XLR analog, AES/EBU and S/PDIF digital, video sync and

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word/bit clock inputs, XLR balanced SMPTE time code, MIDI in/out/thru, MIDI Time Code output, and SCSI port for connecting any Macintosh-compatible memory device. A 1.4MB floppy drive is located beneath the control panel, and a hard disk frame with slots for internally mounting three additional hard drives is provided as is a rear-panel SCSI port for connecting external drives.

Otari designed the DDR-10 as a ready-to-go system, right out of the box (actually a 300-pound crate), without the need for any complicated installation or hard disk formatting procedures. I unpacked the box, placed the monitor atop the DDR-10, plugged it in, and the system booted up perfectly on the first try—which surprised me somewhat, considering some rough freight handling that was apparent from the condition of the outer box.

The DDR-10 is accompanied by a rather imposing collection of manuals and floppy disks; however, after using the system for two months, the only one I even occasionally required was the basic DDR-10 manual. My only

complaint is that the text explaining the various onscreen icons does not show what the icons actually look like, leaving the reader guessing. But other than this omission, the manual is concise and well-written. Sound files for L/R channel ID, dynamic range testing and a short music selection are preloaded on the DDR-10, offering users the immediate chance of confirming proper operation.

Since the DDR-10 offers the same sound manipulation advantages as Sound Tools (previously covered in these pages), I won't reiterate all the software functions. But for those unfamiliar with the program, it offers recording at sampling rates of 32/44.056/44.1/48 kHz from analog or digital sources, internal sample rate conversion for interchanging files recorded at various rates, destructive or non-destructive editing, 1/4-frame accurate SMPTE sync with chase lock, and sample editing for modifying sound files from most digital samplers on the market. DSP functions include true parametric EQ, 5-band graphic EQ, mixing of up to four sound files into a new file, crossfade sound file merging, pitch shifting, and time compression/

expansion.

Also included in the DDR-10 package is MasterList, a recent Sound Designer upgrade allowing the playlisting of completed sound files for playback in any user-specified sequence. Fast, flexible and easy to use, MasterList is especially handy in CD-premastering applications, i.e. dumping a sequence of files to DAT, PCM-1630 or CD recorder. MasterList includes onscreen play/rewind/ff/stop buttons that simplify the auditioning of file segues, although the DDR-10 transport buttons are inoperative in MasterList, which must be activated by the mouse or Unmouse.

The DDR-10's user interface speeds up production tasks immensely. The solid, responsive feel of the jog/shuttle wheel improves the process of finding and marking edit points, while the lighted indicators for transport controls and menu selection add a logical, intuitive touch. And the DDR-10's large LED displays for current and event time code addresses are at least 100 times more readable than the 1/16-inch character display at the top of the Mac screen.

With a few exceptions most editing

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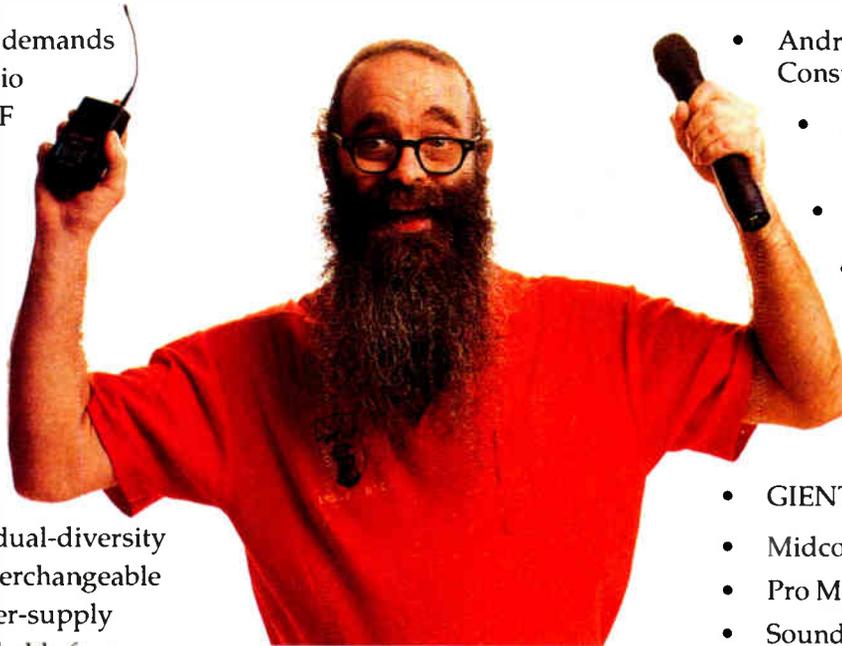
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AUDITIONS

operations can be accomplished without ever requiring the computer keyboard. However, if an engineer using the system is accustomed to operating Sound Designer using keyboard commands, the keyboard is always available.

Another advantage stems from the fact that the DDR-10 is a self-contained system, which can easily be rolled around from one room to another in a studio complex. As in the Digidesign Pro I/O interface, Otari's DDR-10 offers superb audio quality, with 64-times oversampled sigma-delta A/D converters and 18-bit, 8-times oversampled D/A converters with Apogee anti-aliasing filters.

Offering plug-and-go operation in a user-friendly package with excellent audio specs, the DDR-10 is a powerful contender in the realm of audio workstations. While its \$19,990 price is higher than the cost of a similarly equipped Sound Tools system, the DDR-10's added convenience, functionality and flexibility make this system the proper choice in many applications.

Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94004; (415) 341-5900.

Professional Audio Systems Studio Monitor 1

If you're serious about studio listening, you need serious studio monitors. Quality components in a well-engineered enclosure with just the right crossover are all key factors in achieving this goal. Combining these variables in a single package is the TOC Studio Monitor 1 from Professional Audio Systems.

The Studio Monitor 1s don't employ any gimmicks or tricks—just basics and attention to detail. No scrimping or shortcuts were taken in the monitor design. The speakers are sizable: each of the 25 x 19.5 x 18.5-inch vented cabinets weighs approximately 100 pounds. Don't try these on your console meter bridge!

Like the other monitors in the series

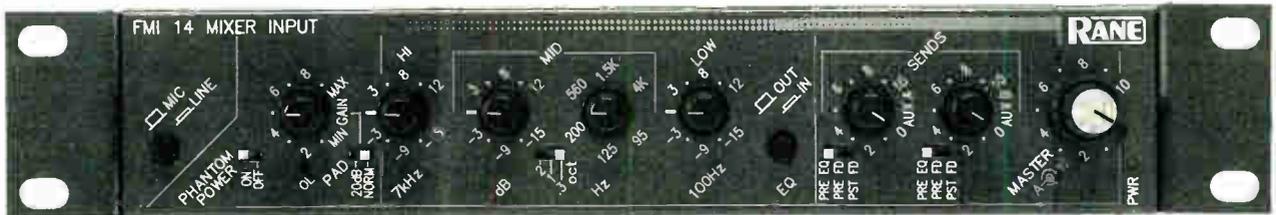
(the 1s are actually the entry level in the line), the Studio Monitor 1s are a two-way, bi-amplified coaxial system. Lows are handled by a heavy-duty 15-inch driver, crossed over at 1.2 kHz to a TAD TD-2001 compression driver. The latter features a 1-inch throat and 2-inch beryllium diaphragm that provides performance well beyond 20 kHz. The TAD driver is coupled to a coaxial



30x60-degree, constant coverage horn.

So far, no surprises, just solid engineering. However, the Studio Monitor 1's real magic comes from its crossover

"SHORT CUT TO PURITY"

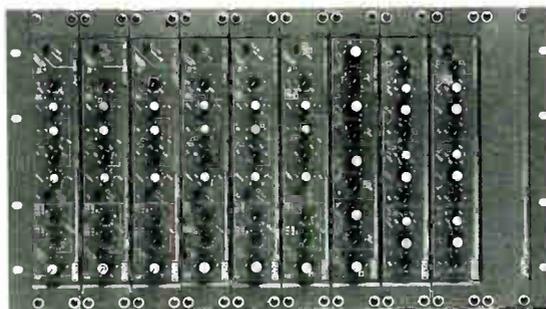


The Flex Series FMI 14 Microphone Preamplifier is simply the shortest path to the cleanest, purest recordings—digital or analog. This compact module offers the kind of serious features found on big consoles, but without the extra circuitry, switching and long routing lines.

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design. More than a simple frequency-dividing network, the active crossover uses Time Offset Correction™, which delays the woofer output by less than a millisecond in order to achieve acoustic alignment between the HF and LF drivers. The active filters are fourth-order (-24dB/octave), crossing over at 1,200 Hz. Also incorporated into the rack-mount crossover is Active Parameter Modification (APM), a feedback excursion circuit that constantly monitors the amplifier output and corrects for LF loudspeaker nonlinearities.

Professional Audio Systems took its crossover one step further by having Doug Sax and Steve Hazelton of The Mastering Lab in Hollywood modify the design. The aces at TML suggested changing the gain structure, shortening the signal path and upgrading critical components.

Setup is straightforward: Connect the LF and HF amps, hook up the return lines for the APM circuit, and use the recessed front panel trim pots to balance the low- and high-frequency levels using a spectrum analyzer or Time Delay Spectrometry unit. There is an unmarked mystery switch on the crossover's back panel, which is a ground lift for audio signals, *not* AC power. Recommended minimum amplifier power is 100 watts/channel for the highs and 300 W/ch on the low end.

The speakers are equally appropriate in mid-field or soffit-mounting applications. Rather than tear out my studio control room wall for this evaluation, I performed all tests with the monitors freestanding in the mid-field, about seven to ten feet away. Included with the speakers are removable grille cloths. While these didn't seem to have any obvious acoustic effects, I didn't install them for the tests. Force of habit, probably.

The most noticeable characteristic of the Studio Monitor 1s stems from the fact that this is a coaxial, horn-loaded

well-balanced at high- or low-level monitoring, which is just fine with me, since I rarely listen at levels exceeding 100 dB.

The 30x60-degree horn provides a definite sweet spot, but at ten feet there was no trouble covering the entire width of the console. Vertical dispersion was more critical, but some care in aiming the monitors took care of that. As long as you can see right into the horn throat, everything's okay.

I expected plenty of bass response from the system, but the LF output was tight, with adequate damping. I'm not sure whether this was the result of the APM circuit, the woofer, the vented enclosure or a combination of all three, but whatever it was, it worked.

The main advantage of any coaxial design is the phase accuracy of the system—in re-creating the effect of a point-source system—and the Studio Monitor 1s excel in this area. Stereo imaging was rock solid, with a real perspective of the soundstage. Console pan-pot positioning becomes quite apparent, and you get an accurate sense of reverb and ambience effects.

Priced at \$4,800 (including crossover), the Professional Audio Systems Studio Monitor 1s are not for everyone. But those seeking a high-end, high-performance monitoring system should give these serious consideration.

Professional Audio Systems, 660 N. Twin Oaks Valley Road, Suite 1, San Marcos, CA 92069; (619) 591-0360.

Q-Logic MIDI Metro

I was impressed with MIDI Metro the first time I saw it unveiled to the pro audio world at last year's APRS show in London. And now that it's available in the USA, I decided to check one out.

As its name implies, MIDI Metro is a device that takes a MIDI clock input and transforms it to a moving, metronome-style display. Housed in a single rackspace chassis, MIDI Metro can also operate as a stand-alone visual metronome, showing tempos from 40-240



bpm. The monitors are capable of far more level (up to 128 dB) than any dome-based system, while resolution is maintained at high-SPL listening. The monitors never had to strain to reproduce punchy transients. At the same time, the speakers sounded equally

bpm.

In the studio, MIDI Metro can replace the traditional click track, which in addition to its annoying qualities, could also possibly bleed into overhead mics during quiet passages when tracking drums, strings or other acous-

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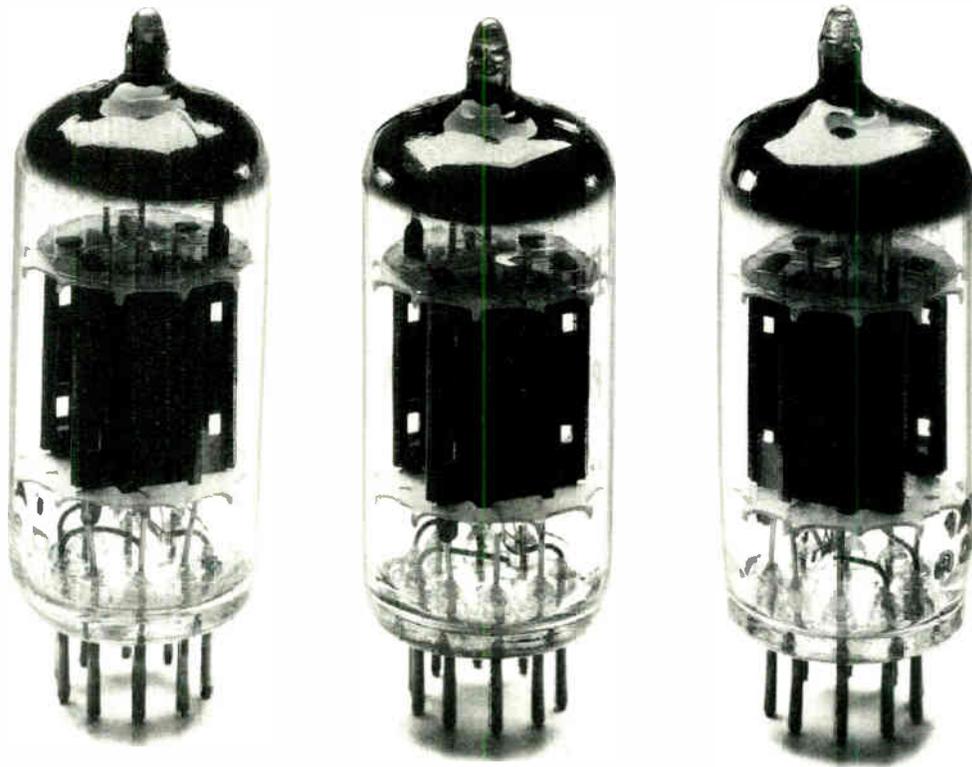
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AUDITIONS

tic instruments.

As a studio drummer, I found the unit useful in a variety of situations: either in stand-alone mode when tracking basics or MIDI-driven in replacing sequenced drum parts. The display is bright and extremely easy-to-read, even from across the room or when viewed at an angle, out of the corner of one's eye. In fact, the display can be distracting when used too close—say, within three to five feet.

At \$399, MIDI Metro isn't inexpensive, but as a studio tool, it's invaluable in many applications. Distributed by Euro-Stuff, 4455 Torrance Blvd., Suite 159, Torrance, CA 90509; (310) 542-6490 or (800) 726-6491.

AKG K500 Headphones

Having seemingly conquered the circumaural monitoring universe with its headphones—particularly the K240 and K1000 models—AKG has expanded its K Series with two new models, the K400 and the top-of-the-line K500.

Boasting a frequency response of 15-27k Hz, the K500s use a dynamic design, employing a rare-earth-magnet structure in the drivers, which are set in an acoustically open structure. Connections are all via oxygen-free cables, terminating in a gold-plated connector that easily converts to accommodate 1/4-inch or 1/8-inch jacks. Little touches, such as the glove-leather headband, suggest that these headphones are designed for years of use.

Weighing in at a mere 240 grams (a little over eight ounces), the K500s seem light as a feather, even after hours of wearing. But the best part is the sound quality: Response is flat with solid LF, well-balanced mids and crisp highs, particularly evident on transient material. These are the best headphones I've heard in the under-\$1,000 category—unfortunately, AKG prices them at a suggested pro user net of \$229. If you're looking for some absolutely top-notch reference headphones, check these out before AKG wises up and triples the price.

AKG Acoustics, 1525 Alvarado Street, San Leandro, CA 94577; (510) 351-3500. ■

George Petersen lives with his wife and two musical dogs in a 100-year-old Victorian house on an island in San Francisco Bay.



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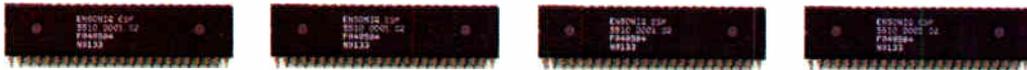
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THE TECHNOLOGY THAT PERFORMS

by David (Rudy) Trubitt

SOUND CHECK



Paula Abdul's crew—House mixer Cubby (left) and system engineer Steve Guest.

Tour Updates

Maryland Sound Industries has a number of full-sized arena tours out. Paula Abdul is hitting the indoor circuit now, with a shed tour expected in the spring. Rob Colby is mixing Abdul's house on a new Midas XL3 console with a 40-channel extender. Vish Wadi is handling monitors, and Steve Guest is serving as MSI's crew chief. The tour is keeping its performances live—for instance, no drum triggers, just microphones, thank you—and is exclusively using Samson wireless equipment, including hand-held and head-set mics and instrument wireless systems. Other Maryland tours include Neil Diamond, who recently headed out on a six-to-eight-month tour, which will be

performed in the round. Bobby McFerrin went out in January. Luther Vandross is still out with MSI, as is Gloria Estefan. MSI also had its share of New Year's Eve gigs, including one with The Pointer Sisters.

Described as the first MIDI opera ever, "Death of Klinghoffer" opened in Brussels last spring. The opera was written by John Adams with sound design by Jonathan Deans. Belgian company CATS (Concert And Touring Systems) provided sound reinforcement gear for the show, which presented numerous challenges as the piece took shape. First, the open set design (resembling an oil refinery) left few places to conceal the Meyer UPM-1 cabinets used to reinforce the actor's voices. Deans solved the problem by removing the horns from their cabinets, covering them with silver grease paint and attaching them onto specially constructed fittings on the pipe staging. The hornless cabinets were used for low-end, relocated out of sight. Additional Meyer UPA

speakers were used for music reproduction.

The second innovation was the use of MIDI-controlled delay lines to keep the apparent sound source coincident with the actors' current location. Their positions were mapped out during rehearsals, and appropriate delay times were stored into pre-

sets of a BSS TCS-804 dual delay unit. Program change messages from a sequencer switch presets continually during the show. "The only thing one must be careful with," Deans cautions, "is [avoiding] any glitches when changing programs. The BSS unit was great." Deans is currently developing Mac-based software that will change delay times dynamically for three performers in different locations, rather than switching between a single static preset. BSS will modify the 804's software to accommodate dynamic delay changes without audible artifacts, and Deans noted ATL and Yamaha may also have suitable units available soon.

Bernhard Brown (Dallas, Texas) has been out with two theater tours—Fishbone, Primus and Stephanie Mills' Christmas tour. Fishbone is carrying Turbosound mains and monitors and Crest amps. A Gamble EX56 is used at FOH, while a Ramsa WR-S840 40x18 console runs monitors. The Mills show also used Turbosound,

—CONTINUED ON PAGE 112



“Touring The Great Wide Open”

Performer: Tom Petty and the Heartbreakers

Venue: Oakland Coliseum, Nov. 24, 1991

Rental Company: Electrotec

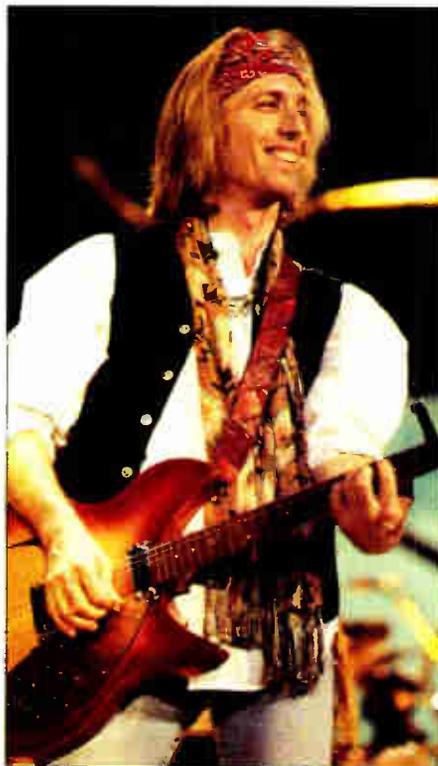
House Mixer: Mark Deadman

Monitor Mixer: Dave Bryson

System Engineer: Chris East

“It’s the most straight-ahead thing I’ve done since Glen Campbell,” says house mixer Mark Deadman, who is out with the Heartbreakers for the second time. Deadman’s previous work includes ten years with Huey Lewis, The Cars and others, as well as spending the last year-and-a-half as a studio engineer at Nickelodeon’s Orlando production facility. Electrotec (Canoga Park, Calif.) is providing equipment for the tour, including its new LAB Q-2 loudspeaker system. “It’s definitely better-sounding than the old system,” Deadman notes. “Every cabinet is fixed, which makes for a much more even sound when you walk the hall. But the fact that we were able to tilt individual cabinets in the old P.A. was handy, because you could still point something down.”

Instead, the new rig offers wedge-shaped, under-hung cabinets. “They cover the whole



front section,” Electrotec FOH tech Peter Downey comments. “If you’re using groundfills on a stage this size, you can lose seats. These fill in that section.” The system crossover is a BSS unit, Klark-Teknik EQ is used on the LAB Q-2 boxes and a White EQ

Above: House mixer Mark Deadman

tweaks the under-hung cabs. A BSS limiter is used to tighten up the sub-bass.

“I’ve been with Tom for a long time—since ‘78,” notes monitor engineer Dave Bryson, who provides Petty plenty of level, with over 50 drivers pointed at the singer. “There are sidefills on either side, the overheads [LAB Q-2 under-hungs at center stage, pointed back] and four monitors on the floor. So, he has five mixes. I do stereo on the floor for the echo [only on ballads], left and right sidefill, and the overhead. That’s all vocal mixes. To get his intonation when he sings, you have to get it really loud, but you have to get the tonal quality, too. Basically, I shoot for how loud I can get it, with the best quality I can get. That’s why you need the drivers.

“The rest of them just have these floor monitors,” Bryson continues. “[Keyboardist] Ben [Tench] has two mixes—band and vocal mix. [drummer] Stan [Lynch] has the same.” Lynch doesn’t require extra sub-bass monitors—Bryson says the TAD 1601 600-

watt drivers powered by Crown amplifiers provide plenty of low end. JBL 2241s are used for the wedge's high end. A Soundcraft console rounds out the monitor system, running a total of 39 inputs, 14 mixes and a couple of effects sends. Effects are used sparingly. "The Lexicon LXP-15 is a really neat unit," Bryson says. "They've come a long way in the last few years as far as dynamic range is concerned."

Deadman describes a no-frills approach to Petty's FOH vocal: "I'm running him through the Summit [tube] limiter, which I really like a lot. I put a little 60ms delay on his vocal left and right through the Eventide, just to fatten it up a little bit and help get it above our monitor levels, which are extremely high. On a couple of songs, I put a 120ms or 175ms delay, similar to what they had on the earlier albums. I put a little delay on the backing vocals and a short reverb on the snare, which is the only reverb I use." A little more subtlety is used to get the band's full, ringing acoustic guitar sound. "I put a little Eventide Harmonizer on the acoustic guitars," he says, "one cent down on the left and one cent up on the right side. I'll use one or the other—it's better to take it up if the hall is kind of boomy, but if the hall's real bright, I'll take it down. Sometimes I use both."

"It's nice to actually mike a kick drum again," Deadman adds. "Of course, it gets frustrating some nights when it would be a lot easier to be triggering a sample!" Drum mics include a Beyer 88 on the kick, Beyer 201 on hi-hat, Shure SM57 on snare (top and bottom). Ramsa WM Series miniature mics are used on the toms, with AKG 414s for overheads. An EV PL10 and a DI are on the bass. "Everything else is 57s," Deadman notes, "all the guitars and vocals. We tried a Beta 57 on Tom last year, and I kind of liked it better, but the monitor engineer didn't like it as much. I'd like to try an EV 1776—I used one with Bette Midler a couple of weeks ago—it's a real tight-pattern mic with a lot of

rejection.

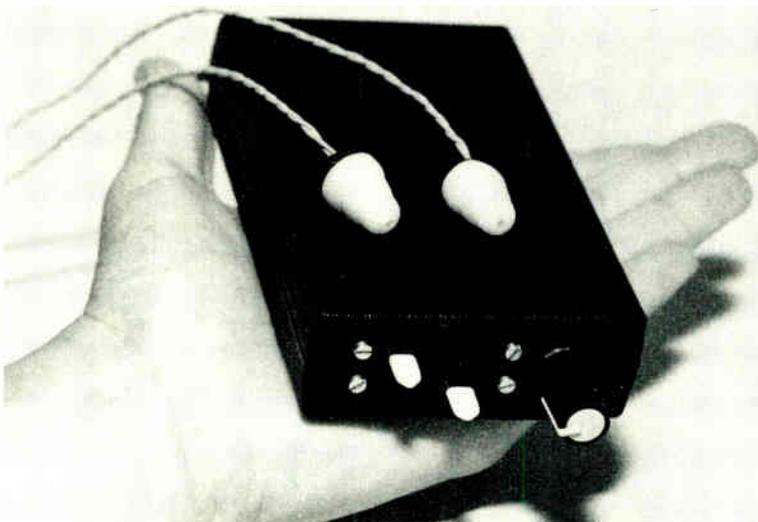
"There's no set list," Deadman explains. "We have the first four songs, a big open space, and the last four songs. I really enjoy it. They're all real steady players, especially Howie Epstein, the bass player. He's the easiest guy to get a tone from I've ever had. Bass is always the toughest in these big halls."

Bass certainly wasn't a problem that night. Epstein's tone and Deadman's mix resulted in one of the purest bass tones I've heard in

that venue. There were a few peaks in the upper vocal range, perhaps due to monitor bleed from the stage combining with the house. Nonetheless, the show sounded quite good, and the LAB Q-2 did seem to be more even-sounding than its predecessor.

"The basic thing to this band is simplicity," Deadman concludes. "It's a simple, straight-ahead rock 'n' roll mix. That makes it a challenge—to go back to the roots. Except, I have a Gamble console!" ■

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—FROM PAGE 108, SOUND CHECK
with Martin CT-2 centerfills and EAW wedges. Consoles included Midas XL3 FOH with Soundcraft 200SR for effect returns and a Yamaha PM2800 40x12 monitor desk.

Scorpio Sound Systems (West Bridgewater, Mass.) added 16 EAW KF 850s to its existing inventory of 50 KF 550s. The company handled tours with the Psychedelic Furs and Rickie Lee Jones last fall. Scorpio also covered eight dates at Trump Castle in Atlantic City. As mentioned here earlier, the company's sales manager and engineer, Mark Frink, is president of the EAW user's group. Frink will be setting up an on-line computer database system to facilitate the organization's operation early this year.

TM Sound and Lighting (Fort Lauderdale, Fla.) installed cabinets of its own design in Croco's Sports Club of the same city. JBL drivers were used, including 2404 HF drivers, 2380 Bi-Radial horns, 2445J compression drivers, 2241H LF transducers and 2152 co-axes. First Coast Entertainment (Orange Park, Fla.) installed a variety of JBL and UREI components in Shades, a nightclub also in Orange Park. Among the items installed were 6650 power amps, 5547A graphic EQs, UREI 1178 limiters and SR4735 loudspeakers.

Speaking of Florida, Pro-Mix's Orlando office moved into a larger facility in order to better serve that city's convention market. Along with the move, the company added equipment including Apogee speakers, Klark-Teknik processing and Crest amplifiers. The Florida office's phone number is (407) 843-3172.

Finally, Walt Disney World installed a Biamp Advantage SCM 7500 stereo club mixer at Mannequins on Disney's Pleasure Island, an adult getaway adjacent to the main park. Pleasure Island is an interesting place with six indoor venues and one outdoor pavilion, each

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with good-sounding systems. Next door, four Tannoy CPA-15 loudspeakers were installed at the River World attraction at Disney World's outdoor stage facility. Show systems designer Doug Wayatt noted the cabinets' weatherproof, laminated construction and good vocal articulation as the deciding factors in their choice.

Odds and Ends

The MIDI Manufacturer's Association has announced the ratification of the MIDI Show Control Specification. MIDI Show Control 1.0 is designed to allow MIDI control of lighting and theatrical equipment. Originally proposed by Charlie Richmond of Richmond Sound Design, the proposal was worked out with the help of Varilite, PanCommand, High End Systems, Strand Lighting, AVAB, ETC, Celco and ADB. More on this to follow, as computer control issues continue to develop... Australian Monitor amplifiers will be installed in Sydney's famous opera house. A total of 48 amps, including 32 1K2s and 16 AM1600s were chosen from a field of 20 competitors. The company also was awarded a contract for 27 amplifiers from Canada's Parliament house in Canberra recently... SpeakEasy of Newton, MA, released Version 3.0 of its Low Frequency Designer CAD program for IBM and compatible computers. The package is now able to model Isobarik and multidriver systems. A free demo disk is available. Contact the company at (617) 969-1460... Audissey Sound of Honolulu put Biamp mixers into The Forum, a multipurpose facility in Honolulu. ■

Mix Sound Reinforcement editor David (Rudy) Trubitt is thinking of adding a fourth name for 1992, but he hasn't figured out whether it goes inside or outside the parentheses. Send suggestions to Mix SR editor at 6400 Hollis St. #12, Emeryville, CA 94608.

Q.

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The Macro-Tech 3600VZ from Crown (Elkhart, IN) uses patented, variable-impedance (VZ), power-supply circuitry to supply 3,600 watts of power from a 56-pound, two-rack-space package. Manufacturer specs state 1,800 W/ch into 2 ohms, 1,655 W/ch into 4 ohms and 1,165 watts into an 8-ohm load. Operable in bridged mono, parallel mono or stereo modes, the amp features Crown's ODEP protection and P.I.P. expandability. Retail is \$2,895, with a three-year, no-fault warranty.

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The 1200 VHF wireless system from Nady Systems (Emeryville, CA) is available with mic elements that can be changed instantly in the field, without soldering. Capsules for this top-of-the-line, true-diversity system include the Shure SM58 and EV N-DYM 257 or 757, or Nady will custom-install any element of the performer's choice. Retail is \$1,699, and up to 20 systems can be used simultaneously.

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**QSC MXa AMPS**

From QSC (Costa Mesa, CA) comes the MXa Series, offering increased power, more features and lower weight than the MX Series it replaces. The price, however, remains the same. A new model, MX 1000a (two-rack-space, 42-pound, 250 W/ch) has been added, along with the MX 1500a (two-rack-space, 42-pound, 350 W/ch) and MX 2000a (three-rack-space, 54-pound, 450 W/ch), with all ratings at 8 ohms. Features include automatic fan-speed control, input slot for expansion accessories and protection from shorts and open circuits, as well as ultrasonic, thermal and RF conditions.

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THD: < 0.05% 1kHz, 0 dBm; Dynamic Range: >100 dB
Digital Conversion: Dynamic Differential
Sampling Rate: 1MHz; Max. Input Level: +22dBm

M5000: Frequency Response: 10-22KHz, -0.5 dB, Fs=48KHz
THD: < 0.01% 1kHz, 0 dBm; Dynamic Range: >100 dB
Digital Conversion: Linear 18bit 64X in, 20bit out
Sampling Rate: 48KHz, 44.1KHz, 32KHz; Max. Input Level: +22 dBm

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World Radio History

by David (Rudy) Trubitt

POI DOG PONDERING

CLUB SOUND SPOTLIGHT



**Band engineer
Deanne
Franklin.**

Poi Dog Pondering's first U.S. tour was played on street corners for dinner and gas money. Since then, they've found their major-label deal and are touring the club circuit in anticipation of the release of their third Columbia album, *Volo Volo*. We asked Poi Dog's sound woman, Deanne Franklin, to describe club tour realities with a band looking to take the next step up.

"They're selling so well at smaller places without a new record out that it's only a matter of time before the places get bigger," Franklin says. "The first thing that we're going to spend a little money on is our own monitor engineer. I'm setting up all of my own stuff in the house, and now I have to go up and set up seven monitor mixes."

And just how much sound is

the tour carrying? "What I carry are my toys—my own essentials," she says. "I need a minimum of four compressors—two dual dbx 166s, a REV7 and three SDE delays. I also carry a Yamaha REV50, which is a little guitar reverb. It fits in a briefcase, and if worst comes to worst, it's more

programmable than a lot of reverbs you'll find in small clubs. I finally got a Furman line conditioner, because I blew up my REV7 on the last tour in Baton Rouge. That was a good \$100 lesson!

"For the most part, I am depending on the house P.A.," Franklin continues. "I send out a rider requesting a 32-channel

board, because Poi Dog is an eight-piece band where many people play more than one thing and everyone sings. Sometimes I need upward of 27 channels on the stage, and most of the places don't have a 32-channel board. Most places we play at would normally have two monitor mixes from the house, but we require seven monitor mixes. I always request six more compressors—I just want that control. It's really just finding out what we can afford and from whose pocket the money comes."

What does she look for when walking into an unfamiliar club? "The most important thing of all is having a competent and friendly house engineer," says Franklin. "I've found too many engineers who don't want to ask questions and never get anywhere. I know

what I don't know, and I'm the first one to admit it." Franklin has a regular routine to tune an unfamiliar system. "The first thing I do," she says, "is flatten out everything that they already have. I like to ask the house engineer what they think, and I'll keep that in the back of my mind. I'll look at the boxes and what's in them. Sometimes you can blow something up because you're expecting a lot more to come out of the box. Then I'll plug in my CD player and almost always cut out certain amounts of highs that hurt. I'll try to get things as close as possible with the crossover, and then I'll go directly to the house EQ. I'll also check the loudest things at soundcheck to find out how far I can go before the club starts turning me down. I try to make it simple for them to tell me what they're doing. Otherwise, you'll find some guy in a back amp room somewhere with a secret knob taking your middle out! Sometimes they're so worried

that they'll just do it without telling you.

"When I started working for Poi Dog," she adds, "I thought, 'Ooh, lucky me, I get to do an acoustic band and I'll never lose my hearing!' But boom, on the

"I've had a lot of fun this year. With Poi Dog, it's always an adventure."

very next tour, 'Well, we're not using acoustic guitars anymore, we're all electric. Not only that, but we're going to add a couple more keyboards.' Now I request 120 dB at the front of house, which means a P.A. that can get 120 dB cleanly. Out of the club systems I've been using, the EAW KF850s, EV manifolds and the Meyers are tops."

Before joining Poi Dog,

Franklin worked at San Francisco's Slim's nightclub. "Louie Beeson was the production manager at Slim's," she says. "He's done a multitude of people, including Chris Isaak, and he's my inspiration. Louie Beeson is a sound god!" She still works with a number of SF bands, including The Limbomaniacs, Psyche-funkapus and Sister Double Happiness.

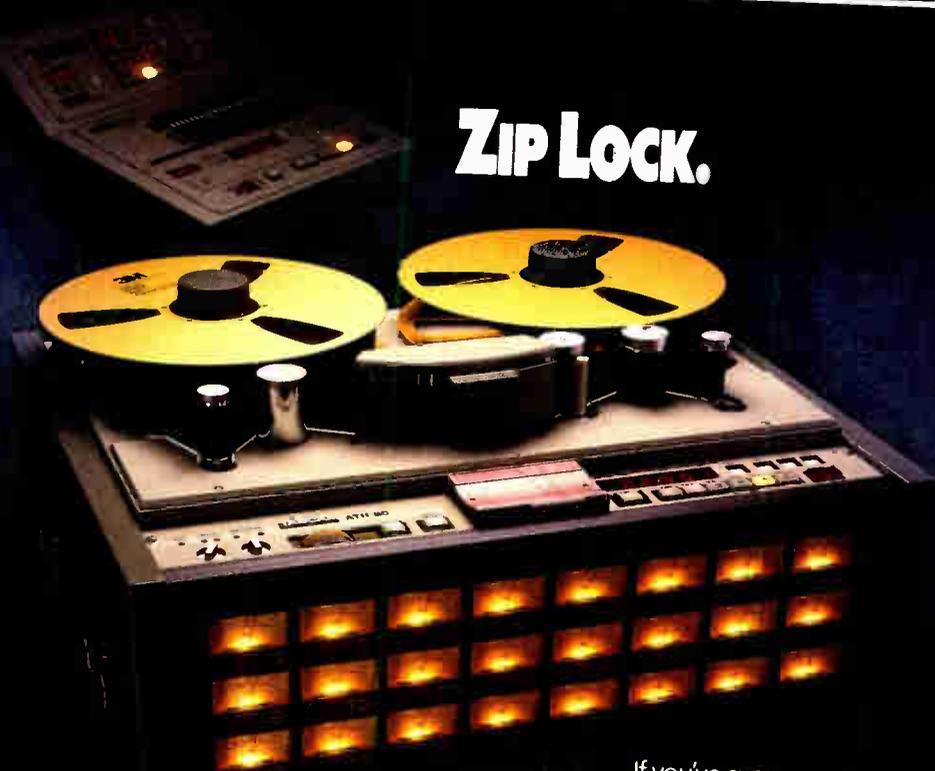
"Poi Dog called me to go on a tour a year ago in May," says Franklin. "At that point, I was going to Europe with a heavy metal band called Gwar. Two weeks after I came back from that tour, Poi Dog was playing here at Slim's. Peter Keppler was doing their sound, but he was getting ready to go out with someone else and they needed somebody in two weeks. I've had a lot of fun this year. With Poi Dog, it's always an adventure. I'm hoping that [the new album] pays off, because all they want in the world is a monitor engineer and a tour bus." ■

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by Amy Ziffer

COOKIE MARENCO

“Surviving in the music industry requires diversification,” says Cookie Marenco, a self-described San Francisco Bay Area “one-stop shop.” She owns a studio, engineers and produces records, composes for film and video, plays MIDI keyboards and develops talent—all in a market that has been on a slow (but constant) boil for the last decade.

Marenco began her career as a private music instructor back in 1969. After attending college as a music major where she continued her studies on the piano and oboe, Marenco then spent ten years as a jazz musician. In 1981 she founded OTR Studios (located midway between San Francisco and San Jose). She worked as a staff A&R producer at Windham Hill Records from 1987 to 1990 and has been an independent producer and engineer since 1985.

In 1990 she established a

publishing/production company that is currently working with several songwriting teams and artists. “I’m concentrating on producing and developing talent, because it gives me the most creative satisfaction,” she explains. The musical styles of artists she works with range from the “junkyard country” of artist Steve Owen to Ron Miles, a jazz trumpet player whose music is a cross between Ornette Coleman and Public Enemy. Marenco feels the diversity of music she’s working with keeps her fresh from project to project.

This last year Marenco found herself recording quite a bit of acoustic music, both in the studio and live. Recently, she mixed Charlie Haden’s latest Quartet West record with Ernie Watts on saxophone. Marenco noted that the greatest challenge with that project was to provide Haden and producer Hans Wendt with a



PHOTO: LARRY MONAST

finished master that mixed classic recordings of Billie Holiday, Jo Stafford and Jeri Southern with the Sony digital tracks that the Quartet recorded on.

The opening of the record was taken from a 3/4-inch video of the movie *The Maltese Falcon*. After about 40 seconds of music, it crossfades into a 1940 traffic scene and then into one of Haden's own compositions. "Charlie was meticulous about getting just the right traffic sounds," Marengo says. "We spent more time creating 30 seconds of traffic than mixing any one of

the songs. To his credit, it was worth the time spent."

Earlier last year, Marengo teamed with producer Hans Wendl and co-producer Wayne Horvitz on Peter Apfelbaum's *Heiroglyphics Ensemble* record. Apfelbaum, the group's founder, writes music for as many as 17 musicians. With two drummers, percussion, seven horns, bass, three guitars and keyboards all playing live, Marengo says the choices are sometimes hard with only 24 tracks to record on. "The group is well-rehearsed, which makes my job easier," she notes. "It's very much like a live, direct-

to-2-track session." The same group of people will begin album number two in 1992 for Antilles/Island Records.

As producer, Marengo's role changes with each project to fit the circumstances and needs of the artist. Turtle Island String Quartet's *SkyLife*, released in July 1990, was challenging because the level of musicianship was so high. "They very much know what they want," Marengo acknowledges, "both musically and sonically." The quartet recorded with the Crown GLM-100 pickups which they were accustomed to using both in the studio and on the road, integrated into a miking system that picked up each instrument's full range of sound.

"Every instrument had two mics—the cello sometimes three—plus a pickup, which we used simultaneously," she explains. "Most of the sound was derived from the mics rather than the pickups, but the quartet do a certain style of percussive playing that can only be picked up that way, and on those songs we mixed more of the pickups in. We used Massenburg preamps and equalizers, bypassing the board and going straight to tape, using Dolby SR on the multitrack. That gave them a huge dynamic range for strings."

TISQ would play through a song several times from beginning to end, and then work on sections, recording each one several times, looking for the best performances. "That method is common in classical music recording," Marengo says. "It's easier to work in sections than to expect a perfect performance all the way through.

"We used a lot of tape," she adds, "because each three- to four-minute song took about one 30-minute reel at 15 ips. Rather than dub down to a more manageable format like 1/4-inch, they'd spend four to five days editing together the multitrack tapes, because the quartet wanted to record the solos over the final edited versions without losing quality by bouncing a dub back to the multitrack. It was scary editing the master tapes, especially at 15 ips, since the edits were extensive." This process is remarkable in light of the spontaneous sound of the recordings, which the critics have attested to.

Marengo's work with the Modern Mandolin Quartet on their project *Intermezzo* was equally unusual. It was recorded in Cunningham Chapel on the grounds of Belmont, Calif.'s Col-

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lege of Notre Dame, more for economic reasons than anything else, although the results are sonically striking.

Engineer Bob Hodas recorded through a Meyers board to both Sony and Panasonic DATs set up in a room to the rear of the altar. "We always had to listen for extraneous noises," Marengo laughs. "We'd be in the middle of a take and I'd hear a plane or a truck go by, and I'd have to make the decision to stop the band or let them go." Overhead lights that clicked until they warmed up were another problem, as were changing temperatures that caused the instruments to go out of tune.

All of the editing was accomplished on the Studer Dyaxis digital editing system. The system was used to create an ambient church sound to edit in between songs, because "silence" was jarring once the very ambient pieces were sequenced. "The ambience gives the record the feel of a performance, a work that all occurred in one place," Marengo explains.

