

NOVEMBER 1982
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THE RECORDING INDUSTRY MAGAZINE

Mix



Interview:
Jeep Harned



AES New Products

A photograph of a large, brightly lit stage at an AES convention. The stage is filled with equipment and people, with a large audience visible in the foreground. The lighting is dramatic, with strong spotlights and a warm, golden glow.

Special Report:
Test Equipment

A photograph of a recording studio. In the foreground, a large, multi-track mixing console is visible. In the background, a drum set and other studio equipment are set up in a room with wood-paneled walls. The lighting is warm and focused on the equipment.

Video Music Update
Neil Young's Studio
Ray Manzarek
.38 Special

W

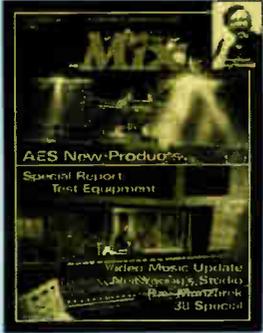
World-class consoles should be judged on the basis of performance, not price. Sophisticated and functional design and proven reliability at realistic prices are the basic factors that distinguish Sound Workshop consoles.



World Radio History

Sound Workshop Professional Audio Products, Inc.
1324 Motor Parkway, Hauppauge, New York 11788 (516) 582-6210 Telex 649230
Circle #001 on Reader Service Card





Cover:
Top: US Festival in Devore, California, Sept. 3, 1982. See related story on page 152
Photo by: Don Almquist
Bottom: Bison Recording, Columbus, Ohio. Story on page 100.
Photo by: D.R. Goff

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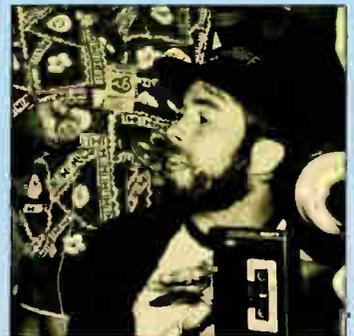
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VOLUME SIX, NUMBER ELEVEN

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INSIDE

We get many requests to run information concerning our listing sections; specifically, how to get listed and when. As far as how, we depend to a great extent on those of you involved with recording industry services and facilities getting in touch with us and letting us know what you do. From there, we pass along the info to our computer who helps us to get back in touch with you when it is time to update our files for publication. If you aren't sure whether our computer has yet made your acquaintance, please call or write and we'll check it out.

Regarding the when, below is a calendar of our listing schedule for 1983. We update our files approximately three months prior to the issue date. We urge you to keep an eye out for our questionnaires and, if you haven't heard from us in this time frame, please get in touch so that you don't get accidentally left out.

January: Northwest Recording Studios

February: Independent Engineers and Producers

March: Southeast Recording Studios

April: Video Production and Post Production

May: Northeast Recording Studios

June: Sound Reinforcement Companies plus Remote Recording

July: Southwest Recording Studios plus Recording Arts Schools

August: Studio Designers and Suppliers (retailers)

September: Southern California Recording Studios

October: North Central Recording Studios plus Studio Services

November: New Products for AES

December: Mastering, Pressing and Duplication

• • •

Coming next month:
Tape-to-Disk

TRACKS



Dear Mix,

I have just been shown the September 1982 issue of Mix Magazine and, in particular, page 16 thereof and the article which purports to show what's been happening at the JVC cutting center in Hollywood.

The first 9 lines of the article may be true; however, the remaining 35 lines of the article are largely untrue. Tom Lubin is a good reporter and I have a lot of respect for him and I am reasonably sure the problem was not his.

The facts of the matter are that JVC cutting center *has never* de-ticked a Hindsight master. I had left several selections there several months ago for their editor, Terri Fiyalko, to work on, to see how they came out. However, their digital equipment was out of the office so much on various rentals that she never really got the chance to finish the demo for me to hear.

Shortly thereafter, I left two Hindsight master tapes, one on Elliot Lawrence (1945) and the other on Jimmy Dorsey (1950) for Soundstream to remove the ticks and pops. Only a few days ago, I picked up the de-ticked master from Soundstream on the Elliot Lawrence master. Jim Wolvington and Tom MacCluskey did the actual work and what they did on that master tape was marvelous. The Lawrence master would have been unusable had it not been for them. I have every reason to believe that their work on the Jimmy Dorsey master will be as good.

I really have no idea as to the quality that JVC has going for it as far as cleaning up master tapes is concerned; but as for Soundstream, they are truly great.

Thank you for noting this correction.

Respectfully,
Wally Heider
Hindsight Records, Inc.
Burbank, California

Dear Mix,

In the article "Technology of the Grateful Dead," which appeared in the August issue, the impression is given that Meyer Sound is in some way a direct offshoot of the Grateful Dead. Nothing could be further from the truth: there is no connection between that band and this company, other than that they have purchased and rented our products from dealers. The Grateful Dead have certainly not influenced the development of Meyer Sound products, nor have they

participated, directly or indirectly, in our research.

Sincerely,
Ralph Jones
Marketing Manager
Meyer Sound Laboratories, Inc.
San Leandro, California

Dear Mix,

Since I make a large part of my living writing for audio and recording magazines (and a small part making and recording music), I am generally loathe to write to any publication in the field criticizing an editorial stance. The report in your otherwise laudable August issue on the so-called Coalition to Save America's Music, however, must not go uncommented upon.

From the tone of the piece, it looks like you simply reprinted a Coalition press release—the source of the statistics is never mentioned, and their validity is never questioned. In fact, the Warner Communications, Inc. 1980 home-taping survey, the source of the statistics, is highly suspect, and their accuracy is, to put it gently, dubious. WCI has never released the methodology of its survey, nor have its detailed results been made available for close scrutiny by anyone outside the organization. If A. C. Nielsen engaged in the same practices, it would be laughed out of the TV-ratings industry.

Assuming a direct cause-and-effect link between increased home taping and lowered record sales is like attributing lowered inflation rates to the success of Ronald Reagan's economic plan: inflation is down not because of any White House miracle, but because the country is in a severe recession. Record sales are down because the audience is changing, and because the country is in a severe recession, and because the product, often as not, is lousy.

Be assured that I am no stooge of the equipment and tape manufacturers—I have close friends in all phases of the music industry, from instrument suppliers, to studios, to radio stations, to pro equipment makers and dealers, to artists, and I also am fully aware that the Electronics Industries Association is quite as capable of excesses and blunders as any business group—but in this case, they happen to be right.

Sincerely,
Paul D. Lehrman
The Boston Phoenix
Boston, Massachusetts

FROM OUR HANDS TO YOUR HANDS

*The Otari 1/2" Eight Channel MARK III/8 &
1/4" Four Channel 5050 BQ-II*



At Otari, we focus everything we do on innovation, quality and staying close to your music. These priorities are values that are interwoven into every tape recorder we offer the recording professional and serious musician.

The commitment to step-up to the level of professional performance in an Otari recorder is a decision that only the successful and knowledgeable musician/engineer can make. Our MARKIII and 5050BQ-II are for those fortunate few who are achieving their musical and artistic goals.

Both recorders are designed with microprocessor circuitry for smooth, responsive transport control and precise electronic counting with L.E.D. display. True, three head design, selectable +4 or -10dBm input and output levels, 15/7.5 ips with continuously variable speed control and full remote overdubbing capability deliver flexibility in multitrack recording that's typically reserved only for the big, world-class studio machines. The same goes for the mastering quality performance and spec's. To wring-out every last dB of quality, you won't find a competitive machine that let's you get your hands on a full complement of adjustments as easily. Add to all this the ability to interface both recorders to SMPTE time code synchronization for multi-media video/film projects and compatability with dbx and Dolby** noise reduction.*

The comprehensive feature list goes on. And so does the craftsmanship that is the hallmark of our reputation. From our hands to yours, the MARKIII and the 5050BQ-II professional recorders are engineered like no other tape machines in the world; with the qualities you can hear and feel. *Trademark dbx Corp. **Trademark Dolby Labs, Inc.

OTARI Technology You Can Touch.

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Take Us For Granted

With 24 tracks going, you don't have time to reach over and adjust for tape-induced level variation. You want to be able to forget about the tape.

Which is why we test every reel of our 2" Grand Master® 456 Studio Mastering Tape end-to-end and edge-to-edge. To make certain you get a rock-solid readout with virtually no tape-induced level variation from one reel of 456 to

another or within a single reel.

No other brand of tape undergoes such rigorous testing. As a result, no other brand offers the consistency of Ampex Tape. The consistency that lets you forget our tape and concentrate on the job.

AMPEX

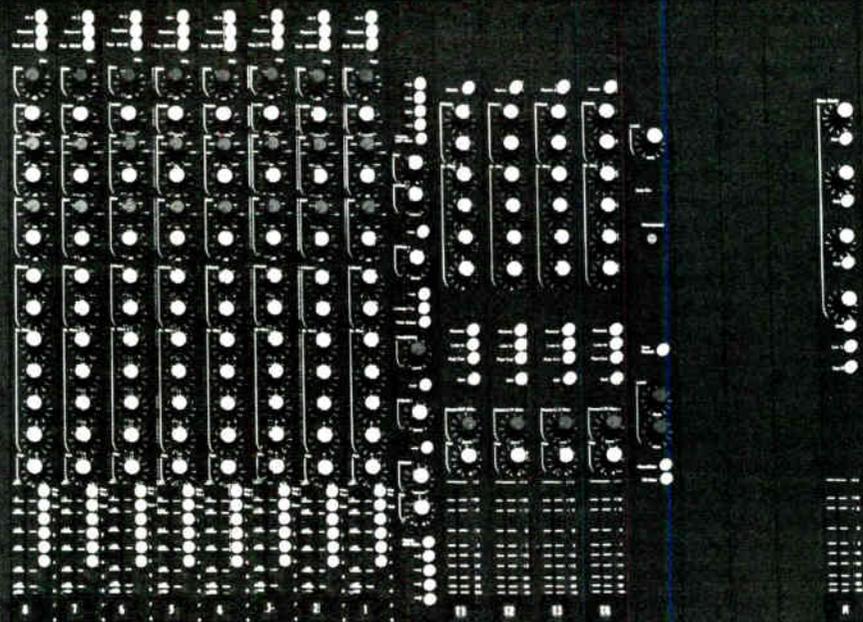
Ampex Corporation • One of The Signal Companies 

Ampex Corporation, Magnetic Tape Division
401 Broadway, Redwood City, CA 94063
(415) 367-4463

**4 out of 5 Professionals Master
on Ampex Tape.***



*1981-1982 Billboard Magazine
Brand Usage Survey
Circle #003 on Reader Service Card



Very Clever, These Americans

A classic rule of advertising is "don't knock the competition." Fine. We really don't have anything bad to say about our largest competitor, anyway. They are smart engineers, and their new Series 30 TASCAM recorders and mixers are very good products. We make only mixers, not tape recorders, so if you plan on purchasing a recorder, we think you really can't go wrong with a Series 30 TASCAM machine. But we're mentioning the other guys because we would like to call your attention to how *our Studiomixer II* professional recording console compares to their top-of-the-series M-35 mixer. We have put some very clever engineering into our console, too, giving *Studiomixer II* many more vitally useful features than theirs. (See the chart.) And we have an exciting *Studiomixer II* offer for you.

What the chart at the right does not reveal is that our *Totally Modular* single-chassis mainframe method of construction, our use of industry standard connectors, and the balanced outputs throughout *Studiomixer II* make it as roadworthy and applicable to sound reinforcement as for studio use. This comes in pretty handy for those who cannot afford the luxury of a separate console for each. Sound like Yankee ingenuity?

Because *Studiomixer II*'s outputs are expandable, we can keep all the tracks of any tape recorder *up to 16-track* very busy, all at once, if you choose to expand this much in the future. We have not forgotten Otari users, either. *Studiomixer II* operates at +4 or -10dB, in and out, and will happily send a balanced signal to an Otari deck

	TASCAM M-35	STUDIOMIXER II
INPUT CHANNELS	8 Standard, expandible to 20 w/ additional chassis	8, expandible to 21 on mainframe, shown, up to 33 on larger MF
OUTPUT CHANNELS	4	4, expandible to 8 on mainframe, shown, up to 16 on larger MF
SENDS PER INPUT CH	2 Effects 1 cue	6 2 effects 4 aux
INPUT CHANNEL CIRCUITRY	transformer, padding & trim controls	transformerless, balanced, 70dB of gain
EQUALIZATION	quasi parametric	quasi parametric
CONNECTORS	XLR mic inputs, remainder RCA jacks	XLR mic inputs and balanced outs, gold plated "X" jacks/all other
SOLG FACILITY	YES	YES
TALKBACK, SLATE	YES	YES
CLUE TO PHONES (ONLY)	NO	YES
PHANTOM POWER	NO	YES
EQ BYPASS TO MON'S	NO	YES
VOLUME'S/ALL BUSSES	NO	YES
LONG TRAVEL FADERS	NO	YES
BALANCED OUTPUTS	NO	YES
4WAY MUSICIAN'S HEAD PHONE MIX FOR OVERDUB	NO	YES
LINE UP OSCILLATOR	NO	YES
EFFECTS SEND/RET. CUEING	NO	YES

But we could be very clever all day long and, until now, you still may not have bought our mixer because all the extra features and ingenuity have normally cost \$1,200 dollars more than TASCAM. So here's the exciting news. For a limited time, through participating *Studiomixer II* dealers, the 8X4X4X2X2 mixer shown above will be offered at the same suggested retail price of the standard 8X4 M-35 (talkback module extra). Now you can compare our professional console to theirs in every way. So go ahead and get their recorder. But, with a deal like this, you'd be very clever to step up to a *Studiomixer II*!

CURRENT

CEO Tax Bill Victory

On September 10, Governor Edmund G. Brown, Jr. signed into law AB 2871, the bill that rescinds the retroactive sales tax on all master recording productions. Sponsored by Assemblywoman Gwen Moore, AB 2871 overwhelmingly passed both the Assembly and State Senate with votes of 53/17 and 40/3, respectively. Marz Garcia had carried the bill in the Senate.

The passage of AB 2871 brought to a close the first chapter of the battle between the California Entertainment Organization and the State Board of Equalization. Due to an interpretation of a law passed by the legislature in 1975, the SBE had been assessing and collecting a retroactive 6% (6½% as of July 1) sales tax on all "fabricating" costs, or any expenses incurred, or

personal services rendered in the producing of a master recording.

"They taxed us for the money we had to spend on studio costs, AFTRA scale, hotels, rental cars and take-out food," said David Rubinson, CEO President. "And on top of the tax, they tagged a 10% penalty for failure to file and a 20% per month interest charge. This was insane."

The SBE made this interpretation despite the law's specific exemption of "copyrightable, artistic or intangible material." Possibly, the most important aspect of AB 2871 is that it is not a new law, but declaratory of current law.

"Now that the law is clear," Rubinson explained, "we need to sit down with the State Board to see that it's carried out. This is the last chance for people to do something about this situation." Rubinson concluded. "This very law has been ignored before and we've suffered for it. We can't let that happen again."

Further information on this bill and CEO's progress can be obtained from Dee Ann Chasle at 213/906-2080.

Yankelovich Survey on Home Taping

A recent survey of home taping in the U.S. has been conducted by the opinion research firm of Yankelovich, Skelly and White for the Audio Recording Rights Coalition (ARRC), a group of retailers, manufacturers and users of audio recording products and allied trade associations. The 127 page report, based on a sample of over one thousand home tapers, was designed to provide input for the legislative consideration of imposing a royalty tax on blank tapes.

ARRC economist Nina Cornell, commenting on the survey's results, noted that since more than half of all blank tapes recorded at home are not used to tape prerecorded music, "many would be paying a copyright royalty tax without using copyrighted material and (the proposed tax) would impose costs on many who are not taping music, while not addressing the real reasons why the sales of records have been declining."

Stanley Gorkhov, President of the Recording Industry Association of America and co-spokesman for the pro-royalty 2,000,000 member Coalition to Save America's Music, responded that, "The new survey confirms what we have been saying all along that the overwhelming majority of home tapers are copying prerecorded music," and observed that the study does not address the extent of the sales lost as a result of home taping and the related economic harm to the music community.

TV Multichannel Sound Testimony

Presentations by the proponents of multichannel sound were made September 13-15 before the EIA's Multichannel Sound Subcommittee, according to Thomas Keller, the panel's chairman and a senior vice president of the National Association of Broadcasters (NAB).

The presentations—by the Electronic Industries Association of Japan (EIAJ), Telesonics Systems, Inc. and the Zenith Radio Corporation—are the last step prior to the selection of a single system capable of transmitting stereo, a separate audio program and an auxiliary service multiplexed on the aural carrier. The system ultimately selected will be recommended for adoption by the Federal Communications Commission (FCC).

Copies of Volume I of the Multichannel Sound Subcommittee's report are still available through the EIA's Consumer Electronics Group, 2001 Eye Street, N.W., Washington, D.C. 20006.