She tried something very different with her production of the soundtrack album for the 1990 movie *Shock To The System*, with original score by Gary Chang. She had to take two dozen or so film cues, some as short as 30 seconds, and develop them into pieces consistent with the musical style of the composer. "In the past, I did a lot of composing for film and video," she explains. "It was a fun challenge to take another composer's work and mimic something they would write. My mindset was, 'What would Gary do with these pieces of music if he were here?' I think there might have been a total of 30 minutes on the multitrack, and I had to create the next ten. Sometimes it involved repeating sections, or lifting stuff off the multitrack and flying it in."

Marengo often uses the old but repopularized technique of recording direct-to-2-track, as heard on three recent projects from guitarists Luiz Bonfa and Alex de Grassi, and the 12-piece male *a cappella* ensemble, Chanticleer.

Bonfa, still an amazing player at 71, is best known as the composer of the music to the film *Black Orpheus*. His upcoming GSP (Guitar Solo Productions) release was recorded entirely with a pair of B&K omni 4006s, direct to Panasonic SV-3700 and Technics SVD1100 DAT recorders.

De Grassi's *Deep at Night*, released January 1991, was also recorded using a pair of B&Ks. In this case, they were two cardioid 4011s, in combination with GML preamps and EQs. "B&Ks are my mics of choice these days for almost everything," she explains. "Microphones and preamps are like perfume. You get tired of smelling the same scents and hearing the same sounds. Yesterday it was Neumanns, today it's B&Ks."

Working with producer Steve Barnett, Marengo engineered the Chanticleer project at The Site in Marin County, Calif., a studio chosen for its large room and relaxed atmosphere. On *With A Poet's Eye: New American Choral Music*, released in late 1991, Chanticleer performs works of 20th century composers. Most of the group's prior recordings were done in churches, but extraneous noise problems led them to try duplicating the sound of a church while in a controlled environment.

The musicians were positioned in a circle, 13 to 15 feet in diameter. They paired off, facing inward. Each pair shared a Neumann U87 mic, but most of the sound came from a pair of B&K 4006 mics placed about 13 feet above the ensemble. A Neumann U47 FET was used for solo voice when required.

The recording media were a Sony DAT and Sony PCM-F1 with a Meyers filter; Lexicon 480L and 224 reverb was printed on tape. "We spent quite a bit of time getting the sound of a chapel by A/B'ing the sound with a previous recording," she notes. She gives special credit to her assistants for the perseverance and concentration it took to catalog about 800 takes.

Again using the Studer Dyaxis hard disk editing system, Marengo and Barnett edited the pieces together and did some extremely creative editing within the takes. "At one point," she notes, "we needed to use two takes that were in slightly different tempos. Fortunately, I was able to edit out milliseconds between beats that allowed us to more 'gracefully' use the better take." Marengo admits that she doesn't use the Dyaxis in the conventional manner, but she's been able to devise techniques that allow her to get the best performances possible.

While all of the musical artists with whom Marengo works create music of great beauty, none of their projects can quite match the enchantment of Rabbit Ears Productions' children's stories

on tape and video, distributed through Windham Hill. Marengo's name appears on three: "How the Leopard Got Its Spots" (nominated for the Best Children's Recording Grammy in 1991), "The Three Little Pigs/The Three Billy Goats Gruff" and "Little Red Riding Hood/Goldilocks."

Marengo began working with Rabbit Ears when she was on staff at the label, and this opened up opportunities to work with a whole new group of artists: Ladysmith Black Mambazo, composer Art Lande, and voice-over talent/actor Danny Glover. Marengo likens her role in these productions to that of an orchestra conductor: "Satisfying the needs of the video producer, translating that to the composer, who in turn is working with musicians, and translating it to a technical language that the engineer can understand—while no one understands the others' language—is a challenge," she declares.

For "The Three Little Pigs/The Three Billy Goats Gruff," Marengo concentrated on capturing what she calls "the creative genius" of composer Art Lande on tape. "Art was one of my music teachers," she recalls fondly. "I wanted him to be able to create and not worry about the technical aspects of the studio." The persistent but subtle humor evident throughout the score (including a slightly out-there riff from "Home Sweet Home") and colorful effects created by Lande, together with Holy Hunter's personality-laden voice, make "The Three Little Pigs" a must-have for any children's collection.

The other side of Marengo's professional life, of course, is her studio: OTR Studios is a 24-track, Dolby SR facility. Most of the work brought there is album production and demos, but she is now concentrating on audio-for-video services and has installed a MIDI pre-production room.

Through talent, a lot of initiative, and a few happy coincidences, Marengo has built a growing and interwoven chain of enterprises that are helping to sustain the Bay Area's on-again, off-again music industry. "The Bay Area is ready to blossom," she says. "There's a great deal of artistic talent and freedom here that I'd like to expose." ■

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

by Phil De Lancie

ITA's MOMS

SEMINAR SHEDS LIGHT ON OPTICAL DISC MANUFACTURING

W

hen the ITA began holding its Magnetic and Optical Media Seminar in 1989, the event covered a wide range of speculative technologies related to entertainment and information media. But according to ITA executive director Charles Van Horn, the feedback from members was that this year's seminar, the third annual, should place greater emphasis on existing manufacturing techniques. While that made for a little less excitement about the techno-wizardry with which we might be living in the 21st century, it probably made the meeting more useful for many in attendance. Even so, MOMS is not for everyone. A strong curiosity about optical and magnetic media manufacturing is needed to sustain one's interest when the going gets a bit dry.

The change in orientation wasn't the only thing different about this year's gathering. In years past, MOMS was held in deluxe resort settings, with sessions spread out over several days. Presentations usually concluded by early afternoon, leaving attendees plenty of time to enjoy the surroundings. Perhaps reflecting a leaner economic outlook, the 1991 seminar was concentrated into fewer days and held in more of a business setting. The site was the Biltmore Hotel in downtown Los Angeles, where the ITA presented two very full days of speakers and panels to about 110 attendees.

The focus of day one was magnetic media manufacturing, including coating, calendering and pollution control techniques for working with solvents. Day two was primarily optical disc-oriented. It provided an informative discussion of material and process considerations influencing CD plant productivity, quality and yield, an overview of which follows. The day also included an appearance by Philips' point man on DCC, Gerry Wirtz (see sidebar, page 128.)

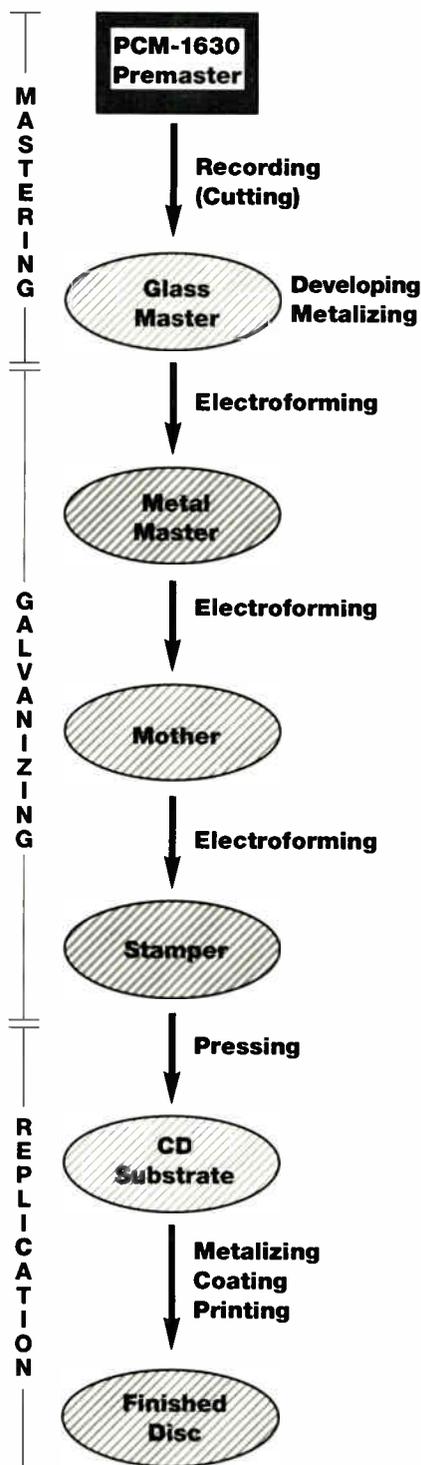


Figure 1: CD manufacturing process

Premastering and Mastering

Starting at the beginning of the disc manufacturing process, Dave Pushic of ODME spoke on premastering and mastering for various CD formats. The differences between types of discs are most evident in the premastering phase, where format-specific authoring systems are in use for CD-ROM (Meridian, OMD), CD-Interactive (Optimage, Tiger Media) and CD-Audio.

In CD-Audio and CD-I, the disc/player interactions are highly defined by the format. But CD-ROM allows much more room for customization, depending on the intended application and platform (type of computer to which the playback drive will be connected). Unfortunately, that leeway is an impediment to universal compatibility. Recognizing the problem, the CD-ROM community has been moving toward ways to minimize it. The standardization process began with an agreement on file structure, ISO-9660. If the information on a disc is organized according to the ISO standard, it may be accessed on more than one platform (IBM, Macintosh, DEC, etc.).

ISO-9660 doesn't mean, however, that the data search and retrieval features that make CD-ROMs so useful will work on all platforms, or even with all applications on any given platform. That would require standardization of what the retrieval software has to do to get at the information. While such a universal "search engine" has yet to be adopted, Pushic reported that the U.S. government intelligence community has proposed a standard, dubbed CD-Rx, which is currently under consideration by others in the field. CD-Rx would establish a specific way that information can be retrieved by all search engines, so that ROM publishers are not limited to any particular retrieval system.

Regarding the media used to get premastered data to the mastering facility, Pushic said the trend for CD-I and CD-ROM is away from U-matic and 9-track tapes toward the 8mm Exabyte format, which he feels is rapidly becoming the standard. The Exabyte approach means all the data types come in on the same tape, rather than combining audio from U-matic and text or graphics from 9-track during the mastering process. The Exabyte tapes use a standardized Disc

DCC Dupe Gear: Philips Talks Prices

Philips has made available price figures for equipment it has developed for the production of DCC software. The company has also moved to relieve growing frustration in the duplication community by forming the Business Unit, Mastering & Duplication, to coordinate its activities in the DCC manufacturing market. The new group will sell products and training to end-users, and will offer technical data and engineering support, on a contract basis, to other vendors of duplication-related DCC equipment.

The DCC developments were announced by DCC product manager Gerry Wirtz at the ITA's third annual Magnetic and Optical Media Seminar (see page 126 for more on this event). In his presentation, Wirtz stressed that the cost figures were intended as "price references," provided to give an indication of what it would take to be among the first to get into DCC. He noted that the primary design consideration for the first generation of gear, slated for availability in April, has been to ensure duplication capacity at launch. Prices for subsequent generations are expected to drop as designs become more cost-effective. That is certain to be welcomed by the industry, since all but the best capitalized duplicators are likely to find the initial prices prohibitive.

In configuring systems for sale, Philips has broken the DCC mastering/duplication process into four main areas (see "Tape & Disc," October 1991 for a complete process description). Premastering involves editing and organizing the text—titles, lyrics, program notes, etc.—that will be available for viewing as the finished DCC plays. The premastering system is built around an IBM-type PC, with a software package for editing and simulating text and PQ-codes. Pricing, exclusive of a PCM-1630/DMR-4000 combination for premaster recording, is \$20,000.

Mastering involves converting the premaster information into a "shop floor master" for use in the dupe plant. Philips' mastering station includes a processor, an en-

coder for converting the audio signal to PASC (DCC's digital audio encoding scheme), a master DCC recorder and a PC with error monitoring and correction software. The station will sell for \$100,000, excluding a 1630/DMR for audio premaster playback.

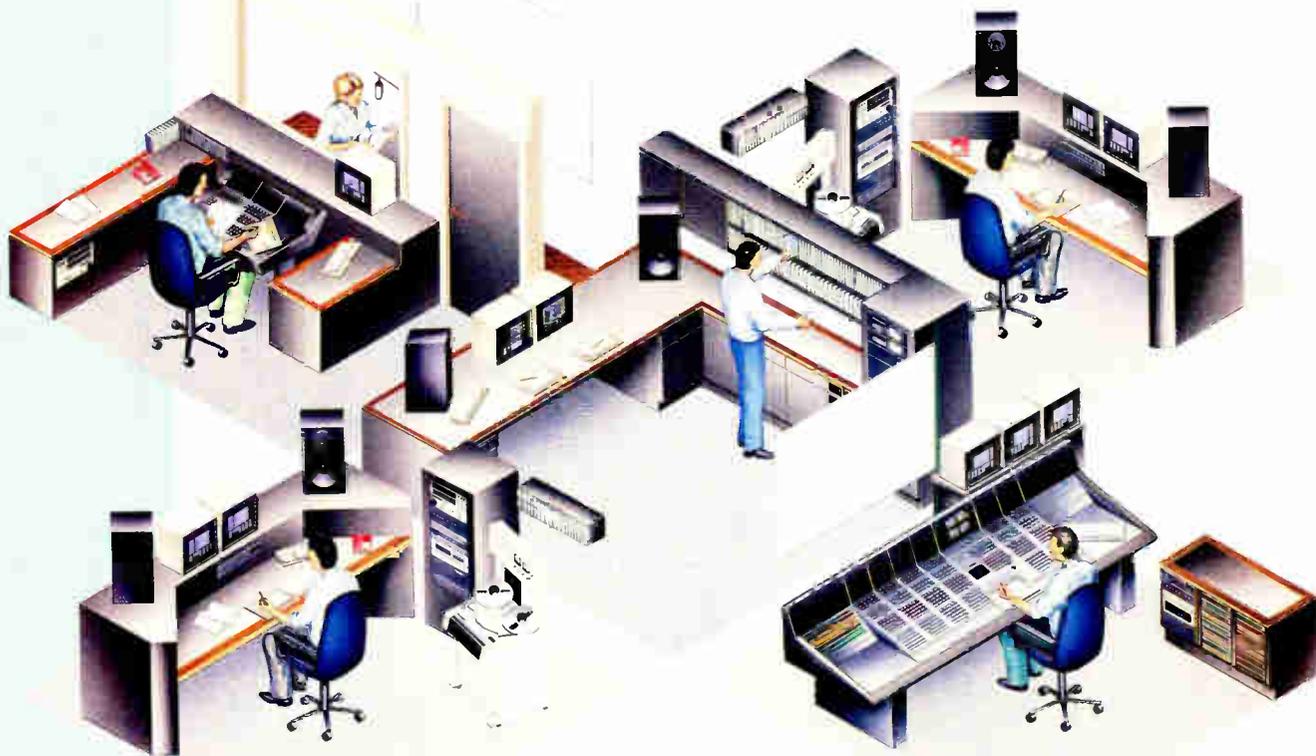
Prior to duplication, the DCC data on the shop floor master is downloaded into a digital bin—called an "SSM" for Solid State Master—from which it will be fed at high speed to the duplication slaves. The downloader, error monitor/corrector and SSM will sell for \$200,000. The slaves are based on an existing PolyGram slave design. The dual-capstan machines incorporate a clean-air crossflow. A four-deck slave will sell for \$150,000.

Philips will not sell machines for loading tape into shells (manufactured by Philips), but DCC-ready loaders are available from Tape-matic. To finish the cassette, a plastic window is ultrasonically welded over an inlay card, and the back is printed with track information. The DCC is then placed into its box, along with printed inserts, and shrinkwrapped. Wirtz said that standard factory-automation tools for these tasks will be available from outside suppliers.

Wirtz also mentioned some duplication-gear vendors who are in various stages of preparation for marketing DCC systems, some of which would compete with Philips' own. These include Gauss and Lyrec (slaves), Otari (slaves and loaders) and Concept Design (digital bin). BASF and Memorex are among those interested in supplying tape, Wirtz said. As for duplication plants, he listed PolyGram, Sonopress, JVC, Cinram and WEA Mfg. as companies readying themselves for production.

Regarding licensing, Wirtz explained that no license will be required to manufacture DCC components, duplication or mastering equipment, though prospective manufacturers will need to purchase an information agreement from Philips if they want details of the DCC standard. Duplicators, on the other hand, will need a license, the licensing costs and conditions for which he described as "similar to those for CD." —P.L.

Network



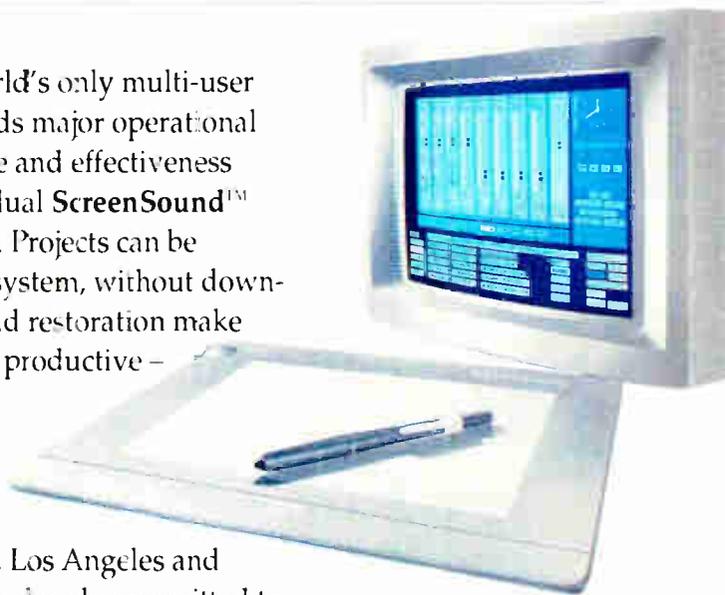
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World Radio History

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Description Protocol (DDP) to identify and store the various types of files (audio, text, digitized video, etc.) on the tape in a way that facilitates the mastering process.

According to Pushic, the mastering itself is pretty much the same for all CD formats. The goal is to get a glass master that contains accurate data, has accurate physical geometries (pit size, etc.) and is highly processable (stands up well to the developing, metalizing and electroplating steps that eventually yield mothers and stampers).

Substrate Materials

Moving on to the making of the CD itself, Hans Mueller of Philips Du Pont Optical brought a replicator's point of view to the proceedings with his talk on considerations in choosing the proper materials for CD substrates. To illustrate, Mueller used PDO's own investigation of materials for plastic magneto-optical discs, but most of the factors are applicable to prerecorded CDs as well. According to Mueller, the substrate material determines the performance of the disc. Optically, the material must allow light transmission of greater than 90%. Birefringence, which is a shift in the optical path due to the structure of molecular chains in the material, must be low.

Physically, the material must accurately fill in around the surface features of the stamper from which it is molded to achieve the crisply defined pits required for accurate readback of the finished disc. It must have a low incidence of non-dissolvable particles, which deflect light and thereby increase error rates. And it must retain its flatness from center hole to outer edge, even after cooling.

To make matters more complicated, the substrate must be stable over time in potentially hostile environments. Chemical imbalances, such as a high chlorine content, correlate with higher error rates in aging tests. And the more water absorption the material allows, the greater the long range incidence of blistering in the deposited layers. Water absorption may also cause bowing, which brings the disc out of the flatness specification.

As might be expected, no one material is ideal in all ways, so the various factors need to be balanced to achieve the best overall substrate performance. Glass performs well in most cat-

egories, but its high expense and vulnerability to breakage have made plastic the preferred material. But not all plastics are equally suited to the task.

Mueller pointed out that since optical discs make up a relatively small part of the overall plastics market, it is hard to justify the development of unique materials for that application. So the choice is among existing basic materials, which may then be optimized for use as substrates. By comparing performance based on the parameters outlined above, Mueller and PDO have concluded that polycarbonate is still the best all-around choice for CD substrates.

The Molding Process

Following Mueller were Dr. John Newcome of Mobay and Barry Potter of Netstal Machinery. Mobay supplies polycarbonate to CD replicators, while Netstal builds injection-molding machines. Both speakers looked at the way interaction of the substrate material with the molding machine affects disc quality.

Newcome concentrated on birefringence caused by stress, either induced by the stamper or introduced during the cooling of the substrate. The birefringence is usually worst at the edge of the disc. Through experimentation, Newcome was able to separate out the many variables that influence the end result. He offered the following recipe for low birefringence: high melt temperature (the heat at which the raw polycarbonate is liquified in preparation for injection), rapid injection into the mold, low hold pressure (the force with which the mold is held closed) and short hold time. He also underlined the importance of using low-viscosity polycarbonate and the need for special equipment and process controls.

Potter spoke about improvements, to date and anticipated, in the molding process. He noted that CDs look like they should be easy to mold because they are "center gated" (hole in center), flat and low-profile. In fact, they are difficult, because molding is a critical step in determining the optical properties of the finished disc.

Great strides in molding have been made since 1984, when replicators could expect yields of about 60% with an average cycle time of 18 seconds. By 1990, yields had risen to 98%, with

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cycle time down to 6 seconds. Cycle time is currently down to about 5 seconds.

Improvements to date have resulted not only from better machines, but also from improved material purity and moldability, as well as from better devices for removing substrates from the mold at the end of the cycle. Potter anticipates that further advances will be less dramatic, perhaps getting cycle time down to about 4.5 seconds. Other areas of progress are expected to include improved stamper-handling capability, multiple-cavity molds (particularly for Mini Disc) and improved communication between the molder and downstream equipment.

Sputtering and Inspection

The need for improved communication results from the evolution of manufacturing approaches in the replication industry. As outlined by Bill Graham of Balzers, the first generation of CD plants were designed around batch processing. Groups of discs were taken from the molder and placed in vacuum chambers for deposition of the aluminum-reflective layer.

As demand increased, batch processing proved too slow. Plants have shifted to in-line or integrated in-line manufacturing, techniques that use sputtering instead of vacuum deposition. Balzers' current in-line sputtering systems are capable of throughput up to 2,400 discs per hour at yields of 99.9%. Graham sees the industry moving toward systems of even higher productivity and greater flexibility in dealing with multiple disc sizes.

The same trends are evident in the area of disc inspection gear. According to Dr. George Mather of Automatic Inspection Devices (AID), CDs may now be scanned for functional and cosmetic flaws in about two seconds. The company's machines rotate the discs under high-resolution line scan cameras for inspection. The company also makes bar-code and alphanumeric scanners to facilitate disc identification in manufacturing.

CD-ROM and Laserdisc

The throughput of inspection devices like those made by AID is particularly crucial to those who do a lot of CD-ROM manufacturing. While the CD-

Audio and CD-ROM specifications call for the same quality standards, the de facto standards for CD-ROM are tighter. That means inspection is critical. Jeff Uitenbroek of 3M said that his company's CD-ROM manufacturing facility uses an in-line laser scanner to inspect every disc replicated. 3M also tests one disc out of 200 with real-time playback, and one disc from each run undergoes a byte-for-byte data comparison with the source master.

Another challenge of specializing in the CD-ROM business, Uitenbroek said, is in the area of service. A one-day turnaround requirement is common, as are production runs of less than 100 discs. Because the discs are generally sold at a high price, their appearance is extremely important to the client, so the quality of on-disc printing is critical.

Even more critical than manufacturing CD-ROMs, according to Alan Hamersly of Disc Manufacturing Inc., is making laserdiscs, which come in 5-, 8- and 12-inch diameters. Because they involve digital audio *and* analog video, the discs are more complicated to master for, and tolerances are tighter throughout the mastering, galvanic and replicating processes. The 8- and 12-inch discs are double-sided, which introduces the added complication of gluing the sides together to make the finished disc.

Noting an upward trend that began with the introduction of combi players, Hamersly predicted that the player base would grow from 225,000 in 1990 to 400,000 in 1992, while disc sales are expected to rise from 6 million to 14 million. Hamersly also noted two new variations on the laserdisc idea. One, an 8-inch, single-sided disc, manufactured like a CD, is already being used in Japan. The other is a new format called LD-ROM, which combines analog video with 540 megabytes of digital data storage on a 12-inch disc. ■

Philip De Lancie is a mastering engineer at Fantasy Studios, Berkeley, Calif.

Correction

In the Nov. 1991 "Tape & Disc News," we gave the wrong name for a Hawaiian tape duplicating company. The correct name is Recorded Media Services.

Tape & Disc News

TDK Puts Industry Ears in Doubt

TDK has released results of an experiment it conducted at last October's AES convention on the ability of audio professionals to distinguish between CDs and high-quality cassette copies. The test was designed by the consulting firm Point One Audio, and verified by independent on-site representatives of a "big six" accounting firm. Depending on how they are interpreted, the results either speak well for TDK-SA cassettes or poorly for the auditory acumen of the participants.

Monitoring on headphones, test subjects were provided three sources for comparative listening. One was a CD player, playing a CD provided either by TDK or by the subject. Another was the play-head output from a three-head cassette deck, which was recording the CD as it played. The third source was randomly selected by machine to be either the CD or the cassette. Its identity was unknown to both the test subject and operator. According to TDK's results, only 8.3% of the 446 participants were able to correctly determine five times out of five whether the unknown source was the CD or the cassette.

Concept Design Claims Patent Vindication

Concept Design has announced final rejection by the U.S. Patent Office of 28 claims made in a patent assigned to rival digital-bin maker Duplitrionics. The companies have been battling before the Patent Office and in court over patent-infringement allegations. The latest decision affirms an earlier preliminary finding (see "Tape & Disc News," November 1991), despite subsequent arguments offered by Duplitrionics in support of its claims. The action lets stand six of the original claims under what has come to be known as the "Newdoll" patent.

Duplitrionics recently made an additional 35 claims under the patent, of which eight have been upheld. According to Concept Design's announcement, none of the remaining claims affect any components found in its DAAD line of bins. Duplitrionics

previously disputed this assertion. Pretrial motions continue in the various suits and countersuits between the two companies. Related Duplitronics suits against WEA Manufacturing and Cinram for using DAADs are also still pending.

DCC Trade Group Formed

Electronics manufacturers, software suppliers and others involved in the DCC roll-out have formed the DCC Group of America. The group is similar to the one created in 1983 to coordinate the introduction of CD. Philips' Emiel Petrone, who led the CD effort, will represent the organization, which is intended to encourage the diverse interests involved with DCC to work together throughout the introductory period. Cooperative public relations efforts and consumer education programs are planned to maximize consumer acceptance and understanding of the new format. Current roll-out plans call for Philips to make demonstration models available to dealers over the summer, with full-scale consumer introduction to begin worldwide September 1.

SPLICES

The ITA has approved an official document, ITA-V-101, setting forth recommended practices for duplicating VHS videocassettes, including SP, EP and LP. Requests for a free copy may be faxed on company letterhead to (212) 643-0624. .Gauss (Sun Valley, CA) has sold high-speed cassette systems to duplicators Ihlas Gazetecilik in Turkey and Nujoom Al Jazeera in Saudi Arabia. Sister company Electro Sound, meanwhile, has sold to five domestic duplicators, including International Cassette, Rocky Mountain Audio/Video, Verbatim, Advanced Audio Technology and Tape Corporation of America. .Eagle-TDT of Fort Wayne, IN, announced the January delivery of 56 duplication slaves in North America. The company has another 38 slaves currently slated for delivery. .Concept Design (Graham, NC) announced the sale of a C-100 capacity DAAD R² digital bin to Brazilian duplicator Videolar, which plans to install audio duplication capacity at its facility in Manaus. .Kewall Productions upgraded its real-time audio duplication capacity with the purchase of an additional DAT master machine and a new fabrication and shipping department at its

—CONTINUED ON PAGE 169

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C O A S T

L.A. GRAPEVINE

by Amy Ziffer

Computer bulletin boards have been around for so long that it's a wonder no one has created one for local studios until now. I just got off the modem, exploring the HARP Electronic Bulletin Board (subtitled: "Telecommunications for the Audio World of the '90s"), organized by Gary Denton, co-owner and studio manager of Stagg Street Studio. The database has many sections, including equipment to buy or sell, stolen items and a HARP membership list. There's a "form" for expressing opinions on equipment. (This information will

—CONTINUED ON PAGE 137

SESSIONS & STUDIO NEWS

by Jeff Forlenza

NORTHWEST HAPPENINGS

Okay, by now you're sick of hearing about Nirvana. Well how about Queensryche, Metallica, Alice in Chains, Faith No More, Primus, Soundgarden, Sister Double Happiness, The Walkabouts, Mudhoney and the spate of underground bands that have ironically made recording the alternative music scene lucrative in the Pacific Northwest? And with the popularity of *Twin Peaks* and *Northern Exposure*, many video eyes are focused on the land of logs and fog. We checked in with some of the recording studios in the Northwest to see whazzup.

Up in Seattle, Lawson Productions Inc. has transformed into *Bad Animals/*

Studio Bau: ton gang did a beautiful job. The SSL is in place, and right now we're slated for a March 1 opening." Prior to being Lawson Productions the facility was called Kaye-Smith, where Heart tracked "Barracuda" in the '70s. Fifteen years later, the Wilsons are co-owners of the same recording facility in '90s state-of-the-art.

Recently Sean Hopper, keyboardist and vocalist with Huey Lewis & the News, joined partners Joe White and Dave Musgrove to make *Muthers' Recording* in Sausalito a force to be reckoned with in the Bay Area marketplace. Along with Hopper came a major upgrade. The heart of the upgrade was the addition of a Euphonix CSH 56-input console. In addition, a Studer A800 MkII 24-track with slave capability, an Otari MTR-12 with 1/2- and 1/4-inch center track time code head assemblies and a TimeLine Lynx KCU with four Lynx modules were also added. *Muthers'* was designed in 1985 by Dr. Richie Moore, who also designed the upgrade with Dave Musgrove and now serves as *Muthers'* technical director.

After 18 years of business, Spectrum Studios (Portland, OR) closed because of long-term financial difficulties. Michael Carter, former owner, has redirected his efforts and is now president of Digital One, a digital recording facility that will share an alliance with Pace Video Center in Portland. Digital One offers four disk-based digital audio systems—the first SSL ScreenSound in Oregon, two Pro Tools and one Sound Tools—and seven Sony time code DATs for full compatibility to video formats: goodbye analog. Slated for a March opening, Digital One's engineers, Michael Carter and Eric Stolberg, will work in conjunction with Bill Stevens, senior production engineer at Pace.

Ken Evans of Mesa Recording (Sebastopol, CA) reports recent studio activity: Engineer Tom Barton recorded



Santana works on new album at The Plant (Sausalito, CA)
L to R : keyboardist Chester Thompson, second Manny LaCarrubba, Carlos Santana and engineer Jim Gaines.

Seattle. According to Steve Lawson, Ann and Nancy Wilson bought into the Lawson facility and are now co-owners of the revamped, retrofitted *Bad Animals/Seattle* complex. "Studio X is the room everyone is talking about," Lawson reports. "Peter Maurer and the

C O A S T



Muthers' Recording Studio, Sausalito, CA, with its new Euphonix CSII.

Rick Reynolds for a Windham Hill project that will spotlight the spoken word, including monologist Spaulding Gray, O.J. Ekemode and the Nigerian All Stars recorded, mixed and used the Sound Tools for digital editing on an independent release. Neil King engineered the poly-rhythmic percussion tracks while Ekemode produced. Known for its live drum sound, Mesa had One World Taiko in from San Jose, as they did digital editing and EQing on DATs of live shows for an independent cassette release. Another drummer slated to work at Mesa is Kwaku Daddy, a master percussionist in the Ghanaian tradition from Petaluma, CA. "The room is nice and large," Evans explains, "But we didn't intend to focus on drum projects." One alternative project at Mesa

was Dr. Obvious (an underground trio) who worked with engineer Neil King.

San Francisco's Hyde Street Studios: The Robert Cray Band was in Studio D working with producer Dennis Walker and engineer Steve Savage for an upcoming Mercury release. Grammy nominees Charles Brown and Bonnie

—CONTINUED ON PAGE 139

N.Y. METRO REPORT

by Dan Daley

Wilbur Systems Ltd., owned by Will Schillinger, has designed and installed two digital artist studios, which both recently went online in Manhattan. Bassist Will Lee's 24-track setup in his Soho apartment is based around two Akai A-DAM digital 12-tracks and Sound Tools/SampleCells. The console is a 32x32 Allen & Heath Sigma. The room can track live dates and has an iso booth. The other installation was City Sound Productions for Bob Kirschner, with a Soundtracs Megas console, Sound Tools and a large MIDI complement. "I'm seeing more all-digital artist studios cropping up in town lately," Schillinger says, noting that the two installations averaged a pretty reasonable \$125,000 each. "It's evidence

—CONTINUED ON PAGE 136

Studio A at East Hill Studios (NYC) with its 700-sq.-ft. live room as viewed from its SSL-equipped control room.



— FROM PAGE 135, N.Y. METRO

of the fact that the digital equipment is becoming a lot more affordable."

World-class studios are by nature affected by world events. Master Sound Astoria, a venerable film-scoring facility in Queens, NY, began building a similar 48-track digital facility in Riga, Latvia, two years ago in what was then the Soviet Union, looking to avail itself of the region's orchestral capabilities for cost-effective film scoring.

Since then, according to Maxine Cherin, one of the studio's owners, cataclysmic political, economic and social changes have ground the project to a halt. The building is finished, and

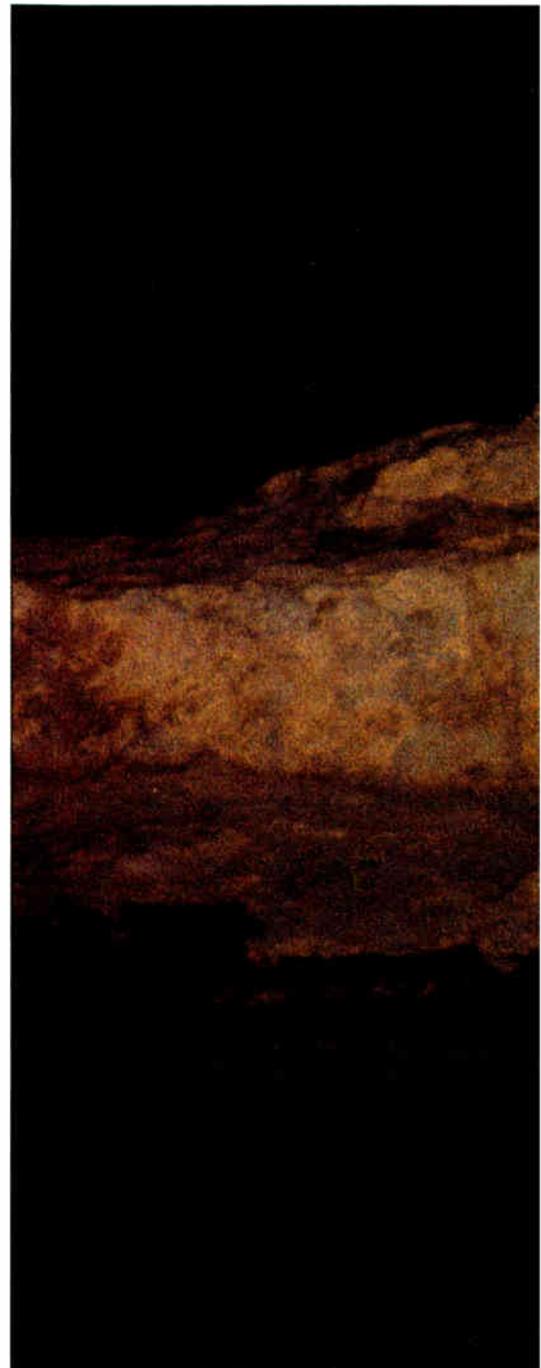
equipment for the studio has been purchased but not installed, awaiting resolution of the situation in Latvia, which is now part of what is known as the C.I.S. "We had meetings in November over there, and the people we met with are no longer in those positions," she says. "We're cautiously optimistic, but we need to be realistic at the same time. These things are simply beyond anyone's control."

Platinum Island added a Neve 8128 console in late December in the Platinum West room. The desk, purchased from L.A.'s Studio 55, has full-sweep, 4-band EQ and 56 modules. Necam 96 automation is in place, but Flying

Faders is expected to be installed by March, according to studio owner Richard Kessler. The studio also added a Studer A800, bringing the room up to 48 tracks, as well as TimeLine Lynx sync and a MIDI rack. "I felt the market needed an affordable 48-track situation," Kessler notes. "This console is the immediate predecessor to the V Series, so it has the technology, and I can offer a first-class room at a better rate."

Home Base Sound closed December 1. According to Drew Milano, one of its owners, four production companies that owed it considerable sums on finished masters went out of business.

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Home Base, formerly Secret Sound, had two 24-track rooms and one edit suite. Equipment was sold at a distress sale, Milano says.

ARcoustics Inc., a Manhattan studio design/building firm, is looking to enlighten project studio owners about their acoustical spaces. "Speakers in project rooms are almost always close-field," says Francis Daniel, the company's acoustician. "So the studio's acoustic requirements are reduced but not eliminated." ARcoustics is offering several acoustical products for project rooms that were originally developed for commercial facilities, including the Linear 85™ linear absorption panel,

which absorbs frequencies equally, and the Softedge™, a fabric-covered foam-roll treatment for meter bridges, controlling console acoustic diffraction.

Fax upgrades, trends, gossip, innuendo, outuendo and other New York-type stuff to Dan at (212) 685-4783. ■

— FROM PAGE 134, L.A. GRAPEVINE

eventually get back to the manufacturer in an attempt to provide feedback from the real world.)

Another submenu lists local events such as "shootouts" between competing equipment, trade shows and meet-

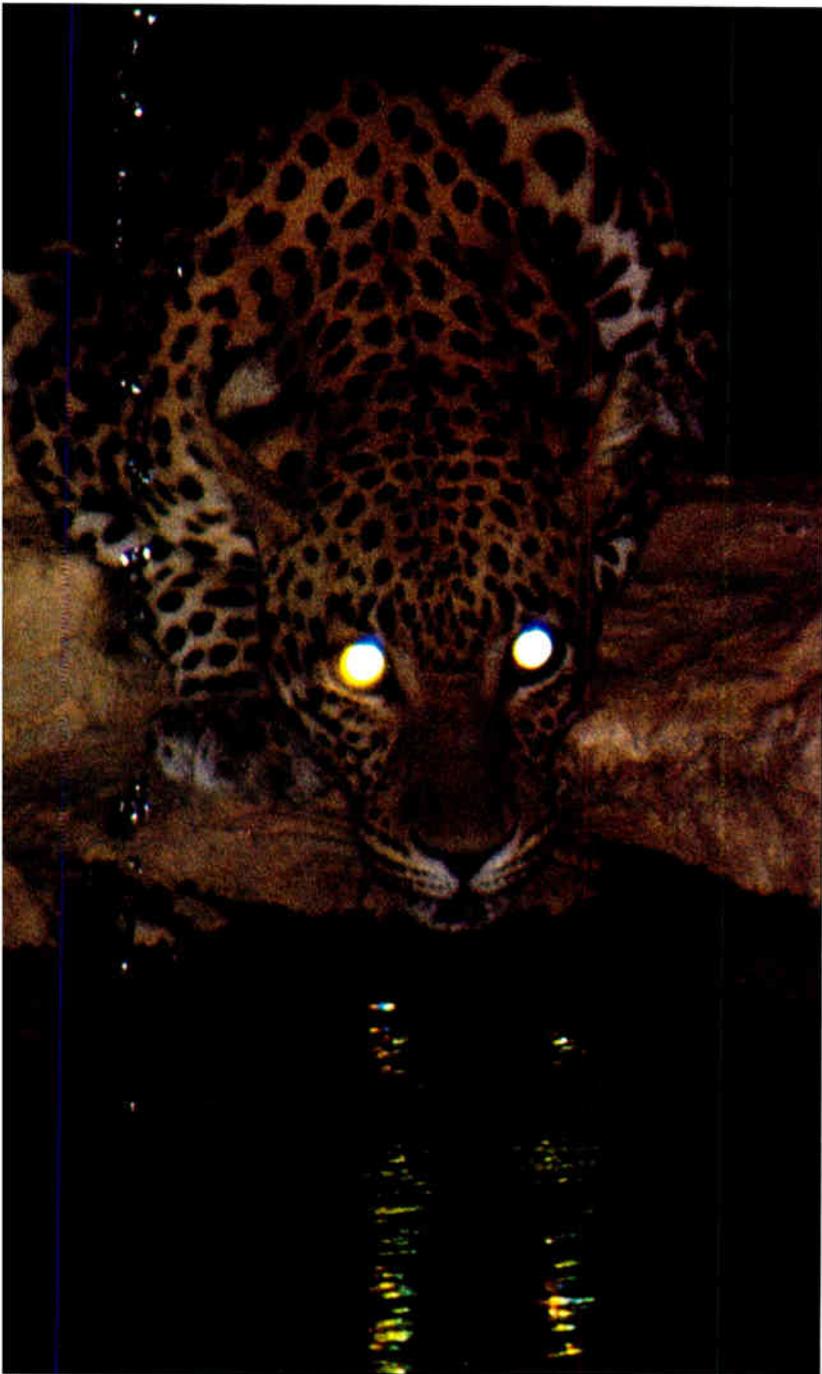
ings. The "How It's Being Done" and "How It Should Be Done" sections concern studio procedures, and when you get tired of business, you can check out a collection of stories and jokes. To access it from any kind of computer, dial (818) 989-0839 through your modem and telecommunications software, and just follow the instructions onscreen.

In a sort of related story, there have been at least two armed robberies of studios in the Los Angeles area that fit the same pattern. You can get the details through the database.

Another useful resource for Los Angeles-area post-production facilities

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OK. IT'S ALL YOURS.



— FROM PAGE 137. L.A. GRAPEVINE

is an organization called the International Teleproduction Society. Membership is open to both audio and video post houses. "ITS is doing work that mirrors, in large part, what HARP is doing in the areas of taxation, benefits, and discussing standardization and formats with manufacturers," says Jim Mandell, CEO of Interlok and an ITS board member. "I would definitely advise any audio post house to consider joining."

Two advantages are a monthly report of ITS members' delinquent clients (called a "Credit Exchange"), and

a "How's Business" survey. The Southern California chapter is apparently one of the largest. For membership information, contact chapter president Ron Burdette at Sunset Post, (818) 956-7912.

Speaking of Interlok, the four-room facility has undergone a lot of changes in recent years and has found an interesting way to expand. Interlok is located in L.A.'s Crossroads of the World, the city's first outdoor shopping mall, built in 1936. "We market our location," Mandell explains. "Our motto is 'Ambience and Artistry in Audio Post.'"