For further information contact Eb Tingley of EIA/CEG at 202/457-4975.

notes

Billboard's 4th International Video Entertainment/Music Conference will be held November 18-21, 1982 at New York's Vista International Hotel. More information on this comprehensive program is available by calling 213/859-5319... **Hans Batschelet** has been appointed Vice President for Marketing at **Studer Revox America**, his primary responsibility to be the marketing of Studer professional recording and broadcast audio products in the United States... **Harrison Systems Inc.** has announced that **Dave Purple** has rejoined the organization as its sales and marketing manager for broadcast products... **Jack James, Ampex** representative for North and South Carolina, has been named 1981 tape salesman of the year. Ampex has also announced agreements whereby a free reel of Ampex mastering tape will be included with each new Studer and **Fostex** audio recorder sold... **Charles W. Gushwa** has been appointed marketing manager for **Crown International**, according to Max Scholfield, president... **Greg Paisley**, owner of **RMS Sound** in Seattle, has announced the opening of a new Portland store and the additions of the BTX, Valley People and EXR lines... **Thomas W. Zoss** has been appointed Advertising Manager at **Electro-Voice, Inc.**... **Lakeside Associates, Inc.** has been chosen by the **Timilon Entertainment Group** for design and construction of a unique west coast entertainment production center with plans for twenty film and video

soundstages, along with six audio/dubbing studios, all on a 20,000 acre site... **AST Sound** has moved to larger quarters at 250 West Broadway, New York, N.Y. 10013, phone 212/226-7781... **The Muscle Shoals Music Association** has accepted the resignation of its first executive director, **F.E. (Buddy) Draper**, who is re-entering the political arena... **Orban Associates** has announced the appointment of **Western Audio Sales** to be their Southern California representatives... **3M's** Board of Directors has named **Allan J. Huber** as executive vice president, Electronic and Information Technologies Sector... **SPARS'** October 1 tutorial on SMPTE Time Code was held simultaneously on the East and West coasts via Slo-Scan Teleconferencing at the **Motown/Hitsville** studios in Los Angeles, and at **Regent Sound Studios** in New York City. ... **Mr. Norio Ohga** was elected President and Chief Operating Officer and Representative Director of **Sony Corporation** to succeed the late President **Kazuo Iwama**... **Syntauri Corp.** has disclosed completion of a private placement financing led by **Steve Wozniak, Apple Computer, Inc.**, co-founder and independent investor... **Dan Jordan** has been elected Chairman of the North Texas Section of the AES... **Fred Foster**, founder and chairman of the board of **Monument Record Corp.**, has announced a pressing and distribution agreement with **CBS Records**... **Tandberg of America** has appointed **Bryan Stanton** to handle public relations for the company.

Before you invest in new studio monitors, consider all the angles.

No one has to tell you how important flat frequency response is in a studio monitor. But if you judge a monitor's performance by its on-axis response curve, you're only getting part of the story.

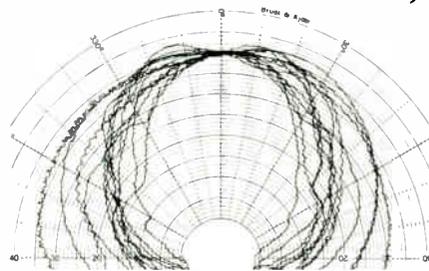
Most conventional monitors tend to narrow their dispersion as frequency increases. So while their on-axis response may be flat, their off-axis response can roll off dramatically, literally locking you into the on-axis "sweet spot." Even worse, drastic changes in the horn's directivity contribute significantly to horn colorations.

Introducing the JBL Bi-Radial Studio Monitors.

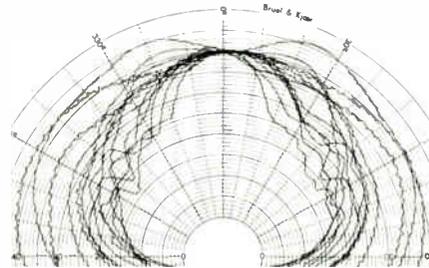
At JBL, we've been investigating the relationship between on and off axis frequency response for several years. The result is a new generation of studio monitors that provide flat response over an exceptionally wide range of horizontal and vertical angles. The sweet spot and its traditional restrictions are essentially eliminated.

The key to this improved performance lies in the unique geometry of the monitors' Bi-Radial horn.¹ Developed with the aid of the latest computer design and analysis techniques, the horn provides constant coverage from its crossover point of 1000 Hz to beyond 16 kHz. The Bi-Radial compound flare configuration maintains precise control of the horn's wide 100° x 100° coverage angle.

1. Patent applied for.

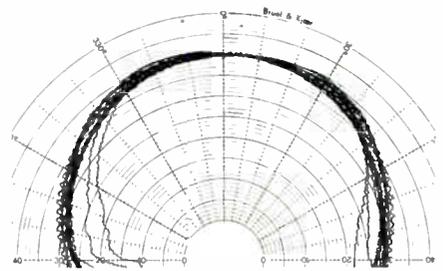


Typical horizontal

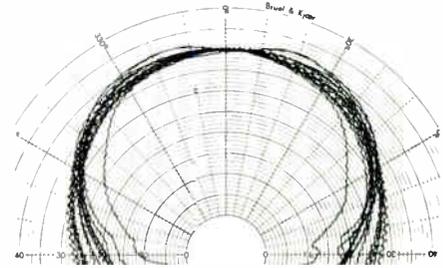


Typical vertical

Polar response comparison of a typical two-way coaxial studio monitor and JBL's new 4430 Bi-Radial studio monitor from 1 kHz to 16 kHz.



JBL 4430 horizontal



JBL 4430 vertical

And the Bi-Radial horn's performance advantages aren't limited to just beamwidth control. The horn's rapid flare rate, for instance, dramatically reduces second harmonic distortion and its shallow depth allows for optimal acoustic alignment of the drivers. This alignment lets the monitors fall well below the Blauert and Laws criteria for minimum audible time delay discrepancies.

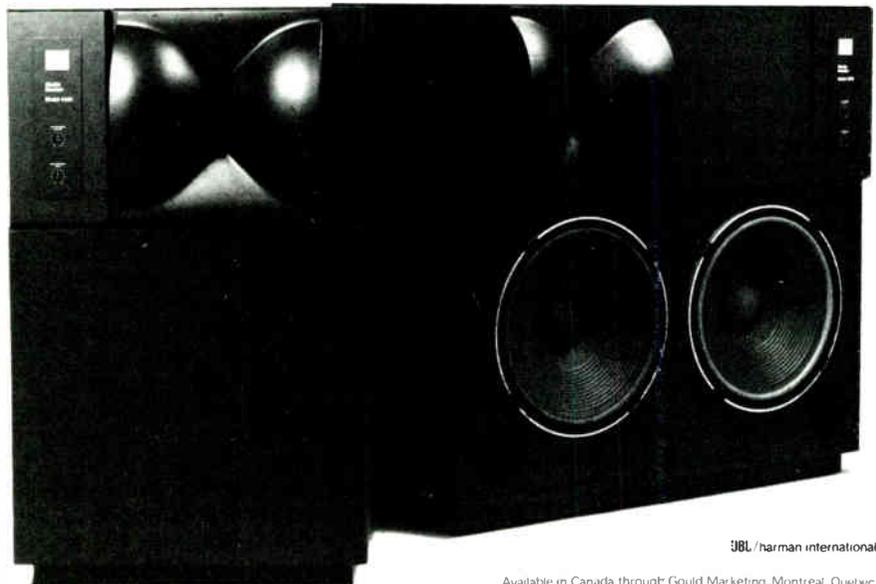
But while the Bi-Radial horn offers outstanding performance, it's only part of the total package. The new monitors also incorporate JBL's most advanced high and low frequency transducers and dividing networks. Working together, these

components provide exceptionally smooth response, high power capacity, extended bandwidth, and extremely low distortion.

Judge For Yourself

Of course, the only way to really judge a studio monitor is to listen for yourself. So before you invest in new monitors, ask your local JBL, professional products dealer for a Bi-Radial monitor demonstration. And consider all the angles.

James B. Lansing Sound, Inc.
8500 Balboa Boulevard
P.O. Box 2200
Northridge, California 91329 U.S.A.



JBL/harman international

Available in Canada through Gould Marketing, Montreal, Quebec

JBL

Professional
Products
Division

NORTHEAST

At Rose Hill Studios, Syracuse, NY, the Jamaican reggae group Soul, Power & Sound just completed mixing, **Andy Chertow** producing. Tracks were recorded at Bob Marley's Tuff Gong Studios in Kingston, Jamaica... Recent activity at Audio Innovators, Pittsburg, PA includes: **Jonathan King** of U.K. Records producing a demo for consideration by CBS Records. **John Struthers** engineering; and **Gary Carolla Band** in recording new material with John Struthers co-producing and engineering... At **Unique Recording**, New York City, **Danny Glass** (Sam Records) recording first independent project with **Andre Booth** (BBCS&A) co-producing and **Frank Heller** engineering. **John "Jellybean" Benitez** mixing "Baja" for new group **Timex** produced by **Jurgen Korduletsch**, **Michael Finlayson** engineering... Recent album activity at **Minot Sound Studios** in White Plains, NY: **Michael Johnson** has just completed an album for **EMI-America Records**. **Michael's** album was produced by **Michael Colina** and **Ray Bardani**. **Ray** also engineered. **Niles Rogers** of "Chic" was recently in to lay down tracks for his upcoming debut solo album... At **Celebration Recording Studios** in New York City, recording artist **Lenny Roberts** just completed four new songs with engineer **Mark Hood**. The Long Island based **Mark Newman Band** is currently over-dubbing tracks on their song "All Night Long" at Celebration with **Scott Kersey** engineering and **Mark Newman** and his band producing... **Phil Ramone** is working at **Chelsea Sound Studios North** (New York City) on the cast album to the new Broadway hit "Little Shop of Horrors." The Geffen Records production is being engineered by **Brad Leigh** with **Marty Robertson** as associate engineer. Artists sitting in on the sessions included **David Brown**, **Alan Menken**, and **Richard Tee**... At **North Lake Sound**, North White Plains, N.Y., current sessions include **Rob Freeman** (producer of the Go Go's debut album) is currently producing **Single Bullet Theory's** debut album for **Nemperor Records**. **Rob Freeman** and **Chris Cassone** engineering... Vocalist **Kip Carmen** (Al Green) and guitarist **Danny Horton** have been laying tracks for **Reveille Records** at **Normandy Sound**, Warren, Rhode Island, with producer **Ogden Fell**... **Century III Audio** of Boston, MA announced the release of "Pac Jam" by the **Jonzun Crew**; on **Tommy Boy Records**. The single was last seen at number 52 in *Billboard* (September 18). Overdubbing and mixing for "Pac Jam" was done at **Century III Audio** with **Michael Jonzun** and **Fred Torchio** handling the production chores... At **The Ranch** in Manhattan, **Lady Killer** is recording and producing their debut album for **PCM Productions, Inc.**, with **Dave Ruf-**

fo engineering and **Matt Susskind** assisting... At **Greene Street Recording**, New York City, **John Jansen** and **Jim Steinman** are producing **Bonnie Tyler's** new album for **CBS International**. **Rick Derringer** is overdubbing throughout this week with **Roddy Hui** engineering and **Joe Arnold** assisting... At **Trod Nossel Recording Studios**, Wallingford, CT, **Plan 9** started their second LP. **Fred Stuart** did more work on his two-song project. **Al Kinsley** and **Peter Gates** re-cut one of their originals. **Bob Maloney** finished 4 songs with his new band.

NORTH CENTRAL

Currently at **5th Floor Recording**, Cincinnati, OH, is the group **Slave** recording their 7th album for **Cotillion Records**. It will be the first album to be mixed to digital 2 track at the studio... At **Creative Sound Recording Studios** in Brazil, IN, laying tracks include 13 year old **Kimberly Dawn**, **Kenneth King**, **Kevin McCrea**, **Darlene Michaels**, **Joe Anderson**, **Loretta Pierce**, and **Kathy Collins**. **Rick Hanson** doing final mix on album project. Engineer **Carrol Ford**. Producer **Joe Anderson**.

NORTHWEST

At **Patchwork Productions**, San Rafael, CA, the **Beau Brummels** (featuring original songwriter/guitarist **Ron Elliot**, and original bassist/vocalist **Dec Mulligan**), on a "Back to Life" project. **Gordon Elliot** is engineering and **Ron Elliot** is producing... At **Triad Studios**, Redmond, WA, recent activity includes: **The Allies' Dave Kincaid**, **Andy Pederson**, **Larry Mason**, and **Carl Funk** in to record four new tunes and a remix of album for new release, and **Tito Fuentes** recording two new songs for **Arista Records**... At **Mobius Music Recording** in San Francisco, CA, recently completed projects include an album for **Tom Hobson** produced by **David Salmonowitz** and a single for **Quinto Sol**. Both projects engineered by **Oliver DiCicco** assisted by **Annette Olesen**... Recent projects at **Independent Sound**, San Francisco, CA, include: basic tracks for **Sylvester's** upcoming release, and **Warner Amex M.T.V.** station **I.D.'s**... At **Harbor Sound**, Sausalito, CA, **Van Morrison** recording tracks for a new **Warner Brothers** album, title to be announced. Engineered by **Tom Anderson**, **Nancy Evans** assisting... At **Heavenly Recording Studios**, Sacramento, CA, **Larry Gosch** producing the new project for **Duke** with engineer **Larry Lauzon**.

SOUTHEAST

Brice Henderson at Nashville's **Sound Emporium** with producer **Scott Tutt** and engineer **Jon "Mr. Big" D'Amelio** mixing his first single for

Avion Records... At **Bullet Recording**, Nashville, **Rodney Crowell** is producing artist **Larry Wiloughby** for **Rockland Roadhouse, Inc.** **Crowell** is also producing **Warner Brothers** recording artist **Guy Clark** for **Free Flow Productions**. Engineer is **Bradley Hartman**, backed up by **Danny Mundhenk**... **Criteria Recording Studios** Cutting Center in Miami, FL, has recently completed the disk mastering on **Chilliwick's** album on **Millennium Records** entitled "Opus X." **Mike Fuller** was the mastering engineer... At **Web IV Studio** in Atlanta, GA **Peabo Bryson** is completing work on a forthcoming album for **Capitol Records** which will feature Bryson's newly released single "Give Me Your Love." Bryson is producing with **Ed Seay** engineering and **Tommy Cooper** assisting... At **The Soundshop**, in Nashville, TN, producer **Buddy Killen** was in the studio with **Epic** artist **Ronnie McDowell** and **Warner Brothers** artist **T.G. Sheppard**. Producer **Jerry Crutchfield** engineered all these sessions... **Reflection Sound Studios** in Charlotte, NC, recently recorded the new **Bojangle's** jingle. The jingle was written by **David Brown** of Atlanta, GA and arranged and produced by N.Y. arranger and session guitarist **David Spinozza**. **Steve Haigler** engineered... Recent activity at **Audio Media**, Nashville, TN, included: **The Whites** (Elektra), **Ricky Scaggs**, producer, **Marshall Morgan**, engineer; and **Liz Anderson**, with **Paul Whitehead**, musical director.

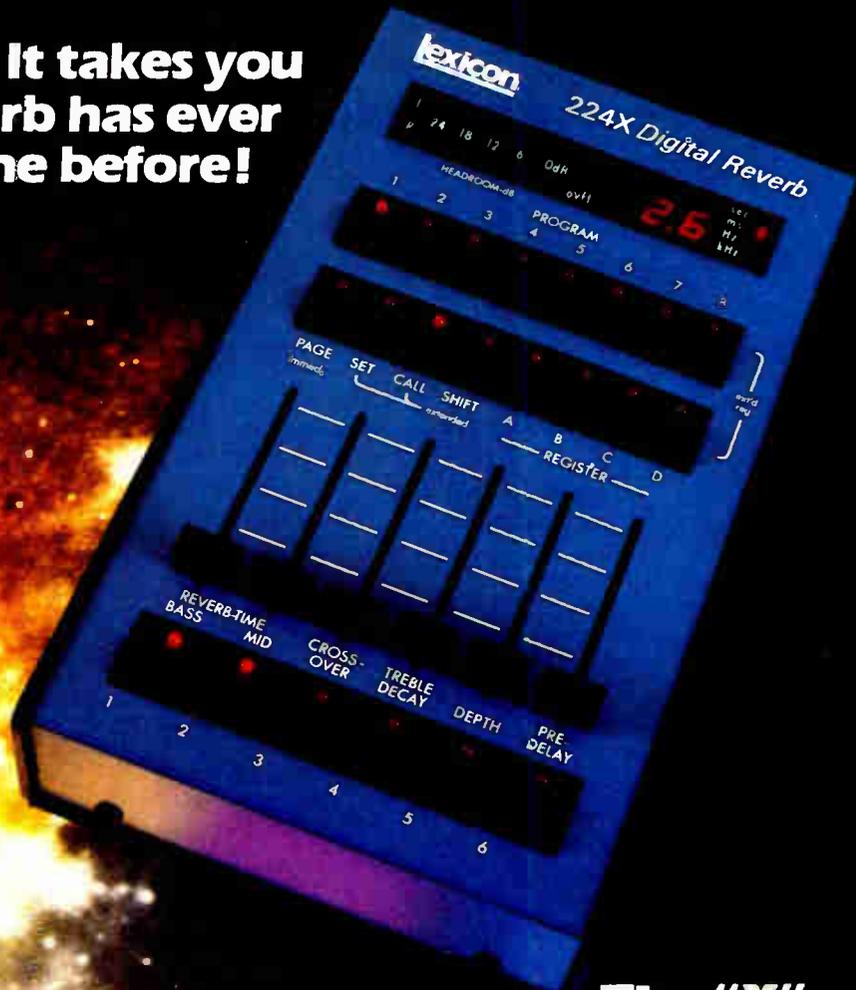
SOUTHWEST

Recent activity at **Rainbow Sound** in Dallas, TX includes: **John Hall** laying tracks for his new album with **J. Daniel Smith** producing. Mixing was finished on **Bob Thompson's** new album on **Rainbow's** label. **C.W. Kendall, Jr.** produced several singles for **Jane Young**. **David M. Boothe** engineered the sessions... At **Startrax Recording Studio**, Las Vegas, NV, **FreeLantz**, a Las Vegas rock group is working on their new LP. Engineering is **Larry Read**. **Little Sister**, a Vegas new wave group has released their new single "Don't Make Waves," recorded at **Startrax**. **Larry Read** engineering.