Studio 4 opened about a year-and-a-half ago and recently upgraded with a custom Quad 8 ScreenStar console, Sony PCM-3324 and Otari MTR-90. In addition, it houses the second of Interlok's custom-designed Emulator III/Mac II workstations. The room was built especially to service The Family Channel, for whom Interlok has completed three seasons of *The New Zorro* series. Other projects are Steven Spielberg's on-again/off-again *Family Dog* and Fox's *Get A Life*. Mandell and company have leased additional space and moved their offices upstairs to make room for Studio 5, which will be devoted to prelays.

A unique addition to Interlok's endeavors is a niche mail-order business called Studio Pro. Through it, Interlok sells about 140 different studio-related products and accessories, such as rack mounts, shelves, lighting solutions, "inventions," forms and small equipment. For a catalog, call (800) 347-7852.

Bell Sound Studio's manager, Chris Smith, told me a Neve 8128 recently replaced a Quad 8 in Studio A; it was upgraded in December with Flying Faders. The Quad 8 now resides in Studio B. Bell has equipped each of three rooms with a digital audio workstation (two from Dyaxis and one Sound Tools). The studio's specialty is TV and radio commercials, and they do frequent sessions via satellite with studios across the country. The future holds more video work because, Smith says, "We want to be more of a one-stop, to fulfill the needs of the clients we already have. In fact, we have plans to buy a 1-inch machine within the next month."

Odds and Ends: As of November, Red Zone can offer clients Flying Faders, four Lynx modules interfaced through a CCU and Supervisor package, and a Neve 33609/C outboard stereo limiter/compressor... At Andora, Aurora Ali has joined the staff as traffic manager and project coordinator. Ali left a position as assistant in A&R administration for Hollywood Records... On the opposite side of town, Larrabee West closed down in late 1991 for a period of refurbishment. The Larrabee North expansion will serve clients until the original facility comes back online.

Send L.A. 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. ■



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— FROM PAGE 135, SESSIONS & STUDIO NEWS

Raitt were recording a duet for Brown's latest Bullseye release; Ron Levy produced the sessions, with engineers Terry Becker and Steve Rosenthal and assistant Tom Doty. Chris Isaak and Jimmy Pugh (keyboardist from Robert Cray's band) were working on an album for Reprise Records with engineer Mark Needham and assistant Matt Kelley. TNT recording artist 2PAC, who appeared in the film *Juice*, was putting down tracks with engineer Matt Kelley and assistant Ross Yeo.

Brilliant Studios has been busy in San Francisco. Producer Norman Kerner was working with Warner Bros. act Sister Double Happiness on an acoustic tune for an upcoming maxi-single. Speaking of jazz, guitarist Bruce Forman came in with saxman Joe Henderson and percussionist John Santos to record with engineer Karl Derfler for Forman's latest Kamei Records release.

Remaining in San Francisco, at Sandy Pearlman's Alpha & Omega Recording Studios, Chris Isaak was doing overdubs with engineer Mark Needham for Isaak's new album; MCA artists Shanghai Pearl were cutting tracks with guest musician Jimmy Pugh providing B-3 organ; and Blue Oyster Cult was slated to work on their upcoming album with their longtime producer Pearlman in February.

In Westminster, CO, Colorado Sound reports Rodney Mills (.38 Special, Doobie Brothers) produced/engineered a project with Denver-based Valor for Famous Music. Dotsero started their third album for Nova Records with producer/engineer Kevin Clock. The Samples were working on an album produced, engineered and mixed by Jim Scott.

Triad Studios (Redmond, WA) has been booked: Engineer Larz Nefzger recorded Eric Tingstad and Nancy Rumbel's recent release *The Garden*. Working with producer Paul Speer on the Narada Records' release, Nefzger used Triad's new Sony PCM-3324 digital multitrack. Also at Triad, Gary Thompson, known as Triad's nightowl, worked with local bands Vile Boogie, Misköl and Sweet Sister Jam.

At Jeff Roth's Focused Audio in San Francisco, engineer Jay Shilliday (who came over from One Pass after the fire) has been putting Focused's AMS 16 Plus AudioFile system to good use with R&B vocalist Frank Gomus. The Fresh Trax production team of Shawn Hayes and Mikel Russell is handling the

production of the digital demo. After hearing snatches of Gomus' demo, shadings of Luther Vandross immediately came to mind. Word has it that Motown is interested in the Bay Area vocalist.

Russian Hill Recording (San Francisco) had guitarist J.J. Cale co-producing John Hammond Jr. with Mike Kappus for an upcoming album. Sam Lehemer engineered the weeklong sessions in Studio A with Michael Ahearn and Christopher Hayners assisting...Up in Vancouver, Mushroom Studios recently hosted the Blüchunks from Berkeley, CA, with local engineer John MacLean and Mushroom assistant Blair Calibaba...At Klub Kev's recording company in Seattle, Scott Spain engineered and produced an album project for Silver Shadow entitled *Me and My Shadow*.

SOUTHERN CALIFORNIA

Producer Walter Becker and engineer Roger Nichols were at Soundworks West mixing Marty Krystall's album for Windham Hill...At Take One Recording Studios (Burbank) EAZY-E recorded two songs for an upcoming NWA album, produced by Jimmy Z and featuring performances by Slash and Matt Sorum of Guns 'N Roses, with Micajah Ryan engineering and assistant Randy Pekich...GRP artist Don Grusin was at Andora Studios (Hollywood) recording his new album with engineer Don Murray...At 41-B Studios in Westlake Village, CA, producers Joe Okuda and Randy Peterson put the finishing touches on Roberta Flack's new album. Engineering on the EMI project was shared by Tom Vicari and Peter Arata...Warner Bros. artist k.d. lang was at Skip Saylor Recording (L.A.) overdubbing and mixing her new album with producers Greg Penny and Ben Mink, and engineers Marc Ramer and Greg Penny...Followup to *Smell The Glove*: Spinal Tap recently stopped by Sunset Sound Factory (Hollywood) to track their upcoming MCA release. Steve Lukather produced, Niko Bolas engineered and Mike Piersante assisted the sessions. Joe Satriani added some sizzling guitar to the Tap tunes recorded in "Dobly." Los Lobos were also at Sunset working on overdubs for their Slash release with producer Mitchell Froom and engineer Tchad Blake...

NORTHEAST

Jay Beckenstein (of Spyro Gyra fame) laid down sax tracks at Beartracks

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(Suffern, NY) for the Atco Records debut of Dream Theater. David Prater produced, Doug Oberkircher engineered and Stephen Regina assisted on the project...SenatorFlux recorded their latest Emergo release at Oz Recording Studio (Balto, MD) with engineer Eli Janney...Small Town, No Airport completed their latest album at Oak Grove Recording in Malden, MA. Rob Lehman engineered the project with David Westner assisting...New York's Skyline Studios hosted Rock 'n' Roll Hall of Fame inductee Steve Cropper as he recorded tracks for the new Blues Brothers project for Warner Bros., with Steve Boyer at the board...



Reunion at Windmark Studios (Virginia Beach): (back row LtoR) drummer Roger Cox, and original members of Springsteen's E Street band, Gary Tallent and Danny Federici; (front row LtoR) Billy Chinnock (original singer for the Downtown Tangiers Band) and Windmark president Michael Marquart. Stewart Harris co-produced the session.

SOUTHEAST

Queen Latifah was at Criteria Recording Studios (Miami) with Naughty by Nature. Engineering the sessions were Ted Stein and Eddie Miller with assistance from Andrew Roshberg...The Black Crowes invaded Atlanta's Southern Tracks Recording to work on their second album for Def American Records. The album was produced by George Drakoulias and engineered by Brendan O'Brien...At MIDILAND Recording Studios (Coral Gables, FL)

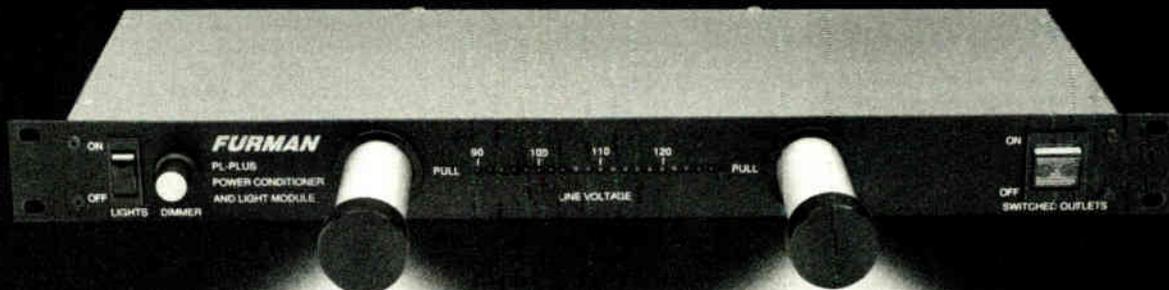
Miami's hot local band R.I.P. was in with Jose Blanco laying down tracks; and "the Merengue King" Wilfredo Vargas was cutting tracks and mixing

his upcoming album...

SOUTHWEST

Planet Dallas had the alternative-rock

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band The Nixons come in from Oklahoma to record a demo project with producer Patrick Keel and engineer Rick Rooney; and alternative-funk band Ezra's Poundcake from Waco worked with engineer Ben Yeager... Sound Arts Recording Studio in Houston is staying busy recording rap artists Prince Johnny C., Too Much Trouble, Gangster Nip and Big Mellow. At the controls was studio owner Jeff Wells for the Rap-A-Lot Records projects...

NORTH CENTRAL

England's Pretty Things returned to Chicago's Seagrape Recording Studios



At Studio A (Dearborn Heights, MI) engineer John Jaszcz (left) and producer Fred Hammond worked on a mix for Commisioned's upcoming release.

to record another album. Led by vocalist Phil May and ex-Mekon guitarist Dick Taylor the band includes drummer Jimmy McCarty (formerly with the Yardbirds) and bassist Richard Hite (formerly with Canned Heat). George Paulas produced the project while Mike Konopka and Tom Haban engineered...

STUDIO NEWS

Scott Singer Productions (San Francisco) expanded its facility to include an acoustic recording room and conference center. New equipment includes a Tascam ATR-80 16-track and a DA-30 DAT recorder... Attention folk, jazz and/or blues radio programmers,

distributors and music reviewers: Kristi Nebel has put together record release kits for independent producers and artists who would like to send their music to interested folks in the music industry. If you are a radio programmer, music distributor or reviewer who would like to be included in the mailing lists, or if you like more info on Nebel's promotional kits contact her via Icebird Record Co., 5109 Pt. Fosclick Dr. NW, #E155, Gig Harbor, WA 98335; or call (206) 884-9705... Zeta Recording Studios in Toledo, OH, recently installed a 32-input Hill Concept 8400 console into their facility, which is

jointly owned and operated by Windham Hill recording artist Tim Story and engineer Jim Kenzie... Resurrection Recording Studio opened in Eden Prairie, MN, in October of 1991. The 24-track studio, designed by acclaimed architect David Ahl, is five minutes from Paisley Park Studios and Flyte Tyme Studios, and fifteen minutes from downtown Minneapolis... Up in Toronto, Ontario, Reaction Studios recently completed a major upgrade: Terry Medweddyk of Group One Acoustics handled the acoustic design while Dektek Audio Technologies took care of equipment installation, which included an SSL SL4000G, CF2000 monitors, and Studer Dyaxis with a Mac II.

Send nationwide sessions and studio news to sessions editor Jeff Forlenza c/o *Mix* magazine, 6400 Hollis Street #12, Emeryville, CA 94608. ■

ONE STEP AHEAD

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MIX

—FROM PAGE 88

except the most trivial problems, you'll want a heavy-duty utility designed to diagnose and fix a wide variety of conditions. Norton Utilities (Symantec Corp., Cupertino, Calif.) is an excellent one, with a particularly well-designed interface that asks you to describe symptoms, gives you recommendations and even describes in fairly elaborate detail what it's doing as it makes repairs. Norton Utilities is also available for MS-DOS machines. (In fact, prior to developing the Mac version, the original developer, Peter Norton, was already well-known for his MS-DOS diagnostic package.)

The Parameter Random Access Memory (PRAM) is a section of RAM that contains low-level information for the Mac's operating system. Often mysterious crashes and other problems can be fixed by "zapping" the PRAM. To do this, hold the option, shift and command keys while choosing "control panel" from the Apple menu. A dialog box lets you confirm your decision. This causes the PRAM to revert to a default state. You will probably subsequently need to reset your computer's clock, and you may also need to change your start-up device from the control panel if you don't want it to be your internal hard drive.

Optimizing Your System

Another way of reducing computer downtime is to optimize your system's hardware and software. Let's consider the hardware side first. It's important to protect your computer from power surges and sags. At the very least, you should run your computer off a separate circuit from that used by your audio equipment, and you should have a surge protection device in the circuit to prevent frying critical components. If you want maximum insurance against the vagaries of line power you might want to incorporate an AC line-regulated uninterruptible power supply system (UPS) from a manufacturer like Tripp Lite (see "Chip Shots"), Clary Corp. (San Gabriel, Calif.) or Best Power Technology (Necedah, Wis.). Such a device will not only protect the computer's sensitive components, but it will also prevent loss of data when the power fails.

With RAM chips at about \$40 per megabyte, it's a good time to maximize

the RAM capacity of your computer. Increased RAM is a great time saver: The more you have, the more programs you can have open simultaneously under Multifinder. And if you're a Sound Tools user, more RAM means you have access to larger gulps of audio, since digital audio is stored in RAM when you play back.

Another place to optimize your PC's performance is to look at your chain of SCSI devices. Theoretically, you can have up to seven SCSI devices (hard disks, CD-ROM drives, SCSI-based samplers) attached to your computer. In practice, however, such a feat is like having seven acrobats standing on top of each other. In both cases you'd better know what you're doing. The maximum recommended cable length is nine feet; the last device must be properly terminated, and each device must have a unique SCSI ID number. I've had best results with my CD-ROM drive set up as the *last* device in the chain. Improper configuration can result in audio noise in Sound Designer II, program lockups, and outright refusal of the computer to start up.

One last note on hardware for improving the performance of your computer: Several companies make accelerator cards for the Mac. One of them, Daystar Digital (Flowery Branch, Ga.) has a new board, called the PowerCache, for the LC, SE30, II, IIx and IIfx. The board does not use a NuBus slot, and it comes in three speeds: 33 MHz, 40 MHz and 50 MHz. I have been using the 40MHz version on my Mac II, and it boosts the general performance of the machine to that of a IIfx with no negative side effects to date. It's a good deal for about \$850 from mail order houses.

On the software side, one sure way to slow down your computer and render it susceptible to random crashes is to load up your system folder with lots of fonts, desk accessories, CDEVs (control panel devices) and INITs. Proper "housecleaning" procedure starts with making sure you have no more than one system on any given hard drive. Then look at the system folder that you are using. My general rule of thumb is to get rid of anything I don't feel is essential to the tasks I must perform. Obviously there is a trade off involved here. For example, it's good to have a screen saver, but screen savers take up system memory, and as you add more of these little

INITs you increase the likelihood of conflicts and crashes. If you're not sure whether a particular piece of software is important, take it out of the system folder, put it in another temporary folder, restart the machine and see what happens. (Make sure you have a system on a floppy disk, so if the computer won't boot from the modified system on the hard disk you can at least boot up and replace the needed piece of code.)

The next step is to rebuild your desktop. The desktop is an invisible file that keeps track of all files on a particular hard drive. Over time, as you use your computer, the desktop file grows. Much of the information it contains becomes obsolete, with a side effect of slowing your computer down. This file can be updated and made to run faster simply by pressing the option and command keys while the disk is mounting. A dialog box will appear allowing you to confirm your intention. The only negative consequence is that you will lose all information you have typed in any "get info" dialog boxes for files on that drive.

All hard disks eventually become fragmented: After repeated writing, editing and erasing of data, what might appear to the user as one coherent file can actually consist of many pieces of data scattered in various different locations of the drive. This happens with increased frequency as a disk fills up. And when the data consists of digital audio, where access time is important, it can cause a problem. Silverlining (from La Cie Limited of Tualatin, Ore.) is a software utility designed to fix that problem. It optimizes your hard drive's performance by defragmenting the data on it. Silverlining is also capable of formatting a wide variety of hard drives. I highly recommend it.

Since I seem to be in the mood for recommending, I'll close with this one: BMUG is an excellent resource for Mac users. For a \$40 annual fee you get a bulletin board service with loads of software, a free help line operated by knowledgeable people, and a huge catalog (which BMUG refers to as a newsletter) with lots of interesting information—both general and obscure. The main number is (510) 549-BMUG. ■

Paul Potyén is an associate editor at Mix and owner of several pet computers.

NORTHWEST STUDIOS

Information in the following directory section is based on listing applications mailed earlier this year and was supplied by those facilities listed. *Mix* claims no responsibility for the accuracy of this information. Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.



Located outside of Portland in Wilsonville, Ore., Musicon was designed by Russ Berger to function primarily as a music recording room, although it also includes video lockup capabilities. The control room features a DDA AMR24 expanded frame console with bar graph meters on inputs, Studer A827 multitracks and custom diffusers. The main monitor system uses Tannoy System 215 DMT speakers with programable EQ setup by George Augsburger. **Photo:** Galbraith & Wilson.

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167	4 & 8 TRACK

Upcoming Directory Deadlines:

Southeast Recording Studios: **March 10, 1992**
 Independent Engineers and Producers: **April 10, 1992**
 Facility Designers and Suppliers: **May 11, 1992**

Mix listings procedure: Every month, *Mix* mails listing applications to recording studios and/or other vital facilities and services for the recording, sound and video production industries. There is a nominal charge to list a Boldface Listing (name, address, contact) and an Extended Listing (equipment, credits, specialization and photo or logo). If you would like to be listed in a *Mix* Directory, write or call the *Mix* Directories Department,

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- C11 Post-Production Company
- C12 Remote Truck
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- C14 Videotape Duplication

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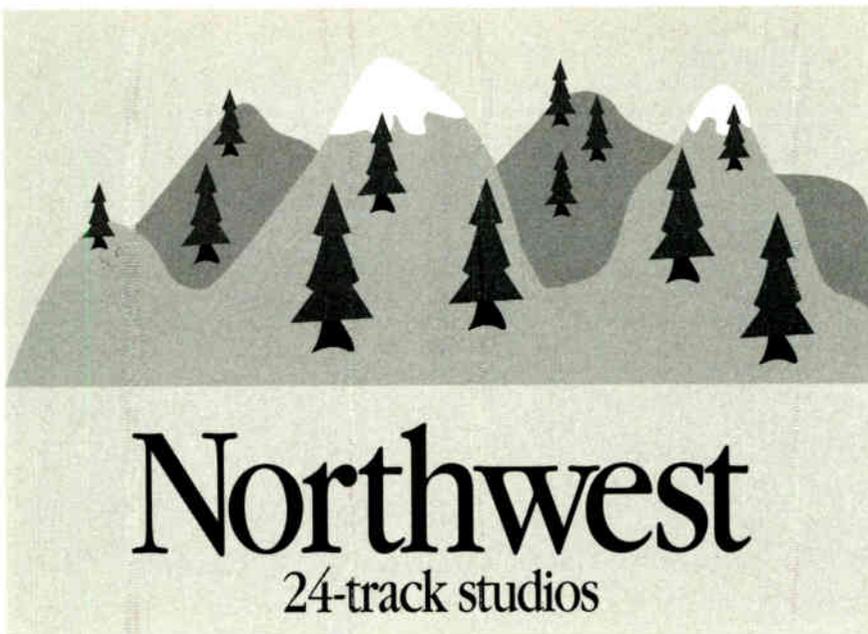
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[24+] AFFINITY PRIVATE MUSIC; DIVISION OF OMEGA ORGANIZATION INTERNATIONAL; also REMOTE RECORDING; PO Box 33623MX; Seattle, WA 98133; (206) 364-7881. Owner: Paren Company. **Manager:** Cameron Powers.

[24+] AKASHIC RECORDS GROUP; also REMOTE RECORDING; PO Box 395; Danville, CA 94526; (510) 837-7959. Owner: Stephen Jarvis. **Specialization & Credits:** High-end signal path rental solutions, 9 xp-24 SR Dolby systems, auto-switching for Studer A80/800/820/827, MCI JH-24 (Cannon or Tuchel), Sony AFF-24, Otari MTR-90/100, MX-80, Tascam ATR80, Ampex ATR-124, 3M M79, manual switching panel. Shipping available throughout the Western United States. 280 Dolby SR cards, stereo pair 361/363 SR/A Dolby systems, George Massenburg preamps, parametric EQ, limiter, Focusrite 115 pre/EQ, 131 dynamics, Neve class A 1084 pre/EQ, 1272 class A pre/dr... 10x2 class A mixers, 2254E limiters, API pre/550A EQ, Diark De Geer MOSFET mic/pre, Avalon class A mic/pre, 24 Maselec 9001 replacement EQ cards for SSL consoles, DCS 900 A/D converter, Panasonic DATS, Sony F-1, Meyers correction filter, Apogee D/A converter, tube mics, Demeter tube direct, B&K, Coles, AKG, Telefunken, Neumann, Sennheiser, Sony, Shure, Beyer, Electro-Voice mics, Genelec S-30NF monitors, Tannoy 10B speakers with Mastering Labs crossovers, Lexicon 480L and more. Rentals by the day, week, month, project. Please call for rates.

[24+] ALPHA & OMEGA RECORDING STUDIOS; 150 Bellam Blvd., Ste. 255; San Rafael, CA 94901; (415) 485-5675. Owner: Sandy Pearlman. **Manager:** Joli Valenti. **Engineers:** Marc Senasac, David Plank, Anne Mar a Scott, Ulrich Wild, Paul Mand, Peter Steinbach. **Dimensions:** Room A: studio 18x34, control room 14x19. (2) iso. booths. **Mixing Consoles:** API 45x36 w/ARMS moving fader automation, API 40x24 with 560 graphic EQs. **Audio Recorders:** Studer A20 24-track, Otari MTR-90 24-track, Ampex ATR-124 24-track, (2) Ampex ATR-124 24 w/16 track heads, (2) Ampex ATR-102 1/2-1/4 heads. **Cassette Recorders/Duplicators:** (3) Tascam 122 Mark II, Panasonic R-DAT. **Synchronization Systems:** (4) TimeLine Lynx. **Echo, Reverb & Delay Systems:** (2) Lexicon 480L, (2) Lexicon PCM42, Lexicon Prime Time II, AMS 15-80S, AMSRMX 16, Eventide SP 2016, (2) Eventide H3000, Eventide 969, Eventide Phaser, TC 2290, TC 1210, Publison JHM89B2, EMT 140ST plate. **Quantec Room Simulator. Other Outboard Equipment:** (2) iVasenberg stereo limiters, Tricent stereo limiter, (2) Drawmer 1960 tube stereo compressor, (4) dbx 160 limiter, (2) API 525: NTP limiter, Fairchild 660, Fairchild 670, (2) UREI LA-2A, (3) UREI 1176, (4) EAR 660, (6) Sontec DRC202, Valley People EMI PDM 156, (10) Kexpe II, (6) Aphex 612 gate, (8) Drawmer DS201, Massenberg EQ, (4) API 560 (2) EAR 822Q, Pultec MEQ, Pultec EQP-1A, Pultec HLF filter, Sontec parametric EQ, (12) Massenberg preamp, API 512, aphex Aural Exciter II, EXR exciter, BBE exciter, EAR mic preamp. **Microphones:** Neumann U89, Neumann U87, Neumann TLM170, Neumann KM100, AKG 460B, AKG C-414, AKG D-112, Sennheiser 421, Beyer MCT740, B&K 4011, B&K 4007, Shure SM57, Shure SM56, Shure SM81. **Monitor Amplifiers:** Bryston, Marantz tube, Phase Linear. **Monitor Speakers:** TAD MSI, (2) Yamaha NS-10M. **Musical Instruments:** E-mu SP-1200 disk drive drum machine, Baldwin 6' grand piano, (2) Marshall JCM-800 w/Celision speakers, (2) Marshall JCM-800 head.

[24+] ART OF EARS; 12174 Fell St.; San Francisco, CA 94117; (415) 864-4641. Owner: Andre Ernst. **Manager:** Nancy Urquidez.



**AUDIO PRODUCTION GROUP
Sacramento, CA**

[24+] AUDIO PRODUCTION GROUP; 3100 Fite Circle, Ste. 105; Sacramento, CA 95827; (916) 362-2540; FAX: (916) 368-4133. Owner: Ralph and Diane Stover. **Manager:** Diane Stover. **Engineers:** Ralph Stover, David Houston, Cecil Ramirez. **Mixing Consoles:** Neotek Elite 32x24 w/MIDI mute automation. **Audio Recorders:** AMS AudioFile digital recording/editing system, Studer A80 MkIV 24-track, Studer A81 22-track w/center time code, Otari MX-5050, Panasonic SV-3500 DAT, Panasonic SV-2500 DAT. **Cassette Recorders/Duplicators:** Akai GX912, NAD. **Noise Reduction Equipment:** (2) Dolby SR. **Synchronization Systems:** (3) TimeLine Lynx time code module, Opcode, MIDI Time Piece. **Echo, Reverb & Delay Systems:** Lexicon 480L w/LARC, Lexicon PCM70, TC Electronic 2290, Yamaha REV7, Yamaha SPX90, Alesis M Dverb II, ART Multiverb, Alesis Microverb, Yamaha R1000. **Other Outboard Equipment:** (4) dbx 903 compressors, (4) dbx 904 Kexpe, dbx 902 de-esser, Drawmer dual gate, Symmetrix Quad expander gate, Eventide H3000 Ultra Harmonizer, BBE 422A Sonic Maximizer. **Microphones:** AKG Tube AKG C-414, Neumann U87, Neumann U89, (2) Neumann KM84, Beyer M380, (2) AKG Dynamic. **Monitor Amplifiers:** CSC, Perrault, (2) Rane headphone amps. **Monitor Speakers:** (2) Westlake BBSM-8, (2) Yamaha NS-10M. **Musical Instruments:** Emula or III w/8 MB RAM, CD ROM and OMI w/in/vison library and 45MB removable HD, Emulator II w/CD-ROM and OMI library, E-mu SP-1200, E-mu SP-12 w/DrumFile, Roland Octapad, Roland R-8M, Alessi HR-16, Roland MKS-80, Roland MKS-20, Roland D-50, Oberheim DPX-1, Ensoniq ESG-1, Yamaha KX88, Yamaha TX802, Yamaha DX7HFD, Steinway grand piano, Spector bass guitar, Fender Jazz bass, Steinberger w/Roland synth electronics. **Other MIDI Equipment:** MegaMix automation system, Sycologic 16x32 MIDI switcher, Yamaha MJC8 MIDI patchbay, Macintosh SE w/4MB RAM, Performer 3.61,Alchemy, Sound Designer, Q-sheet, Cue Film music system, Opcode Librarian. **Video Equipment:** JVC CR850 3/4" w/remote, Sony SLV-676 1/2" hi fi VHS w/remote, Sony color monitor, (2) NEC color monitor, Sigma Electronic black signal generator. **Other:** (8) Simon Systems integrated direct box: extensive music and SFX libraries. **Rates:** Please call. Spe-

cialization & Credits: Audio Production Group is a full-service facility specializing in all aspects of recording, from artist pre-production to the final mix. With rooms that feature excellent acoustics, great gear and a comfortable working environment, APG has built a solid reputation among artists and producers who want the very best for their projects. We also handle audio post-production for motion pictures and video productions, with complete Foley, ADR, SFX and mix facilities. Our experienced staff of engineers, composers, arrangers and technicians will help you complete your project on time and within your budget in a relaxed and creative atmosphere. For any question regarding our services, please call Diane.



**AVALANCHE RECORDING STUDIOS
Northglenn, CO**

[24+] AVALANCHE RECORDING STUDIOS; 10650 Irma Dr. #27; Northglenn, CO 80233; (303) 452-0498. Owner: Avalanche Recording Studios. **Manager:** Linda Warman. **Engineers:** George Counnas, Harry Warman, Bill Thomas, Steve Forgy. **Dimensions:** Studio 44x30, control room 20x30. **Mixing Consoles:** Soundcraft 2400 52 channel w/SMPTE-based automation. **Audio Recorders:** Sony/MCI JH-24 24-track, Sony/MCI JH-24 16-track, Sony/MCI JH-110C 1/2/ 4-track 1/2" or 1/4", Studer Revox PR99 2-track 1/4", Studer Revox A77 2-track 1/4", Sony PCM-2500 DAT. **Cassette Recorders/Duplicators:** Technics RSB100. **Noise Reduction Equipment:** (2) Dolby SR. **Synchronization Systems:** (3) TimeLine Lynx. **Echo, Reverb & Delay Systems:** Lexicon 92, Lexicon 480L, Lexicon PCM42, (2) Lexicon PCM70, Lexicon 95, Audience RFS-2 plate reverb, MXR flanger/doubler, Eventide H3000 Ultra-Harmonizer, Roland Stereo Chorus, Ecoplate II, Lexicon PCM41, TC Electronic 2290 (12 sec.), Eventide 949 Harmonizer. **Other Outboard Equipment:** (2) Aphex CX1 compressor/expander, (2) B&B F-2 EQ, (2) dbx 160, (3) UREI 1176LN, dbx 263X, dbx 166, UREI 546 parametric EQ, Aphex Type B Aural Exciter, (2) Symetrix 522 stereo expander gate, (2) Pultec EQ (tube), (2) Electropace Strate Gate, TC Electronics 1128 programable EQ, BBE 822A Sonic Maximizer. **Microphones:** (2) Neumann U87, (2) Neumann U47, Neumann U48 tube, (2) Neumann U67 tube, (4) AKG C-414, (5) AKG C-451, AKG D-112, (2) Telefunken ELAM 251 tube, (2) Sony C-37A tube, Sony C-37P, (6) Sennheiser 421, Sennheiser 441, RCA 77, (2) Electro-Voice RE20, (2) Crown PZM-30GPB, (2) Beyer M260, (5) Shure SM57. **Monitor Amplifiers:** UREI 6500, Haller 200, Phase Linear 400, Technics SE-9080. **Monitor Speakers:** (2) JBL 4430, (2) Yamaha NS-10, (2) Tannoy SRM-12, (2) Auratone cube. **Musical Instruments:** Yamaha C7 grand piano, Hammond B-3 w/Leslie 147, Korg M1 keyboard, Yamaha RX11 drum machine, Fender 1965 P bass, Fender 1965 Telecaster. **Other MIDI Equipment:** Programmers available w/various equipment. **Video Equipment:** JVC 3/4" recorder, Panasonic CT-1930 19" color monitor. **Other:** Seymour Duncan 100-watt convertible (all modules), Fender Bassman 10. **Rates:** Upon request. Rate card and color brochure available. **Specialization & Credits:** We are pleased to offer our clients a complete sound effects and music library. Up to 40-track capability with automated mixes also available. Accommodation service for mountain retreat Denver's best hotels with transportation arrangements available. Less than an hour drive to Rocky Mountain serenity. Top studio musicians, producers, arrangers and composers. Digital 2-track mastering, synchronized lockup and additional equipment available upon request. **Credits:** Camper Van Beethoven, J.B. Allstars, Kip Winger, Kenny Loggins, Fiona, Pretenders, The Winans, Michael McDonald, the Four Tops, Leon Russell, Jock Bartley, INXS, TNT, Highway 101, Nelson, Flash Cadillac, Producers: Jimmy Waldo, Paul Worley, Beau Hill, Bill Porter, Geoff Workman. We continue to offer our clients the best in state-of-the-art equipment, engineers and personal service. Avalanche has a highly creative and comfortable atmosphere and total privacy.

[24+] BAD ANIMALS/SEATTLE; 2212 4th Ave.; Seattle, WA 98121; (206) 443-4666; FAX: (206) 441-2910. Owner: Lawson Productions Inc. **Manager:** Steve Smith. **Engineers:** Reed Ruddy, Ed Brooks, Jason Brown, Vince Werner, Eli Brackett, Jim Wilson, Gary Spradling, Sony Felho, Carol Howell. **Dimensions:** Room X: studio 35x60, control room 25x27, Room

—LISTING AND PHOTO/LOGO CONTINUED TOP OF NEXT PAGE



BAD ANIMALS SEATTLE

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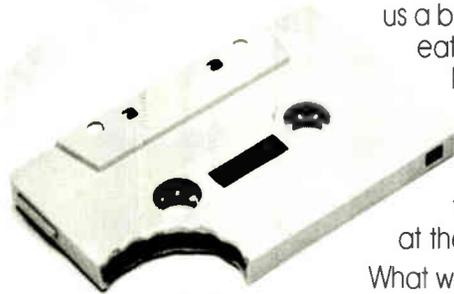
BAD ANIMALS/SEATTLE
Seattle, WA

A: studio 32x25, control room 17x19. Room B: studio 19x29, control room 18.5x19. Room C: studio 8x8, control room 16x19. Room D: studio 8x12, control room 17x19. **Mixing Consoles:** SSL 4064 G 64 inputs w/Ultimation & Total Recall (Studio X), API w/DiskMix Moving Fader automation (Studio A), API w/ARMS DiskMix automation (Studio B), (2) Sony JH636 w/DiskMix automation (Studios C and D), Tangent 3216 (Studio E). **Audio Recorders:** (2) Sony 3324/A 24-track digital, Studer A827 24-track analog, Otari MTR-90 III 24-track analog, Sony JH-24 24-track analog, (2) Ampex ATR-100 2-track 1/4" and 1/2", Sony JH-110 8-track, (2) Sony APR-5003 w/center track, (7) Panasonic 3700 R-DAT, Sony 7030 time code R-DAT digital. **Cassette Recorders/Duplicators:** Kaba duplicator, (6) Nakamichi, Sony, Teac. **Noise Reduction Equipment:** Dolby A 24-track units, Dolby SR (XP-24), Dolby A, SR and dbx on all 2-track recorders. **Synchronization Systems:** TimeLine Lynx and Adams-Smith Zeta-3 (available to all studios). **Echo, Reverb & Delay Systems:** (2) Lexicon 480LX reverb and effects, Lexicon 224XL reverb, Lexicon 300 reverb and effects, (2) Prime time/Super Prime time, (3) Lexicon PCM42, (2) Eventide H3000, (2) AMSRMX 16, (2) EMT 140 plates, (2) Yamaha SPX1000, (2) Klark-Technik DN 780, (3) Yamaha SPX90, Dynacord DRP-20, TC 2290. **Other Outboard Equipment:** (9) LA-2A, (8) LA-3A, (6) 1176, 1178, (8) Gain Brain, (2) Summit tube compressor, Summit stereo tube compressor, Drawmer 1960 stereo tube compressor, (3) Sum-mit stereo tube EQ, (12) Neve modules model 1073, (2) ITI (Massenberg) parametric EQ, (4) Pultec EQP-1A3, (2) Pultec MEQ-5, (6) UREI 545 parametric EQ, (16) Keepep gate, (24) Rodger Mayer gate, (6) Drawmer DS-201 gate. **Microphones:** (120) AKG, Neumann, Electro-Voice, Beyer, Shure, Sennheiser and RCA. **Monitor Amplifiers:** Crest, Crown, Hafler, UREI. **Monitor Speakers:** TAD, Tannoy, JBL, UREI, Yamaha, Auratone. **Musical Instruments:** (2) Yamaha C7 grand piano, (2) drum kits, Hammond B-3 w/Leslie. **Other MIDI Equipment:** Fully equipped MIDI production studio. **Video Equipment:** Sony BVU-800, JVC CR-850, JVC CR-650, MCI 1" layback, (6) Sony video monitors. **Other:** Huge CD sound effects and needle drop library. **Digital Workstations:** (2) New England Digital Post Pro 16-track, New England Digital Post Pro 8-track. **Rates:** Call for rates. **Specialization & Credits:** Heart, Soundgarden, Pearl Jam, The Posies, Brian Eno, The Walkabouts, Faith No More, Dharma Bums, Sky Cries Mary, The Love Mongers, Steve Miller, The Duke Ellington Orchestra, Kodak, Boeing, Microsoft, Safeco Ins., Weyerhaeuser, Memorex. We've taken years of experience and put together a facility that rivals any in the world. Studio X has features in its construction that cannot be found anywhere on the planet. We recognize that people are the most important element in the creative process. To that end, we have a diverse and professional staff ready to make your project happen. Enjoy the beauty and recreational opportunities the Northwest offers while recording your project in a relaxed and professional atmosphere. Call for rates and further information.

[24+] **THE BANQUET SOUND STUDIOS;** also REMOTE RECORDING; 540B E. Todd Rd.; Santa Rosa, CA 95407; (707) 585-1325; FAX: (707) 585-1330. Owner: Warren Dennis. Manager: Warren Dennis.

[24+] **BAY RECORDS;** also REMOTE RECORDING; 1741 Alcatraz Ave.; Berkeley, CA 94703; (415) 428-2002. Owner: Michael Cogan. Manager: Michael Cogan. Engineers: Robert Shumaker—chief, Michael Cogan, David Pontecorvo, Bill Thompson, David Julian Gray. Dimensions: Studio 32x34, control room 15x20. **Mixing Consoles:** BIMIX 20x16, Bi-amp 1604. **Audio Recorders:** Otari 24-track MX-80, M79 16-track, Ampex ATR 800, M79 8-track 1", Studer B-67, Ampex AG440-4, (2) Panasonic DAT. **Cassette Recorders/Duplicators:** Onkyo. **Noise Reduction Equipment:** (2) Dolby A and SR. **Echo, Reverb & Delay Systems:** MICMIX Super C reverb, Yamaha SPX90, Lexicon 200 reverb, Effectron, Lexicon LXP-1/MRC. **Other Outboard Equipment:** dbx 160, (2) UREI 1176LN, Complex. **Microphones:** (4) Neumann U87, Neumann SM69, (4) Neumann KM83/84, Neumann KM86, RCA 77DX, (4) AKG C451, (20) various dynamic. **Monitor Ampli-**
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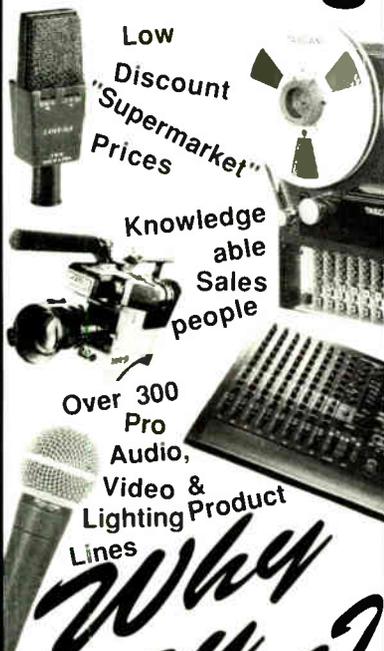
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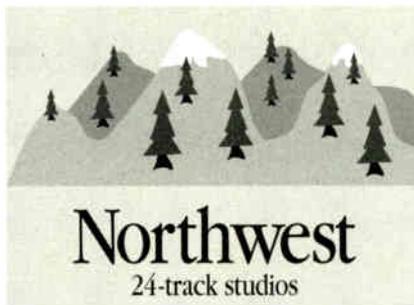
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fiers: (3) Hafler. **Monitor Speakers:** (4) TA-2, (2) JBL 4310. **Musical Instruments:** Yamaha C7D concert grand. **Other MIDI Equipment:** E-mu Emax SE, Roland MKS-7, Yamaha TX81Z, Aphex studio clock, I.V.L. Pitchrider 4000 MkII, Roland MKB-300, Macintosh IIcx, Digidesign Sound Tools II. **Rates:** \$65/hour for studio, \$45/hour MIDI prep room. **Specialization & Credits:** Bay Records Studio is proud to announce the addition of <studio>rd, a full-scale MIDIprep room with hard disk digital music editing. Also added to our staff are MIDIcian Bill Thompson and computer music expert David Julian Gray. Recent clients include ROVA, Henry Kaiser, Merl Saunders. We still do complete CD, cassette and even LP packages.



BAYVIEW STUDIO
Richmond, CA

[24+] **BAYVIEW STUDIO;** 1368 S. 49th St.; Richmond, CA 94804; (510) 237-4066. **Owner:** Robert Hall, Stephen Suda. **Engineers:** Tom Anderson, Jack Crymes, Robert Beaton, Pete Carlson. **Dimensions:** Studio A 45x20x17, studio B 19x16x17, control room 14x18x8. **Mixing Consoles:** Soundcraft TS24 40x24. **Audio Recorders:** Studer A800 Mk III 24-track, Ampex ATR-102 2-track, Studer A800 Mk IV RC 2-track 1/2", Panasonic SV-3500 R-DAT. **Echo, Reverb & Delay Systems:** (2) EMT 140 stereo plate, Yamaha REV7, Roland SRV-2000, Yamaha SPX90, Yamaha SPX90II, Roland SDE-1000. **Other Outboard Equipment:** Eventide 949 Harmonizer, Lexicon Prime Time II, UREI 1176, (2) UREI LA-4A, Teletronix LA-2A, dbx 160, Valley People Dyna-Mites, Pultec MEQ-5, Dolby 361, TC Electronic sampler, Dolby SR, Aphex 612 expander/gate, Symetrix 544 gates. **Microphones:** AKG 414EB, AKG 414EB-P48, C-451E, 452EB, C-422 stereo, C-460B, Telefunken Elam 251, Sony C-37A, Neumann U87, Neumann KM84, Neumann U47 FET, Neumann M49B, Crown PZM, EV RE20, Shure SM57, Shure SM7, Sennheiser 421, Sennheiser PML DC-73, Countryman Isomax, Countryman direct boxes, Sony ECM-50. **Monitor Amplifiers:** Hafler. **Monitor Speakers:** Meyer Sound Labs 833, Yamaha NS-10, JBL 4311, Auratone 5C, Ed Long MDM-4, Meyer HD-1. **Musical Instruments:** Gretsch and Yamaha "R" Series, Simmons drums available by arrangement, Fender basses and guitars (vintage), Martin guitars, Gretsch guitars, Fender amp (old), Ampeg B-15 bass amp also available by arrangement, Steinway B grand piano built in 1929, Hammond B-3 organ w/Leslie unit, Roland Juno 106. **Rates:** Please call for rates.

[24+] **BEAR CREEK RECORDING AND MUSIC PRODUCTION;** also REMOTE RECORDING; 6313 Malty Rd.; Woodinville, WA 98072; (206) 481-4100; FAX: (206) 486-2718. **Owner:** Joe Hadlock. **Manager:** Pam DeMeerleer.