SOUTHERN CALIFORNIA

RCA's Ron Fair mixing **The Toasters** EP at **Eldorado Studios**, Hollywood. Tracks were recorded at **Sage & Sound**, Hollywood. **Fair** handling producing and engineering duties... **Henry Mancini** was laying piano overdubs recently at **Rusk Sound Studios**, Hollywood, for producer **Bill Griffith**. **John Kovarek** engineering, **Howard Dresden** assisting... At **Sound City Recording Studios** in Van Nuys, **Glen Shorrock**, formerly

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with the Little River Band, laying down tracks, John Boylan producing with Paul Grupp engineering and Ray Leonard assisting. In Studio B, producer John Ryan has finished a new LP for Bill Wray on EMI and has started work on a Patrick Simmons LP for Elektra Asylum, with engineer Mark Smith and assistant Ray Leonard... At Conway Recording, Hollywood, Capitol recording artists Rene & Angela tracking their third album project with producer Bobby Watson and engineer Steve Zaretsky... Linda Ronstadt has just completed recording her newest album Get Closer at The Complex (West Los Angeles) The album, scheduled for a Fall release, was produced by Peter Asher and engineered by George Massenburg for Elektra/Asylum Records. At Group IV Recording, Hollywood, composer Pat Williams remixing his "Lou Grant Theme," co-produced with engineer Hank Cicalo, for single release in PCM Records and scoring "Devlin Connection" segment "Point Dume" for Viacom with engineer Hank Cicalo, assisted by Andy D'Addario

studio news

Audiotechniques has completed installation of a new MCI JH 636-36 automated recording console in RCA's famed Studio "A" in New York City. The new 36 input console is supplied with dual microphone pre-amplifiers which allow for up to 72 active microphone inputs. Also installed with the console was a new MCI JH 24 multi track recorder... **Criteria Recording Studio, Miami, FL**, has announced that Chris Joyce has been named Director of Engineering. His responsibilities will include overseeing the audio-maintenance department and maintaining technical excellence at Criteria. In Nashville, TN, **Woodland Sound Studios** has replaced two A80VU MKII Studer recorders with a new A800 24 track Studer recorder in Studio A. A new Studer A80VU MKIII 24 track recorder has also been installed in Studio B. **Sierra Recording, Fort Worth, TX**, opened October 1st with the first 24 track LEDE control room in the state of Texas designed by Al Bardick and Keith Kavanaugh of Premier Audio in Dallas. Sierra has a Neotek Series III console, Stephens 821-B 24 track, UREI 813 monitors and Ampex 102 for mixdown. Randy Adams is studio manager and Tony Rodriguez is chief engineer. Alan Kubickas Chicago Recording Company opened its third 24 track studio on September 7. The room is being utilized for all means of audio recording: album, commercial and audio/video sweetening. CRC's new studio is equipped with a brand new Neve 8068 Console, an MCI 24 track recorder soon to be

complemented with a Studer 24 track machine, a Sony BVH 1000, Type C, 1-inch video recorder to be used in video sweetening sessions in conjunction with a BTX Shadow SMPTE Synchronization System... **Crescendo's** (Miramar, FL) new state-of-the-art recording facility is located in the heart of downtown Atlanta. With 2 full 24 track facilities, an Ampex MM1200, a microprocessor controlled Otari MTR-90, an automated Audio tronica 24 and a Harrison 32 in/32 out automated console, both available with dbx or Dolby noise reduction, Crescendo is equipped to record in any format or to suit any musical tastes. Formerly called the "Sound Pit" with approximately 70 gold albums under its belt, Crescendo has added a full complement of signal processing to the existing 2 live chambers, EMT plate, Lexicon, UREI, Kepex, Allison, Eventide, ADR, and Marshall Time signal processing Neumann tube and solid state mics as well as AKG, Sennheiser, RCA ribbons, and Audio Technica "R" series mics are available and our monitoring facilities include JBL, EAW, Auratones, and Westlake monitors. **Associated Productions of Texas** (Lufkin, TX) has designed and installed a totally-interfacing sound/studio system at **The Texas Stage**. The Houston-owned combination nightclub/recording studio boasts a 35,000 square foot concert hall (seating 2200), APT provided acoustical conditioning for concert sound, a state-of-the-art sound system and an on premises 24 track recording studio that features Electro Voice and MCI products. The Texas Stage offers conditions ideal for taped radio programs, for quality live recordings, and is video-ready to accommodate MTV-style spotlights

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The face is young, but the credentials show fifteen years of experience in the industry. In seven years with A&R Recording and eight years as an independent engineer and producer, Elliot Scheiner has worked with the finest: Jimmy Buffet, Donald Fagen, Roberta Flack, Foghat, Billy Joel, Olivia Newton John, Ricki Lee Jones, Phoebe Snow and Steely Dan. With two Grammys as proof of his engineering skills, he now spends about a third of his time producing.

ON METHOD

"All of my recordings have basically been very, very clean. I like everything that's on tape to be heard, without strain to one's ears. My method is to clean up everything and make sure that everything that was intended to be heard is heard. I guess that's carried over to production. I don't really want to be categorized as... 'Oh yeah, his stuff is real clean, it always sounds good.' I want to be able to make really good records of all types."

ON COMING UP

"I still feel the best way to learn about the industry is being in the industry. The recording schools teach basic fundamentals and that's OK. But it doesn't really apply. You have to go in there and experience it and get in trouble and work it out yourself. That's sort of how I grew up in the industry. I learned everything I know from Phil Ramone. But basically I started at the bottom and it was really the only way to go. It's a long process now days, but you learn a lot."

ON DIGITAL

"Well the first time I recorded in a studio with it, we were doing an overdub on a piano track and it was this wonderful grand piano, that sounded unbelievable in the room. We recorded it and I played it back for the first time digitally and it was like having my head under the cover of the piano. It's so real. It will have to get a lot more inexpensive to replace analog totally, but I definitely think that it's the future."

ON BAD EXPERIENCES

"There was a moment not too long ago when I got into the studio, producing and engineering, and I was really happy with what everybody was playing. The room sounded amazing that day. And when it came up to the first play back I was thrilled. We reeled back the tape and it starts to roll and it sounded terrible. There was no top end on the tape, the bottom end was ill-defined and I was embarrassed. We had a serious tape problem."

ON TAPE

"One of the maintenance engineers suggested that I try 226. The first playback just astounded me, I was amazed. The top end, the bottom end, everything sounded exactly the way I was listening to it when it went through the console. And I became a 226 freak after that. I can't be bought, so if I say I like 3M 226 it's because I believe in it. I really feel strongly about the tape and what it's done for me."

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Sunset Sound

by **Wolf Schneider**

It's a family business. A down-to-earth Italian family business, where taking care of the customers is the prime concern. However, it just so happens that the neighborhood is Hollywood, and the customers are musical nabobs like Led Zeppelin, The Rolling Stones, Ringo Starr, and The Doobie Brothers. Still, what kind of business would you expect Tutti Camarata to build? The 69-year-old maestro, who left Julliard in the 1940s to arrange and conduct big band orchestras for Jimmy Dorsey, Benny Goodman, and Duke Ellington, then served as musical director for American Decca Records, and co-founder of first London Records (with his friend Sir Edward Lewis) and then Disneyland Records (with Walt Disney), certainly had music in his blood—as well as in his head.

While working on the Disneyland soundtracks for "Snow White," "Bambi," and other late-1950s films, Camarata was frustrated by the small selection of recording facilities available in L.A.: Radio Recorders, United, Whitney Studios, and few others. He suggested that Disney found their own studio, but they replied that they would prefer to be a client of his. And so Camarata founded two-track Sunset Sound in 1962—kicking things off with "Son of Flubber" and "The Legend of Sleepy Hollow."