[24+] **BRILLIANT STUDIOS;** 444 Natoma St.; San Francisco, CA 94124; (415) 543-4262; FAX: (415) 543-4586. **Owner:** Brilliant Studios Inc. **Manager:** Laura Clark. **Engineers:** Norman Kerner & the Bay Area's top indie engineers: Karl Derfler, David Plank, Marc Senasac, Bryan Zee, Adam Munoz—chief asst. engineer, Mack Clark—technical engineer. **Dimensions:** Room 1: studio 40x45 w/35' ceiling. Control room: 18x24. Isolation booth: 10x12. MIDI room: 15x15. **Mixing Consoles:** Trident mod. Series 80. **Audio Recorders:**

Studer A80A MkIII 24-track, Ampex ATR-102 2-track with 1/2" and 1/4" heads, Panasonic SRV-3500 DAT. **Cassette Recorders/Duplicators:** Nakamichi MR-2B, Awa 780. **Noise Reduction Equipment:** Dolby SR 2-channels. **Echo, Reverb & Delay Systems:** Lang PEQ-2A EQ, (2) UREI Tektronics LA-2A tube compressors, (2) Pultec EQH-2 tube EQ, (2) Neve 1073 modules/pre-amps and EQ, (2) Trident A-range modules/pre-amps and EQ, (2) MXR original instant flanger, Eventide H3000 SE Ultra-Harmonizer, (2) Lexicon PMC70 digital reverb, (2) Lexicon PCM42 digital delay, Massenberg Model 8200 stereo program EQ Ser. III, (2) UREI LA-4 comp/limiter, (2) dbx 165A comp/limiter, Aphex expander/gate, Aphex Type III Aural Exciter, Drawmer DS201 dual gate, (2) Valley People Dyna-Mite expander/gate, Valley People 415 de-esser, Alessi Quadraverb, Wendell Jr. drum trigger. **Microphones:** (2) Neumann U67 tube—Klaus Heyne modified, Neumann M49 tube, AKG C-414/EB CL-12 brass capsules, Neumann U87 condenser, (4) Neumann KM84 condenser, (8) Shure SM57 dynamic, (6) Sennheiser HD-421 dynamic, AKG D-112 dynamic, AKG C-460B condenser, Sony C-37 condenser, Shure SM58 condenser, Sennheiser 441, (4) MD-421. **Monitor Amplifiers:** Meyers Sound MS1000A stereo amp, HD-1 onboard amp, QSC Model 1200. **Monitor Speakers:** Meyer Sound Labs 833 studio mains w/834 sub-woofer and CP10 processor, Meyer Sound Labs HD-1 near field, Yamaha NS-10, Realistic Minimus 7. **Musical Instruments:** Yamaha recording series drums, Roland MKS-20 piano module, various vintage and modern guitars, basses and amp. **Other MIDI Equipment:** Kawai M-8000 88-key weighted MIDI keyboard controller, Macintosh Apple SE 30 w/ 40 Meg hard disk, Mark of the Unicorn Performer sequencer software, Opcode Vision sequencing software, E-mu SP 1200 drum machine, Alessi HD-16 drum machine. **Specialization & Credits:** Brilliant Studios is the home of Norman Kerner's Brilliant Productions, a long-standing producer of records in the Bay Area. Built in the Kingswell Brother's Forge building (1864), Brilliant now offers the largest and liveliest recording room available in Northern California. In our first year of operation, we have booked both major and independent album projects, as well as film soundtrack work. Studio manager Laura Clark is extremely interested in hearing from qualified engineers and producers who might wish to use this extraordinary facility. Call for a tour and further information.

[24+] **KEN CARLTON RECORDING;** also REMOTE RECORDING; 11240 Hwy. 41; Madera, CA 93638; (209) 431-5275. **Owner:** Kenneth and Marilyn Carlton. **Manager:** Ken Carlton. **Engineers:** Ken Carlton, Donovan Dear. **Dimensions:** Studio 20x22, control room 14x17 w/8x8 piano alcove, iso room 9x10, vocal booth 5x10, equipment room 22x18. **Mixing Consoles:** Sound Workshop Series 34 32 x 24 w/Diskmix II. **Audio Recorders:** Panasonic SV-3700, JVC DS-DJ 9000 DAT w/SMPTE, Otari MTR-90 16/24-track, Otari MTR-12c-2 w/ ctc, Otari MTR-10 1/4" and 1/2" heads, Panasonic SV-250 DAT, Pioneer RT505 1/4-track. **Cassette Recorders/Duplicators:** (2) Akai GX-912, (1) Hitachi DE-7. **Noise Reduction Equipment:** Dolby SR (2 channels), Dynaflex. **Synchronization Systems:** Soundmaster 5 (3 machine system w/shuttle and GPI to CD player). **Echo, Reverb & Delay Systems:** Lexicon 224XL digital delay, Lexicon PCM70 digital delay, Ecoplate II, DeltaLab DL-3 DDL, Eventide 949 Harmonizer DDL, Marshall 5402 Time Modulator, Eventide H3000 Harmonizer DDL. **Other Outboard Equipment:** (2) dbx 165 comp/lim, ADR Vocal Stressor, ADR Stereo Express comp/lim/exp, (2) UREI LA-4, (2) UREI 1176LN, Drawmer DS-201 stereo noise gate, Orban 622B parametric EQ, Aphex Aural Exciter, Aphex stereo Compeller, Gatex noise gate. **Microphones:** Neumann TLM170, (2) Neumann U87, (2) Neumann U89, Neumann KM86, (2) AKG 414EB, (7) AKG 451EB, (2) Sennheiser 441, (9) Sennheiser 421, (2) EV RE20, EV RE16, Neumann RSM190 stereo/MS, (2) Crown PZM, Shure 56, (8) Countryman FET 85 DI. **Monitor Amplifiers:** (3) Bryston 4B, Hafler, (2) Symetrix headphone amp. **Monitor Speakers:** JBL 1430 w/TAD drivers bi-amped (control room), Yamaha NS-1000 (studio) Yamaha NS-10M Studio (control room), Auratones. **Musical Instruments:** (2) Kurzweil 250 fully loaded, Linn 9000 drums, Yamaha TX802, Yamaha C7 grand piano, Moog synth, Roland MKS-70, Roland D-550, Roland Juno-106, various guitars and effects. **Other MIDI Equipment:** Macintosh Plus w/Mark of the Unicorn Performer and Coda Finale, Opcode Studio 3 interface. **Video Equipment:** JVC CR8250 3/4" w/shuttle, Sony VO-5600, fast forward F-30 SMPTE generator/reader, Sony VHS Hi-Fi recorders, Fostex 4010 SMPTE generator/reader, Horta Micro-window, Sigma sync generator, (5) Sony monitor. **Other:** Studer CD player, Sound Ideas and Hollywood Edge SFX libraries. **Digital Workstations:** Spectral Synthesis 16-channel D.A.W. w/Waveform editing and synths engine option & SMPTE upgrade. **Rates:** Please call for rates.

[24+] **C.D. PRESENTS LTD.;** 1317 Grant Ave., Ste. 531; San Francisco, CA 94133; (415) 285-3348; FAX: (415) 641-7889. **Owner:** C.D. Presents. **Manager:** David Ferguson.

[24+] **CLOUD NINE STUDIOS;** 275 Fairchild Ave., Ste. 101A; Chico, CA 95926; (916) 342-7794. **Owner:** Rich Cavanaugh. **Manager:** Rich Cavanaugh. **Engineers:** Rich Cavanaugh, Bruce Coykendall, Joe Hammons. **Dimensions:** Room 2: control room 15x13 w/iso booth, control room 20x18. Room 1: studio 30x18 w/iso booth, control room 20x18. **Mixing Consoles:** Amek/TAC Matchless 26x24 VUs 60 inputs at mid/down, Allen and Heath System B 24x8x16. **Audio Recorders:** Fostex G245 24-track, Fostex B-16D 16-track w/A.L., Ampex AG-440 2-track 1/4" 15-30 ips, Fostex Model 20 2-track 1/4" w/center-track

time code, Tascam DA-30 R-DAT. **Cassette Recorders/Duplicators:** Akai GX-912, Nakamichi MR-1B. **Noise Reduction Equipment:** dbx Type 12 channels, Dolby C & S (16 & 24 channels). **Synchronization Systems:** Jam Box/4+, 8330 Card on Fostex G24S, MIDI time piece. **Echo, Reverb & Delay Systems:** Sony R-7 reverb, Eventide H3000 Ultra-Harmonizer, Lexicon PCM60, Lexicon PCM42, (2) Roland SRV-2000, Roland DEP-5 multi-effects processor, Yamaha SPX901l, Ibanez DM-2000. **Other Outboard Equipment:** (2) dbx 160x compressor, (2) UREI 1176 limiter, dbx 166 comp/limiter/gate, Aphex 612 exp/gate, Symetrix 511 NR/exp, BBE 822 processor, Aphex Type C exciter, dbx 263x de-esser. **Microphones:** Neumann U87, (2) AKG C-414BULS, (2) AKG C-451, (2) AKG C-747, (2) Sennheiser 421, EV PL20, AKG D-112, (4) Shure SM57. **Monitor Amplifiers:** (2) QSC 1400, QSC 1200, Crown DC-300A, QSC MX-700, USAudio headphone amp system, Rane HC-6 headphone amp. **Monitor Speakers:** JBL 4430 bi-amped, JBL 4411, Yamaha NS-10M, PAS w/time offset correction. **Musical Instruments:** Korg 01A/W, E-mu ProCussion module, E-mu Performance piano module, Yamaha DX7, Roland D-50, Akai S-900 sampler, Roland MKS-20 digital piano, E-mu Proteus XR, E-mu SP-12 turbo drum sampler, Gibson 335, Strat, P-bass, Martin D-16, Mesa/Boogie studio pre-amp, Roland Jazz Chorus, Fender Tweed Deluxe. **Other MIDI Equipment:** Macintosh SE w/40MB HD, MIDI time piece, Southworth Jam Box/4+ SMPTE/MIDI interface, Digital Music MX-8 MIDI patch bay, Mark of the Unicorn Performer 3.61. **Other:** Simon direct box, Steward D.I., (10) headphone (AKG, Sennheiser), Denon DCD-810 CD player, Sound Ideas sound effects and music production libraries on CD. **Rates:** From \$40/hour.

[24+] COAST RECORDERS; 1340 Mission St.; San Francisco, CA 94103; (415) 864-5200; FAX: (415) 864-7541. **Owner:** Dan and Ketty Alexander. **Manager:** Bethanie. **Engineers:** Steve Atkin, Bob Lindner, Peter Steinman, Gibbs Chapman, independents, Mark Wallner. **Dimensions:** Room 1: studio 45x25, control room 25x20. Room 2: studio 25x15, control room 22x18. Room 3: studio 10x6, control room 10x10. **Mixing Consoles:** Neve 44 inputs all discreet w/Necam 96, Neve 5016A 36-inputs, Neve 20 input production desk. **Audio Recorders:** Sony APR-24, Studer A80 Mark 4, (2) Ampex ATR-102, (10) MCI JH-110 2- and 4-track, (2) Otari MTR-102-track. **Cassette Recorders/Duplicators:** Complete Real time, high speed and tape dubs. **Noise Reduction Equipment:** Dolby SR 24-channel, Dolby A 30-channel, Dolby SR 2-channel. **Synchronization Systems:** Adams-Smith 2600, Audio Kinetics 3.1, (2) Lynx modules. **Echo, Reverb & Delay Systems:** EMT 250 digital reverb, Lexicon 480L, (2) EMT 140 w/Martech mods., (2) Eventide H3000 w/sampling, AKG 68K, TC 2290 w/11 sec sampling, Yamaha REV-1, (3) Yamaha REV7, (3) Yamaha SPX90, Eventide H969, Eventide H949, Roland SDE-3000. **Other Outboard Equipment:** (6) UREI 1176LN, (3) UREI 1178LN, (5) Pultec equalizer, (2) Lang equalizer, (6) ITI parametric, (4) Levy program EQ, (2) dbx 165 limiters, (2) Fairchild 666 limiters, Teletronics LA-2A, ADR vocal stressor, ADR complex, (2) Trident A range inputs modules, Telefunken tube preamps, Aphex compellor, (10) Drawmer 201 gate, (6) Kepex IIs gate, (9) Aphex gate, Roland Dimension D, many other goodies (50+), Russian Dragon, GML limiter, ADR complex limiter. **Microphones:** Telefunken Elam-250, Neumann U47 tube, (4) Neumann U87, (4) AKG 414, (4) AKG C-12A, Neumann M367, AKG C-24 stereo, Neumann TLM170, (2) Neumann KM150, (3) Neumann KM54, EVs, Sennheisers, Shures, AKG C-12, (10) AKG 451. **Monitor Amplifiers:** (6) UREI, (2) Phase Linear. **Monitor Speakers:** (4) UREI 813, (8) UREI 809, Augspurger w/ TAD components, (2) Genelec S90 NF, (2) Genelec 1022A, (4) Yamaha NS-10, Tannoy. **Musical Instruments:** Steinway Model B grand, wide variety guitar amps. **Video Equipment:** Sony BVU 800 3/4". **Rates:** Call Bethanie or Dan for rates.



COLORADO SOUND RECORDING
Westminster, CO

[24+] COLORADO SOUND RECORDING; 3100 W. 71st Ave.; Westminster, CO 80030; (303) 430-8811. **Owner:** Kevin Clock. **Manager:** Kevin Clock. **Engineers:** Kevin Clock, Tom Capek, Jeff Shuey. **Dimensions:** Room 1: studio 550 sq.ft.,

control room 500 sq.ft. Room 2: studio 450 sq.ft. **Mixing Consoles:** Trident TSM 29x24x2 w/moving fader automation. **Audio Recorders:** Otari MTR-9011 24/16-track, Ampex ATR-104 2/4-track 1/4" and 1/2", Studer A80 2-track 1/4" center time code and 1/2", Revox PR99 2-track 1/4", Panasonic SV-3500 DAT, Panasonic SV-3700. **Cassette Recorders/Duplicators:** Nakamichi MR-2, (2) Technics RSB100. **Synchronization Systems:** Adams-Smith Zeta-3. **Echo, Reverb & Delay Systems:** Lexicon 480L, AMS RMX 16 digital reverb, Lexicon PCM70, Lexicon H3000 Ultra Harmonizer, (2) Yamaha SPX901l, (2) TC 2290 digital processor, DeltaLab 1024, Echo Plate II. **Other Outboard Equipment:** (2) API 55D EQ, Teletronix LA-2, (2) UREI LA-3A, (2) UREI 1176, (2) UREI LA-4A, BBE 802, (2) dbx 160, (2) dbx 902 de-esser, (4) Valley People Dyna-Mite, Aphex Aural Exciter, Altec 436C tube compressor, Sontec mic pre-amps, (2) Aphex Expressors. **Microphones:** AKG C-24 stereo tube, (4) AKG 414, (2) AKG 451, AKG C-33 stereo, Neumann U48 tube, (2) Neumann U47, (2) Neumann U87, Neumann U89, Neumann KM84, Neumann KM86, (4) Sennheiser 421, (2) Sennheiser 441, (2) Shure SM81, (4) Shure SM57, Crown P2M. **Monitor Amplifiers:** UREI 6300, Crown DC-300, Yamaha. **Monitor Speakers:** Meyer HD-1, UREI 813, Yamaha NS-10, UREI 809. **Musical Instruments:** Yamaha C7 grand piano, Hammond C-3 organ w/Leslie. **Other MIDI Equipment:** Macintosh IICI w/Mark of the Unicorn Digital Performer, (2) Midi Time Piece, Digidesign Pro Tools, Opcode Galaxy librarian, Akai S1000PB sampler, E-mu Proteus 2 sound module, Emulator II, Korg M-1 REX, Korg M-3R, (2) Korg DSM-1, (2) Yamaha TX802, (2) Oberheim Matrix-1000, Roland R-8M percussion module, Yamaha KX88 keyboard controller. **Video Equipment:** Panasonic AG7500A videodeck, NEC 19" monitor, (3) Sony 13" monitor, Toshiba DX900 videodeck.

[24+] CROW RECORDING STUDIO; also REMOTE RECORDING; 4000 Wallingford Ave. N.; Seattle, WA 98103; (206) 634-3088. **Owner:** John Nelson. **Manager:** John Nelson.

DIFFERENT FUR RECORDING

415-864-1967

3470 Nineteenth Street
San Francisco, California 94110

DIFFERENT FUR RECORDING
San Francisco, CA

[24+] DIFFERENT FUR RECORDING; also REMOTE RECORDING; 3470 19th St.; San Francisco, CA 94110; (415) 864-1967. **Owner:** Susan Skaggs, Howard Johnston. **Manager:** Susan Skaggs, Asst.: Teri Untalan. **Engineers:** Howard Johnston, Ron Rigler, Mark Slagle, Matt Murman, Mack Clark, Nancy Scharlau. **Dimensions:** Studio 25x35, control room 17x21. **Mixing Consoles:** SSL 4056E 48x48 w/Total Recall, G Series computer. **Audio Recorders:** Studer A80 VU MkIII 24-track, Sony 3324 digital, Studer A80 VU MkIII 2-track 1/2" and 1/4", MCI JH-110A 2-track and/or 4-track, Sony R-DAT 1000ES, Panasonic R-DAT SV-3500, Sony PCM-F1. **Cassette Recorders/Duplicators:** (5) TA-2700 Integra Onkyo. **Noise Reduction Equipment:** Dolby SR 26 channels, Dolby A 2 channels. **Synchronization Systems:** (3) Lynx. **Echo, Reverb & Delay Systems:** Lexicon 480L digital reverb, Lexicon 224 digital reverb, AMS RMX 16 digital reverb, (3) Lexicon PCM70, Yamaha REV7, (2) Yamaha SPX90, EMT 240 Gold Foil, Eventide DDL, (2) Lexicon Prime Time, Eventide 910 Harmonizer, (2) PCM 42, Eventide H3000 SE, w/sampling, TC Electronic 2290. **Other Outboard Equipment:** GML mic pre and EQ, (2) Drawmer gate, Aphex Compellor, (6) Kepex, (2) RM noise gate, (6) Gain Brain, (2) 1176, (2) LA-4A, White 1/6-octave spectrum analyzer w/software processing. **Microphones:** Neumann SM69 stereo tube, Neumann 269, (2) Neumann 254, (7) Neumann U87, (2) Neumann U47, (3) Neumann KM84, (9) AKG 414/452, Beyer, (8) Sennheiser, (3) Sony, (7) Shure. **Monitor Amplifiers:** Crown, BGW, Spectra Sonics, Phase Linear, Yamaha. **Monitor Speakers:** Westlake TM-1, JBL 4310, JBL 4311, Yamaha NS-10, Auratone, Tannoy NFM-8. **Musical Instruments:** Yamaha C7B grand piano. **Other MIDI Equipment:** "MIDIFUR" Synclavier 3200, Kurzweil, Roland D-550, Emax. **Video Equipment:** Sony 25" monitor, Sony 19" monitor, JVC 8250 3/4" U-Matic tape machine. **Other:** Sonic Solutions digital mastering system. **Rates:** \$135/hr; \$1,800/12-hour lockout. **Specialization & Credits:** Complete seclusion and custom service in a very private atmosphere. Spacious lounge, kitchen, sauna, showers, washer/dryer, 26" cable TV and off-street secured parking. Recent clients include Phil
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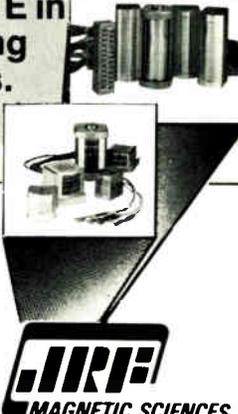

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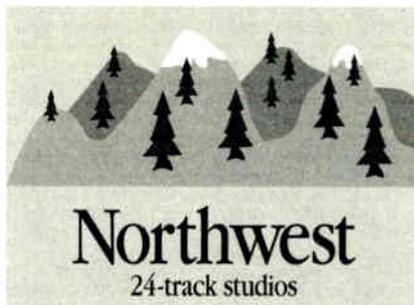


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Collins, Tuck & Patty, Kronos Quartet, Bobby McFerrin, Mr. Bungle, Bobby Brown, Primus, Limbomaniacs, George Winston, Erasure, The Residents, Exodus, Stevie Wonder, Windham Hill artists, Penelope Houston. 1989 Grammy Award for Best Children's Story "Pecos Bill" with Robin Williams and Ry Cooder.

[24+] **DOG FISH SOUND**; also *REMOTE RECORDING*: 17385 NE Hillsboro Hwy.; Newberg, OR 97132; (503) 538-5638; (503) 636-8080; FAX: (503) 538-3885. Owner: Drew Canulette and Norm Costa. Manager: Drew Canulette.

[24+] **PHIL EDWARDS RECORDING**; also *REMOTE RECORDING*: 1522 W. Winton Ave.; Hayward, CA 94545-1311; (510) 784-1971. Owner: Phil Edwards. Manager: Phil Edwards. Engineers: Phil Edwards, Chris Coon. Dimensions: Truck 20x8x10. **Mixing Consoles**: API De Medio 4024 40x24. **Audio Recorders**: (2) 3MM79 24-track, (2) DTC 1000 DAT, (2) F-1 PCM, MCI 110B 2-track, Ampex 4400 2-track. **Cassette Recorders/Duplicators**: (6) Denon DRM 700. **Noise Reduction Equipment**: Dolby M24 "A" and "SR", (4) Dolby A361. **Synchronization Systems**: Adams-Smith 605B three-machine synchronizer, Otari and Timeline SMPTE generators. **Echo, Reverb & Delay Systems**: Lexicon PCM70, Yamaha SPX90II, Yamaha REV5. **Other Outboard Equipment**: (5) UREI 1176LN, (2) UREI LA-3A, (2) Orban parametric EQ, Orban 516 de-esser, (4) Valley People noise gate, (4) Sony SLO 323 and SLHF 1000 Beta decks, Panasonic VHS deck. **Microphones**: (6) Neumann U87, Neumann U89, (2) Neumann U47 FET, Neumann KM84, AKG 414, (2) AKG 451, (25) Shure SM56, Shure SM58, (2) Shure SM85, (2) Shure SM87, (4) EV RE15, (2) EV 1761, (6) Sennheiser 421, Sony ECM-22P, (2) RCA 77-DX, (5) Countryman FET 85 Di C-tape stereo transducer **Monitor Amplifiers**: Crown DC-300A, (2) McIntosh MC2100, McIntosh MC250. **Monitor Speakers**: (2) UREI 811A, (4) Auratone 5C, (2) KLH CL4, (4) Dolby Pro-Logic surround system. **Video Equipment**: Sony KX-1901 video monitor, Sony KX-1201 video monitor, Sony Tricoin 220 color camera. **Rates**: Studio hourly rates from \$75; truck daily rates from \$1,500.

[24+] **EMERYVILLE RECORDING CO.**; 1331 61st St., unit C; Emeryville, CA 94608; (510) 655-9490. Owner: Randy Rood. Manager: Randy Rood. Engineers: Various independents. Dimensions: Room 1: studio 22x25, control room 15x12. **Mixing Consoles**: Neotek Ilic 26x24 w/Mega-Mix automation. **Audio Recorders**: Ampex MM1200 16/24-track, Ampex 351/440 2-track, Panasonic 3500 DAT. **Cassette Recorders/Duplicators**: JVC, Sony. **Echo, Reverb & Delay Systems**: Lexicon LXP-5, Lexicon LXP-1, Yamaha REV7, Yamaha SPX90, Alesis Quadverb, DeltaLab acoustic computer. **Other Outboard Equipment**: UREI LA-4 compressor, Symetrix 522 compressor/gate, Symetrix SG200 expander, Furman parametric EQ, BBE Sonic Maximizer, Eventide Omnipressor. **Microphones**: Neumann U48, Neumann U87, AKG 414, Sony C37, (2) Shure SM81, (3) Sennheiser 421, (2) EV RE20, (8) Shure SM56, (2) Shure SM53, EV 664, (3) Audio-Technica ATM 21. **Monitor Amplifiers**: Dynaco, QSC, Symetrix. **Monitor Speakers**: UREI 809, Yamaha NS-10. **Other**: Macintosh. **Rates**: \$45/hr., block rates available.

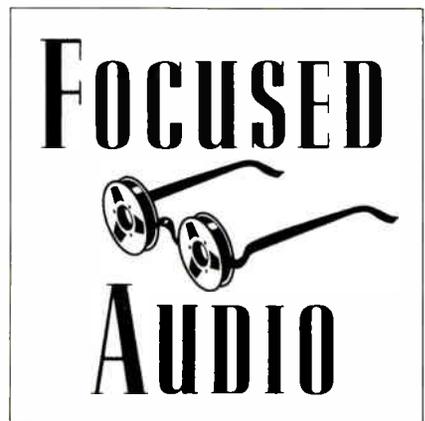
[24+] **ENHARMONIK RECORDING STUDIOS**; also *REMOTE RECORDING*: PO Box 22243; Sacramento, CA 95822; (916) 443-0373; FAX: (916) 444-8972. Owner: Mad Rover Records Inc. Manager: John Bacogaluppi.

[24+] **FALCON RECORDING STUDIOS INC.**; 15 SE 15TH; Portland, OR 97214; (503) 236-3856. Owner: Dennis Carter/Axel Unbehau. Manager: Dennis Carter.

[24+] **FANFARE RECORDING STUDIOS**; 5142 Quaker St.; Golden, CO 80403; (303) 279-2334. Owner: Guy Bianchini. Manager: Guy Bianchini. Engineers: Mark Derryberry, Guy Bianchini. Dimensions: Studio 16x35, control room 17x15. **Mixing Consoles**: Trident 24 Series w/64 inputs in mixdown. **Audio Recorders**: Studer A827-24 24-track, Otari MTR-10CT 2-track 1/4" with center track, Sony PCM-2500 R-DAT, Digidesign Pro-Tools 4-track hard disk digital recording/editing system. **Cassette Recorders/Duplicators**: Nakamichi MR-2, Technics RS-B905. **Noise Reduction Equipment**: (2) Dolby SR. **Synchronization Systems**: Adams-Smith Zeta-3. **Echo, Reverb & Delay Systems**: Lexicon PCM70, (2) Lexicon LXP-1, Lexicon 200, (2) Yamaha SPX90II, ADA D1280 digital delay. **Other Outboard Equipment**: (2) UREI 1176 LN, (2) dbx 160,

(2) Valley People Gain Brain, (5) Valley People Kepex II, Valley People DSP-815 de-esser, Audioarts 4200B 2-channel 4-band parametric EQ, Klark-Teknik DN360 graphic EQ, Aural Exciter Type B, White 4700 programmable graphic EQ. **Microphones**: AKG Tube, (2) AKG C-414, (4) AKG C-460 w/CK61 and CK62 capsules, (2) Sennheiser 441, (4) Sennheiser 421, EV RE20, (3) Shure SM57, (2) Shure SM59, (2) EV PL95, (2) Neumann U87, Neumann 269C. **Monitor Amplifiers**: JBL/UREI 6290, (2) Crown D-300A, (2) Yamaha P2200, Crest 1501A, Ramsa WP-9055. **Monitor Speakers**: Gauss 15" co-axial custom made, Yamaha NS-10M, JBL Control 5, JBL Control 1, Auratone Cubes. **Musical Instruments**: Yamaha C7 conservatory 7' grand piano with Krystal synth MIDI modification, E-mu Emulator III, Marshall amp 50 watts, E-mu Emax SE, Prophet 600, Korg T3 synthesizer, Gon-Bop congas. **Other MIDI Equipment**: Mac IIFX w/Performer, Master Tracks Pro and other assorted software, Southworth Jam Box/4+ MIDI interface, JL Cooper MSB+REV2 MIDI patch bay. **Video Equipment**: JVC CR600U 3/4" VCR, JVC BR7700U Hi-fi VHS VCR, fast-forward video F21 SMPTE time-code character inserter, Adams-Smith Zeta-3 will lock up all audio and video machines. **Owners**: A full assortment of sound FX and music production libraries. **Mastering and editing with Digidesign Pro-Tools system offering over 2 hours of online hard disk storage. Rates**: Call for brochure and rates.

[24+] **FANTASY STUDIOS**; 10th & Parker Sts.; Berkeley, CA 94710; (510) 549-2500. Owner: Fantasy Inc. Manager: Nina Bombardier. Engineers: Dave Luke, Michael Semanick, Eric Thompson, Vincent Wojno. Dimensions: Studio A: 30x50, control room 20x16. Studio B: 21x26, control room 15x17. Studio C: 24x37, control room 18x16. Studio D: 30x50, control room 25x22, string room 18x30. **Mixing Consoles**: SSL 4056G 56x32 w/Total Recall automation, Neve 8108 56x48 w/Necam 96 automation, Neve 8108 32x24 w/Necam 1 automation, Trident Series 80 32x24x32. **Audio Recorders**: (5) Studer A80 24-track, (5) Studer A80 2-track 1/2" and 1/4", Studer A80 4-track 1/2", Mitsubishi X-850 32-track digital, (6) Mitsubishi X-80 2-track digital, MCI 110C 4/8-track, (2) PCM-1630 2-track digital w/D4000, (3) Sony PCM-F1 2-track digital. **Cassette Recorders/Duplicators**: Sony. **Noise Reduction Equipment**: Dolby A, SR, dbx. **Synchronization Systems**: Audio Kinetics Q-lock, TimeLine Lynx. **Echo, Reverb & Delay Systems**: (5) live chambers, (3) EMT 140, Ecoplate, (2) AMS reverb, EMT 250, Lexicon 224XL, Lexicon 200, PCM60, (2) BelDDL, Eventide DDL, Lexicon PCM42, AMS 15-80S DDL, Yamaha SPX90 reverb. **Other Outboard Equipment**: (2) Eventide 910 Harmonizer, (2) Eventide 949 Harmonizer, Lexicon Prime Time, Dyna-Mite gates, Drawmer gates, Space Station, dbx 160 limiters, Orban de-esser, Scamp rack, (2) Lexicon PCM70, Kepex racks, EchoPlex, much more. **Microphones**: (174) vintage tube, ribbon, dynamic, condenser and PZM. **Monitor Amplifiers**: Crown, McIntosh. **Monitor Speakers**: Sierra-Hidley, UREI Time Align, Yamaha NS-10, Auratone, Visonik, MDM, JBL 4311. **Musical Instruments**: Steinway 7', Yamaha 9' grand piano, Yamaha 7' grand piano, Baldwin 5' piano, Hammond B-3 organ. **Video Equipment**: Sweetener, SMPTE code, window dubs, 3/4" to VHS or Beta 1/2" transfers. **Rates**: Call for Nina, Casey or Roy. **Specialization & Credits**: In addition to our 4 recording studios we offer the following: a keyboard room that features Kurzweil 250, Roland S-550, Korg M1, Linn 9000 drum machine, Roland D-5, (4) DX7, Soundcraft Series 600 38-input/24-track console and much more for your pre-production needs. A tape-copy room accommodates 1/4" and 1/2" analog, DAT, Mitsubishi X-80 digital, F1 and real-time cassette copies. A full mastering facility for LP, cassette and CD mastering features Neumann lathe, Zuma audio computer, Studer analog, Mitsubishi X-80, F1 digital, DAT and Sony 1630. And a CD room prepares your tapes for CD manufacturing including Sony 1630, Harmonia-Mundi, digital sampling converter, Mitsubishi X-80, F1 and DAT formats, Sonic Solution NoNoise™ system for digital editing or removal of any type of noise problem.



FOCUSED AUDIO
San Francisco, CA

[24+] **FOCUSED AUDIO**; 544 Natoma St.; San Francisco, CA 94103; (415) 626-9777. Owner: Jeff Roth. Manager: Jeff

Roth, Susan Quinn. **Engineers:** Jeff Roth, Jay Shilliday, Marc Pittman, Gary Levenberg, JD Reilly, Nic Tenbroek and independents. **Dimensions:** Room 1: studio 10x20, control room 20x20. Room 2: studio 6.5x8.5, control room 12x16. Room 3: studio 6x5, control room 10x14.5. Room 4: control room 11x12. **Mixing Consoles:** Sony 636 w/DiskMix II Plus (40 in/24 out). **Audio Recorders:** MCI JH-24, Otari MTR-102-2-track w/center track SMPTE, Fostex E-2 2-track w/center track SMPTE, Panasonic SV-3700 DAT. **Noise Reduction Equipment:** Dolby XP24 rack w/24 SR cards, (3) Dolby SR 361 rack. **Synchronization Systems:** (2) IBM computer w/Kelly Quan software, (6) Cipher Digital Shadow. **Echo, Reverb & Delay Systems:** Eventide H969 Harmonizer, UREI 1178 compressor (stereo), Roland SRV-2000 digital reverb, Roland SDE-3000 digital delay, (2) Yamaha SPX90, (2) Orban 672 paragrahic EQ, Orban 516 dynamic sibilance controller, (2) Alesis Quadaverbs, (2) Alesis MIDverb, Alesis Microverb, Alesis Microverb III. **Microphones:** (2) AKG 414, (2) Neumann KM84, (3) EV RE20, (2) Sennheiser 421, RCA 77-DX, Schoeps MK-4. **Monitor Amplifiers:** BGW 750, NAD 220, (3) Sony P-100. **Monitor Speakers:** JBL 4435, JBL 4430, JBL 4425, (2) Yamaha NS-10, Yamaha NS-40. **Musical Instruments:** Roland S-50, (2) Roland S-550, Roland D-550, Roland U-220, (3) Korg, M-3r, Yamaha DX7 II, E-mu E II, Alesis SR-16, Alesis HR-16, Yamaha TX7, Yamaha TX802, Oberheim Matrix 1000, (E-mu Pro Performance. **Other MIDI Equipment:** Opcode Studio 3. **Video Equipment:** JVC CR850 3/4" VTR, JVC BR8600 VHS VTR w/jog/wheel, Cypher SMPTE gen/regen/jam sync/window doubler, Panasonic S-VHS portable, 35" Mitsubishi video monitor, (2) 14" Sony Super fine pitch video monitor, 19" Sony monitor. **Other:** Technics SP1200 CD player, (7) CD sound effects libraries. **Digital Workstations:** ADAP w/Atari Mega ST, SoundTools, w/Mac IIcx and color 19" monitor, Pro Tools 4-track, AMS AudioFile+ 16-track. **Specialization & Credits:** Focused Audio continues to be a leader in music recording as well as in film and video post-production sound. Having produced over 100 soundtracks for broadcast and cable television, as well as numerous features and documentaries, Focused has moved into the '90s with a brand-new facility. Four control rooms and three recording spaces have been carefully designed and equipped with the best audio tools available today. All rooms are SMPTE-locked to picture and can record directly to either 24-track w/Dolby SR, or our 16-track AMS AudioFile Plus digital workstation. Pro Tools, Soundtools and ADAP digital workstations are available in all control rooms. Through our main machine room, the appropriate control room, recording space and recording format can be configured easily for any project. Engineers with expertise in feature film and television sound, CD-I, music and radio work are available to put this facility to work for you.



FTM STUDIOS
Denver, CO

[24+] FTM STUDIOS; also REMOTE RECORDING; 1111 S. Pierce St.; Denver, CO 80232; (303) 922-3330. **Owner:** John and Diane Sundberg. **Manager:** John F. Sundberg. **Engineers:** John Sundberg, Steve Sundberg—digital engineer, approved independents: Jim Illis, Steve Avedis, Kerry Conner, Rick Abitbol, Michael Pfeifer. **Dimensions:** Room 1: studio 2,200 sq. ft. w/5 isos, control room 550 sq. ft. Room 2: studio 1,500 sq. ft. w/4 isos, control room 450 sq. ft. Room 3: 550 sq. ft. w/iso, control room 350 sq. ft. **Mixing Consoles:** Custom 28x24x24, Custom 24x24x24, WaveFrame w/Automation, Tascam 15 24x16x8 customized and modified. **Audio Recorders:** (2) Otari MTR-90 24-track w/autolocator, (2) Soundcraft 760 24-track w/autolocator, Otari MTR-10 2-track 1/2" and 1/4" w/center-track SMPTE, (3) Otari MkIII 2-track 1/4", (2) Otari 5050B 2-track 1/4", Otari MkIII 4-track 1/2", Tascam 80-8-8-track 1/2", Otari 5050B 8-track 1/2", WaveFrame digital hard disk multitrack, (2) Panasonic SV-2500 R-DAT. **Echo, Reverb & Delay Systems:** EMT 140 plate, Audience plate, Quantec QRS, AMS RMX 16, (2) Lexicon 200 w/6 programs, Roland SRV-2000, AKG BX-10, (2) Scamp stereo, (2) Lexicon Prime Time II, Lexicon Prime Time, (3) DeltaLab, Eventide 949 Harmonizer, Eventide 910 Harmonizer, (2) 1 Effectron II, MXR pitch transposer, DL-5 pitch transposer, Ursa Major Space Station, Lexicon PCM70, (4) Yamaha SPX90, TC Electronic 2290 w/16-sec 18-bit sampler, (2) Eventide

H3000SE Ultra-Harmonizer Studio Enhanced. **Other Outboard Equipment:** Drawmer stereo compressor, parametric EQs: Sontec, Arts, Orban, (8) Gatec gates, Dyna-mite gates, full Scamp rack, (6) Symetrix limiters, dbx limiters and EQs, UREI limiter, (2) dbx de-esser, (2) Valley Audio 440 limiters. **Microphones:** Variety including AKG, Neumann, Shure, EV, Sennheiser, Crown PZM, Countryman Pressure Zone. **Monitor Amplifiers:** Crown Delta Omega, (8) Hafler 500, Crown D-300, Crown D-150, Crest 3501. **Monitor Speakers:** UREI B13C, EV 500, KRK 703, Tannoy SRM 12B, Tannoy SRM 10B, Yamaha NS-10M, Yamaha NS-40M, Auratone, EV 100. **Musical Instruments:** Steinway 9' concert grand and artist, WaveFrame digitally sampled instruments, Kawai 7'4" grand piano, Kawai US50, Kurzweil 250 w/all block and sampling, Oberheim OB-Xa, Oberheim DSX, Rhodes, Korg C-30 organ, ARP Odyssey, Korg DW-8000, Yamaha TX7, Yamaha RX5. **Video Equipment:** Adams-Smith 2600 SMPTE/EBU, JVC CR850U 3/4" stereo recorder, NEC 25" high-resolution monitor, (2) 1/2" VHS. **Rates:** (1) \$65 w/eng.; (2) \$45 w/eng.; (3) \$15 w/eng. Block rates available. **Specialization & Credits:** Large lounge w/big-screen TV, kitchen and meal table. Conference room with high ceilings for practice and relaxing. All rooms acoustically designed. Constructed from the ground up. Studios 1 & 2 with RPG diffusers on rear walls. Real-time cassette duplication, CD sound effects and music libraries. 48 tracks available, commercials, jingles, audio sweetening, film scoring, Digital Foley Stage. Macintosh computer w/Performer arranging and sequencing to our Kurzweil 250. Arrangers and producers are available. CD pre-mastering with digital EQ, sequencing and crossfades. We have worked with labels including CBS, MCA, Sparrow and PolyGram. One of nation's finest studios. Located on the west side of Denver. Near summer mountain activities and winter skiing.

[24+] PHILIP (ROSCOE) GALLO PRODUCTIONS; 3112 Laguna; San Francisco, CA 94123; (415) 563-8223. **Owner:** Philip (Roscoe) Gallo. **Manager:** Philip (Roscoe) Gallo.

[24+] GUNG-HO RECORDING STUDIO; 86821 McMorott Ln.; Eugene, OR 97402; (503) 484-9352. **Owner:** Bill and Julie Barnett. **Manager:** Bill Barnett. **Engineers:** Bill Barnett, Michael Edwards, independents. **Dimensions:** Studio 20x30, control room 18x17. **Mixing Consoles:** 36+ input Quad-8 Weststar/Virtuoso w/VCA subgrouping. **Audio Recorders:** Otari MX-80 24-track, Otari 5050B-II 2-track w/Dolby SR, Panasonic SV-3500, Panasonic SV-3700 2-track. **Cassette Recorders/Duplicators:** (5) Nakamichi MR-2-B. **Noise Reduction Equipment:** (2) Dolby 361 SR, (2) dbx 180/150. **Echo, Reverb & Delay Systems:** Lexicon 480L, Lexicon PCM70, Eventide H3000 Ultra-Harmonizer, TC 2290 w/fast trigger and memory exp., Yamaha SPX90, ART DR-I, Lexicon PCM41, DeltaLab ADM-1024. **Other Outboard Equipment:** Summit TPA-200 dual mic pre(tube), Studio Technologies dual mic pre, Drawmer 1960 dual mic pre-compressor (tube), Summit TL-100A tube compressor, UREI/JBL 7110 comp/limiter, (2) dbx 160X compressor/limiters, Symetrix 525 dual gates/comp, Aphex stereo Compellor, Summit EQF-100 full-range tube EQ, Summit EQP-200 dual program tube EQ, Klark-Teknik DN-405 parametric, BASE 1, (2) Aphex 612 dual exp/gate, Valley Autogate (dual), (5) Valley Gatec 4-channel exp/gate, Orban 536 de-esser, Aphex A Exciter. **Microphones:** (2) Neumann U87, Neumann U87 3 micron Stephen Paul Mod., Neumann KM140, Neumann KM84, (4) AKG 414EB, (2) AKG 451, AKG D-112, AKG D-12E, (2) Sennheiser 441, (4) Sennheiser 421, (5) Shure SM56/Shure SM57, (2) Shure SM58, Beyer M-422, (2) Crown PZM custom, etc. **Monitor Amplifiers:** (2) Hafler 220, Hafler P505, McIntosh 6100, Rane HC-6 headphone. **Monitor Speakers:** JBL 4411, Tannoy PBM-6.5, Yamaha NS-10M, Auratone 5C, Eclipse. **Musical Instruments:** Fender 1959 P-Bass, Fender 1967 Telly w/Bigsby, Yamaha 6' 1" conservatory grand piano, 1946 Martin 0018, 1976 Fender fretless P-bass, Ampeg B-15N amp, Ampeg SVT amp, Scholz Rockman. **Other:** (7) AKG 240 phones, (4) Fostex T-20 phones, Sony CD player, ASC Tube Traps, Mr. Coffee 10 cup version. **Rates:** Reasonable, please call.



JOE HOFFMANN STUDIOS
Occidental, CA

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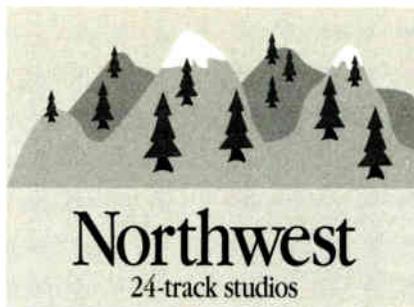
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[24+] JOE HOFFMANN STUDIOS; ALSO REMOTE RECORDING;

Joe Hoffmann, Manager: Joe Hoffmann, **Engineers:** Joe Hoffmann, Chris Caswell, Brian Walker, Stephen Hart, Gary Mankin. **Dimensions:** Room 1: studio 23x26, control room 16x21. Room 2: studio 10x14. **Mixing Consoles:** Neotek Series II 28x24, Ramsa 8210A 10x4, Soundcraft Spirit 8x2x1. **Audio Recorders:** Otari MTR-90 16/24-track, Otari MX-5050 MkII 8-track, TEAC 3340S 4-track, Otari MX-5050B 2-track, Otari MTR-12 2-track, Panasonic SV-3500 DAT, Panasonic SV-255 portable DAT, Pro Tools 4-track digital audio. **Cassette Recorders/Duplicators:** Denon DR-M14HX, (2) TEAC V25, (4) Aiwa AD-S27 for real-time dubs, Denon DRM-800A. **Noise Reduction Equipment:** (24) Dolby A, (4) Dolby C, (2) Dolby SR, (8) dbx Type I. **Echo, Reverb & Delay Systems:** Klark-Teknik DN780, Lexicon 60, Lexicon 70, Lexicon 200, Roland DEP-5, Roland SRV-2000, Ibanez SDR-1000, MasterRoom XL-305, Sony MU-R201. **Other Outboard Equipment:** (2) dbx 263X de-esser, dbx 1631P 1/3-octave graphic EQ, Symetrix 522 (5-function stereo), Symetrix SG200 stereo gate, (2) Symetrix 501 comp/limiter, (2) UREI LA-4 comp/limiter, (2) Phase Linear E51 parametric EQ, Denon DCD-620 CD player, (2) Stewart MP-2 mic preamps. **Microphones:** (2) Neumann KM84, (4) B&K 4006, (2) Sony C-48, (3) AKG 460B/CKI, (2) Shure SM81, (3) Sennheiser 421, Shure SM57, Electro-Voice RE20, Tascam PE250, Shure SM85 vocal, AT 814, AKG D-12, Beyer M88, (2) Sennheiser 441, Beyer M130, Beyer M160, Beyer M260, AKG C-451EB, AKG C-535, AKG C-414B-ULS, Samson SR2 wireless. **Monitor Amplifiers:** Denon POA-800, Carver 1200, JBL 600, Carver C-2 preamp, Rane HC-6 (cue). **Monitor Speakers:** JBL 4408, Yamaha NS-10, KEF 105/2, KEF 104/2, Audix, Auratones. **Musical Instruments:** Steinway 9' concert grand piano (1956)—Centennial Edition, Alesis D4, Korg 01/WFD. **Other MIDI Equipment:** E-mu Proteus 2, Mark of the Unicorn MIDI Time Piece. **Video Equipment:** Magnavox VHS-HQ 1/2" camcorder, 3/4" video by arrangement for live session shooting. **Other:** Wheelchair accessible. **Digital Workstations:** Macintosh II w/Digidesign ProDECK, ProEDIT, Sound Designer II, Opcode Studio Vision, Mark of the Unicorn Performer. **Rates:** Call for information or to arrange a visit. **Specialization & Credits:** Hoffmann Studios is a beautiful acoustic space nestled in the woods and vineyards of western Sonoma County, 80 minutes north of San Francisco. The area's only custom-built studio, Hoffmann's is the premier facility for demanding acoustic recording. (Our Steinway concert grand is a favorite of many area artists.) Chris Caswell is now an associate engineer in mixing, mastering and producing. This, along with the addition of multitrack digital audio recording and hard disk editing, make us an ideal site for contemporary acoustic, jazz, ethnic and fusion projects of any length. Digital mastering, pre- and post-production, digital remote recording and tape duplication provide for all your needs. Album credits include: Allauid Mathieu, Richie Cole, Patrick Ball, Chrystal Wind, G.S. Sachdev, Platero, Carnahan and Petre, Chaskinakuy, Carol McComb, Metamora, Ira Stein and Russel Walder, Solid Air, Katie Kechum, Betsy Rose and others. Please call for rates or to arrange a visit.

[24+] HWOSH PRODUCTIONS; PO Box 268; Mill Valley, CA 94941; (415) 921-3366; FAX: (415) 921-5087. Owner: Peter Hwoshchinsky. **Manager:** Priscilla Huber.

[24+] HYDE STREET STUDIOS; 245 Hyde St.; San Francisco, CA 94102; (415) 441-8934; FAX: (415) 441-1496. Owner: Michael Ward. **Manager:** Tambré Bryant. **Engineers:** Larry Schalit, Matt Kelley, Tom Doty, Ross Yeo. **Dimensions:** Studio A: 22x28, control room 14x23. Studio D: 31x20, control room 20x18. Studio B: MIDI room 14x14. **Mixing Consoles:** Amek 2500 48x24x48 automated/MasterMix disc-based (studio D), Biamp Legend 28-input w/8-track Cooper MixMate (MIDI room), Neve-8038 38x16x24 automated (Studio A). **Audio Recorders:** Studer A800 24/16-track w/ autolocator, Otari MTR-12 2-track 1/2", Otari MTR-10 2-track 1/4", Otari MX-5050B 2-track 1/4" (optional 1/4-track playback), Scully 280 4-track 1/2", (2) Aiwa AD-F870U cassette, Sony DAT DRC-1000ES, Otari 5050 MkII 8-track w/remote, Panasonic SV-3500 Pro-DAT. **Studio A:** Ampex ATR 124 24-track, MTR Augspurger, JBL, TAD. **Noise Reduction Equipment:** Dolby SR-XP 24-channel, (2) Dolby 361 SR or A. **Synchronization Systems:** Adam-Smith 2600. **Echo, Reverb & Delay Systems:** Acoustic chamber, Lexicon 480L w/LARC and 3.0 update, Lexicon PCM70 w/3.1 update, Lexicon PCM60, Lexicon PCM42, Lexicon PCM41, Eventide H3000

Ultra-Harmonizer with HS322 internal sampling board, Eventide 949 Harmonizer, TC 2290 w/12 seconds of sample memory, Yamaha REV-7, DeltaLab DL-2. **Other Outboard Equipment:** (2) Massenburg 8200, Focusrite ISA 115HD, (2) Teltronix LA-2A, (3) UREI 1176LN, (2) dbx 165A, Aphex Studio Dominator, (6) Drawmer noise gate, (5) Dyna-Mite, Lang PEQ-1, (2) Klark-Teknik DN27 1/3-octave graphic EQ, White 4100A stereo octave EQ, White 4001 1/3-octave EQ, (2) Neve 2074 EQ, (2) Neve 1081 4-band EQ, (2) Drawmer 1960 stereo tube comp/limiter, (5) Neve 1272 class "A" preamp. **Microphones:** Neumann 47 FET, Neumann 47 (tube w/optional omni capsule), (2) Neumann KM54 (tube), Neumann M49 (tube), Neumann U67, Neumann U87, AKG C-12 (tube), (4) AKG C-12A (tube), (2) AKG 460B, (2) AKG 414EB, (2) Pearl DC-63, (9) Sennheiser, (9) Beyer, (6) Shure, (3) C 451 EB w/CKI cardioid capsules, (2) D224 LI, D12, RCA 74 BX, (2) West. Elec. 618A, Sony C-38, Crown PZM, etc., (6) Countryman direct box. **Monitor Amplifiers:** Meyer, (2) Hafler, (4) Crown, Bryston. **Monitor Speakers:** Meyer, Tannoy PBM 6.5, Yamaha NS-10M, Tannoy LGM. **Musical Instruments:** Yamaha 6' grand piano, Hammond B-3orgah w/Leslie, Seymour Duncan 100-watt convertible amp, Roland D-50, Music Man amp (2-12's), assort. percussion. **Other MIDI Equipment:** Atari ST computer (2MB RAM) w/C-Lab Creator, Akai S900 16-bit sampler (60MB HD), Korg MR-1 music workstation, DVI/Video, Roland D50, D550, JX10, Jupiter 6, Ensoniq ESQ-M, Casio C21, C2101, R&M, Octapad, GM70 guitar controller. **Video Equipment:** Sony VO-5800 3/4" video deck w/address-track modification, Proton 602M 26" monitor, JVC 27" high-resolution monitor, Sound Ideas CD effects library. **Rates:** Call studio for rates.

[24+] INFINITE STUDIOS; PO Box 1709; Alameda, CA 94501; (510) 521-0321; FAX: (510) 521-0368. Owner: Michael Denton. **Manager:** Michael Denton.



IRONWOOD STUDIOS
Seattle, WA

[24+] IRONWOOD STUDIOS; 601 NW 80th St.; Seattle, WA 98117; (206) 789-7569; FAX: (206) 784-2880. Owner: Paul Scoles. **Manager:** Myron Partman. **Engineers:** Jay Follette, Steve Adamek, Paul Scoles, Rod Johnson, Myron Partman, Adam Kasper, Dave Schans. **Dimensions:** Room 1: studio 34x28, control room 16x14. Room 2: studio 36x34, control room 22x18. **Mixing Consoles:** Harrison Raven 32x24 automated, Harrison MR-3 28x24 automated. **Audio Recorders:** (2) Sony JH-24 24-track, (2) Sony JH-110C 2-track 1/2" and 1/4", Tascam ATR-60 2-track 1/4" w/center time code, Sony JH-110C 1" layback. **Cassette Recorders/Duplicators:** (6) Technics. **Synchronization Systems:** Audio Kinetics Q.Lock 4.10, Adams-Smith Zeta-3. **Echo, Reverb & Delay Systems:** Lexicon 480L w/LARC, Lexicon 224X w/LARC, Lexicon 200, Lexicon PCM70, Lexicon Super Prime Time delay, (3) Yamaha SPX90, Yamaha SPX 900, FX-900, DeltaLab DL-2 delay, Lexicon LXP1, LXP5, LXP15. **Other Outboard Equipment:** dbx 900 rack w/gates/compressors/de-essers, Aphex Type E Exciter, Teltronix LA-2A compressor, (2) UREI 1176 limiter, (2) Symetrix parametric EQ, MXR pitch transposer, Audioarts parametric EQ, UREI 527A EQ, (2) Symetrix compressor, (2) Symetrix gate (2) Roland Dimension D, Roland flanger, Aphex Compellor, (2) UREI LA-4. **Microphones:** Telefunken U47 (tube), Neumann U67 (tube), (5) Neumann U87, Neumann U47 FET, (2) Neumann KM56 (tube), (2) Neumann KM84, AKG The Tube, (4) AKG 451, AKG D-12E, (2) Sennheiser 441, (2) EV RE20, (2) EV RE16, (2) Sony C-37A (tube), Sony C-500, (2) AKG 412, (2) Sennheiser 421, (4) RCA 77DX, (2) American D-330 ribbon, Beyer M500 ribbon, (2) Norelco C-60 (tube), (3) Shure SM57, Microtech M-70, M-71. **Monitor Amplifiers:** (2) Hafler P-500, (2) Yamaha P2050, (3) Crown D-60, McIntosh 240, BGW 100. **Monitor Speakers:** (2) JBL 4430, (2) Yamaha NS-10, (2) Auratone 5C, JBL 4435. **Musical Instruments:** Yamaha 7'4" grand w/forte MIDI, Korg M-1 MIDI workstation, Korg DSS-1 digital sampling synthesizer, Roland JX-10 synthesizer, LinnDrum w/MIDI, Hammond M-3 w/Leslie. **Other MIDI Equipment:** Yamaha QX-5 sequencer. **Video Equipment:** Sony JH-110C 1" layback recorder, (3) Sony VO-5600 3/4" VTR, (3) NEC monitor, Betacam A-B roll video edit suite. **Other:** Digital Creations Diskmix console automation. **Rates:** Please call for rates.

[24+] **JAMMIN PRODUCTIONS**; also *REMOTE RECORDING*; PO Box 360524; Milpitas, CA 95036-0524; (800) HEY-JAMN (San Francisco Bay Area only); (408) 263-7030. **Owner:** Benjamin Hinson. **Manager:** Ben (Jammin) Hinson.

[24+] **JENSEN SOUND PRODUCTIONS**; 363 Brannan St.; San Francisco, CA 94107; (415) 543-7095; FAX: (415) 543-7098. **Owner:** Eric Jensen. **Manager:** Eric Jensen. **Engineers:** Eric Jensen, Gary Mankin. **Dimensions:** Studio 5' 11" x 15' 6", control room 18' 7" x 13' 4". **Mixing Consoles:** Sound Workshop Series 34 w/Disk Mix automation 40x24x8x2. **Audio Recorders:** Otari MTR-90 24-track, Otari MTR-12C 2-track with center track, Sound Tools hard disk recording system, Panasonic SV-3500 DAT, Studer Dyaxis hard disk recording system. **Cassette Recorders/Duplicators:** Denon DRM30 Hx, Nakamichi CRZ, Sony TCD5. **Noise Reduction Equipment:** Dolby SR noise reduction available upon request. **Synchronization Systems:** Otari EC-101, Fostex 1040 SMPTE reader/writer/regenerator, Shadow II synchronizer, Cipher Digital Softtouch controller. **Echo, Reverb & Delay Systems:** (2) Lexicon PCM70 effects processor, ADA STD-1 tappel delay, ART Multiverb EXT multi-effect processor, Lexicon PCM60 digital reverb, Lexicon PCM41 digital delay, Roland SDE-3000 digital delay, Roland SRV-2000 digital reverb. **Other Outboard Equipment:** (2) dbx 160X compressor/limiter, Valley People Dyna-Mite model 430, Groove Tubes speaker Emulator, Groove Tubes STP-G guitar preamp, Mesa/Boogie studio guitar preamp, (2) Scholz Rock Modules. **Microphones:** AKG 414EB P-48, Neumann U67, Beyer M500, Sennheiser MD-412, Shure SM57, (2) Sony ECM33. **Monitor Amplifiers:** Hafler P505-A. **Monitor Speakers:** UREI 809, Auratone 5C, MINIMUS 7, Yamaha NS-10M. **Musical Instruments:** Emulator III digital sampler 8 meg, Oberheim Xpander, Prophet VS, Roland MKS 70, Kurzweil 1000-PX, Oberheim Matrix 6, Oberheim Matrix 1000, Roland D550, Roland U220, Yamaha G10 MIDI guitar, Roland GM-70 MIDI converter, Various electric and acoustic guitars, Yamaha TX802. **Other MIDI Equipment:** Mark of the Unicorn Performer software, Opcode Vision software, Coda Finale software, Opcode Cue software, (2) Mark of the Unicorn MIDI Time Piece, Digidesign Turbosynth software, Opcode Galaxy software, Upbeat software, "M" software. **Video Equipment:** JVC 8250 3/4" video editing deck, Magnavox VHS Hi-Fi video deck, Mark of the Unicorn Video Time Piece. **Other:** Macintosh II, Duncan Convertible amp, Mesa/Boogie Mark II B amp, Music Man RDSO amp, Carvin X-60 amp. **Rates:** Rates available upon request.

[24+] **KERR/MACY MUSIC GROUP**; 7700 E. Iliif, Ste. E; Denver, CO 80231; (303) 755-9422; FAX: (303) 755-9377. **Owner:** Bill Kerr/John Macy. **Manager:** John Macy.

[24+] **KLUB KEV'S RECORDING COMPANY**; Seattle, WA; (206) 527-2250; FAX: (206) 232-4142. **Owner:** Kevin G. Boyd. **Manager:** Scott Spain.



LIVE OAK STUDIO
Berkeley, CA

[24+] **LIVE OAK STUDIO**; 1300 Arch St.; Berkeley, CA 94708; (510) 540-0177. **Owner:** Jim and Priscilla Gardiner. **Manager:** Priscilla Gardiner. **Engineers:** Dale Everingham. **Mixing Consoles:** MCI JH-636 w/ARMS II DiskMix automation, Sound Workshop Series 34C 32x28x24 automated, Yamaha DMP7 digital. **Audio Recorders:** (2) MCI JH-24 16/24-track, Otari MTR-10 2-track 1/2" and 1/4", Sony PCM-F1 2-track digital, IMS Dyaxis digital workstation/editor, Technics DAT, Pioneer DAT. **Synchronization Systems:** Q.Lock 4.10-E w/Eclipse editor. **Echo, Reverb & Delay Systems:** Lexicon 224XL, Lexicon Prime Time II, Lexicon PCM42, Publison Infernal Machine 90 w/controller, Yamaha REV7, (4) Yamaha MIDI-verb II, Publison Fulmost exciter (stereo). **Other Outboard Equipment:** Scamp rack (full), vocal stressor, (2) Drawmer DS-201 gate, UREI LA-2, (2) UREI LA-3A, UREI 1176, Spectra Sonics 610, Publison vocal exciter, Publison CL20C, Symetrix 544, dbx compressor/limiter, Eventide Ultra-Harmonizer, Rane parametric EQ, Roland Boss SE-50. **Microphones:** (24) Full selection, AKG Tube. **Monitor Amplifiers:** Bryston, Yamaha, Crown, Crest, UREI. **Monitor Speakers:** JBL 4430 bi-radial, JBL 4401, Yamaha NS-10, Toa 265ME, (2) Auratone. **Musical**

Instruments: Kurzweil 250 w/50kHz sampling option, Emax SE w/HD, Yamaha TX816 rack system w/8 DX7s, Oberheim Matrix-12 (rentable), Korg M1 (rentable), E-mu SP-12 drum machine, Alexis drum machine, (2) Macintosh computers, E-mu Proteus XR, Roland D-50, MIDI Minimog, Roland S-770 sampler (16-bit, 2 meg RAM, 40 meg hard disk). **Video Equipment:** JVC 8250 3/4" U-VCUR, Sony color projection system w/100" screen, Sony 13" color monitor. **Specialization & Credits:** Artists' lounge with spectacular views of the bay. Private garden with redwood decks and brick patios. Complete pre-production services available using top-of-the-line synthesizers and computer programs. Live Oak Studio is designed for the artist/composer or producer who wishes the highest quality recording tracks for his or her project. We are equipped to produce albums or to record tracks for movie scores or video work. We have the very latest synchronization gear, a computer-automation mixing console and an outstanding collection of outboard gear including the Publison Infernal Machine 90. We have a long list of satisfied clients who enjoy the beautiful and peaceful, private atmosphere. If you need a producer for your project, Jim Gardiner is available to help you get the best product.

[24+] **LONDON BRIDGE STUDIOS INC.**; 20021 Bellinger Way NE, Ste. A; Seattle, WA 98155; (206) 364-1525. **Owner:** Rajan and Rick Parasher. **Manager:** Rajan Parasher. **Engineers:** Rick Parasher, Don "The King" Gilmore, Ron Gangnes. **Dimensions:** Room 1: studio 35x55, control room 40x30. Room 2: studio 15x25, control room 20x25. **Mixing Consoles:** Trident series 65, Neve 8048 w/1081 EQs. **Audio Recorders:** Studer A800 24-track, Akai A-DAM 12-track digital, Sony APR-5000 1/4" or 1/2" 2-track, (2) Aiwa DAT. **Cassette Recorders/Duplicators:** (5) NAD. **Synchronization Systems:** Adams-Smith Zeta. **Echo, Reverb & Delay Systems:** Lexicon 224XL, Eventide H-3000 SE Harmonizer, Lexicon LXP-1, large assortment of reverbs and delays. **Other Outboard Equipment:** Klark-Teknik gate, (2) Teletronix LA-2A, (3) Neve onboard compressor, wide selection of compressors and limiters, full Scamp rack, UREI 11178, dbx 160X. **Microphones:** (6) Neumann, (12) AKG, (6) Sennheiser. **Monitor Speakers:** JBL 4435, (2) Yamaha NS-10, Yamaha NS-40. **Musical Instruments:** Wide selection of synthesizers, Yamaha C7E grand piano (7"). **Other MIDI Equipment:** Macintosh with Vision andAlchemy. **Video Equipment:** Sony VO-9800 3/4". **Rates:** Upon request.

[24+] **MICHAEL LORD PRODUCTIONS**; 9508 17th Ave. NE; Seattle, WA 98115; (206) 527-9002. **Owner:** Michael Lord. **Manager:** Michael Lord.

[24+] **MASTER TRACK PRODUCTIONS**; 1524 W. Winton Ave.; Hayward, CA 94545; (510) 782-0877; FAX: (510) 782-6280. **Owner:** Don Enns. **Manager:** Jim Hawthorne. **Specialization & Credits:** For over 19 years we've been producing music products in the fields of contemporary and traditional gospel, jazz, rock and other styles with an emphasis on gospel music. Our facility is a completely professional, fully equipped 24-track studio with spacious rooms and high ceiling, plus a wide assortment of microphones and signal processing gear. We deliver quiet and sonically superior recordings with our transformerless 32x24 Neotek Series IIIC console and MCI multitrack recorder. We also include 15/30-ips Studer A80 2-track recorders with Dolby A and SR, and Macintosh equipped MIDI room. Our engineering staff is experienced, knowledgeable and helpful with a long list of album and radio credits. Their combined expertise in the fields of musical performance and technical production assures a high level of excellence and understanding of each client's needs. MTP is also a complete, high-volume cassette duplication and packaging plant. Please call for additional information.



MESA RECORDING
Sebastopol, CA

[24+] **MESA RECORDING**; 10150 Mill Station Rd.; Sebastopol, CA 95472; (707) 823-5702. **Owner:** Ken Evans. **Manager:** Ken Evans. **Engineers:** Thomas Martin, Lynn Levy. **Dimensions:** Studio: 35x30, control room 23x25. Isolation booth 1: 14x15. Isolation booth 2: 10x8. **Mixing Consoles:** Neotek

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Elite 40x26. **Audio Recorders:** Studer A827 24-track, Ampex ATR 102 1/2" and 1/4" half-track, Panasonic SV-3500 DAT. **Cassette Recorders/Duplicators:** (2) Tascam 122 MkII. **Noise Reduction Equipment:** Dolby SR 2-channel. **Echo, Reverb & Delay Systems:** EMT stereo plate w/TimeLore upgrade, Lexicon 480L digital effects, Lexicon 200 digital reverb, Lexicon LXP-5, Lexicon LXP-1, Lexicon PCM24 digital delay, DeltaLab ADM 1024 digital delay, Yamaha SPX90. **Other Outboard Equipment:** Summit Audio Tube leveling amplifier, (2) UREI 1176 LN peak limiter, (2) dbx 165A compressor/limiter, Drawmer DL-241 stereo compressor/limiter, (8) Drawmer DS-201 gate, Massenburg 8200 stereo parametric EQ, Pultec MEQ-5, Aphex Aural Exciter Type III, White 4001 1/3 octave EQ, (4) Hardy M-1 mic preamp, (2) Ampex MX80 tube mic preamp. **Microphones:** Neumann U67 (Klaus Heyne modified), Neumann KM86i (Klaus Heyne modified), (2) Neumann U87a, AKG C-414 (Klaus Heyne modified), (2) AKG 414-EB, (2) AKG 460B, (2) AKG D-112, AKG D-224E, (6) Sennheiser MD-421, (2) Beyer M500, Beyer M260, (4) Shure SM57, Shure SM58, Shure PE65L, Sony ECM-50, Sony ECM-250, Sony ECM-23F, (3) Countryman EM-101. **Monitor Amplifiers:** (3) Adcom GFA 555. **Monitor Speakers:** (1 pair) Meyer Sound Labs HE-1 w/Velodyne ULD-18 subwoofer, (1 pair) Tannoy PBM-6.5, (1 pair) Yamaha NS-10M, (9) Dave Haynes 4-channel cue system, (9 pairs) Sony, AKG, Fostex headphones. **Musical Instruments:** Apollo 7' grand piano, Hammond B3 organ w/Leslie, E-mu Performance and piano module, Alesis HR-16 drum machine, Alesis HR-1615 drum machine. **Other MIDI Equipment:** Roland A880 MIDI patch bay, Macintosh IIx computer w/Opcode Studio Vision. **Digital Workstations:** Digidesign Sound Tools. **Rates:** Please call for brochure and rates. **Specialization & Credits:** Mesa Recording (formerly Sonoma Recording) has been providing the North Bay with quality recording for the past fifteen years. Located an hour north of San Francisco in the wine country, Mesa is a modern facility with a relaxed, secluded feel. Our naturally-lit 10,000-cubic-foot main studio and large control room have a spacious ambience and great sound. When combined with our audiophile mics, vintage or state-of-the-art processing equipment and Studer 24-track, Mesa is a superb tracking environment. We offer analog and digital mixing and editing. Recent clients include Flora Purim and Aito Moriera's *Fourth World*, Fungo Mungo, O.J. Ekemode and The Nigerian All-Stars, Cinnabar Opera Orchestra, The Movie Stars, Fiop House, Island Records, HeyDay Records and Carmel Records. Though drawing international clients, Mesa maintains a policy of supporting local artists. Our competitive rates are structured to accommodate both short sessions and extended lock-outs.



MOBIUS MUSIC
San Francisco, CA

[24+] **MOBIUS MUSIC;** also *REMOTE RECORDING*; 1583 Sanchez St.; San Francisco, CA 94131; (415) 285-7888. **Owner:** Oliver DiCicco. **Manager:** Janet Stark Krack. **Engineers:** Oliver DiCicco, Jane Sciolieri, Ken Kessie. **Dimensions:** Studio 17x38, control room 17x14. **Mixing Consoles:** Neve 8068. **Audio Recorders:** Studer A827 24-track, Studer 820A 2-track, MCI JH-110 2-track, Panasonic SRV-3700 DAT. **Cassette Recorders/Duplicators:** (3) Sony FX44. **Noise Reduction Equipment:** (2) Dolby SR, (24) Dolby SR (available

as rental). **Echo, Reverb & Delay Systems:** Lexicon 224 reverb, Eventide H3000SE Ultra-Harmonizer, Yamaha REV7 processor, Yamaha SPX90 processor, DeltaLab DL-4 delay, Master-Room MR3 reverb. **Other Outboard Equipment:** Lang program EQ, (2) dbx 160 compressor/limiter, (2) UREI LA-4 compressor/limiter, (2) Dyna-Mite expander/gate, (2) Kexep gate, Orban 622 parametric EQ. **Microphones:** (2) B&K 4006, Neumann U47 tube, (2) Neumann KM54 tube, (2) Neumann U87, (4) Neumann KM84, (6) Sennheiser 421, Sennheiser 402, (2) Shure SM57, Beyer M500. **Monitor Amplifiers:** Halfer 500, Crown D-150, Crown D-60. **Monitor Speakers:** (2) UREI 8111, (2) Auratone, (2) Yamaha NS-10, (2) Altec 604 w/Mastering Lab crossovers. **Musical Instruments:** Yamaha C3 6' grand piano, Radio King drums. **Video Equipment:** Available as rental package. **Other:** Available as rental package. **Rates:** On request, lockout rates available.

[24+] **MOTHERLODE AUDIO VIDEO;** also *REMOTE RECORDING*; 15775 Brooks Rd.; Grass Valley, CA 95924; (916) 272-3278. **Owner:** Brad Evans. **Manager:** Paul.

[24+] **MUSIC ANNEX AUDIO POST PRODUCTION; 69 Green St.; San Francisco, CA 94111; (415) 421-6622; FAX: (415) 391-4995. Owner:** Music Annex Inc. **Manager:** Michelle LeComte. **Engineers:** Patrick Fitzgerald, Mary Ellen Perry, Jon Gner, Will Harvey, Vance Walden, Roger Wiersma. **Dimensions:** Room 1: studio 12x16, control room 23x28. Room 2: studio 13x11, control room 17x24. Room 3: studio 12x10, control room 20x25. Room 4: control room 20x24. **Mixing Consoles:** (2) Amek 2500 36x24 w/Master Mix automation, Amek/TAC Scorpion 16x8, Amek 2520 40x 24 w/Mastermix automation. **Audio Recorders:** Otari MTR-9011 24-track w/Dolby A, Otari MX-80 24-track w/Dolby A, MCI JH16-/24-track w/Dolby A6, Otari 5050 MkII 8-track w/dbx, Otari MTR-10 1/2" 4-track, (4) Otari MTR-12 2-track w/center track time code, MX55 CTTT, Nagra 4.25, Nagra 4S, (8) Otari 5050 2-track, (2) New England Digital Post Pro Direct-to-Disk tapeless, (4) MTM 35mm and 16mm recorder, (6) MTE dubbers, Sony TCD-D10 DAT, Sony DTC-700 DAT. **Cassette Recorders/Duplicators:** (2) Tascam 122B, Otari C-2 (in-cassette duplex), (6) Nakamichi. **Noise Reduction Equipment:** (3) Dolby M-24 Type A, (10) Dolby 361 SR/Type A, (3) Dolby 363 SR/Type A, (2) Dolby CAT 43/361, dbx Type I (4-channels). **Synchronization Systems:** (4) Audio Kinetics Q.Lock 4.10 w/3-machine lock, Soundmaster synchronizer/editor. **Echo, Reverb & Delay Systems:** (2) Lexicon 480 LARC, (2) Yamaha SPX90, (2) LXP-1, (2) LXP-5, Eventide 949, Yamaha SPX 900, Alesis Quadverb, Korg DVR-2000 reverb. **Other Outboard Equipment:** Scamp rack (EQ, gates, comp.), (8) dbx 160X, (2) UREI 1176, (4) Symetrix TZ01 phone patch, (4) dbx 900 rack (gates, compressor), (2) Pultec hi/low pass filter sets, Dolby surround encoder/decoder. **Microphones:** Neumann, AKG, EV, RCA, Beyer. **Monitor Amplifiers:** Yamaha, Halfer, Crown, Symetrix, SAE, AB Systems. **Monitor Speakers:** KRK, Tannoy, JBL, Auratone, Yamaha, Genelec, UREI. **Musical Instruments:** E-mu E-III, Korg M1-R, Roland D-550, Roland R-8, NED Synclavier 9600 24 meg RAM, 32-voice. **Other MIDI Equipment:** (2) Macintosh II, (2) Opcode Studio 3 MIDI/SMPTE converter, JL Cooper Synapse MIDI router. **Video Equipment:** Sony DVR-10 digital video, Sony BVH-1100 1" C type, Sony BVW-70 Betacam SP, (3) JVC CR-850V 3/4" U-matic, Sony BVU-800 3/4", Sony 5850 3/4", Skoter time code window generator/reader w/VTC, Datametric time code generator/reader, Sigma Black generator, Fostex TC generator/reader, (6) Sony color monitor, (2) Sharp color monitor. **Other:** (2) Technics SL-P1200 CD player, (4) Technics SP-P500 CD player, (3) Technics SL-P1200 turntables. **Rates:** Available upon request.



MUSIC ANNEX RECORDING STUDIOS
Menlo Park, CA

[24+] **MUSIC ANNEX RECORDING STUDIOS;** also *REMOTE RECORDING*; 970 O'Brien Dr.; Menlo Park, CA 94025; (415) 328-8338. **Owner:** Music Annex Inc. **Manager:** Charles Albert. **Engineers:** Russell Bond, Tom Carr, Pat Coughlin, Mike Hersh, Robert Iriartborde, Bruce Kaplan, Scott Paulsen, Steve Papoutsis, etc.; independent welcome. **Dimensions:** Room 1: studio 28x25, control room 22x25. Room 2: studio 16x13, control room 21x18. Room 3: studio 16x14, control room

27x19. Room 4: studio 40x33, control room 25x19. **Mixing Consoles:** Neve 8036, Soundcraft 3200 56 channel w/DiskMix automation, DDA DMR12 56x24, Amek TAC Scorpion 16x8. **Audio Recorders:** (2) Studer A827 24-track, Studer A80 16/24-track, Otari MX-15 1/2" 2-track, (5) MCI JH-110B, Otari MRT-10 2-track, Fostex B-16, Otari 5050B MkIII 8-track, (2) Ampex AG440C 2/4-track, Panasonic SV-3700 DAT, Sony 2500, 1000, 700 DAT, Aiwa XD-001 DAT. **Cassette Recorders/Duplicators:** (10) Nakamichi Deck 2, (10) Nakamichi BX-100, (4) Nakamichi MR-1/ MR-2, Tascam 122 Mark II, (6) Tascam 122B, Otari C-2 duplicator CR1A and 2-3 slave. **Noise Reduction Equipment:** Dolby XP-24 SR, (4) Dolby 363 SR/A. **Echo, Reverb & Delay Systems:** Lexicon 480L, Lexicon 224XL, (3) Lexicon 224, Quantec QRS room simulator, Eventide HD3000 SE, (4) Lexicon PCM70, Lexicon PCM60, (4) Korg and others digital reverb, (3) Lexicon Super Prime Time DDL, Lexicon LXP-1, LXP-5 w/MRC, (5) Lexicon PCM42MEO, PCM41 and other DDL, (5) Roland and other DDL, EMT Gold Foil plate. **Other Outboard Equipment:** Focusrite ISA 100, Aphex Dominator, (2) Drawmer M500, (8) UREI 1176LN limiter, (2) UREI 1178 stereo limiter, (2) UREI LA-4 limiter, (4) dbx 160X compressor/limiter, ADR Vocal Stresser, Aphex Compellor, Summit Audio tube limiter, (2) Aphex Exciter Type C, Barcus-Berry BBE processor, (8) Drawmer DS-201 gate, (4) Valley People Dyna-Mite, (2) Valley People Gain Brain, (2) Scamp rack w/gate/EQ/limiter, (6) UREI 546 parametric EQ. **Microphones:** Neumann U67 tube, (5) Neumann U87, (2) Neumann U47 FET, (4) Neumann KM84, AKG C-12A tube, (6) AKG C-60/C-61 tube, (3) Accurate Sound CR-3A, (8) AKG 452/460/451, AKG D-12, (12) Sennheiser 421/441, (6) EV RE20/RE16, (18) Beyer, Sony, Countryman, Calrec, Audix, etc. **Monitor Amplifiers:** (19) Hafler, Crown, Brynton, BGW, Yamaha, Symetrix, AB, etc. **Monitor Speakers:** UREI/JBL 813C, 813, JBL 4430, Westlake BBS M-6, Yamaha NS-10 studio, Auratones, etc. **Musical Instruments:** Yamaha C7 grand piano, Gretsch/Ludwig/Paiste/Zildjian drum set, Roland 770 sampler, R-8 drums, D-70 and D-550 synths, Yamaha TG77, TX802, TX81Z, RX5, DX7, E-mu Proteus, more. **Other MIDI Equipment:** Macintosh Quadra, Opcode OMS, Vision, Galaxy, MOTU Performer, MIDI Time Piece. **Video Equipment:** Sony color monitor, (2) Beta and VHS VCR. **Other:** Sony PCM-701, Sony 2860 3/4" U-matic, (2) SMPTE based automation system. **Digital Workstations:** Studer Dyaxis, Opcode Sound Tools. **Specialization & Credits:** Music Annex has an eighteen-year history of studio development, success and growth. With credits that include Gold, Platinum and Grammy-winning albums, our staff knows how to make great recordings. Our five recording

studios include three 24-track rooms, recently upgraded to offer the latest in studio acoustical design and technology. Knowing that everyone has a different budget for their project, we offer a wide range of studios and services priced for any budget. Services include complete digital mastering, MIDI production, copying services for all formats, audiophile cassette duplication and full time in-house tech support. Music Annex also owns and operates four audio post-production studios in San Francisco (see adjacent listing) and a complete cassette duplication plant with CD replication services in Fremont. For affordable professional recording and support, call Music Annex. Musician-owned and -staffed, we'll deliver what you're looking for.

[24+] MUSIC ARTS RECORDING STUDIO (MARS); PO Box 1838; Aptos, CA 95001; (408) 688-8435. Owner: Ken Capitanich. **Manager:** Heather Capitanich. **Engineers:** Ken Capitanich, Ken Kraft, David Gibson, Eric Bates. **Dimensions:** Studio 16x20, control room 14x16, ISO booth 12x8.5. **Mixing Consoles:** Soundcraft TS 24 32x24. **Audio Recorders:** Ampex MM1100 24-track, Tascam 80-8, Ampex 440-C 2-track, Otari 5050 2-track, Panasonic 3700 DAT. **Cassette Recorders/Duplicators:** (3) Sony TC-K81. **Noise Reduction Equipment:** (8) dbx. **Echo, Reverb & Delay Systems:** Lexicon 200, Ecoplate II, EMT 140, Lexicon Prime Time 93, Eventide Harmonizer, MICMIX XL-305, ADR Time Module, Yamaha SPX90, Lexicon PCM 60. **Other Outboard Equipment:** (5) ADR (Scamp) expander/gate, (5) ADR (Scamp) comp/limiter, (2) ADR (Scamp) parametric, Aphex Exciter, dbx 165 compressor, dbx 162 compressor, (2) TLA 100 tube limiter, (2) TPA 200 tube preamp, Pultec tube EQ, (4) Valley 817 Comanders. **Microphones:** (2) Neumann U47, (5) AKG C-414, (2) Sennheiser MD-441, Sony C-37P, (2) Shure SM54, (2) Neumann U87, (5) Beyer M500, Neumann U67, Electro-Voice RE20, (2) Electro-Voice 666, (2) Electro-Voice CS15, Electro-Voice RE16, Electro-Voice DS35, Electro-Voice ND408, (2) Shure SM56, (4) Shure SM57, (2) Shure SM545SD, (3) AKG C-451, (2) AKG 330BT, AKG D-112, AKG D-12E, (4) Sennheiser MD-421, Sony ECM-22, Equitec II. **Monitor Speakers:** (2) UREI B11, (2) MDM-4, (2) JBL 4313B, (2) Auratone, (2) Yamaha NS-10M. **Musical Instruments:** Chickering 6'6" grand piano, Hammond B-3 with Leslie, Yamaha DX7II FD, Oberheim DMX, various drums, cymbals and toys, Ampeg amp. **Rates:** Rate sheet available upon request.

[24+] THE MUSIC SOURCE; 615 E. Pike; Seattle, WA 98122; (206) 323-6847; FAX: (206) 323-6896. Owner: Jim Wolfe. **Manager:** Peter Barnes. **Engineers:** Peter Barnes,

Glenn Lorbiecki, Steve Fisk, John Goodmanson, Dave Cruikshank, Barry Dowsett. **Dimensions:** Room 1: studio 27x24, control room 27x18. Room 2: studio 15x13, control room 15x21. Room 3: studio 11x12, control room 15x15. **Mixing Consoles:** Euphonics fully automated 56-input console, MCI 636 36x36 automated, MCI 636 28x28, Yamaha DMP7. **Audio Recorders:** MCI JH-24 24-track in room A, MCI JH-114 24-track in room A, MCI JH-24 24-track in room B, MCI JH-24 24-track in room C, Sony/MCI JH-110 2/4-track, (2) Sony/MCI JH-110 2-track, (2) Tascam ATR-62 center-track time code, (2) Panasonic 3500 DAT, (2) Panasonic 3700 DAT, Sony 1" layback, Magna-Tech 16/35mm Mag film recorder/reproducer, (5) Tascam 22-2 2-track. **Cassette Recorders/Duplicators:** (13) Nakamichi. **Noise Reduction Equipment:** Dolby SR/A 2 channels, dbx 8 channels, all other formats available. **Synchronization Systems:** (2) Adams-Smith 2600 with compact controller, Adams-Smith Zeta-3. **Echo, Reverb & Delay Systems:** (2) Lexicon 224X w/LARC digital reverb, Klark-Teknik DN-780 digital reverb, Lexicon Prime Time digital delay, Lexicon Super Prime Time digital delay, Eventide H3000 Harmonizer, (2) Eventide 949 Harmonizer, (2) Yamaha REV7 multi-effects, (3) Yamaha SPX90 multi-effects, Lexicon LXP-1 multi-effects, Lexicon LXP-5 multi-effects, various Alesis and Roland effect units, (2) Lexicon PCM60 reverb. **Other Outboard Equipment:** (2) Neve preamp/compressor/EQ prism modules, Summit Audio stereo tube preamp, (2) UREI 1176 limiter, (2) Spectra Sonics limiters, (2) JBL 7110 limiter/compressor, (2) dbx 162 stereo compressor, dbx 160X compressor, (2) Scamp rack w/B noise gates, Symetrix Quad noise gate, various Symetrix processors, Roland Vocoder, Klark-Teknik stereo parametric EQ, UREI stereo parametric EQ. **Microphones:** Neumann U67, (2) Neumann U87, (2) Milab DC-96, (2) AKG 460B, (2) AKG 414, (2) AKG 451, various other standard dynamic and condenser mics. **Monitor Amplifiers:** Crest, UREI, (2) Carver. **Monitor Speakers:** Tannoy FSM, JBL 4400, (3) Yamaha NS-10M, KRK near-fields. **Musical Instruments:** Kawai 9' concert grand piano, Kurzweil 250 w/updated sound package, (3) MacIntosh systems running Vision, Performer and Mastertracks Pro sequencer, (2) Emax sampler, Yamaha DX7, various drum machines and sound modules. List available upon request. **Other MIDI Equipment:** Garfield Electronics MIDI/SMPTE interface. **Video Equipment:** (3) JVC CR660 3/4" U-matic. **Digital Workstations:** (2) AMS AudioFile digital recorder/editor. **Rates:** \$40-\$250/hour. Rate/Equipment card available upon request.