In later years such diverse projects as Sam Cooke's "You Send Me" (1965), The Stones' "Beggars Banquet" (1968), Janis Joplin's "Pearl" (1970), Elton John's "Island Girl" (1975), Van Halen's "And the Cradle Will Rock" (1979), and Juice Newton's "Angel of the Morning" (1980) would emerge

from this very same Sunset Boulevard location.

Of course, the studio grew over the years. Today, it's a 24-track three-studio operation, and Camarata also owns The Sunset Sound Factory (formerly The Sound Factory), just a few

mosphere, and freedom for the artist to create without any outside encumbrances."

Those philosophies are obvious at once. Driving up to Sunset Sound, the visitor is admitted to a completely private parking lot (a Sunset Sound to-

PHOTO: KATHY COTLER



Sunset Sound owners Paul Camarata (left) and Tutti Camarata (right)

blocks away. Semi-retired, the quiet spoken master has handed over the bulk of his ownership responsibilities to his 29-year-old son, Paul, who is keeping the traditions alive. According to Paul Camarata, the priorities remain the same: "Reliability, maintenance, no down time, a comfortable working at-

ken is necessary to exit). Each of the three studios is in a separate building, all of which open onto a small, secluded courtyard. Once you've entered your requested studio, you have free run of your control room, studio, isolation booth, lounge areas, and restrooms. It's your own private world, and you re-

TWO DECADES OF RECORDING

main completely undisturbed. Furnished comfortably with sofas, TVs, coffee machines, and the requisite assortment of game machines, the lounges resemble homey dens.

The control rooms have custom consoles, because, as Paul Camarata elaborates, "We've always built our own consoles. We've never been able to buy ready-made equipment that offers as good a signal-to-noise ratio or all the state-of-the-art technology as it exists. This way, all our design specs can be met. We use API equalizers, Jensen transformers; the boards are not complicated to work. Ninety percent of our clientele are outside engineers; they can learn these boards in ten minutes. These are among the cleanest sounding boards in town because of their componentry."

Over 100 microphones, including Sennheisers, AKGs, Sonys, Crown PZMs, and Neumanns line the walls of a central supply room, and the maintenance shop remains staffed practically around the clock. An extensive array of echo, including three live chambers, five EMT plates, and an AKG BX20 reverb, is another feature of which the Camaratas are quite proud. Included in the \$125- to \$140-an-hour studio price, which has not been raised since 1974,

is a good collection of outboard gear—digital delays, flangers, limiters, and the like.

Studio Three, a very ambient room with sliding panel walls, a high ceiling, and a separate vocal booth, is the newest of the rooms. Studio Two is the string room and is preferred by The Doobie Brothers, Van Halen, Ringo Starr, Led Zeppelin, The Stones, and Toto.

Studio One, however, is the sentimental favorite, vibrating still with the memories of past projects. Although the control room has been updated, the studio remains intact to this day; and an eerie aura of rock and roll history envelopes this area. Herb Alpert did "Brazil 66" here and expressed an interest in buying the business. When Camarata turned him down, he went down the street and opened A&M Studios. Tommy LiPuma recorded The Beach Boys in this room. Most importantly, when it was only a four-track studio in 1966, it was here that The Doors recorded their first album, with producer Paul Rothchild and staff engineers Bruce Botnick and Jimmy Messina. Camarata remembers hiring them both: "Bruce came in off the street. He was young and eager and wanted a chance. He brought in Paul Rothchild

and Jac Holzman. He and Allan Nemich (Sunset Sound's first engineer and designer) later helped Jac Holzman create Elektra Studios. Bruce left around that time, and then we established the policy of guest engineers who would bring their own clients. I hired Jimmy Messina as an apprentice engineer. I interviewed him, and he impressed me as a really solid individual with his head in the right place. I didn't know that he was a guitar player. He did the engineering on Buffalo Springfield here, and that's how I lost him.

"My philosophy," Camarata continues, "which I learned from Herbie Alpert, is to never go in on anyone else's date. Unless they really want me to, I have never gone in. They have the right to all the privacy that Sunset Sound can give them."

That right to privacy has occasionally led to some unnerving incidents for Tutti Camarata. "I remember quite vividly," he chuckles. "I had to come down here early one morning. I remember how pale Paul Rothchild was when he saw me. Jim Morrison had done a whole thing on the equipment, our equipment and his equipment, with a fire extinguisher. They were afraid that I was going to become, well, diffi-

(continued on page 18)



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(continued from page 16)

cult. After getting over the initial shock, I had compassion for what was going on. I did not make any waves. I'm very happy now that I didn't."

Although he was not to establish close relations with The Doors, Camarata was intrigued. "I thought the producer, Paul Rothchild, really knew what he was doing. I found it very interesting that they did "Light My Fire" directly in

Young, The Stones, Phil Ochs, and James Taylor ("Fire & Rain"). The next year, The Doors, Eric Clapton, The Moody Blues, John Sebastian, Janis Joplin, Leon Russell, Rita Coolidge, and Earth, Wind & Fire all worked here. Then 1971 saw new customers in Led Zeppelin (their fourth album), Faces, Little Feat, and Montrose. Highlights from '72 included Linda Ronstadt ("How Long," "Don't Cry Now"), Jackson Browne, and The Doobie Brothers.

PHOTO: KATHY CCIFFER



Control Room of Studio A at Sunset Sound Factory

a one-take situation, because of our isolation booth. At that time, the AFofM (musicians' union) frowned on overdubbing vocals. We were the first studio to have an isolation booth right in the middle of the studio, so the singer could do the tracks, then we could wipe those tracks and do them again to perfect them. I guess we were circumventing the union. I thought the final performance on the records was the most important thing."

The Doors returned to Studio One in 1967 to record "Strange Days." It had been upgraded to an eight-track room, and Studio Two had also been built. During this year, Jim Messina engineered for (and later joined) Buffalo Springfield, Love recorded their first album, and Tim Hardin, Del Shannon, and The Turtles were clients. The following year saw Joni Mitchell (produced by David Crosby), Richie Havens, The Rolling Stones ("Beggars Banquet"), Neil Young, and The Animals making records at Sunset Sound.

In 1969, The Doors returned to record "Waiting For The Sun," their third album. Other customers included Judy Collins, Joe Cocker, Arlo Guthrie, Delaney & Bonnie, Willie Nelson, Neil

Through the years, the list stretched on: Ringo Starr, John Mayall, Kris Kristofferson, Johnny Cash, The Who, Eddie Rabbitt, The Motels, and more. Among Sunset Sound's most loyal repeat clients today are producer Ted Templeman, The Doobie Brothers, Van Halen, and Toto.

The Camaratas work hard to treat clients like these well. Paul Camarata, who grew up in the hallways of Sunset Sound, understands how to please: "Producers get used to a room and like to come back. But if there's anything that really disturbs the producer or engineer, it's got to be the down time. They don't care if it's just a light bulb burned out. They don't want to hear from it. They want it working now. And they deserve it."

Tutti Camarata, whose love of music spans not only the generations, but also the big band, classical, pop, rock, and religious styles, has been greatly influenced by his experiences at English studios. He explains, "Their methods of recording have always impressed me. One difference is that the apparent levels are less than what comes out of the monitors. The rooms have also impressed me—at Abbey

Road, the number one studio is one of the most ambient rooms I've ever worked in. In the classical field, the dynamic range is done internally over there, with an orchestra, rather than mechanically. They're constantly upgrading their mics—they use mostly German mics—and their tape machines. I also find their personnel very knowledgeable. We try to pattern ourselves along those lines here."

In December of 1981 the Camaratas purchased The Sound Factory, after nine months of negotiation. Paul Camarata explains why. "We decided to take it over because we feel that the days of huge budgets are over. Our clientele are concerned with prices now. With The Sound Factory, we can help a client with a smaller budget. The Sound Factory is less expensive than Sunset Sound. We can make a package deal: tracks at Sunset Sound, overdubs at Sunset Sound Factory, and the mix at Sunset Sound. Before, if you had a small budget, it was rough to overdub at Sunset Sound."

They've updated their new studio, both cosmetically and technologically; and since the Camaratas took over this past February, clients at The Sunset Sound Factory have included Eddie Rabbitt, David Lindley, Jesse Colin Young, The Rubber City Rebels, The Crusaders, Ringo Starr, Richard Simmons, and Tom Waits. Although less costly, Sunset Sound Factory is run with the same management philosophies as Sunset Sound.

Both facilities have peripheral digital equipment. Says Tutti Camarata, "We watch digital closely. We read articles on it. But we haven't jumped into it as far as tape machines—we are reluctant to get into it heavily until there's more reliability. Our clients have not expressed themselves as needing it yet."

Paul Camarata foresees that, "Our next step will be video. Whenever a client calls for it, we do it. We've done Bette Midler, Toto, and The Doobies live in Santa Barbara. We have the capability, but at the moment we rent the equipment—it's not in-house just yet."