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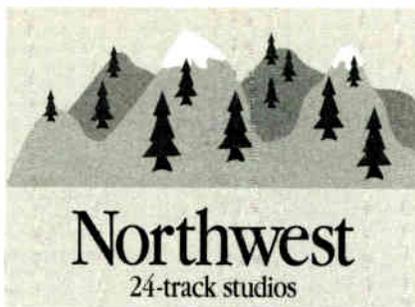
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MUSICON
Wilsonville, OR

[24+] **MUSICON**; 27501 SW 95th Ave.; Wilsonville, OR 97070; (503) 682-8668; FAX: (503) 682-3043. Owner: Bill Berry. Manager: Duane Scott. Engineers: Duane Scott, Mike Newman, Jim Rogers. Dimensions: Studio 40x21, control room 21x20. Control room 2: 24x18. Control room 3: 24x18. Mixing Consoles: DDA AMR-24 36/24 (60 mixing inputs) with Uptown morning fader automation. Audio Recorders: Studer A827 24-track with autolocator, Studer A807 1/4" 2-track with time code, Otari MTR-12 1/2" 4-track with HX Pro, Technics 1520 1/4" 2-track, JVC DS-CT90JU DAT w/tme code. Cassette Recorders/Duplicators: Nakamichi, Studer, Versadyne 1500 high-speed duplication system with (6) King 790 loaders. Noise Reduction Equipment: Dolby SR/A, Dolby MT24 24-channel SR/A auto-aligning mainframe. Synchronization Systems: Adams-Smith Zeta III. Echo, Reverb & Delay Systems: Lexicon 480L digital effects w/LARC, Eventide H3000SE Ultra-Harmonizer, (2) Yamaha SPX900 digital effects, TC Electronic 2290 DDL, R-16 digital reverb. Other Outboard Equipment: GML 8200 parametric EQ, Summit Audio EQP-200 EG, TC Electronic 2240 2-channel EQ, Klark-Teknik DN410 EQ, Summit Audio TLA100 2-channel tube limiter, (2) UREI LA-4 limiters, BSS DPF-901 dynamic EQ, TC Electronic 1210 special effects, Klark-Teknik AN514 quad noise gate. Microphones: Complete assortment of microphones. Monitor Amplifiers: Bryston. Monitor Speakers: Tannoy DMT-215, Yamaha NS-10 near-fields, Meyer Sound Labs HD-1 near-fields, EV 100A near-fields. Musical Instruments: Steinway D 9' grand piano. Other MIDI Equipment: Yamaha SY77 synth with huge sound library, Korg M1 synth with huge sound library, Oberheim Xpander, E-mu Proteus, Roland R-B drum machine, Macintosh Ixix with Vision sequencing software. Digital Workstations: Studer Dyaxis 2+2 w/DAT backup. Specialization & Credits: Open since June first 1991, Musicon Recording Studios, located fifteen miles south of Portland and only 25 miles from Portland International, is nestled between rolling hills and tall pines within sight of majestic Mount Hood, where world class skiing runs from November to July. If snow and skiing is not your thing, then within one hour, you can be enjoying one of the United States' most scenic coastlines, "the Oregon coast." Also the Columbia River Gorge, "a national scenic area," is breathtaking to see, with the variety of salmon...to die for! But if you insist on working, you will find Musiccon's 48-track, world-class facility comfortable and musician friendly...So come on up and play!—The Gang at Musiccon. Credits: Michael Lynch, ABC Television, General Hospital: Harder! Faster!, Warner Bros.; Jim Sluder Nouveau, K-Tel; NBA Portland Trailblazers '92 theme; John Archer, Doug Smith American Gramophone; Nike; Jenny Craig; CBS Television Winter Olympics theme; Oregon Ballet theatre.

[24+] **OTR STUDIOS**; also REMOTE RECORDING; PO Box 874; Belmont, CA 94002; (415) 391-9861; FAX: (415) 598-0915. Owner: Cookie Marengo. Manager: Amy Yamamoto. Dimensions: Room 1: studio 23x14, control room 23x17. Room 2: studio 27x17, control room 11x12. Audio Recorders: Otari MTR-90II 24-track, Otari MTR-10 2-track 1/2", 1/4" and 1/4" center-track time code, Otari 5050 4/2-track 1/2", (2) Otari 5050 24-track, Technics SV-1110 DAT, (2) Sony PCM-

F1 digital encoder/decoder. Cassette Recorders/Duplicators: (2) Tascam 122. Noise Reduction Equipment: Dolby SR 24-track, (2) Dolby SR rack unit. Synchronization Systems: Lynx SMPTE system, 3/4" Sony 9800 video deck, Echo, Reverb & Delay Systems: Lexicon 224XL reverb, AMS RCM 16 reverb, Lexicon Super Prime Time delay, (2) Lexicon PCM42 delay, Lexicon PCM60 reverb, Yamaha SPX90 effects, Roland SV-3000 reverb, Eventide HD3000. Other Outboard Equipment: Massenberg preamps and EQs, Eventide 949 Harmonizer, Aphex Compellor, Drawmer dual noise gate, (2) Valley People Dyna-Mite dual noise gate, UREI LA-4 compressor/limiter, de-esser, (2) Gatex 4-channel noise gates. Microphones: (2) B&K 4012, AKG 414, AKG 451, Neumann U87, Neumann U67, EV RE20, Crown PZM, Shure SM56/57, Sennheiser 421, Beyer, Sennheiser ME-80/88. Monitor Amplifiers: McIntosh 2300, Crown D-300, Crown D-150, Crown D-75. Monitor Speakers: Meyer Sound Labs 833, Tannoy, Yamaha NS-10M, Auratone Cubes, Little Reds. Musical Instruments: Steinway 7' grand piano (1885), Yamaha TX7, Korg M1 synthesizer, Proteus Ix, Akai S1100, Prophet-VS synthesizer, Prophet-5 synthesizer w/MIDI, Minimoog, LinnDrum, Hammond B-3 organ, Roland MC-500 sequencer, Casio CZ-100 synthesizer. Other MIDI Equipment: Macintosh IICI computer MIDI system, Mark of the Unicorn Performer MIDI Time Piece, Opcode.

[24+] **PACIFIC MOBILE RECORDERS**; only REMOTE RECORDING; 2616 Garfield Ave.; Carmichael (Sacramento), CA 95608; (916) 483-2340. Manager: Kat Coffey Hibbard.

[24+] **PARADISE SOUND RECORDING INC.**; PO Box 1117; Index, WA 98256; (206) 793-2614. Owner: Patrick Sample. Manager: Karen Sample. Engineers: Patrick Sample. Dimensions: Room 1: studio 40x19, control room 25x20. Room 2: studio 13x16. Room 3: studio 13x13. Room 4: studio 16x12. Room 5: 13x8. Mixing Consoles: Harrison MR-4 32 x 24 automated w/Diskmix. Audio Recorders: Otari MTR-90 24-track, Otari MTR-12 2-track, Sony DAT. Cassette Recorders/Duplicators: (6) Nakamichi, (5) Yamaha, (3) Otari high-speed duplicator. Noise Reduction Equipment: Symetrix 511. Synchronization Systems: TimeLine Lynx. Echo, Reverb & Delay Systems: AKG ADR 68K digital reverb, Lexicon 200 digital reverb, Lexicon PCM60 digital reverb, Lexicon PCM41 digital delay, (2) DigiTech 128 delay/reverb. Other Outboard Equipment: Eventide H3000 Harmonizer, (2) Yamaha SPX900, Aphex Compellor, (4) dbx 163X comp/limiter, (4) dbx 463X noise gate, Orban. Microphones: Neumann U89, (3) AKG, AKG 414, Beyer M88, Sennheiser 441, (4) Sennheiser 421, (2) EV PL20, (2) EV PL76, (5) EV ND257, EV ND357, (2) Fender P-2, (2) Shure SM57, Shure SM81, AKG tube. Monitor Amplifiers: Hafler P-5050, Yamaha M80, UREI 6260, UREI 6230, SCS 2450A, Carver PM-600. Monitor Speakers: UREI 811, EV Century 100, EML CRM 100, Yamaha WS10. Musical Instruments: Hammond B-3 organ w/Leslie, Yamaha DX7 synthesizer, Yamaha QX7 sequencer, Roland S-50 synth/sampler, Emulator II w/outstanding library, Roland DDR-30 digital drums, Marshall amp, Mesa/Boogie amp, Gibson Les Paul guitar, Martin guitar, Sonor acoustical drums. Video Equipment: TimeLine Lynx synchronizer, Panasonic CT2010 monitor, Sony BVU-800 U-matic 3/4". Rates: \$75 per hour audio/\$100 video sync. Specialization & Credits: Picture yourself taking a break from your session, walking into the front yard, which is surrounded by the Cascade mountains, and overlooking the North Fork of the Skykomish River—imagine a full, powerful rhythm section with big, solid drums, and clean clear vocals all recorded in a 12,500-cu.-ft. main room with variable acoustics. Think of the separation with four different isolation rooms all large enough to provide complete frequency response and positioned for excellent eye contact. To top it all off, there's a large, comfortable control room with crisp, accurate monitoring thanks to Chips Davis' precision design and Ed Long's full-range speakers; all driven by Harrison's versatile, automated MR-4 console and an incredible selection of outboard gear. No, you're not dreamin', Paradise Sound was built with one thought in mind: outstanding recordings. Sleep on it! Paradise Sound Recording's new facility is in full operation with a number of excellent projects including: a blues recording with Reggie Reese (produced by Bill Grabowski), Spirit Song Celebration (produced by Scott Burnett), Dan Erickson, Tom Scott, The Wake and Shattered Silence (produced by Ron Waters). If you haven't seen the facility, you owe it to yourself to check out what Paradise Sound Recording has to offer for your project. Give us a call!

[24+] **PARADISE STUDIOS**; also REMOTE RECORDING; 1020 35th Ave.; Sacramento, CA 95822; (916) 424-8772. Owner: Arne Peterson, Kirt Shearer, Craig Long. Manager: Kirt Shearer, Craig Long. Engineers: Kirt Shearer, Craig Long, Barry Dixon. Dimensions: Room 1: studio 22x30, control room 22x17. Room 2: studio 14x10. Room 3: studio 18x7.5. Mixing Consoles: Trident 80B30x24x24 (54 channels on remix w/EQ) w/40 channels of automation, Hill 16x4 multmix. Audio Recorders: Sony/MCI JH-24, (2) Fostex B-16 (can be synced w/24-track), Panasonic 3500 R-DAT, Panasonic 3700 R-DAT, Fostex E-2 2-track center stripe SMPTE. Cassette Recorders/Duplicators: (2) JVC TD-V66. Synchronization Systems: Fostex 4030/4035 for JH-24 or B-16. Echo, Reverb & Delay Systems: Lexicon 480L, Lexicon PCM70, Lexicon LXP-1 w/MRC controller, Yamaha SPX900, (2) Yamaha SPX90, Yamaha REV5, Roland SDE-3000 delay, Alesis XTIC reverb, MXR O1a reverb, Alesis QuadraVerb, Alesis MIDiverb II. Other Outboard Equipment: (2) UREI 1176LN compressor, Aphex

Dominator peak limiter, (3) Symatrix 522 compressor/expander, (2) Drawmer DS-201 noise gate, Barcus-Berry Z02R phase compensator, Tascam PE40 parametric EQ. **Microphones:** Telefunken 251 tube (Steven Paul mod), Neumann J87, (4) AKG 414EB/ULS, (4) AKG 451, (2) Sennheiser 421, (7) Shure SM57, Shure Beta 57, (3) EV PL20, Shure SM58, (2) EV PL80, (4) Countryman direct box, (2) Boss DI-1 direct box. **Monitor Amplifiers:** Hafler P-505, (2) Hafler P-225, Hafler P-125, Carver 175. **Monitor Speakers:** UREI 813A, Yamaha NS-10M (studio version), Auratone 5C cube, (8) Fostex T-20 headphone. **Musical Instruments:** Baldwin 6'3" grand 1947, Hammond B-3 w/Leslie, Gretsch 6-piece drum set (power Toms), Fender Jazz bass 1962, Fender Rhodes, Mesa/Boogie MkII 100-watt guitar amp, Marshall 9000 guitar preamp, Mesa/Boogie 4 x 12 cabinet w/EVdrivers, "Amp" 400-watt bass amp, Mesa/Boogie 15" bass cabinet, Roland S-770 sampler w/16 meg of memory and the entire Roland sample library on Syquest carts, Korg M1 synth w/extra PCM cards, Korg T-3, Roland D-550 with extra library of sounds, Yamaha TX-816 rack, Moog Memorymoog Plus, Yamaha DX7, Yamaha TX7 module, (2) Oberheim Matrix-1000, E-mu SP-12 turbo sampling drum machine, Alesis HR-16 drum machine. **Other MIDI Equipment:** (2) Macintosh computers w/Sonus Macface MIDI interface, (2) Performer 3.42 sequencing software for the Mac, Drumfile sample storage for SP-12, Opcode librarian software for DX7 w/6,000 patches, Fostex 4050 autolocator w/SMPT/MIDI conversion, Atari 1040ST computer.



THE PLANT
RECORDING STUDIOS
Sausalito, CA

[24+] **THE PLANT RECORDING STUDIOS;** also *REMOTE RECORDING*; 2200 Bridgeway; Sausalito, CA 94965; (415) 332-6100. **Owner:** Bob Skye, Arne Frager. **Manager:** Kim Lafleur. **Engineers:** Arne Frager, Bob Skye, Curtis Drake—technical director, Mark Hensley, Manny LaCarubba. **Dimensions:** Room 1 (studio A): studio 35x25, control room 23x21. Room 2 (studio B): studio 32x25, control room 23x21. Room 3 (studio 01): 15x17, control room 18x28. Room 4 (Boortown): studio 15x17, control room 30x20. **Mixing Consoles:** SSL 4064G w/Total Recall, SSL 4056G w/ Total Recall, Neve VR-72 w/Flying Fader, DDA AMR-24 36x24, Sound Workshop Series 30 35x24. **Audio Recorders:** (2) Otari MTR-100 24-track (one w/integral Dolby SR), (3) Otari MTR-90II 24-track, Otari MTR-12 2-track 1/2", (4) Ampex ATR-102 2-track 1/4" and 1/2", (2) Sony APR-5003 2-track w/center track time code, Otari 5050 2-track, (4) Panasonic 3700 DAT, Tascam ATR-50 4-track, Sony PCM-2500B, New England Digital 16-channel direct-to-disk. **Cassette Recorders/Duplicators:** Yamaha, Aiwa, Tascam, Nakamichi. **Noise Reduction Equipment:** Dolby SR and Dolby A. **Synchronization Systems:** (5) Adams-Smith Zeta-3 w/remote, Otari EC-101 (integral in MTR-90) w/remote. **Echo, Reverb & Delay Systems:** AMS, Lexicon, Sony, Quantec, Eventide, Klark-Teknik, Yamaha, Roland. **Other Outboard Equipment:** Pultec, Orban, Lang, Teletronix, Universal Audio, UREI, API, Fairchild, Drawmer. **Microphones:** AKG, Beyer, RCA, Milab, Electro-Voice, Neumann, Sennheiser, Shure, Sony, Telefunken. **Monitor Amplifiers:** Perreux, Bryson, Crown, Phase Linear, Hafler, Yamaha. **Monitor Speakers:** Custom PFRS all TAD component 2-way system, Westlake, Yamaha, Meyer Sound Labs ADC system. **Musical Instruments:** NED Synclavier 9600, Korg, Kurzweil, Roland, Yamaha, Oberheim, E-mu, (2) Marshall JCM-800 guitar amp, Hammond B-3 w/Leslie, (2) Yamaha C7 grand. **Video Equipment:** JVC 3/4", Sony 3/4" Panasonic VHS. **Specialization & Credits:** The Plant is located in picturesque Sausalito, just across the Golden Gate Bridge from San Francisco. Originally opened as The Sausalito Record Plant in 1972, the complex today blends a relaxed atmosphere with modern technology. The area sports a charming mixture of quiet Marin County, California wine country and San Francisco. Partial studio client list: Journey, Heart, Aretha Franklin, Mariah Carey, Michael Jackson, The Eagles, the Doobie Brothers, Michael Bolton, MC Hammer, Steve Wonder, Bonnie Raitt, the Neville Brothers, Metallica, Billy Idol, Whitney Houston, Huey Lewis, Starship, Sammy Hagar, Santana and Tony/ToniTone!. Rover, our remote recording facility, is perfect for live concert recording, remote broadcast link-up, audio-for-video/film, in-house recording and

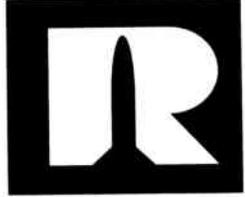
mixdown. Rover's partial client list: U2, Bobby McFerrin, B-52's, Anita Baker, Dio, Chick Corea, Al Jarreau, Robert Cray, Neil Young, Bonham, Miles Davis, the Yellow Jackets, Joe Satriani, AC/DC, David Bowie and Ozzy Osbourne

[24+] **POOLSIDE STUDIOS;** 2269 Chestnut St. #310; San Francisco, CA 94123; (415) 931-9390; FAX: (415) 921-5087. **Owner:** Mitchell Stein, David Nelson. **Manager:** Steve Goodfriend. **Engineers:** David Nelson, chief engineer/producer; Mitchell Stein, executive producer. **Dimensions:** Studio: 14x21, iso booth: 5x10, control room 1: 12x18, control room 2: 9x10. **Mixing Consoles:** Euphonix Crescendo digital 48 (stereo) x 24 with Total Automation, Soundcraft Spirit 24x8. **Audio Recorders:** Otari MX-80 2" 24-track w/Dolby SR, Otari MX-70 1" 16-track, Fostex 80 1/4" 8-track, Otari MX-55 2-track w/center-track time code and Dolby SR, Panasonic 3700 professional DAT. **Noise Reduction Equipment:** (26) Dolby SR, (16) Rocktron System One. **Synchronization Systems:** (3) TimeLine Lyrx with controller, Opcode SMPTE/MIDI time code converter. **Echo, Reverb & Delay Systems:** Lexicon 200, Lexicon LXP-1 stereo, Lexicon LXP-5 stereo, (2) Efectron II, (2) Alesis MIDVerb, Roland SRV-2000. **Other Outboard Equipment:** Orban 424A stereo compressor/limiter/de-esser, Aphex Aural Exciter, USAudio GateX 4-channel expander/noise gate, dbx 166X compressor/noise gate, dbx 463X noise gate, dbx 163X compressor/limiter, Sony PCM-501 ES digital audio processor. **Microphones:** Klaus Heyne-modified Neumann U67, (2) Klaus Heyne-modified Neumann KM83, (4) Klaus Heyne-modified Neumann KM84, (2) Sennheiser 421, Sennheiser 441, (3) Sony ECM-50, (2) Shure SM57, (2) Shure SM58. **Monitor Amplifiers:** Hafler 500, Crown D-150A, BGW M-75. **Monitor Speakers:** (2) UREI 809, (2) Yamaha NS-10M, (2) Tannoy System 8, (2) Auratone. **Musical Instruments:** Korg M-1 workstation, Roland D-10, Korg M-3R, Roland GR-50 guitar synth, Yamaha studio drum kit w/Noble & Cooley snare, Fender jazz bass, Wendel Jr. drum replacement module, congas, Korg Vocoder, Moog Minimoog. **Other MIDI Equipment:** 360 Systems MIDI router, Opcode Studio Plus, Mark of the Unicorn MIDI Time Piece. **Video Equipment:** Sharp XG-1500U LCD video projection system w/4x9 perf screen, JVC 8250 3/4" editing VTR w/controller, JVC professional 1/2" Hi-fi VTR, Sony Super Beta Hi-fi VTR, Proton 619-S monitor, Panasonic CT-110 monitor. **Other:** Extensive digital sound effects library, (7) AKG/Sony MDR-V6 digital stereo headphones. **Digital Workstations:** (2) Macintosh IICI w/8MB RAM, 105MB internal and 1.2GB external hard drive, (2) Digidesign ProTools/Sound Tools direct-to-disk recording and editing system, Studio Vision, Q-Sheet A/V, Alchemy, UpBeat, CD Technologies CD-ROM, Sample Cell. **Rates:** Available upon request. Complete production packages available. **Specialization & Credits:** Poolside Studios is a unique recording facility specializing in soundtrack production and mixing for independent film and video. We offer complete production services from pre-production consultation, MIDI pre-production and original music composition to CD pre-mastering and Dolby Stereo Surround mixdown. Recent Poolside productions include award-winning theatrical motion pictures, PBS documentaries, television and radio programs and commercials, music videos and record albums/CDs. Our frame-accurate synchronization system makes complete soundtrack work (including sound design/effects, ADR, music and Foley) possible. Situated in one of San Francisco's most beautiful neighborhoods, Poolside Studios is an ideal location for producers and clients. Whether your project takes a few hours or a few weeks, every step has been taken to provide you with a creative, comfortable working environment. While our production services are state-of-the-art, our rates are very reasonable. Poolside Studios—we take pride in every project we produce.

[24+] **PRAIRIE SUN RECORDING STUDIO;** also *REMOTE RECORDING*; PO Box 7084; Cotati, CA 94931; (707) 795-7011; (707) 795-8184. **Owner:** Mark "Mooka" Rennick. **Manager:** Jeffrey Sloan. **Engineers:** Mooka Rennick, Steve Counter, Steve Fontano, Allen Sudduth, Dino Alden. **Dimensions:** Room 1: studio 25x30, control room 10x15. Room 2: studio 8x10, control room 22x23. **Mixing Consoles:** Midas 32x8, Trident Series 80 32x24x56, Trident TSM 42x32x80. **Audio Recorders:** 3M 56 16-track 2", (2) Ampex ATR-102 2-track, Sony DTC-1000ES DAT, Studer MKIV 24-track, Studer MkII 24-track. **Cassette Recorders/Duplicators:** (3) Nakamichi/Onkyo and Kaba duplicator systems. **Noise Reduction Equipment:** (4) dbx 160XS, dbx 263K de-esser. **Echo, Reverb & Delay Systems:** (2) 1,000-sq.-ft. drum tracking room, AMS RMX 16 digital reverb, AMS DMX 15-80 delay/sam., (2) EMT 140 stereo, Eventide H910 Harmonizer, EXP Aural exciter, (2) Lexicon 92/93, (2) Lexicon PCM41 digital delay, Publison exciter, Publison Integral 90 processor w/21 sec. stereo sam, TC Electronic 2290 sampler/delay, Yamaha REV7, (4) Yamaha SPX90. **Other Outboard Equipment:** (6) Neve EQ, (4) UREI 1176 comp/limiter, (4) Allison Research Kepex gate, Aleq tube limiter vintage, Aphex Type C exciter, (2) Drawmer DS-201 stereo, (4) Valley People Dyna-Mite stereo gate, Eventide 949, Lang EQ, Neve comp/lim, Orban stereo para, Publison C120 comp/lim, Publison relief enlarger, Pultec tube EQ vintage, Rane para EQ, Sontec stereo para vin., (2) TC Electronic 1128 RTA real-time analyzer, (2) White Instruments 1/3-octave EQ, (6) 80 series discrete Neve preamps. **Microphones:** Neumann: Tube 47, M49, U67, KM54, KM84, AKG: C12A, C61, Schoeps stereo pair, Neumann: U87, AKG 414, 451L, D330, Sennheiser: D-25, 441, 421, EV: RE20, 665, 666, Beyer, Shure. **Monitor Amplifiers:** (3) Crown Micro-Tech 1200, McIntosh 2300, UREI

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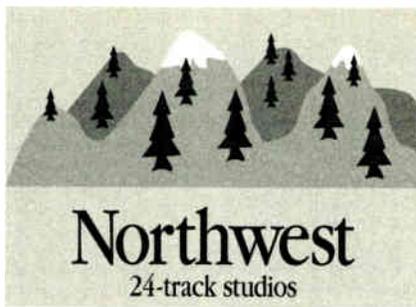
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6500, Yamaha P2100. **Monitor Speakers:** Big Reds, Genelec 1022A, JBL 4311, MDM 4 Ed Long, (2) UREI 811B/813B, Wharfedale Diamonds, (2) Yamaha NS-10M. **Musical Instruments:** E-mu Emulator II, Hammond B-3 w/122, Kimball 7' grand piano, Korg M1 8-voice MIDI keyboard, Pearl MLR Maple recording series drums, (8) various guitar and bass. **Other:** Roland JC-100 and other amps, (2) Macintosh Plus w/Jasmine HD, Sound Designer and Performer, JL Cooper Magi II automation system. **Rates:** Please call.

[24+] PROFESSIONAL SOUND AND RECORDING INC.; only REMOTE RECORDING: 3100 W. 71st Ave.; Westminster, CO 80030; (303) 426-7819. **Owner:** Chris Mickie. **Manager:** Phil Crumrine. **Engineers:** Kevin Clock, Mickey Houlihan, Phil Crumrine. **Mixing Consoles:** Soundcraft 1624 24x16x24, Rowland Research Audiophile 8x2. **Audio Recorders:** Stephens 1824A 24-track recorder, (2) Nakamichi DMP-100 PCM digital 2-track, Revox PR99 2-track analog. **Cassette Recorders/Duplicators:** (10) TEAC V-2RX cassette decks. **Echo, Reverb & Delay Systems:** Yamaha REV7 effect, PCM60 Lexicon reverb, ADM 1024 delay. **Other Outboard Equipment:** UREI LA-3 compressor, (2) Symetrix 501 comp/limiter, (2) Symetrix 522 comp/limiter/gate, dbx 900 rack w/(2) parametric, (4) compressor, (3) gate, Barcus Berry BBE-202. **Microphones:** (2) AKG C-414EB P-48, (2) AKG C-451 shotgun, Schoeps CMTS 301 stereo, (4) Schoeps CMC-3, AKG C-33 stereo, (2) Sennheiser MD-421U, (3) Shure SM81, (2) Countryman Lavaliere, (2) pre-Crown PZM, EV RE20. **Monitor Amplifiers:** Rowland Research model 5, Halfler DH-200. **Monitor Speakers:** Yamaha NS-10M, B&W DM-100, EV Sentry 100. **Video Equipment:** Canon VC-20A camera, Panasonic AG-6400 Hi-fi VHS stereo VCR, (3) color monitor. **Other:** 1984 Winnebago Centauri Van 20', air conditioning, Mogami wiring, isolation transformer.

amps, Spectra Sonics 701 series. **Monitor Speakers:** Meyer 833 sound monitor system, Yamaha NS-10T, Visonik David 7000, JBL 4333A (studio). **Musical Instruments:** Roland R-5, Octapad 2, Roland DDR-30 MIDI drums, Kurzweil K-1000, Kurzweil HX-1000, Alesis drum machine, Linn drum machine, acoustic drums (two full sets), 1930 Mason Hamlin acoustic grand piano, church pump organ, Hammond with Leslie, Leslie speaker with all JBL components, Sho-Bud pedal steel, Casio M6510 MIDI guitar, Korg with TX rack, (2) Yamaha DX7, Fender amps, Vox amps, Marshall amps, Gibson acoustic Hummingbird, Gibson acoustic 2-50, Martin acoustic D28, Rickenbacker 6- and 12-string guitars, 1950 Fender Broadcaster, 1957 Gretsch, Dean Bel-Air with Floyd Rose tremolo, Mosrite 12-string w/tremolo, Jacksons, 1955 and 1958 Stratocasters, 1958 Precision bass, Hofner "Beatle" bass. **Other MIDI Equipment:** Voyetra SMPTE/MIDI interface, IBM-compatible (AT) system, Roland S-550 digital sampler, JL Cooper MIDI patch bay, Patch Master Plus, Sequencer Plus GMD Version 4.02. **Video Equipment:** Available upon request. **Rates:** \$1,000 a day (lodging included). **Specialization & Credits:** Located near Pike's Peak, just 45 minutes from Colorado Springs and 90 minutes from Denver, you will find Flash Cadillac's Ranch. This beautiful recording complex in the Rockies is located on 120 secluded acres surrounded by Pike National Forest. The Ranch blends computerized 24-track recording and high-technology with vintage acoustic and electric instruments. The Ranch's vaults contain a large library of classic rock 'n' roll songs from the '50s through the '90s for your film, video or commercial needs. Flash Cadillac has used their 20+ years of experience in recordings, movies, television and live concerts to design this industry-standard recording studio. Relax in the beautiful surroundings of The Ranch, fish in the trout ponds, shoot some hoops, or just escape into the woods. Lodging is provided in a 2-story, 5-bedroom ranch house, complete with moss-rock fireplace, fully equipped kitchen and wide-screen TV. The studio and lodging are yours 24 hours a day without interruptions. Meanwhile, back at The Ranch... a perfect situation to get away from it all and concentrate on your music and recording project.

[24+] REX RECORDING CO.; 1931 SE Morrison; Portland, OR 97214; (503) 238-4525; FAX: (503) 236-8347. **Owner:** Sunny Day Productions Inc. **Manager:** Greg Branson. **Engineers:** Russ Gorsline, Chris Douthitt, Rob Perkins, Doug Durbrow, John Lansing, Greg Branson. **Dimensions:** Room 1: studio 25x25, control room 15x18. Room 2: studio 11x7, control room 14x11. Room 3: studio 11x6, control room 13x11. Room 4: control room 12x11. **Mixing Consoles:** Artek Angela 28x24 w/automation, (2) Tascam 16x4, Tascam M2516 16x8. **Audio Recorders:** MCI JH-24 24-track, Otari MTR-10 2-track w/SMPTE, (2) Scully 280-B 2-track, Tascam ATR60-T 2-track w/SMPTE, Tascam BR20-T 2-track w/SMPTE, Fostex E-2 2-track w/SMPTE, (2) Tascam A32 2-track, Otari 5050 Mk III 8-track, Tascam 80-8 8-track, Sony 110 1" audio layback, Panasonic SV-3700 DAT. **Cassette Recorders/Duplicators:** (30) Technics RS-B605. **Noise Reduction Equipment:** (10) dbx Type I. **Synchronization Systems:** Q-Lock 4.1. **Echo, Reverb & Delay Systems:** Lexicon LXP-15, Lexicon LXP-1, Lexicon PCM70, Yamaha SPX90, EMT 240, (2) Alesis MIDVerb II. **Other Outboard Equipment:** (2) UREI 1176LN, Symetrix 501 limiter, Aphex Compellor II, Audio Logic Quad gate, Symetrix 564 Quad gate, (4) Scamp compressor, Scamp deesser, Symetrix 522 limiter, Aphex Aural Exciter Type C. **Microphones:** Neumann U87, Neumann U87, Neumann KM84, Neumann KM86, Sony C-37P, Sony ECM-377, AKG C-414, (2) Shure SM81, Sennheiser MD421, (4) Shure SM57, EV 666R, (2) Sanken CU31. **Musical Instruments:** Chickering 8' grand piano, Roland U-20, Yamaha DX7, Ensoniq EPS, E-mu Emax, Roland Mk-20, Roland MT-32, Yamaha TX812, Roland R-8 drum machine, Alesis HR-10 drum machine. **Other MIDI Equipment:** (2) Hybrid Arts SMPTE track II sequencer. **Video Equipment:** BTS DCR-10 D-2 recorder, Sony BVW-65 Betacam SP, Sony BVW-70 Betacam SP, JVC 8250 3/4" U-matic. **Digital Workstations:** Digital Dynamics ProDisk 464 8-track, Digital Dynamics ProDisk 464 4-track. **Specialization & Credits:** Rex Recording is a collection of exceptional individuals offering the finest services for music, commercial and video production. Our creative engineering team has won numerous awards. Our multiple digital audio workstations, video post suite and extraordinary staff are what sets Rex apart. Our engineering staff is experienced in working on national label projects. Rex Recording truly is—good people helping you sound great.

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"THE RANCH"
Westcreek, CO

[24+] "THE RANCH"; 15849 Stump Rd.; Westcreek, CO 80135; (303) 647-2482. **Owner:** Flash Cadillac. **Engineers:** Jody Stewart, Duane Scott, Sam McFadin, Linn Phillips, Dan Berthelot. **Dimensions:** Room 1: studio 20x20, control room 18x16. Drum room 10x10, piano room 18x10, iso booths 25x8 and 7x10. **Mixing Consoles:** Sony MXP-3036 36x36, 4-band parametric EQ, 6 cue sends, optional EQ L.C. type MXBK-EQ34, CAF 3000 fader automation system, dbx VCA system. **Audio Recorders:** Panasonic SV-3900 DAT, Panasonic SV-3700 DAT, MCI JH-24 24-track, MCI JH-110C 2-track 1/2" headstack w/Dolby SR, MCI JH-110B 4/2-track. **Cassette Recorders/Duplicators:** Technics RSB100, Yamaha XY1200. **Noise Reduction Equipment:** Dolby SR. **Echo, Reverb & Delay Systems:** Lexicon 224, Yamaha SPX90II, Yamaha REV7, Lexicon PCM70, Alesis MIDVerb II, Harmonizer 910, (2) Lexicon PCM42. **Other Outboard Equipment:** Aphex Aural Exciter, dbx 165A overeasy, dbx 904 noise gate, dbx 903 limiter/compressor, UREI 1176 limiter, rack-mounts, Ibanez multi-effects, Hush II, Sontec stereo parametric EQ. **Microphones:** AKG, Neumann, Sennheiser, Shure, Sony, Beyer, Electro-Voice, Neumann tube mics. A complete selection of microphones is available. **Monitor Amplifiers:** Meyer MS-1000

ramic digital delay/effects processor, TC Electronic TC 1210 spatial expander/stereo chorus/flanger. **Other Outboard Equipment:** Pultec EQP-1A equalizer, Studio Technologies stereo mic preamp, BBE Sonic maximizer. **Microphones:** (2) Neumann U87, Neumann U47 vocal mic, (2) AKG 414, (2) AKG 452, (2) Sennheiser 441, (4) Sennheiser 421, Electro-Voice RE20, (6) Shure Beta-57, Hafler DH-500, Hafler P-230, Bryston 3B. **Monitor Amplifiers:** Hafler DH-500, Hafler P-230, McIntosh 2105. **Monitor Speakers:** Professional Audio Systems bi-amp system T.O.C., (2) Mastering Lab time offset correction/crossover, (2) Yamaha NS-10 close range, (2) KEF listening speaker, Auratone T66. **Musical Instruments:** Linn 9000 drums/sequencer w/SMPTE, Kurzweil 1000-PX sampled keyboard expander, Kurzweil 1000-SX string expander, Kurzweil 1000-HX horn expander, E-mu Proteus/1 sampled keyboard expander, 360 Systems Pro-MIDI sampled bass sound expander, Roland D-50 keyboard, Sequential Circuits VS keyboard, (2) Rocktron Pro-Gap guitar preamp, (2) Kasha Amplifiers Rockmod-2 guitar preamp, Macintosh Plus w/Sound Designer and Performer software, guitars, bass, drums, etc. **Other MIDI Equipment:** KMX MIDI 16-channel patch bay. **Rates:** Available upon request. Block rates available.

[24+] ROCKY MOUNTAIN RECORDERS; 1250 W. Cedar Ave., Denver, CO 80223; (303) 777-3648; FAX: (303) 777-3923. Owner: Gannon Kashiwa, Paul Vastola. **Manager:** Guila Montoya.

[24+] ROXOUND STUDIOS; also REMOTE RECORDING; 9804 Lake City Way NE; Seattle, WA 98115; (206) 522-7699. Owner: Mark Angelesdes. **Manager:** DeLana Scoville.

[24+] RUSSIAN HILL RECORDING; 1520 Pacific Ave.; San Francisco, CA 94109; (415) 474-4520. Owner: Jack Leahy, Bob Shotland. **Manager:** Cindy McSherry. **Engineers:** Samuel Lehmer, Jack Leahy, Jeff Kliment, Michael Ahearn. **Dimensions:** Room 1: studio 20x30, control room 15x24. Room 2: studio 18x28, control room 13x22. Room 3: studio 12x14. **Mixing Consoles:** SSL 4040E 32x32, Neotek Series III 28x24, Soundcraft 600 24x16. **Audio Recorders:** Otari MTR-100A 24-track, Otari MTR-90II 24-track, MCI JH-114 24-track, (4) MCI JH-110 2/4-track, Otari MX-55 center channel SMPTE, (2) Fostex E-16 16-track, Fostex E-2 center channel SMPTE, Otari MX-5050 2-track, Panasonic SV-3700 R-DAT, (2) Sony F-1 **Cassette Recorders/Duplicators:** (2) Aiwa. **Noise Reduction Equipment:** (2) Dolby SR 24-channel rack, (2) Dolby A 24-channel rack, (6) Dolby SR/A 361. **Synchronization Systems:** (2) Q.Lock 3, 10, Fostex 4035, Kelly Quan SC610. **Echo, Reverb & Delay Systems:** (4) Lexicon PCM70, (2) Lexicon PCM60, EMT plate, Lexicon 224, Lexicon Prime Time, AKG ADR 68K, Klark-Teknik DN780, Klark-Teknik comp/limiter, Eventide H3000 Ultra Harmonizer. **Other Outboard Equipment:** Anything currently available, if not in-house, we'll rent it. **Microphones:** Neumann, AKG, RCA, Sony, Sennheiser, Crown, Shure, Countryman, Beyers, etc. **Monitor Amplifiers:** Hafler, McIntosh, QSL. **Monitor Speakers:** UREI 813TA, JBL 4311, Yamaha NS-10, Auratone. **Musical Instruments:** Yamaha C5, Yamaha G2, Emulator II, DX7, various synths and drum machines. **Other MIDI Equipment:** Macintosh-driven systems, various MIDI interfaces. **Video Equipment:** Film-to-tape transfer, double system 16 and 35mm to 3/4" VHS and Beta, sync audio for video in all studios, big-screen projector, (2) Sony BVU-800. **Other:** Mixing to all film-release formats (mono to 6-track surrounds) on custom SSL console. **Rates:** Brochure on request.

[24+] SAGE ARTS; also REMOTE RECORDING; Littlefield Farm; 14311 Stehr Rd.; Arlington, WA 98223; (206) 691-5203. Owner: Ed Littlefield, Jr. **Manager:** Warren Argo. **Engineers:** Ed Littlefield, Jr., Daniel Protheroe, Paul Speer, Matthew Sutton, Danny Wheelman, Neville Pearsall, Julian Adamaitis. (Other qualified engineers are welcome.) **Dimensions:** Studio 25x35x10, control room 12x12.5x8. **Mixing Consoles:** Sony MXP-3036 w/Sony hard disk automation. **Audio Recorders:** Sony PCM-3224 24-track digital w/Apogee filters, Sony PCM-3202 2-track digital w/SMPTE time code, Sony R-DAT 2500 w/Apogee filters, Sony/MCI JH-24-16 16-track, Sony/MCI JH-112 w/1/2" or 1/4" heads, Nagra IVs, (3) Sony F-1, Panasonic SV-255 R-DAT. **Cassette Recorders/Duplicators:** (4) Nakamichi MR-1. **Echo, Reverb & Delay Systems:** Lexicon 480L, Lexicon PCM70, Lexicon 41, Lexicon LXP-1, Ursa Major 8x32 MKII, LXP-5, LXP-15. **Other Outboard Equipment:** (2) Demeter preamps, (2) Matherly pre-amp, GML stereo equalizer, (2) Summit Audio TPA/200 dual tube preamp, (4) Jensen-Hardy preamp, Mesa/Boogie Quad preamp, Mesa/Boogie Studio preamp, (2) API EQ, (4) Summit Audio EQP/200 tube stereo EQ, (2) Summit Audio TLA/100 tube leveling amp, (2) UREI Teletronix LS-3 limiter, (2) Gain Brain limiter, (4) Kepex noise gate, (2) Yamaha DE07 digital EQ, Klark-Teknik spectrum analyzer, Aphex gate, Aphex Exciter type III, Meyer VX-1. **Microphones:** (6) Bruel & Kjaer 4003, (2) Bruel & Kjaer 4004, (2) Bruel & Kjaer 4006, (2) Bruel & Kjaer 4007, (2) Bruel & Kjaer 4011, (2) Bruel & Kjaer 4012, (2) Neumann TLM 170, (2) Schoeps, AKG "the Tube," (4) Countryman Isomax 77-DX, (2) CAD-Equitic II. **Monitor Amplifiers:** (4) Yamaha PC2002, Yamaha PC2001, UREI, Bryston 4B. **Monitor Speakers:** Nestorovic, Tannoy, MDM-20, Westlake Audio, Auratone, Meyer HD-1. **Musical Instruments:** Steinway D 9' 1982, Steinway B 7' 1914, Yamaha KX88 MIDI keyboard, Kurzweil K-1000, Emax, SP-1200 drum machine, Oberheim DMX drum machine, Yamaha DX7. **Other MIDI Equipment:** Lexicon LARC, Lexicon MCR. **Video Equipment:** (4) Betamax.

Other: For hard disk recording and editing, Macintosh II, Sound Tools II w/G.B. hard disk, (2) Macintosh Plus, Apple LaserWriter II printer, (6) Mesa/Boogie speaker cabinet, great collection of cameras and lenses, Leica, Nikon, Hasselblad, Linhof, Deardor Schneider, Nikkor, Rodenstock, Calumet 3000 w/electronic flash. **Rates:** Call. **Specialization & Credits:** Sage Arts is located an hour's drive north of Seattle. We specialize in providing a relaxed environment conducive to the production of highest quality recordings. The studio has a warm, living-room feel, fine library, stone fireplace and a view of Deer Mountain. We can provide quality photographic services and album cover design. Traditional music is one of our specialties. Our superb Steinways are maintained by Ed McMorrow. Call for more details concerning our unusual collection of fine instruments including Alembic, Martin, Gibson, Matlin, Sierra, Dobro; super guitars by Robert Girdis. Please write or call for more information. **Credits include:** *First Generation*, Bertram Levy & Peter Ostroushko; *New Melody Storm*, How's Bayou; *Box Lunch*, Sandy Bradley & The Small Wonder String Band; *Desert Visions*, Paul Speer & David Lanz; *Haunting Melodies*, Marley's Ghost; *Sweet Rural Shade*, Boys of the Lough; *Moons On The Roof*, Norsken; *Timepieces*, Larry Edelman; *Singing a Glad Noel*, Seattle Symphony Choral; *Cataract*, The Walkabouts.

[24+] SCM PRODUCTIONS; 5070 Dover; Arvada, CO 80002; (303) 422-5244; FAX: (303) 422-8985. Owner: Steve Cooper.

[24+] SKYWALKER SOUND; PO Box 3000; San Rafael, CA 94912; (415) 662-1000; FAX: (415) 662-2429. Manager: Cate Coombs.



SOMA SYNC STUDIOS
San Francisco, CA

[24+] SOMA SYNC STUDIOS; 372 Brannan St.; San Francisco, CA 94107; (415) 546-1374; FAX: (415) 546-1433. Owner: Salvage Productions. **Manager:** Kyle Johnson. **Engineers:** Kyle Johnson, Larry the O. **Dimensions:** Studio 21x20, control room 22x20. **Mixing Consoles:** SSL 4040 w/G Series computer and electronics. **Audio Recorders:** Otari MTR-90 Series II w/locator, Otari MTR-12 2-track 1/2", Otari MTR-10 2-track 1/4" w/center track time code, Panasonic SV-3700 DAT. **Cassette Recorders/Duplicators:** Nakamichi MR-2, Akai GX-912. **Synchronization Systems:** EC101 for MTR-90, Cipher Digital Shadow for JVC CR850, Opcode Time Machine SMPTE and MTC reader/writer. **Echo, Reverb & Delay Systems:** Lexicon 480L digital effects, Yamaha REV5, Lexicon 200 reverb, Lexicon PCM70, (2) Lexicon PCM42. **Other Outboard Equipment:** Eventide H3000 Ultra-Harmonizer, (2) Neve 2254 compressor, Aphex Compellor, Aphex 612 stereo gates, Drawmer DS-201 stereo gate, (2) UREI LA-4 compressor, Pultec EQH-2 tube EQ, (2) EAR 882Q tube EQ, EAR MP2 stereo mic pre, EAR 660 tube compressor. **Microphones:** Neumann M49 tube, (2) Neumann U87, (2) AKG 414, (2) AKG 460, (2) AKG 451, (2) Schoeps M221 tube, (6) Sennheiser 421, Electro-Voice RE20, (2) Shure SM57, (2) Sennheiser 409. **Monitor Amplifiers:** Crown PSA-2, (2) Crown PS-400, Crown PS-200. **Monitor Speakers:** PAS Time Offset Correction (TOC) w/Mastering Room crossovers, Yamaha NS-10M studio, JBL 4411, Auratone, Tannoy SRM 10B, Tannoy PBM 6.5. **Musical Instruments:** Yamaha C3 baby grand w/fiber optic MIDI interface, Roland D-50, Kurzweil K-1000, Akai S900 sampler w/trigger inputs. **Other MIDI Equipment:** Macintosh SE computer, Opcode Studio Plus Two MIDI interface, Performer and other sequencing and librarian software, 360 Systems MIDI patcher. **Video Equipment:** JVC CR850 3/4" deck, Kelly Quan audio editing system, JVC 26" monitor, Fostex 4010 time code generator, Sigma BSG 100A house sync reference. **Other:** Sony CD player, Denon turntable. **Rates:** Please call for rates. **Specialization & Credits:** Soma Sync Studios is a full-featured 24-track production facility with a spacious control room and variable studio acoustics to meet the needs of the contemporary recording process. Our centerpiece is a Solid State Logic console with 'G' Series computer and EQ mated with Otari tape machines for tracking and mixdown as well as DAT. A Yamaha grand with fiber optic interface combines the finest acoustic piano with the most sophisticated MIDI controller. The

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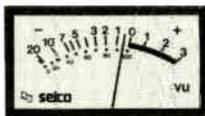
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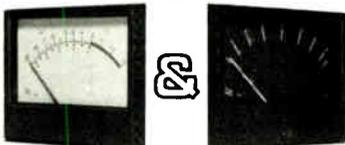
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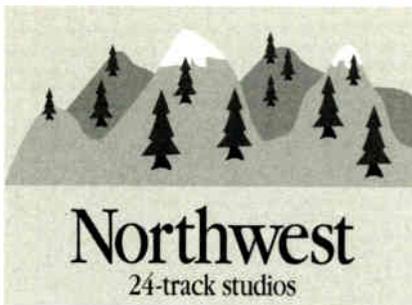
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[24+] SOUND IMPRESSIONS; 4704 SE View Acres; Milwaukie, OR 97267; (503) 659-5953. Owner: Dan Decker. Manager: Bob Stark. Engineers: Bob Stark, Tony Lash, Nick Kellogg. Dimensions: Studio 24x24, control room 18x20. **Mixing Consoles:** Amek Matchless 26x24x8x2, Biamp 1642. **Audio Recorders:** Otari MX-80 32-track/24-track, Otari MTR-12 llw/center track 1/4", Tascam 52 1/4", Panasonic SV-3500 RDAT. **Noise Reduction Equipment:** Dolby SR (28-channels). **Synchronization Systems:** (2) Adams-Smith Zeta-3's computer controlled, w/Kelly Quan software. **Echo, Reverb & Delay Systems:** Lexicon 480L, (2) Lexicon PCM70, Lexicon LPX-1, Lexicon PCM41, (2) Yamaha REV7, Yamaha SPX90, Alesis Multiverb, Ibanez SDR-1000, Eventide H3000 Ultra-Harmonizer, Roland SDE-3000, Deltalab 64, Deltalab 1064, **Audio Design delay. Other Outboard Equipment:** B.A.S.E. Spatial Processor, Aphex II Aural Exciter, Aphex B Aural Exciter, (2) dbx 263X de-esser, Orban 672A 8-band full parametric EQ, Orban 622B four-band stereo full parametric, NIH PE-30 four-band full parametric, UREI A522 1/3 octave graphic, Aphex stereo Compellor, (2) JBL 7110, (2) Symetrix CL-501, Symetrix CL-150, (2) Symetrix GL-100, (2) Symetrix 544 quad gate, Aphex 612 stereo gate, Audio Logic quad gate. **Microphones:** AKG "The Tube," AKG 414, Neuman U87, Neuman KM140, EV RE20, AKG 330, AKG 320, AKG 451, AKG 460, AKG D12, Audio Technica ATM-63, Tascam PE-250, American Ribbion, Shure SM57. **Monitor Speakers:** (2) UREI 813, (2) Yamaha NS-10M w/matching sub-woofers, (2) Auratone 5-C. **Musical Instruments:** Yamaha C-3 6' grand piano, Yamaha DX7, Oberheim Matrix 6R, Korg DW-8000, Sequential Prophet-5, Sequential Drumtrax, Korg M-3R, E-mu Proteus. **Other MIDI Equipment:** Performer sequencing software, MIDI Time Piece interface (128 MIDI channels). **Video Equipment:** Sony V-9850 type II SP U-matic 3/4" editing recorder, Sony RM-450 editing controller. **Other:** (2) Roland Compu-editors (30 programmable faders and mutes). **Digital Workstations:** Mac Ilcx, Digidesign Sound Tools Pro I/O, 1.2 gig 660, MEG and 100 MEG drives. **Rates:** \$50/hour—\$400/day block music, \$85/hour—\$600/day video sweetening, \$800/day lockout.

[24+] SOUND SOUND/SAVAGE FRUITARIAN PRODUCTIONS; also REMOTE RECORDING; PO Box 22999; Seattle, WA 98122-0999; (206) 322-6866. Owner: Tom Falat. Manager: Steven M. Miller. Engineers: Tom Falat, Steven M. Miller, qualified independents welcome. Dimensions: Studio 20x30. **Mixing Consoles:** Tascam M-3500 32-channel in-line with full meter bridge, Mackie CR1604 w/XLR-10 mic preamp unit. **Audio Recorders:** Tascam MSR-24 1" 24-track with dbx type I NR, Tascam DA-30 DAT 44.1 48kHz sampling rate, Sony D-10 Pro portable DAT, Studer A77 1/4" 2-track. **Cassette Recorders/Duplicators:** Nakamichi MR1 with Dolby B & CNR, Sony D-5M with Dolby BNR, Technics RS-B18 with Dolby B & C and dbx NR, Marantz PMD-430 portable 3-head w/Dolby and dbx NR. **Synchronization Systems:** Tascam MTS-1000 MIDlizer-synchronization and remote control. **Echo, Reverb & Delay Systems:** Eventide H3000 SE Ultra Harmonizer MIDI programmable w/remote, Klark-Teknik DN780 MIDI programmable w/remote, Delta Lab Effectron II ADM 1024, vintage Furman RV-1 spring reverb. **Other Outboard Equipment:** Aphex 612 dual noise gate, Aphex Compellor (stereo), Klark-Teknik DN410 10-stage parametric EQ, Rane MPE14 dual 2/3-octave MIDI programmable EQ. **Microphones:** (2) Bruel & Kjaer 4006 Omni w/ noise cone, (2) Bruel & Kjaer 4011 cardioid, (2) Audio-Technica 4051, (2) Sennheiser MD 421, AKG C-410 headset, AKG C-522 ENG stereo, (3) Nakamichi CM-300, Shure DM57, Electro-Voice 674, Electro-Voice 676. **Monitor Amplifiers:** Bryston 4B Pro 240 watts/channel, Marantz 2270 70 watts/channel, Rane HC6 headphone amp. **Monitor Speakers:** (2) Westlake BBSM10, (2) Tannoy system 12 DMT, (2) Radian MM8, (5) Sony MRD 7506 headphone, Sennheiser HD540 and HD420 headphone. **Musical Instruments:** Wuritzer (1929) 5 1/2" grand piano, Ludwig, Tama and Remo drums, Zildjian, Sabian and Paiste cymbals, Drumkat MIDI percussion controller, (3) complete gamelan (Cirebon bronze;

Java iron/bronze; American aluminum), lots of assorted percussion instruments from around the world, rare National steel guitar (circa 1930) mint condition, Folksroots D-50 mountain dulcimer, Regal vintage 4-string banjo (1930), Capiol accordion, Gibson GA35RVT vintage tube guitar amp, Korg T-1, Roland A-50 MIDI keyboard controller, Oberheim XK MIDI keyboard controller, Roland S-770 sampler with hard drive and 16 meg RAM, Ensoniq ESQ-M, Yamaha DX100, Roland R-8 drum machine, Roland TR-505 drum machine, Yamaha RX-211 latin drum machine, classic Sequential Circuits Pro One analog synth, classic ARP Odyssey analog synth. **Other MIDI Equipment:** Macintosh portable 4/40, Opcode Studio 3 interface, JL Cooper MSB+ Rev II MIDI patch bay, Opcode Vision sequencer, Opcode Galaxy librarian, Coda Finale 2.0 Notation software. **Other:** Tascam CD401 CD player, Thorens TD150 Mk II AB turntable, champion juicer. **Rates:** Contact us to discuss our affordable rates for your CD, demo, location recording or music composition and production projects. **Specialization & Credits:** Sound Sound is a 24-track audio recording and production facility located in Seattle, WA. We are an artist-owned-and-run business committed to bringing you the finest in audio recording knowledge, experience and service. We strive to provide access to professional tools in a healthy, supportive and artistically sensitive environment where alternative and experimental music is actively pursued, not merely tolerated. Our composition and production interests include all kinds and sizes of commercial and non-commercial projects. Sound Sound can take your project from initial planning to final product. Recent recordings have included work for Will Ackerman of Windham Hill and Gang of Seven Records; Gamelan Pacifica; American Gamelan Institute and National Endowment for the Arts; etc. Our engineers have worked with and recorded such notables as Anthony Braxton, Steve Lacy, David Rosenboom, Nightnoise, Fred Frith/Skeleton Crew, Ingram Marshall, Ellen Fullman, Jay Clayton, Julian Priester, Trichy Sankaran and many others.

[24+] SPARK PRODUCTIONS; 5854 Colby St.; Oakland, CA 94618; (510) 547-3669; FAX: (510) 652-7782. Owner: Tony Mills.

[24+] STARLIGHT SOUND INC.; 617 S. 13th St.; Richmond, CA 94804; (510) 233-7140. Owner: Bill Thompson, Neil Young. Manager: Holly Cantrell. Engineers: Bill Thompson, Steve Counter, Darrin Harris. Dimensions: Studio 20x40, control room 18x20. **Mixing Consoles:** Harrison MR-4 48-input w/Disk Mix II automation. **Audio Recorders:** Studer A800 MR11 24-track, Ampex ATR-102 1/2" mastering deck, Panasonic SR-2500 DAT. **Cassette Recorders/Duplicators:** (2) Nakamichi MR-1. **Synchronization Systems:** JL Cooper PPS w/SMPTe gen/reader. **Echo, Reverb & Delay Systems:** Lexicon 224X digital reverb, Lexicon PCM70 digital reverb, Lexicon PCM60 digital reverb, Lexicon LXP-5, Lexicon LXP-1, Quadraverb multi-effect, Yamaha SPX90 multi-effect, Lexicon PCM42 digital delay, (3) Effectron digital delay, Roland SDE-1000 digital delay, Eventide 910 Harmonizer, MXR flanger/doubler, (2) Audioarts parametric, (2) Biamp graphic EQ, (2) Dyna-mite noise gate, (2) Drawmer noise gate, (4) Symetrix noise gate, (3) dbx 160 compressor, (2) UREI 2A-4 comp/limiter, UREI 1176 comp/limiter, Roland Dep-5 multi-effects, Alesis XT digital reverb, Axi exciter. **Other Outboard Equipment:** Akai audio-MIDI Trigger. **Microphones:** Neumann U47 tube, Neumann KM69 stereo tube, (2) Neumann KM253 tube, (2) Neumann 250 tube, Neumann U87 w/Klaus Hein modification, Neuman U07 FET, (2) Neumann KM84, (2) AKG 414, Sennheiser 441, (5) Sennheiser 421, RE20, AKG 451, RCA 77 ribbon, (2) Crown PZM. **Monitor Amplifiers:** Halfer, (3) Micro-Tech 1000, Bryston. **Monitor Speakers:** UREI 813 Time Align, Yamaha NS-10 nearfield, custom sub-woofer system. **Musical Instruments:** E-max II sampler, Akai 612 sampler, Prophet-2000 sampler, Yamaha 7" grand piano, Kawai K1 modular synth, Oberheim Matrix 6 synth, Marshall 6-track amp, Mega-boogie 6-track amp, Fender Bassman amp, Fender Pro reverb amp. **Other MIDI Equipment:** (2) Atari 1040ST computer w/patch librarians and sequencing software, Roland Pad 8 octapad, (2) Cubase and Pro creator software.

[24+] STARSOUND AUDIO INC.; 2679 Oddie Blvd.; Reno, NV 89512; (702) 331-1010. Owner: Scott Bergstrom. Manager: Lee Taggart. Engineers: Lee Taggart, Scott Bergstrom. Dimensions: Studio 35x30, (3) iso rooms 8x14, 7x10, 8x16; control room 15x25. **Mixing Consoles:** Amek Angela 28x24. **Audio Recorders:** Studer A80 24-track, Otari MklII-2 2-track, Tascam 52 2-track, Panasonic SV-3700 Pro DAT. **Cassette Recorders/Duplicators:** Yamaha C200. **Echo, Reverb & Delay Systems:** Lexicon LXP-1/5, Yamaha REV7, Yamaha REV5, (2) Yamaha SPX90, SPX900, Roland SRV-2000, Roland SDE-3000, (2) DEP-5 Bruck Audio 3300 plate, Alesis Quadraverb, AKG ADR 68K. **Other Outboard Equipment:** Aphex II broadcast, Aphex C (mod), UREI LA-4, dbx 166, Valley People Dyna-Mite, Symetrix 522, 525, 528, Orban 674A parametric, Dimension D, dbx 503, Aphex compellor, Aphex impulse, MRC. **Microphones:** Neumann U87, AKG 414EB, AKG 460, AKG 451, AKG 330, Sennheiser 441, Sennheiser 421, Sennheiser 409, Sennheiser 211, EV PL20, EV RE20, EV RE15, EV RE18, Shure SM56, Shure SM57, Shure SM81, Shure SM85, Sony C-37, PZM, Countryman 101, Groove Tube. **Monitor Amplifiers:** Crown DC-300, Yamaha PC2002, Crown PS-400. **Monitor Speakers:** JBL 4425, JBL 4410, Auratone T6, Yamaha NS-10, Tannoy Super Gold series. **Musical Instruments:** Large set Fibes drums, Simmons, Kawai 7'4" grand, E-mu SP-12, Yamaha DX7, Korg T-1, Ensoniq EPS, Roland S-

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Voice 666, Electro-Voice 667A, Sennheiser 409, (5) Sennheiser MD-421, (2) Shure SM57, (2) Shure SM81, RCA 77-DX. **Monitor Amplifiers:** UREI 6500, Yamaha P2150, McIntosh 2100. **Monitor Speakers:** UREI 813A Time Align, JBL 4333, JBL 4313, JBL 4311, Tannoy PBM 6.5, Auratone 5C. **Musical Instruments:** Yamaha C3 grand piano, Yamaha DX7, E-mu Emax, E-mu Proteus, Roland MKS-70, Korg M-3R, E-mu Performance, Roland R-8 drum machine, Alesis HR-16 drum machine, Alesis D4 drums. **Other MIDI Equipment:** Alesis MMT-8, Alesis Data disk drive. **Video Equipment:** Sony VO-1800 3/4" U-matic VCR, Kenwood KV-917HF VHS Hi-fi VCR. **Other:** Video security system, official regulation Nerf Hoop, Lazer Tag (w/mod.), Edwards designed/Augsperger tuned, Polaroid One Step.

[24+] TAMBLING SOUND; 458 A Reynolds Cir.; San Jose, CA 95112; (408) 441-1028. Owner: Bruce Tambling. Manager: Bruce Tambling.

[24+] TARPAN STUDIOS; 1925-G Francisco Blvd. E.; San Rafael, CA 94901; (415) 485-1999. Owner: Narada Michael Walden. Manager: Janice Lee. Engineers: David Frazer, Marc Reyburn, Jeff Gray, Matt Rohr, Doc Shaffer (systems engineer). Dimensions: Studio 25x35, control room 19x18. Mixing Consoles: Solid State Logic 4000G 56x32x56 w/Total Recall. Audio Recorders: Studer A80VU MkIV 24-track, MCI JH-24 16/24-track, (2) Ampex ATR-102 2-track w/SSI amp (1/2" and —LISTING AND PHOTO/LOGO CONTINUED TOP OF NEXT COLUMN



TARPAN STUDIOS
San Rafael, CA

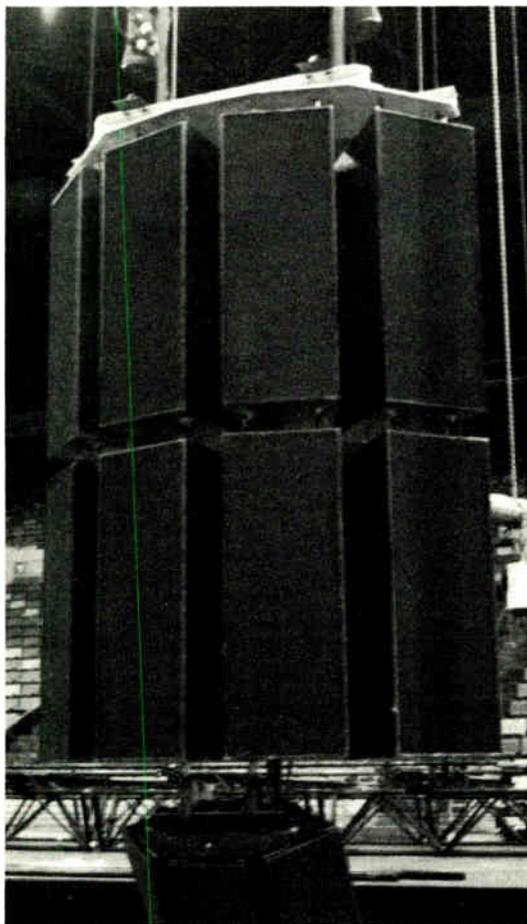
1/4"), (2) Sony PCM-2500 A-DAT. **Cassette Recorders/Duplicators:** (3) Technics RS-B100, Awa ADWX909, Nakamichi MR-1. **Synchronization Systems:** Audio Kinetics Q.Lock 3.1, Roland SBX-80 sync box. **Echo, Reverb & Delay Systems:** (2) AMS RMX 16 reverb, AMS 15-80S digital delay, Sony MU-R201, (2) Yamaha SPX90II, Yamaha SPX900, Lexicon Prime Time, Eventide 949 Harmonizer, Eventide H3000, Ecoplate I, DeltaLab DL-4 w/memory module, Marshall time modulator, ADA SD-1, anything upon request. **Other Outboard Equipment:** (2) Focusrite 110 module, NTP compressor, BBE 802, dbx 120X-DS, Aphex Compellor, (2) Drawmer gate, (2) Valley People Dyna-Gate, Orban de-esser, Teletronix LA-2A, (4) UREI LA-4 compressor/limiter, Symetrix, (4) Allison Research Kepex and Gain Brain, anything available upon request. **Microphones:** Neumann, AKG, Sennheiser, Beyer, Shure, PZM. **Monitor Amplifiers:** Crown DO-2000 w/Delta Omega module, BGW 750, Crown D-150 Series II, Crown PS-400, Crown Micro-Tech 1000, Crown Micro-Tech 600, Crest 8001. **Monitor Speakers:** UREI 813B, Yamaha NS-10MS, Auratone, UREI 811. **Musical Instruments:** Fairlight CMI Series III w/custom library, Roland D-50, Korg M1, Roland R-8 drum ma-

chine, Roland MSQ-700, Linn drum machine, Alesis HR-16 and 16B drum machine. **Other MIDI Equipment:** Kahler Human Clock. **Video Equipment:** Mitsubishi 35" color monitor w/RGB, NEC DX-2000U VHS player. **Other:** Sony CDP-310, and CDP-550 CD players, Denon DP-30L II turntable w/Shure V15 cartridge. **Rates:** Please call for rates. **Specialization & Credits:** Credits: Narada, Whitney Houston, Shance Wilson, Tevin Campbell, Aretha Franklin, Lisa Fischer, Cherrille, Eddie Murphy, O'Jays, Barbra Streisand, Quincy Jones, Regina Belle, D'Atra Hicks, Gladys Knight, Mick Jagger, Clarence Clemons, Mariah Carey, Natalie Cole, Freddie Jackson.



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JAH WORKS STUDIOS
O'Brien, OR

[24+] THEOCRATIC RECORDS/JAH WORKS STUDIOS; PO Box 15; O'Brien, OR 97534; (503) 596-2899; FAX: (503) 596-2800. Owner: Jah Levi, Karl Goldstein. Manager: Luna Dove. Engineers: Jah Levi. Dimensions: Room 1: studio 10x12, control room 12x12. Room 2: studio 12x12, control room 10x12. Drum booth 9x9. **Mixing Consoles:** Studiomaster Series II 24x16, Yamaha RM1608 16x16. **Audio Recorders:** Yamaha DMR8 digital 8-track, Yamaha YPDR 601



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[24+] TIKI RECORDING STUDIOS; also REMOTE RECORDING; 195 S. 26th St., San Jose, CA 95116; (408) 286-9840; Production: (408) 286-4091; FAX: (408) 286-9845. **Owner:** Gracie O'Neal. **Manager:** Jeannine O'Neal. **Specialization & Credits:** Specializing in album and single production work in all styles of music from country, rock, heavy metal, contemporary, Christian, gospel, top 40, high energy, new age, R&B, European jazz and reggae. All styles of Mexican, Chinese, Indian and Brazilian with in-house producers, arrangers and musicians with chart-proven results. Cassette duplication (real time or high speed) and DAT. Record pressing: LP, 45 RPM singles, 12" singles and CD manufacturing available. Two 24-track recording studios. Large string-and-horn room, extra-large drum room, 9' lbach concert grand. Publishing companies for BMI and ASCAP. Music telemarketing, record mailing and promotion. Radio and television commercials.

[24+] T.J. RECORDING STUDIO INC.; also REMOTE RECORDING; 2718 E. 96th St., Tacoma, WA 98445; (206) 537-0123. **Owner:** Thomas J. Landon. **Manager:** Debra Landon.

[24+] TRIAD RECORDING STUDIOS; also REMOTE RECORDING; 352 W. 12th Ave., Eugene, OR 97401; (503) 687-9032. **Owner:** Alwin Sauters—Engineer. **Manager:** Alwin Sauters/Michael Setton.

[24+] TRIAD STUDIOS; 4572 150th Ave. NE; Redmond, WA 98052; (206) 881-9322; FAX: (206) 881-3645. **Owner:** Full Scale Corporation. **Manager:** Chris Middaugh. **Engineers:** Larry "Larz" Nefzger (chief engineer), Tom Hall, Michael Torello, Dave Dysart, Gary Thompson, Dave Raynor. **Dimensions:** Studio A: studio 40x24, control room 19x24; studio B: studio 35x24, control room 16x19; studio C: studio 10x10, control room 10x14. **Mixing Consoles:** Mitsubishi Westar 52-input w/DiskMix moving fader automation, Neotek III C modified 36-input w/DiskMix moving fader automation, Saber modified 32-input. **Audio Recorders:** Sony 3324A digital 24-track, (2) Sony/MCI JH-24 24-track, Sony/MCI JH-16 16-track, Ampex 440B 4-track 1/2" w/various heads, Digidesign Soundtools, Otari MTR-12-2-2-track w/center track time code, Sony/MCI JH-110B 2-track w/1/2" and 1/4" heads, Ampex 102 w/1/2" and 1/4" heads, Panasonic SV-3700 DAT, Sony 2500 DAT, (3) Nakamichi MR-1B cassette, Aiwa F660 cassette, KABA real-time duplication system, Versadyne high-speed duplication system. **Noise Reduction Equipment:** (2) Dolby SR. **Synchronization Systems:** (6) TimeLine Lynx. **Echo, Reverb & Delay Systems:** Lexicon 224XL, (2) Klark-Teknik DN780, (2) EMT 140TS plate reverb, Lexicon PCM70, (2) Lexicon PCM41, (2) Lexicon Super Prime Time, Yamaha REV5, (3) Yamaha SPX90II, (2) Eventide H3000, (2) Eventide H910, (2) TC Electronics 2290, (3) Alesis Microverb. **Other Outboard Equipment:** Klark-Teknik RTA, ADR Panscan, (2) Aphex stereo Compellor, ADR F760X, (4) dbx RM160, (2) BBE 802 Sonic Maximizer, (12) Valley People Kepex II gate, (2) Drawmer 201 gate, (2) UREI 1176, (3) Teletronix LA-2A, (2) API 550 A, (2) B&B EQF-2, Orban 586A de-esser, (2) Valley People Dynamic Sibilance controller, Pultec EQH-2. **Microphones:** (10) AKG, (11) Neumann, (2) B&K 4006, (5) Sennheiser, (7) Shure, (6) Electro-Voice, (3) Sony C-37A tube, (2) Beyer. **Monitor Speakers:** (4)

Tannoy SGM-10B w/Master Lab crossover, (4) PAS SM-1 w/Mastering Lab mods, (6) Yamaha NS-10M, (6) Auratone 5C. **Musical Instruments:** Yamaha C7D grand piano w/Forte MIDI-Mod., Paul Reed Smith electric 6-string, Yamaha acoustic 12-string, Gretsch drums, misc. percussion instruments, Marshall amplifier. **Other MIDI Equipment:** (3) Macintosh computer w/external drives, Opcode SMPTE "Time Machine", Digidesign SoundDesigner, Digidesign Soundtools, Digidesign Soft Synth, Opcode DX librarian and patch editor, Mark of the Unicorn Performer and Composer, (2) Emulator II w/librarian, (2) Akai S900, (2) Yamaha TX802, (2) Roland D-550, (2) Roland MKS-70, (2) Alesis HR-16, Roland R-8, (2) Emulator E-max, Oberheim DPX, Yamaha MJC-8, Yamaha DX7, E-mu SP-12, Prophet 5 w/MIDI, Linn Drum, Synhance MTS, Akai ME30P. **Video Equipment:** Sony BVU-800 3/4" recorder, JVC CR6655OU video recorder, (2) Panasonic AG-7510 S-VHS, Panasonic AG-7500 S-VHS, (2) Panasonic AG-7400 portable recorders, (2) NEC DX-2500U 1/2" VHS-HQ, (2) NEC CT-2020 20" color monitor, (2) Panasonic BT-D 1910V color monitor, (2) Panasonic BTM 1310V color monitors, (2) Panasonic WVT300 S-VHS cameras. **Other:** Pinnacle Paintbox system, Sound Ideas SFX library, various CD players, Technics SL1200 turntable. **Rates:** The best deal on digital multi-track in the US, our rates are reasonable and very competitive. Block time available. Please call. **Specialization & Credits:** Guns 'N Roses, Queensryche, Deniece Williams, Michael Tomlinson, David Lanz, Steve Miller, Eric Tingstad/Nancy Rumbel, Ralph Towner/Gary Burton, Tim Noah, UB40. Nestled in evergreens, minutes from downtown Seattle. Complete subcontracting, equipment rental and hospitality services available. For ten years, we've been called the best-sounding studio north of San Francisco. Triad prioritizes your creative comfort in everything from the ergonomics of the MIDI workstations to the gourmet coffee in the lounge areas. State-of-the-art studios are balanced with warm, contemporary design elements. Award-winning rooms, outstanding engineers, sensitive support staff and attractive rates make Triad worth the trip from anywhere.

[24+] TRUE NORTH RECORDING STUDIO; PO Box 81485; Fairbanks, AK 99708; (907) 456-3419. Owner: Michael States. **Manager:** Michael States.

[24+] DAVE WELLHAUSEN STUDIOS; 1310 20th Ave.; San Francisco, CA 94122; (415) 564-4910. **Owner:** Dave Wellhausen. **Manager:** Janet Wellhausen. **Engineers:** Dave Wellhausen, John Altmann, Gary Mankin, Mark Needham, Steve Heger, Randy Sellgren, Aaron Gregory, Steve O'Hara. **Dimensions:** Studio 25x15 w/iso booth, control room 15x15. **Mixing Consoles:** Sound Workshop 34C w/ARMS and Disk-Mix, 32 inputs—52 inputs in mixdown. **Audio Recorders:** MCI JH-24 w/24 and 16-track heads, Otari MTR-12, Otari MX-5050, Sony TCD-10 Pro DAT machine. **Cassette Recorders/Duplicators:** (2) Awa. **Noise Reduction Equipment:** (2) Dolby spectral recording on MTR-12. **Echo, Reverb & Delay Systems:** Lexicon 224XL digital reverb, Eventide H3000 Ultra Harmonizer w/45 seconds stereo sampling, Roland DEP-5, (2) Roland SRV-2000, (2) Yamaha SPX90, Yamaha D1500, Marshall time modulator, DeltaLab ADM 1024, DeltaLab ADM 64, Alesis Microverb, Roland SDE 3000, Roland SDE-1000. **Other Outboard Equipment:** (2) Drawmer gate, (2) Valley People Dyna-Mite, ADR Vocal Stresser, (2) UREI 1176 limiter, (2) UREI LA-4 limiter, Aphex Compellor, (2) SAE graphic equalizer, (4) Massenburg microphone preamp, (2) Massenburg EQ, Aphex Aural Exciter, Symetrix gate. **Microphones:** (2) Neumann U87, Neumann KM84, (2) AKG 414EB, (3) AKG 451, (2) AKG 460B, (2) AKG D-12, (2) Electro-Voice RE20, (2) Electro-Voice RE15, (5) Sennheiser 421, Sennheiser 441, (5) Shure SM57, Shure SM58, (4) Countryman direct box, Countryman EM101, Demiter tube direct box, Beyer M201, Sony C-36P, (4) Crown PZM, Beyer M88. **Monitor Amplifiers:** Symetrix A220 (headphones), BGW 100, AB Systems Precedent Series 600, BGW 250. **Monitor Speakers:** (2) Westlake BBSM8, (2) Yamaha NS-10M, (2) Auratone. **Musical Instruments:** E-mu Emu HD sampler w/over 3,000 voices, Yamaha C3 6' conservatory grand piano, Yamaha DX7, Yamaha RX5, Roland MXS-30, Fender Precision bass, Casio CZ-101, Midi Bass, Roland Octapad, Alesis SR16, Alesis D4. **Other MIDI Equipment:** Macintosh SE w/Performer software and SMPTE-MIDI interface. **Rates:** Call for rates.

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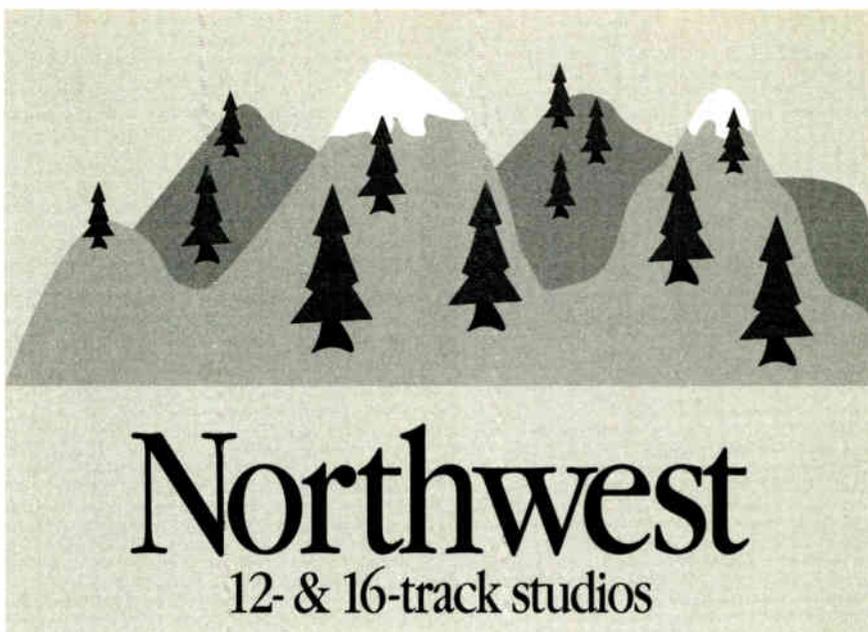
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[16] **AVAST RECORDING CO. AND AVAST STUDIO RENTALS**; also *REMOTE RECORDING*; 1325 N. 46th St.; Seattle, WA 98103; (206) 633-3926. **Owner:** Stuart Hallerman. **Specialization & Credits:** Rentals in Seattle! Avast Studio rentals, providing first-class equipment to your studio. Imagine how much better your music will sound with microphones by Neumann, AKG and Sennheiser. Choose from our rentals and track with EQ & dynamics by UREI, AKG, Focusrite, Summit and Orban. Enjoy better mixes with effects by Lexicon, Yamaha and Eventide. We also rent monitors, headphones, DATs, Dolby SR and PA systems by the day, week or month. Your studio is better when you use Avast Studio rentals! Avast also provides in-house recording services. We thank the bands: Soundgarden, Screaming Trees, Scott Cossu (live), Nirvana (live), Supersuckers, Steve Fisk, Best Kissers in the World, Mudhoney (live), Treepeople, Terry Date, CBS, Sony Records, A&M, Sub-Pop, Gunny Junk, Alice in Chains, C'nosaur Jr., Jon Auer, Jad Fair, IMJ... We're here to help you. Please call (206) 633-3926 to join this successful list.

[16] **ROBERT BERKE SOUND**; 50 Mendell St. #11; San Francisco, CA 94124; (415) 285-8800; FAX: (415) 285-8847. **Owner:** Robert Berke. **Manager:** Nancy Berke.

[16] **CASCADE RECORDING CO.**; 1107 E. 3rd St.; Cle Elum, WA 98922; (509) 674-2891. **Owner:** Allen Larsen. **Manager:** Allen Larsen.

[16] **DANCING DOG RECORDING STUDIO**; 1500 Park Ave. #B210; Emeryville, CA 94608; (510) 655-6760. **Owner:** David Bryson and Lydia Holly. **Manager:** Damien Rasmussen.

[16] **DOMESTIC STUDIOS**; 1912 Gilmore Trail; Fairbanks, AK 99712; (907) 457-1993. **Owner:** Jerry Rafson. **Manager:** Rif Rafson.

[16] **DREAMLAND PRODUCTIONS**; 645 E. Arques Ave.; Sunnyvale, CA 94086; (408) 773-0544; FAX: (408) 773-0546. **Owner:** Jesse Feliciano. **Manager:** Jesse Feliciano.

[16] **EAR RELEVANT RECORDING**; also *REMOTE RECORDING*; 240 Duncan St.; San Francisco, CA 94131; (415) 282-9675. **Owner:** John Karr. **Manager:** John Karr.

[16] **EYE IN THE SKY SOUND**; 4315 County Rd. 54G PO Box 642; La Porte, CO 80535; (303) 482-3947. **Owner:** Randy Mlotke. **Manager:** Greg Ide.

[16] **HILLVIEW RECORDING STUDIOS**; also *REMOTE RECORDING*; PO Box 110; Gilroy, CA 95020; (408) 847-5059; FAX: (408) 847-5059. **Owner:** Gary W. West. **Manager:** Gary W. West. **Engineers:** Gary W. West. **Dimensions:** Studio 10x12, control room 12x12. **Mixing Consoles:** Ramsa WRT-820B. **Audio Recorders:** Tascam MSR 16 w/dbx. **Cassette Recorders/Duplicators:** Tascam DA-30 DAT, Tascam 112, Otari MX50 2-track. **Synchronization Systems:** Tascam ES-50. **Echo, Reverb & Delay Systems:** Ibanez SDR 1000+, (2) SPX 900, Roland DSE-1000, ARX quad compressor/limiter, ARX quad noise gate, Aphex Exciter Type C, Rane PE15 parametric EQ, Rane ME15 EQ, Rane AC22 crossover. **Microphones:** (2) Sennheiser 441, (2) AKG D-414, (2) AKG 451, (6) Shure SM57, (2) AKG D-12E, AKG C-1000. **Monitor Amplifiers:** Peavey PMA 200. **Monitor Speakers:** (2) Tannoy PBM8, Miller&Kreisel sub woofer. **Musical Instruments:** Roland D-70, Proteus I, Korg M1R, Yamaha TX7, Emulator

Proformance 1+, Roland R-8, Roland Octapad 8. **Video Equipment:** JVC BR5610 recorder. **Digital Workstations:** Digidesign Pro Tools. **Rates:** On request.

[16] **HOMETOWN ARTISTS RECORDING STUDIOS**; also *REMOTE RECORDING*; 120 W. 5th St.; Rifle, CO 81650; (303) 625-3421; FAX: (303) 625-3421. **Owner:** Lee and Roberta Gillespie. **Manager:** Lee Gillespie.

[16] **ILLUSTRATED AUDIO**; also *REMOTE RECORDING*; Caldwell, ID 83605; (800) 676-1864. **Owner:** Doug Davis, Rod Davis. **Manager:** Rod Davis.

[16] **MAGIC SOUND**; also *REMOTE RECORDING*; 1780 Chanticleer Ave.; Santa Cruz, CA 95062; (408) 475-7505. **Owner:** Alan Goldwater. **Manager:** Alan Goldwater. **Engineers:** Alan Goldwater, Merle Sparks, Richard Karst. **Dimensions:** Studio 16x20x12 (asymmetrical wedge ceiling), isolated drum room 12x14, booth 5x6x7, control room 12x14x16. **Mixing Consoles:** Studio A: custom 36 x 8 separate 16-track fully equalized monitor, section, full patch bay, API 550 mix-board EQ. Studio B: Allen & Heath CMC 24. **Audio Recorders:** Studio A: MCI/Inovonics JH-16 15/30 ips, Rockwell computer autolocator, Ampex AG440 2-track 15/30 ips, Otari MX-5050 2-track, Sony PCM-701 2-track digital. **Studer** Dyaxis digital workstation. Studio B: Fostex B-16 30 ips, Panasonic SV-3500 DAT. **Cassette Recorders/Duplicators:** (2) Kenwood KX 1060. **Echo, Reverb & Delay Systems:** Ecoplate II multitrack reverb, Marshall Time Modulator, Roland Space Echo, Lexicon Prime Time II, Lexicon PCM60, PCM70, PCM200. **Other Outboard Equipment:** (2) Universal Audio 175B tube limiter, Allison Gain Brain, Roger Mayer noise gates, (8) API 550A EQ, (2) UREI LA-4 limiter, Thorens/Rabco disc player, Eventide Harmonizer. **Microphones:** Neumann KM54a, Neumann UB7, (2) AKG 414EB, AKG C-451, AKG D-190, AKG D-160, AKG D-12, AKG C-28A (tube), Beyer M260, (2) Beyer X1N, (2) Sennheiser MD-421, Shure SM57, Shure SM58, Shure SM81 (several each), Sony C-377, Sony C-22, Sony C-37A (tube), Al M30s (tube), RCA BK5 (ribbon), (2) AKG C-61a tube, AKG C-12 (tube), Shure SM7. **Monitor Amplifiers:** Hafler 250. **Monitor Speakers:** Altec/UREI 811, White 4100 EQ, Yamaha NS-10M, Sennheiser and AKG headphones. **Musical Instruments:** Emu E III, Drumulator, Guild F30, Danelectro and Rickenbacker 12-string guitars, Fender Princeton and Deluxe amps, Polytone amps, CB drums w/Zildjian cymbals, E-mu Drumulator w/computer sequencer. **Video Equipment:** Panasonic NV8200 w/computer search, Panasonic 8500 VHS editing system. **Rates:** \$40/hr. 16-track 2"; \$35/hr. 1/2" or block (10 hrs. or more); \$30/hr. 8-track; \$30 block; \$30/hr. 2-track and editing; 1 hour free setup. Above rates include engineer and instruments.

[16] **MEDIA WORKS**; also *REMOTE RECORDING*; 3545 S. Park Dr. (Box 15); Jackson Hole, WY 83001; (307) 733-1300; FAX: (307) 733-1324. **Owner:** Jeff McDonald, Mark Rohde. **Manager:** Jeff McDonald.

[16] **M.I.P. PRODUCTIONS**; 3013 E. Monte Vista Ave.; Denver, CO 95316; (209) 632-8415; FAX: (209) 668-7673. **Owner:** Gary Shriner. **Manager:** Craig Floyd.

[16] **MOMENTUM RECORDING STUDIO**; 401 SW 148th, Ste. A; Seattle, WA 98166; (206) 439-7683. **Owner:** Victor M. Marrese. **Manager:** Victor M. Marrese.