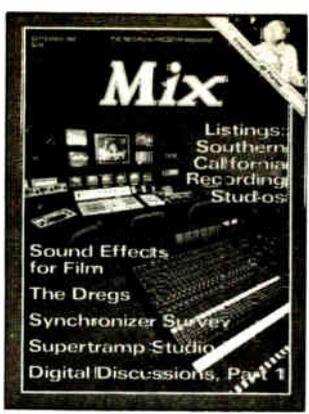
The Camaratas remember the boom years of the late Seventies, when studios were commonly charging as much as \$250 an hour for their facilities. They also remember the early Sixties, when two-track was state-of-the-art for recording artists. Although the industry has changed dramatically over the past twenty years, the Sunset Sound plan, providing a comfortable, private environment, equipped with good technical facilities, seems to survive the winds of change well. ■

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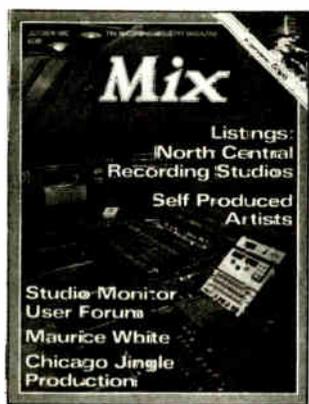
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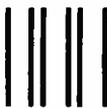
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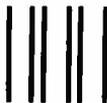
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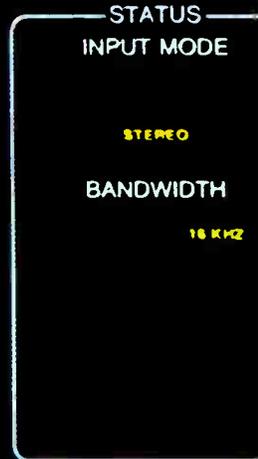
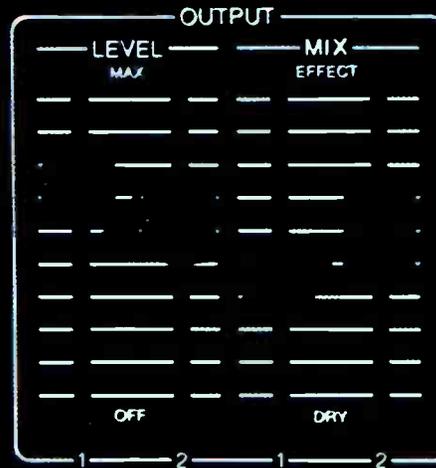
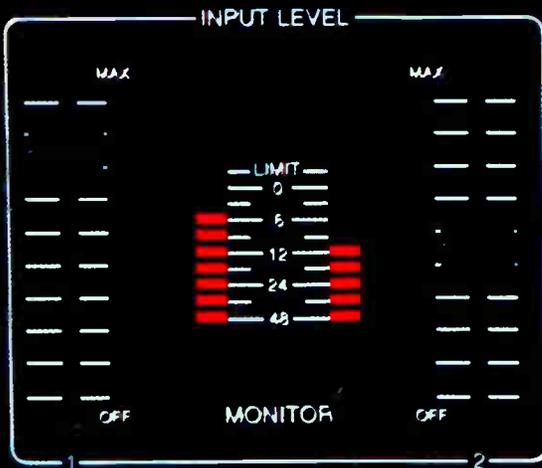
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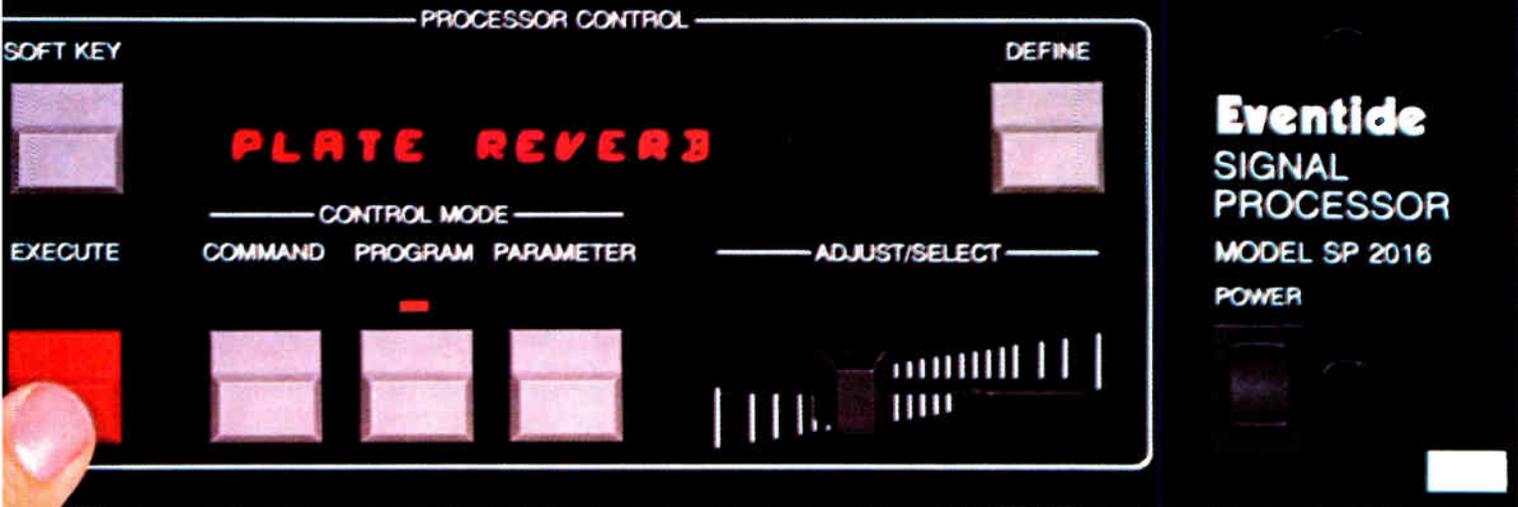
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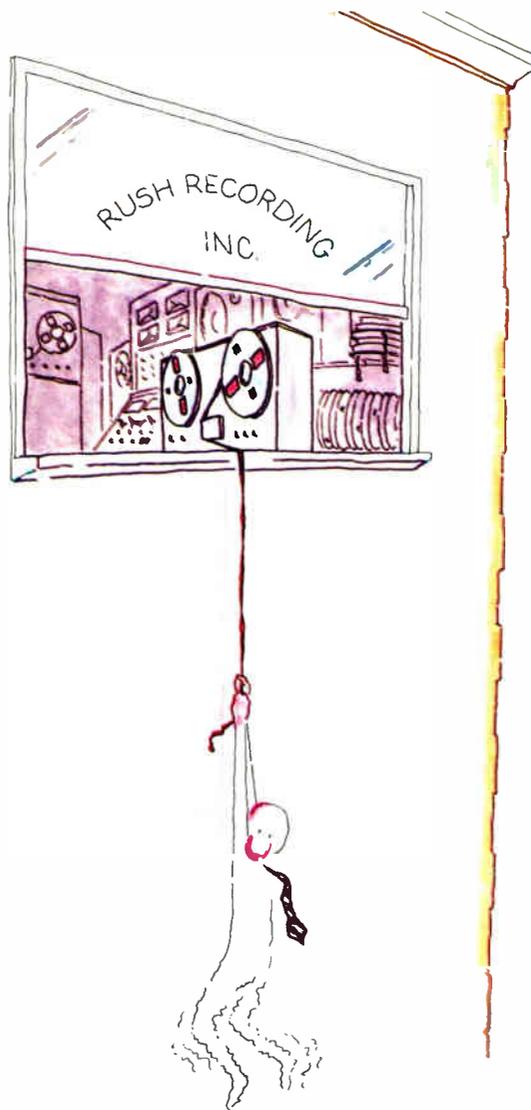
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Ric Ocasek—on producers' panel at New Music seminar. Lead singer/songwriter of the Cars.

New Music Seminar

by Bruce C. Pilato

It was one of those you-had-to-be-there-to-believe-it scenes recently at the prestigious Sheraton Centre Hotel in New York City. You see, it was early Sunday evening and checking out were the state's Republicans, who had just wound down their convention. Checking in were several registrants to the third annual New Music Seminar, a music industry conference centered around the New Wave scene. The dichotomy between the two groups was, to say the least, amusing.

The fact that a convention dealing with what is considered by most to be an underground artform was being conducted in such an establishment environment was ironic in itself. But the real irony, however, came when it was realized by everyone that the New Wave element of the record industry has actually become as homogenized as the album oriented rock side of it. Not to mention, the New Music scene, despite its energy and innovativeness, is not devoid of the problems which currently plague the industry as a whole: a poor economy, home taping, and an overall half-hearted interest by the public when it comes to purchasing new records.