NACNUD SOUND
Lodi, CA

[16] **NACNUD SOUND**; 6748 Hogan Ln.; Lodi, CA 95240; (209) 334-2845. **Owner:** Richard Duncan. **Manager:** Richard Duncan. **Engineers:** Rick Duncan, Mark Zarek, Steve Gorley. **Dimensions:** Studio 20x40, control room 22x12. **Mixing Consoles:** Soundtracs MR Series 32x8x16x2. **Audio Recorders:** Tascam MS-16 16-track w/autolocator, Otari MX-5050 1/2-track master w/remote, Sony PCM-2400 R-DAT. **Cassette Recorders/Duplicators:** Yamaha C300, Nakamichi MR-2. **Noise Reduction Equipment:** dbx 16 tracks. **Synchronization Systems:** Yamaha MSS-1, Performer SMPTE. **Echo, Reverb & Delay Systems:** Yamaha REV5, Yamaha SPX90C w/remote, Lexicon PCM70, Lexicon Prime Time II DDL, Eventide H3000 Harmonizer, AKG BX-20, Alesis Quadverb. **Other Outboard Equipment:** Valley People rack w/Gain Brain Max EQ/Keep-xx/Commander/DSP, dbx 160, Aphex Aural Exciter, Furman compressor, Crown paragratic EQ. **Microphones:** Neumann U87, AKG 414, AKG 441, AKG 442, Sennheiser 421, Shure SM81, Shure SM58, Shure SM57, Sony ECM-230F. **Monitor Amplifiers:** Hafler D-500, Yamaha PC26CZM, Rane H-6 headphone amp. **Monitor Speakers:** Westlake BB-SM10, Yamaha NS-40M, Auratone, Yamaha and Sony headphones. **Musical Instruments:** Yamaha KX88, Yamaha DX7iFDE, Yamaha TX-816 rack, Oberheim Expander, Oberheim DPX-1 sample playback of Mirage/Propratt-2000/E-2, Roland D-50, Roland MKS-20 digital piano, Roland Super Jupiter, Moog Minimoog complete w/MIDI interface, E-mu SP-12 drum machine, Emulator Proteus, Korg M3R, Korg WaveStation, complete stereo guitar rack system, Ibanez guitar, complete Yamaha rock bass system, Yamaha 7-pc recording series drums, Zildjian and Sabian cymbals, SWR studio bass system, Fender, Yamaha and Tobias basses, Rockman Pro-Gap. **Other MIDI Equipment:** Macintosh Plus w/Performer sequencer/editing/sound libraries, Opcode MIDI interface, Jasmine 20M3 HD, Sycologic 32x32 MIDI switcher, Universe of Sound ED-ROM library. **Rates:** Available upon request. **Specialization & Credits:** At Nacnud Sound we specialize in custom original production. We offer producers, engineers, arrangers, musicians of only first-rate quality for the San Joaquin Valley. Our studio is located in a peaceful country surrounding perfect for creative endeavors. You will find a diverse selection of acoustic and electronic capabilities available to give the musician, singer, songwriter and producer the most flexible work environment in which to realize projects with a minimum of effort and cost. Nacnud Sound is a musician-owned and operated facility with a strong emphasis on musical and technical co-existence. With an emphasis on album, cassette and demo production, we have produced jazz, classical, rock, contemporary Christian, country and many other styles of music. Look for expansion in Nacnud Sound in the coming months to keep pace with our clients' ever-changing needs. We hope to work with you in the future on a most enjoyable and creative project.

[16] **NIGHTWIND PRODUCTIONS**; also REMOTE RECORDING; 60 Monument Plaza; Pleasant Hill, CA 94523; (510) 827-0200; FAX: (510) 827-1390. **Owner:** Bob Peacock, Donna Stewart. **Manager:** Bob Peacock. **Specialization & Credits:** At Nightwind Productions we offer direct-to-disk digital recording with producer and engineer services. For more extensive projects we offer MIDI and digital computer recording and editing. We produce music for television and radio commercial, and can also provide budget video production services with digital stereo sound.

[16] **NORTHERN LIGHTS RECORDING**; 1130 Industrial Ave., Ste. 5; Petaluma, CA 94952; (707) 765-2852. **Owner:** Barry Schiffman. **Manager:** Barry Schiffman.

[16] **OREGON SOUND RECORDING**; 125 S. Central, Ste. 209; Medford, OR 97501; (503) 773-3292; FAX: (503) 779-8970. **Owner:** Sean McCoy. **Manager:** Sean McCoy. **Engineers:** Sean McCoy. **Dimensions:** Studio 13x12, control room 16x17. **Mixing Consoles:** Pamsa WR-7820 20-channel, Rane SM82 16-channel. **Audio Recorders:** Otari MX-70 16-track, Otari MX-5050 II 2-track, Otari MX-5050-2-track, Panasonic SV-3700 DAT. **Cassette Recorders/Duplicators:** Tascam

112, JVC TD-V66. **Noise Reduction Equipment:** (16) dbx 180A Type I. **Synchronization Systems:** JL Cooper PPS-100 SMPTE-to-MIDI converter. **Echo, Reverb & Delay Systems:** Ecoplate II modified, Lexicon LXP-1, Lexicon LXP-5, Alesis Quadverb, Alesis MIDverb II, Yamaha SPX90, DeltaLab Effectron II digital delay, BBE 822A Sonic Maximizer. **Other Outboard Equipment:** (2) dbx 160X comp/limiter, (2) Valley Comanders, Valley Kepex II, Valley Maxi Q, Symetrix SX206 comp/limiter, Omni Craft GT-4A 4-channel gate, Symetrix SX 203 telephone interface, Valley Dynamite stereo comp/limiter, (2) Rane FMI 14 mic preamp/EQ. **Microphones:** Neumann U87, (2) Neumann KM140, (2) AKG 414EB, AKG D112, AKG 451, (2) Sennheiser 421, Beyer M160, Crown PZM 315, (4) Shure SM57, Shure SM5B, Shure SM94, Countryman FET 85 DI, (3) AES DI. **Monitor Amplifiers:** Carver PM600, Rane HC-6 headphone amp, Sony TAN-5550. **Monitor Speakers:** (2) JBL 4311, (2) Realistic Minimum 2.5, (2) Boston Acoustics A40. **Musical Instruments:** E-mu Emax SE, Roland U-20, Yamaha DX7 w/EI, Ensoniq Mirage, Oberheim Matrix-1000, Oberheim Matrix-6R, Roland D-70, Roland D-110, Kawai K4, Yamaha TX81Z, Alesis HR16, Kurzweil 1000PX, Roland Octapad, Roland MIDI drum kit w/PMI-16 Kawai 5'9" grand piano. **Other MIDI Equipment:** ME 386SX computer w/MX32M interface, Cakewalk 4.0 sequencing software, 150 various disk Emax library, Turtle Beach Sample Vision 2.0, Triton sound software for Mirage, JL Cooper MSB+ Rev2 MIDI patchbay. **Other:** (100) APM, Network, Omni music libraries; (20) Hollywood Edge Premiere Edition SFX CDs; (40) Network SFX CDs.

[16] **PACIFIC LUTHERAN UNIVERSITY—AUDIO SERVICES**; also REMOTE RECORDING; 121st and Park Ave.; Tacoma, WA 98447; (206) 535-7268; FAX: (206) 535-7799. **Owner:** Pacific Lutheran University. **Manager:** Bob Holden.

[16] **PEAK RECORDING & SOUND**; also REMOTE RECORDING; PO Box 1404; Bozeman, MT 59715; (406) 586-1650. **Owner:** Peak Recording & Sound Inc. **Manager:** Gil Stober.

[16] **PLAN A PRODUCTIONS**; PO Box 1588; Novato, CA 94948; (415) 382-9066. **Owner:** John Main. **Manager:** Reid Whalley.

[16] **PLH SOUND INC.**; 4140 Gilbert St.; Oakland, CA 94611; (510) 654-0180. **Owner:** Bill Lackey. **Manager:** Bill Lackey.

[16] **PYRAMID SOUND—A SAN FRANCISCO AUDIO NETWORK RECORDING STUDIO**; 39 Gilbert St.; San Francisco, CA 94103; (415) 863-8565; FAX: (415) 863-8419. **Owner:** Gregory Gordon, Keith Moreau. **Manager:** Michael Lande.

[16] **RAINBOW RECORDING**; 6614 SW Garden Home Rd.; Portland, OR 97223; (503) 246-5576. **Owner:** Gailen Hegna. **Manager:** Thomas Dietsche.

[16] **THE RECORDING CENTER**; also REMOTE RECORDING; 118 W. Pine St.; Missoula, MT 59802; (406) 721-4172. **Owner:** Richard H. Kuschel.

[16] **DON ROSS PRODUCTIONS**; also REMOTE RECORDING; 3097 Floral Hill Dr.; Eugene, OR 97403; (503) 343-2692. **Owner:** Don Ross. **Manager:** Don Ross. **Engineers:** Don Ross. **Dimensions:** Studio 24x15x14, control room 24x15x10. **Mixing Consoles:** Tascam M-3700 32x8 w/automation. **Audio Recorders:** Tascam MS-16 16-track 1", Tascam DA 30 2-track DAT, Panasonic 3700 2-track DAT, Revox PR-99 Mk II 2-track, Revox B-77 2-track, Fostex 20 2-track w/SMPTE trk. **Cassette Recorders/Duplicators:** Nakamichi, Aiwa. **Noise Reduction Equipment:** dbx Type 1. **Echo, Reverb & Delay Systems:** Lexicon 200, LXP-1, LXP-5, PCM-42, MRC digital reverbs & EFx, Yamaha SPX90, dbx 163X comp/limiter, Drawmer DL241 comp/limiter, BSS DPR-504 noise gate, Ashly Audio SC-50 comp/limiter, Aphex Aural Exciter, Gaines mic preamp, Symetrix SX-201 parametric EQ. **Microphones:** Neumann U87, KM84, AKG 414, 460, 451, Sennheiser MD 421, EV RE20, Shure SM53, 57. **Monitor Speakers:** Tannoy NFM-8, Yamaha NS-10, Auratone 5C. **Musical Instruments:** Steinway M grand piano (1925), Ensoniq EPS w/44 meg Syquest removable drive. **Other MIDI Equipment:** JL Cooper PPS 100, Opcode Studio 3. **Video Equipment:** JVC CR-850U 3/4" video deck w/SMPTE address track, Sony video monitors 13" and 20", Fostex 4030/4035/4010 SMPTE synchronizer system, Sony SLV-575, SLV-585 1/2" VHS. **Other:** Black & Decker 10-cup coffee maker. **Digital Workstations:** Digidesign Pro Tools digital hard disc recording/editing system w/Mac II, HP635 meg hard drive, DECK & Studio Vision.

[16] **SESSION KAT PRODUCTIONS**; 1016 Morse Ave., Ste. 18; Sunnyvale, CA 94089; (408) 734-2034; FAX: (408) 734-2034. **Owner:** Timothy Vandenberg. **Manager:** Timothy Vandenberg.

[16] **SHORELINE STUDIOS**; PO BOX 1102; Mill Valley, CA 94942-1102; (415) 389-1959; (415) 381-9701; FAX: (415) 381-0446. **Owner:** Mark Stein. **Manager:** Mark Stein. **Engineers:** Mark Stein, Arn Johnson. **Dimensions:** Studio 12x16, control 12x16. **Mixing Consoles:** Soundcraft 48 input. **Audio Recorders:** Fostex G-16S 16-track, Panasonic 3700 DAT, Digidesign Sound Tools direct-to-disk digital recording/editing. —LISTING CONTINUED ON NEXT PAGE

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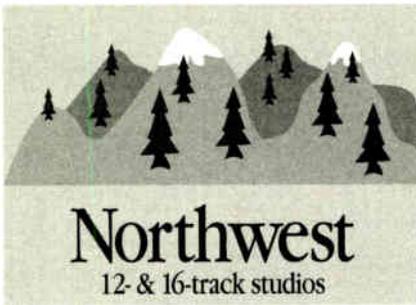
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—LISTING CONTINUED FROM PREVIOUS PAGE

Studio Vision 16-track integrated MIDI & digital recording w/ unlimited virtual tracks (MIDI). **Cassette Recorders/Duplicators:** (2) Aiwa TX999 3-head. **Noise Reduction Equipment:** Dolby S 16 channel, (2) dbx, Orban. **Synchronization Systems:** Fostex 8330 synchronizer/autolocator/full video lock, Studio 3 Mac interface, SMPTE generator. **Echo, Reverb & Delay Systems:** Zoom 9010 multi-effects processor,

DigiTech 254XL multi-effects processor, (2) Alesis Quadraverb multi-effects processor, BBE 422A Sonic Maximizer, Orban 209RX adaptive enhancement processor, dbx 166 comp/limiter/expander (stereo), Rane ME-15 graphic EQ. **Other Outboard Equipment:** (2) Custom TT patch bay. **Microphones:** AKG, CAD, Electro-Voice, Shure. **Monitor Amplifiers:** Hafler Pro 2400, Crown Power Base-2. **Monitor Speakers:** Tannoy. **Musical Instruments:** Korg M-1 keyboard, Roland U220 synth module, Yamaha TG77 synth module, Roland D-50 synth module, Ensoniq EPS sampler, Yamaha TG33 synth module, guitars & basses by Fender, Yamaha, Guild, Ibanez, Peavey, Alesis SR-16 drum machine. **Other:** Audio-for-video. **Digital Workstations:** Macintosh w/Studio Vision, Atari w/Cubase. **Rates:** Expert MIDI consultation, in-house or out. Call for rates.

[16] **SOUND & VISION;** also REMOTE RECORDING; 684 Indiana St.; San Francisco, CA 94107; (415) 821-2321. **Owner:** Michael Molenda, Neal Brighton. **Manager:** Neal Brighton.

[16] **SOUNDHOUSE RECORDING STUDIO;** 7023 15th Ave. NW; Seattle, WA 98117; (206) 784-4848; FAX: on request. **Owner:** Patricia Crane. **Manager:** Scott Crane.

[16] **STARSHINE AUDIO ENTERPRISES;** 932 Nord Ave.; Chico, CA 95926; (916) 345-3027. **Owner:** Hugh Santos. **Manager:** Hugh Santos.

[16] **JACK STRAW PRODUCTIONS;** also REMOTE RECORDING; 4261 Roosevelt Way NE; Seattle, WA 98105-6999; (206) 634-0919; FAX: (206) 634-0925. **Owner:** The Jack Straw Foundation. **Manager:** Charles Hamilton.

[16] **STUDIO 5 RECORDING;** 13400 Northup Way, Ste. 2; Bellevue, WA 98005; (206) 643-1755. **Owner:** Art Massover. **Manager:** Becky McPeters. **Engineers:** Thad Crowe—chief engineer, Bill Levey. **Dimensions:** Studio 12x8, control room 12x12. **Mixing Consoles:** Amek Matchless 26x24x8x2, Ramsa WR8210 monitor mixer. **Audio Recorders:** Sony/MCI JH-24-16 with Autolocator III, Sony 5003V 2-track with center band time code, Otari MX-5050Mk III 2-track 1/4" with CB1160 remote, Otari MX-5050B 2-track 1/4", Otari MX-5050Mk III 4-track 1/2", Panasonic SV-3700 DAT. **Cassette Recorders/Duplicators:** Yamaha C-300 with remote, (2) SAE C102 with remote. **Echo, Reverb & Delay Systems:** Lexicon PCM70 digital reverb/efx processor, Eventide 969 Harmonizer, (2) DeltaLab CE 1700 Compu-effectron, (2) Symetrix 501 compressor/limiter, (2) Symetrix 522 stereo compressor/expander/gate/ducker, Symetrix SE-400 stereo parametric EQ, Rane GE14 stereo graphic EQ, (2) Audio & Design Scamp rack. **Other Outboard Equipment:** Symetrix TI 101 telephone interface, Sony CPD 550 CD player with remote. **Microphones:** (2) Neumann U82, (2) AKG 451, (2) Sennheiser 441, Sennheiser 421, Beyer M5000. **Monitor Amplifiers:** UREI 6250, UREI 6150, Hafler PRO230, Crest 901, Symetrix A-220, Rane HC-6. **Monitor Speakers:** (2) Westlake BBSM-10, (2) Tannoy PBM-8, (2) Yamaha NS-10M, (2) Auratone Cubes, (2) JBL 4408 studio monitor, (2) JBL 4301. **Musical Instruments:** Roland MPU 401, Roland Pad 8 MIDI percussion controller, Yamaha KX88 keyboard controller, (2) Roland S-550 sampler with video monitor, Roland 5-50 LA synthesizer, Yamaha TX802 8-voice 4-operator rack module, Yamaha TX16W sampler, Yamaha DX7, Yamaha RX11, Roland PG-1000 editor. **Other MIDI Equipment:** Compaq DeskPro 386 with 40MB hard drive 1.2 Mb, Yamaha MJC8 MIDI patch bay, Voyetra sequencer plus MkIII V. 4.0, Voyetra patch master plus librarian, Voyetra Sideman DTX editor, music printer plus music scoring/publishing, Barcus-Berry TX802 editor. **Other:** AKG D-240 headphones, Technics SP-15 direct drive turntable.

[16] **TIME CAPSULE RECORDING;** also REMOTE RECORDING; 1042 Perry St.; Denver, CO 80204; (303) 534-6977. **Owner:** James L. Jackson. **Manager:** James L. Jackson. **Engineers:** James Jackson, Kirby Orrick, T. J. Jackson (service tech.). **Dimensions:** Room 1: studio 36x20, control room 22x14. Room 2: studio 24x20. Room 3: studio 20x14. Room 4: studio 12x11. **Mixing Consoles:** Tascam M-520 20x8x16x2, Tascam M-320 20x4x8x2. **Audio Recorders:** Tascam MSR-16 16-track, Fostex E-16 16-track, Tascam 38 8-track, TEAC 3440S 4-track, Tascam 32 1/2-track, Nakamichi DMP-100 digital 2-track, (2) Panasonic SV-3700 DAT. **Cassette Recorders/Duplicators:** Technics RS-B100, Tascam 122B. **Noise Reduction Equipment:** (2) Tascam DX-4D 4-channel dbx, Tascam DX-2D 2-channel dbx. **Synchronization Systems:** JL Cooper PPS-100 SMPTE/MIDI. **Echo, Reverb & Delay Systems:** (2) Yamaha REV7 reverb/multi-effects, Lexicon PCM60 reverb, (3) Yamaha SPX900 reverb/multi-effects, (2) Yamaha SPX90II, Yamaha SPX50D, ADA 640 digital delay, Alesis MIDverb. **Other Outboard Equipment:** (7) Tascam PB-64 patch bay, (2) Orban 672A graphic parametric EQ, Yamaha GQ2031B 2-channel 31-band EQ, Yamaha GQ1031B single-channel 31-band EQ, Yamaha GE60 dual-channel 10-band graphic EQ, (3) Symetrix 522 dual-channel compressor, (2) Yamaha CG2020BII dual-channel compressor, (3) Symetrix SX-202 dual ch. mic preamps, (2) Gatex 4-channel noise gate/expanders, (2) Audio Logic MT-44 4-channel noise gate, Aphex dual-channel Exciter, Yamaha CP-50 CD player, Technics quartz turntable. **Microphones:** Neumann U87 condenser, (2) AKG 414 condenser, Sony ECM 94 stereo condenser, (2) Audio-Technica AT 4031 condenser, Audio Logic Pro 37R condenser, (4) AKG C-1000S condenser, (2) AKG 451E condenser, Fostex M-88RP ribbon, (2) Sennheiser 421, (2) Sennheiser 441, (2) AKG D-112, (8) Shure SM57, (18) various others by EV, AKG, Shure. **Monitor Amplifiers:** Yamaha M60, Yamaha M80, Rane HC-6 headphone. **Monitor Speakers:** JBL 4425, Yamaha NS-10, JBL 4410, (10) AKG 240 headphone. **Musical Instruments:** Kawai K4, Yamaha DX7IIIFD, Yamaha RX5 drum machine, Yamaha TSX16W stereo sampler, Phillips grand piano (1905 restored), (6) Marshall and Yamaha guitar amps, (12) classic guitars and basses (1950's and 1960's Gibson & Fender), Fender steel (1946), Ode 5-string banjo, Casio C2-1 synth. **Other MIDI Equipment:** Amiga 500 computer w/Master Tracks Pro, Apple IIE w/Master Tracks Pro, Akai 8-channel audio-to-MIDI triggers, (2) Akai MIDI delays, (2) Yamaha TX812 synth module.

[16] **JOE WEED'S HIGHLAND STUDIO;** PO Box 554; Los Gatos, CA 95031; (408) 353-3353; FAX: (408) 353-3388. **Owner:** Joe Weed. **Manager:** Joe Weed.

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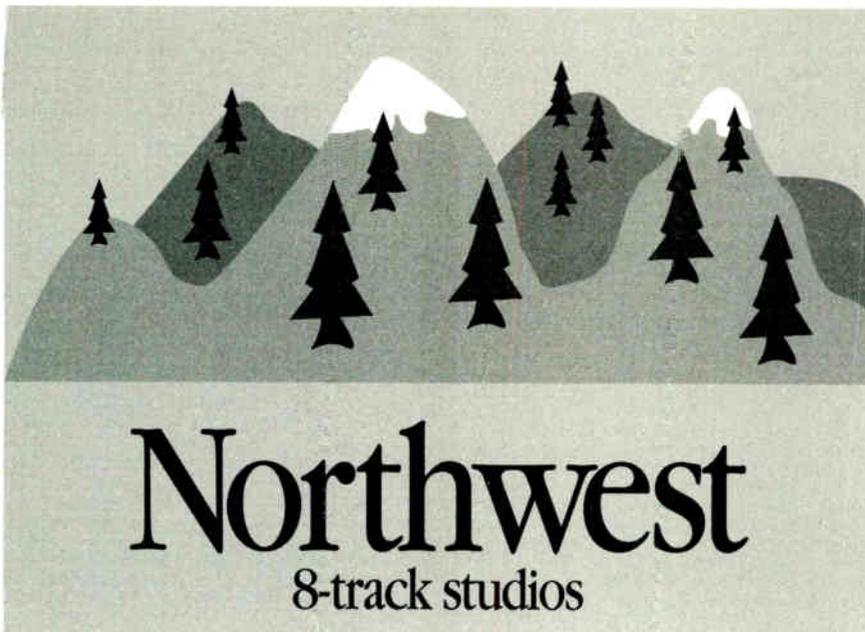
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[8] **ALBRIGHT PRODUCTIONS**; 607 W. 3rd; Ellensburg, WA 98926; (509) 962-2820; FAX: (509) 962-3127. Owner: Sam Albright.

[8] **ALMOSTA STUDIO**; PO Box 581; Moss Beach, CA 94038; (415) 728-7561. Owner: Marc Marcus. Manager: Lisa Barney.

[8] **AUDIO RECORDING INC.**; also *REMOTE RECORDING*; 4718 38th Ave. NE; Seattle, WA 98105; (206) 525-7372; (206) 623-2030. Owner: Kearney W. Barton. Manager: Kearney W. Barton.

[4] **AVID PRODUCTIONS-DIGITAL**; also *REMOTE RECORDING*; 235 E. Third Ave.; San Mateo, CA 94401; (415) 347-3417; FAX: (415) 344-2878. Owner: Henry Bilbao. Manager: Chris Craig.

[8] **FRANK SHORT'S BANDBOX MUSIC AND RECORDING**; 537 S. Main St.; Ukiah, CA 95482; (707) 462-5386. Owner: Frank Short. Manager: Frank Short.

[8] **COMMAND PRODUCTIONS**; also *REMOTE RECORDING*; 107 Industrial Center Building; Sausalito, CA 94965; (415) 332-3161. Owner: Warren Waagant. Manager: Michel Dupen.

[8] **EARWAX PRODUCTIONS**; 245 Hyde St.; San Francisco, CA 94102; (415) 775-8561. Owner: Partnership. Manager: Jim McKee. Specialization & Credits: LucasFilm Ltd., Zoetrope, Cannon Films, General Motors, MTV, *Levi's*, Planned Parenthood, Apple Computer, Capitol Records and many others have all asked the producers at Earwax to compose music, create sound effects and produce products for them. Earwax experience encompasses all media including feature films, broadcast commercials, corporate communication videos and radio dramas. The Earwax multimedia division has produced many Laserdiscs and CD-ROMs as well. Earwax has full SMPTE, MIDI, video lock with multitrack analog recording and an additional 2 channels of direct-to-disk digital recording that also locks to picture, center code 1/2-track mastering, 8 channels of Dolby SR, plenty of computers, samplers and synthesizers all of which are located in two comfortable studios. The producers at Earwax also have experience in surround sound, live multimedia production and film. Take advantage of the best, Earwax productions. The results will astound you.

[8] **FLAVIANI RECORDING**; 846 33rd Ave.; San Francisco, CA 94121; (415) 386-2722. Owner: Victor Flaviani. Manager: Victor Flaviani.

[8] **FULL MOON RECORDING COMPANY**; also *REMOTE RECORDING*; 197 W. 12th Ave.; Eugene, OR 97401; (503) 343-1294; FAX: (503) 686-0248. Owner: FRN Inc. Manager: Steve Diamond. Engineers: Steve Diamond, Jon Davis, Phil Powers, Pat Brand, Will Spicher. Dimensions: Room 1: studio 24x15 plus 2 isolation booths, control room 15x12. Room 2: control room 15x12. Mixing Consoles: TAC Scorpion 16x8, Ramsa 12x4. Audio Recorders: Otari MX-70 8-track, (2) Otari MTR-10 2-track, Otari MX-5050 2-track, Ampex 350 1-track, Ampex 700 2-track, Panasonic 3700 DAT. Cassette Recorders/Duplicators: Otari DP-4050C2 stereo high-speed w/5 slaves, Nakamichi MR-1, Nakamichi MR-2 and others. Noise Reduction Equipment: Dolby SR 2 channels, dbx 150X 8 channels. Synchronization Systems: (2) Adams-Smith Zeta-3 SMPTE generator/controller, Adams-Smith Zeta remote. Echo, Reverb & Delay Systems: Lexicon PCM70, Yamaha SPX90, Alesis QuadraVerb. Other Outboard Equipment: dbx 166 dual-channel comp/limiter/gate, —LISTING AND PHOTOLOGO CONTINUED TOP OF NEXT COLUMN



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Aphex Compellor dual channel, Valley People Dyna-Mite 2 channels, Valley International Gategate 4 channels, UREI 533 EQ, Valley International dynamic sidechain processor, Summit Audio dual-channel tube preamplifier, Summit Audio tube equalizer. Microphones: (4) Neumann U87, (2) Neumann TLM170, (2) Neumann U89, (4) Neumann KM84, (2) AKG 460, Beyer 500, (2) Sennheiser MD-421, (4) Neumann 487 w/Stephen Paul modification, others. Monitor Amplifiers: Hatler DH-220, Yamaha, Rane HC-6, (2) McIntosh C-60 tube. Monitor Speakers: Tannoy Little Red w/sync source, JBL 4315, JBL 4311, Auratone 5C. Musical Instruments: Many synths available. Video Equipment: Panasonic AG 6500, center-stripe time code for Otari MTR-10 2-track, 1" layback kit for Otari MX-70 8-track, (2) MGA monitor. Other: Technics SL-1200 MkII turntable, (4) Harris cart machine, (2) custom phone patch coupler, Technics SL-P1200 CD player.

[8] **GNU-WAY ENTERPRISES**; also *REMOTE RECORDING*; PO Box 5653; Bend, OR 97708-5653; (503) 382-7487. Owner: Wayne Newitt. Manager: George Tirebiter.

[8] **HEART STREET STUDIO/SAN RAFAEL**; (415) 459-7594. Owner: Richard Duvall, Marcia Cohen. Manager: Richard Duvall. Engineers: Richard Duvall, Jack Sack. Mixing Consoles: Soundtracs FM Series 8x4.8. Audio Recorders: Otari Mk III 8 1/2" 8-track. Cassette Recorders/Duplicators: (2) Kenwood, Aiwa. Echo, Reverb & Delay Systems: Eventide H969 Harmonizer/delay, Alesis MIDverb II, (2) Alesis Microverb, VESTA digital delay, ADA STD-1 stereo tap delay. Other Outboard Equipment: Eventide Omnireverb comp/limiter/gate, Alesis MicroLimiter. Microphones: Beyer M740 condenser, Beyer M69 dynamic, (2) Shure SM58 dynamic. Monitor Amplifiers: Dynaco stereo 70 tube. Monitor Speakers: Digital Designs LS-161. Musical Instruments: Yamaha DX7 synth, Ensoniq ESQ1 synth, E-mu Proteus synth module, ARP Odyssey analog synth w/MIDI box, ARP Axse analog synth, Yamaha FB01 module, Alesis HR16 drum machine, Fender Squier Stratocaster w/Seymour Duncan p/u, Roland Juno 6. Other MIDI Equipment: Roland MC50 sequencer, Kawai 8x2 line mixer, Atari computer w/MasterTracks Pro. Encore Notation software. Other: Many other items avail-

able on request. Rates: Rates are flexible and very affordable. Please call for quote.

[2] **HOLLCRAFT STUDIOS**; also *REMOTE RECORDING*; 1961 Rose Ln.; Pleasant Hill, CA 94523; (510) 689-3444. Owner: E. J. Hollcraft. Manager: Carol Greenley.

[2] **KLAY ANDERSON AUDIO INC.**; *REMOTE RECORDING* only; 4689 S. Holladay Blvd.; Salt Lake City, UT 84117; (801) 272-1814; FAX: (801) 278-3886.

[8] **LEON-FORREST PRODUCTIONS**; also *REMOTE RECORDING*; 4416 SE Hwy. 101; Lincoln City, OR 97367; (503) 996-2575. Owner: L.F. Caulkins. Manager: eLF.

[4] **LITTLE WINGS ARBORETUM RECORDING**; 7534 SE Taggart Ct.; Portland, OR 97206; (503) 775-2894. Owner: Colin G. Heade. Manager: Colin G. Heade.

[8] **OPEN DOOR PRODUCTIONS**; PO Box 8556; Berkeley, CA 94707; (510) 527-9311. Owner: Burke Trieschmann. Manager: Burke Trieschmann.

[8] **PROJECT ONE AUDIO**; 1925 Bailey Hill Rd., Ste. G; Eugene, OR 97405; (503) 345-6004. Owner: Denny Conn, Gus Russell, Bill Shreve. Manager: Denny Conn.

[8] **PYRENEES PRODUCTIONS**; also *REMOTE RECORDING*; PO Box 13303; Portland, OR 97213; (503) 284-6155; FAX: (503) 284-6155. Owner: Richard Mathis.

[8] **REYNOLDS AUDIO PRODUCTION**; 104 Yosemite Ave.; Santa Cruz, CA 95060; (408) 457-8385. Owner: John V. Reynolds. Manager: John V. Reynolds.

[8] **RANDALL SCHILLER PRODUCTIONS**; also *REMOTE RECORDING*; 1141 Polk St.; San Francisco, CA 94109; (415) 567-2651. Owner: Randall Schiller.

[8] **THE SOUND SMITH**; PO Box 1567; Monterey, CA 93942; (408) 394-6940; FAX: (408) 394-6940. Owner: David Kemp-ton. Manager: Jeremy Hertzberg.

[8] **STUDIO G PRODUCTIONS**; 7451 1/2 Monterey St.; Gilroy, CA 95020; (408) 847-4202. Owner: Theodore Gaeta. Manager: Theodore Gaeta.

[2] **<STUDIO.H>, COMPUTER MUSIC FACILITY**; also *REMOTE RECORDING*; 1741 Alcatraz Ave.; Berkeley, CA 94703; (510) 658-4333. Owner: David J. Gray. Manager: Bill Thompson.

[8] **SULLIVAN RECORDING**; also *REMOTE RECORDING*; 1390 Frank Hill Rd.; Ashland, OR 97520; (503) 482-8181. Owner: Frank J. Sullivan. Manager: Lisa Campbell.

[8] **SUNSET RECORDING**; also *REMOTE RECORDING*; 856 Airport Rd.; Monterey, CA 93940; (408) 375-2861. Owner: Sal Marullo.

[8] **TONAL MAGIC RECORDING**; also *REMOTE RECORDING*; 1028 Lakeside St.; Cour d'Alene, ID 83814; (208) 667-8332. Owner: Cody Taylor. Manager: Cody Taylor.

[2] **T-V RECORDING**; also *REMOTE RECORDING*; Box 70021; Sunnyvale, CA 94088; (408) 248-6927. Owner: Richard Clay. Specialization & Credits: Digital Domain editing, equalization, cross fading, etc. Specializing in pipe organ recording and CD mastering. Personalized service and competitive pricing.

[8] **VINEYARD STUDIOS**; also *REMOTE RECORDING*; PO Box 69522; Seattle, WA 98188; (206) 630-3466. Owner: Roger B. Cox. Manager: Dale Stetson.

[8] **THE WRECK ROOM**; 19827 30th Ave., NE; Seattle, WA 98155; (206) 363-6914. Owner: Steve and Tyler Carlson. Manager: Tyler Carlson. Engineers: Steve Carlson (chief), Tyler Carlson (assistant). Dimensions: Room 1: studio 18x13, control room 20x16. Mixing Consoles: Ramsa WRT-820. Audio Recorders: Tascam TSR-8 8-track, Sony DTC-75 ES DAT. Cassette Recorders/Duplicators: Nakamichi MR-1, JVC KD-W7 dubbing. Echo, Reverb & Delay Systems: Roland SRV-2000 digital reverb, Alesis MIDverb II, Alesis MIDverb III, Alesis Quadraverb, Yamaha SPX90. Other Outboard Equipment: Symetrix 525 comp/limiter, Alesis 3630 comp/limiter. Microphones: AKG 414, (2) Shure SM57, (2) Shure SM58, AKG D-112, AKG 330 BT, (2) RS 33-1080. Monitor Amplifiers: QSC 3200, JVC AX-2. Monitor Speakers: (2) Tannoy System 8 NFM, (2) JVC SK-400 II, Proton P-300. Musical Instruments: Gibson Explorer guitar, Marshall JBP-212 amp, custom studio bass, Fender Princeton amp, 7-piece studio drum set, Roland 707 drum machine, Epiphone acoustic guitar. Rates: Available on request. Specialization & Credits: The Wreck Room is a comfortable, low-key demo studio, catering to musicians who are tired of playing with home 4-tracks. Can't find the sound? Get off the porta-potty and make a real record. We believe in loud, live rock 'n' roll and are dedicated to the continuing evolution of the Seattle sound, because this is where it all begins. We can deal with thrash, country, jazz, punk, metal, hard rock, folk, blues, classical, pop and standards. "All who enter here believe in what they're doing." "We've produced demos for Terrorist, From The Edge, Planet News, and Kevin Yount, and worked with Phil Stewart, Jeff Couch, Ecstasy 4 Hours, Jerry Stalder and Bill Roman. "It was a room and now it's wrecked." —Rick Vaughn.

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006	036	066	096	126	156	186	216	246	276
007	037	067	097	127	157	187	217	247	277
008	038	068	098	128	158	188	218	248	278
009	039	069	099	129	159	189	219	249	279
010	040	070	100	130	160	190	220	250	280
011	041	071	101	131	161	191	221	251	281
012	042	072	102	132	162	192	222	252	282
013	043	073	103	133	163	193	223	253	283
014	044	074	104	134	164	194	224	254	284
015	045	075	105	135	165	195	225	255	285
016	046	076	106	136	166	196	226	256	286
017	047	077	107	137	167	197	227	257	287
018	048	078	108	138	168	198	228	258	288
019	049	079	109	139	169	199	229	259	289
020	050	080	110	140	170	200	230	260	290
021	051	081	111	141	171	201	231	261	291
022	052	082	112	142	172	202	232	262	292
023	053	083	113	143	173	203	233	263	293
024	054	084	114	144	174	204	234	264	294
025	055	085	115	145	175	205	235	265	295
026	056	086	116	146	176	206	236	266	296
027	057	087	117	147	177	207	237	267	297
028	058	088	118	148	178	208	238	268	298
029	059	089	119	149	179	209	239	269	299
030	060	090	120	150	180	210	240	270	300

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- 01. Recording Studio (including Remote Trucks)
- 02. Independent Audio Recording or Production
- 03. Sound Reinforcement
- 04. Video/Film Production
- 05. Video/Film Post-Production
- 06. Broadcast/Radio/Television
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- 09. Equipment Mfg. (including rep. firm)
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- 13. Educational
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- 15. Management-President, owner, other manager, etc.
- 16. Technical & Engineering-Engineer, editor, design engineer, etc.
- 17. Production & Direction-Producer, director, etc.
- 18. Sales & Administration-Sales representative, account executive, etc.
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- 21. Recommend the purchasing of a product or service
- 22. Specify makes, models or services to be purchased
- 23. Make the final decision or give approval for purchase
- 24. Have no involvement in purchasing decisions

4 What is your company's annual budget for equipment, supplies and services? (check one)

- 25. Less than \$50,000
- 26. \$50,000-\$149,999
- 27. \$150,000-\$249,999
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- 30. Immediate purchase
- 31. Files/future purchase

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7 In which of the following locations does your audio/video production take place? (check all that apply)

- 37. Commercial (Public) Production Facility
- 38. Private (Personal) Production Facility
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027	057	087	117	147	177	207	237	267	297
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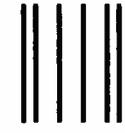
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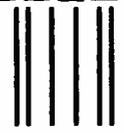
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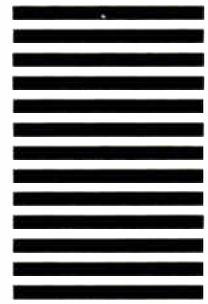
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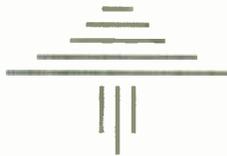


—FROM PAGE 67, PROJECT STUDIOS

soles—and the introduction of relatively inexpensive virtual recording systems, manufactured, interestingly enough, by MI companies like Korg and Roland, will surely be followed by downsized systems from the larger tapeless proponents. This will set the stage for the transition to Avid-like integrated audio and video systems, bypassing tape except as an archival medium.

There'll always be a range of studios in the market, and many of them will use tape to serve those clients who don't need or can't afford the features of the next wave of virtual recording. And post houses, tape-to-film transfer suites, mastering houses and other tertiary facilities will continue to serve their present roles (although with new

Take away the modifier and a project studio is simply that—a studio, subject to all the same market and economic forces that any other studio is subject to.



technology, as well). But integrated tapeless audio/video systems have the potential to become the future's new middle class, operating in a wide but clearly defined technology and price range, with rates determined by their

features rather than the number of tracks.

The project studio was the natural child of progressing technology. Like all things new, it met resistance, and it mutated and evolved according to forces larger than the science that spawned it. It was probably the central socioeconomic entity of the times for the audio industry. The past tense is appropriate here; it is not the end of history, but as any New Yorker knows, as soon as a trend is capable of being analyzed, it's over. And the project studio, by virtue of its arrival, is ready to relinquish its spearhead role to new mutations. ■

Dan Daley is Mix's East Coast editor. If only he could get out from under all this paper, then he'd show them...

TAPE & DISC

—FROM PAGE 133, SPLICES

facility in Bay Shore, NY...World Media Group (Indianapolis, IN) has increased its audio-cassette capacity to 800,000 units per month with the addition of a Lyrec high-speed duplication system. The company, which recently acquired special CD-packaging equipment, also opened an art department and added to its warehouse space... Record industry veteran Dennis Drake, former studio operations VP for PolyGram, has opened The Music Lab, an audio mastering and reissue restoration room in Morganville, NJ...Arnie Acosta of A&M Mastering has been busy with U2's new album and singles, as well as with projects by Barry White and Swervedriver. Also at A&M, Ken Perry has been mastering reissue projects including The British Invasion, John Lee Hooker and the Monkees... Engineers at BMG Studios in New York City have been using the CEDAR System to remove unwanted noise from a wide range of jazz and classical reissue projects...Bernie Grundman Mastering (Hollywood, CA) recently purchased a Gold Line Model PN-3 Gated Pink Noise Generator and Timer. ■

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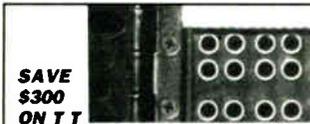
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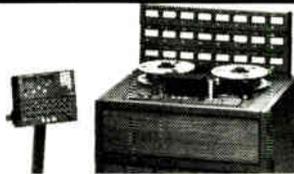
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The 4200 Series. Designed For The Control Room, Not The Living Room.

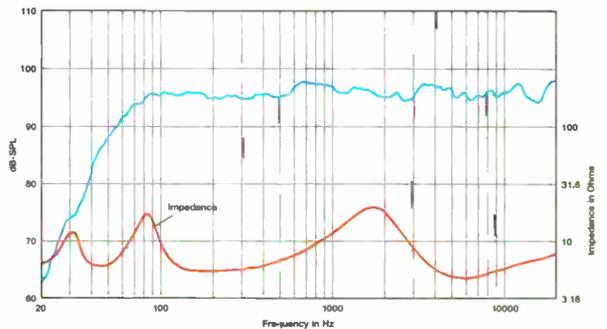
Today's recording studio has evolved into a multi-function facility which simultaneously addresses the specialized needs of music recording, film and video post, and radio production. In this environment, where the most critical listening often occurs in the final mix, close proximity monitors are often more important than the mains. The problem: most console top monitors, unfortunately, were designed for the living room not the control room. Until now.

With the 4200 Series we're taking our stand from where you sit: right where you work at the console. Designed, engineered and tested from this position, the 4200 Series is the first console mount monitor created specifically for the professional recording environment.

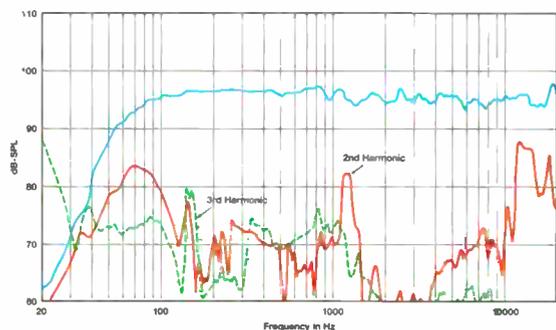
Both models give you pin-point imaging by delivering high and low frequency information to your ears at precisely the same instant. By virtue of their symmetrical design the 4200 Series monitors are mirror imaged.

And so nothing gets in the way of your music, the 4200 Series introduces our uniquely sculpted Multi-Radial™ baffles incorporating newly designed pure titanium tweeters and low frequency transducers. The combination of these technologies successfully corrects time arrival anomalies and eliminates baffle diffraction distortion.

4200 Series: console top monitors designed in the studio, for the studio, with sonic performance rivaling much more expensive monitors. 4200 Series: the shape, and sound, of things to come. Available at your local authorized JBL Professional dealer.



Frequency Response (Model 4206): 96 dB at 1 m, typical console listening levels



Distortion vs. Frequency (Model 4208) 96 dB at 1 m, typical console listening levels (distortion raised 20 dB)



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