All this is not to say that the recent New Music Seminar was one big pitch session. It wasn't. As far as music industry conventions go, it was one of the more enlightening gatherings in recent memory. Problems and gripes were certainly brought out; however, positive solutions and alternatives were plentiful as well. It was a chance for over 1300 music industry insiders, both big and small, to get together and figure out where everything is heading; and whether or not it

is the right direction.

The convention was organized this year by Mark Josephson (founder of ROCKPOOL), Joel Webber (an independent record rep whose roster includes Joan Jett), Nancy Goldstein (former Elektra Records East Coast publicity head and now an indy) and Tom Silverman.

It was broken down over two days into nearly 20 different forums, as well as two major speeches and a series of live band showcases at The Ritz and The Peppermint Lounge.

The keynote speaker for this year's seminar was Malcolm McLaren, the controversial British manager and producer who was the driving force behind The Sex Pistols in the late 1970s and is currently promoting BowWowWow. "The real question for the New Music Seminar," said McLaren at the onset of his speech, "is 'How the fuck are any of us going to earn a living five years from now?'" After the laughter had died down, he retorted with yet another question: "I mean, should I stay here or go get a job in hotel management?"

McLaren, more so than any of the other music industry notables, was this year's prophet of doom. "The entire possibility of changing the music industry lies with the ascension of the cassette over the standard LP. So, tell me, what is the real value of a record anyway? I mean, the only value it has to the collector is as some kind of antique. Or to the d.j., where maybe it has its only real worth."

The essence of McLaren's speech dealt with the breakdown of music as a form of cultural communication in today's white society. He spoke at length on how black society uses the "boom box" or "ghetto blaster" as a form of communication, whereas white society has opted for

the Sony Walkman, making music a private and personal experience.

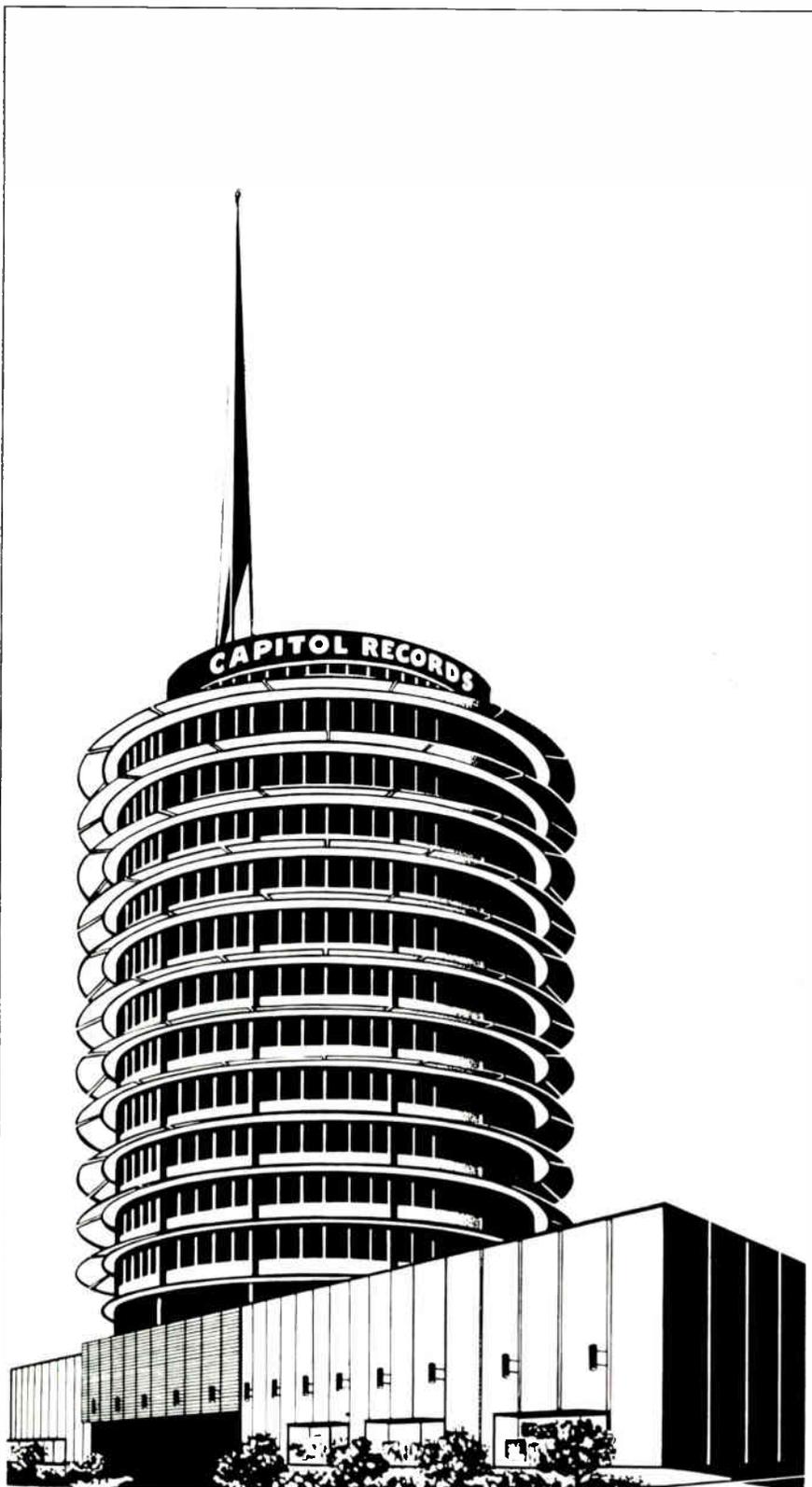
Most of the forums at the New Music Seminar were well organized and covered a wide range of topics. There was a strong emphasis on video this year, with impressive presentations from MTV, The USA Cable Network, Rockamerica and RCA's videoc disc division.

One of the more animated forums of the convention was the "Album Radio" session, which featured John Sebastian of Sebastian-Casey Associates, the man most commonly associated with FM radio's current tight-listed A-O-R format. Although there was a presence of tension in the air and some members of the audience made actual verbal slurs towards Sebastian, he defended himself well.

Sebastian appeared to be what in reality he is: a businessman who knows his business very, very well. He claimed his A-O-R format goes after music on a gut level, but then researches that music to make sure it is accessible to a particular market. FM radio today, he announced, is merely responding to that research.

The producer's forum, which was attended by Kenny Laguna (Joan Jett/BowWowWow), Martin Rushent (The Human League), Trevor Horn (The Buggles, Yes), John Luongo (Pavilion Records), Bill Nelson (Flock of Seagulls, BeBop Deluxe) and Rick Ocasek (of the Cars), among others, was probably one of the seminar's most informative.

When asked whether or not the producer has become more important than the artists themselves, Martin Rushent, who at the time was riding high with the Human League's #1 record, responded by saying, "The truth of it is, the average kid on the street doesn't know who produced what record... and doesn't really



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give a shit, as long as it's good. And good records are combinations of artists, producers and engineers... but it's really all about *the song*. The production is like the icing on the cake. You can't overplay it."

John Luongo, whose Pavilion Records is distributed by CBS, was blunt in his response to a different question. "The bottom line," he said to the packed room, "is not getting a great producer, but rather, getting the right producer for a band. That's the biggest problem record companies have right now; an insufficient A&R department. They're insufficient in the fact that they don't spend enough time with the group, studying the group and planning out their future. Understanding where they want the group to be in a year or two. To do the development that's necessary for the group to have a proper introduction to the public, you've got to have the right producer for that band."

Other producers on the panel, such as Ocasek of The Cars, were less concerned about the business and more dedicated to the artist and the music itself. Ocasek, who recently took on the production chores for Romeo Void, has found the group with a radio hit that he never expected to get played.

The A&R seminar was probably the most violent. Audience members lashed out at the speakers (who included A&R heads from RCA, Warners, Epic, Arista and Sire) and accused them of being afraid to take chances on the new music scene. Although each defended him or herself by listing progressive acts that they've recently signed, they did, however, admit their concern as to whether or not a particular artist would be accepted by "the radio community" when considering signing the act.

The gathering was also highlighted by informative forums on artist management, bookings, distributing and marketing, independent labels, publicity, retailing, music law, the music press, college and album radio promotion, rock clubs, and sound engineering. Arista Records' president Clive Davis spoke for an hour. Among the musical showcases were Haircut 100, Fashion, Soulsonic Force, Gang of Four and Ballistic Kisses.

Both those who attended the two-day event and those who organized it agreed it was a very worthwhile one. With all the changes the industry is undertaking in 1982, next year's seminar should be even more controversial. If nothing else, it will provide an opportunity for those concerned to get together and brainstorm.

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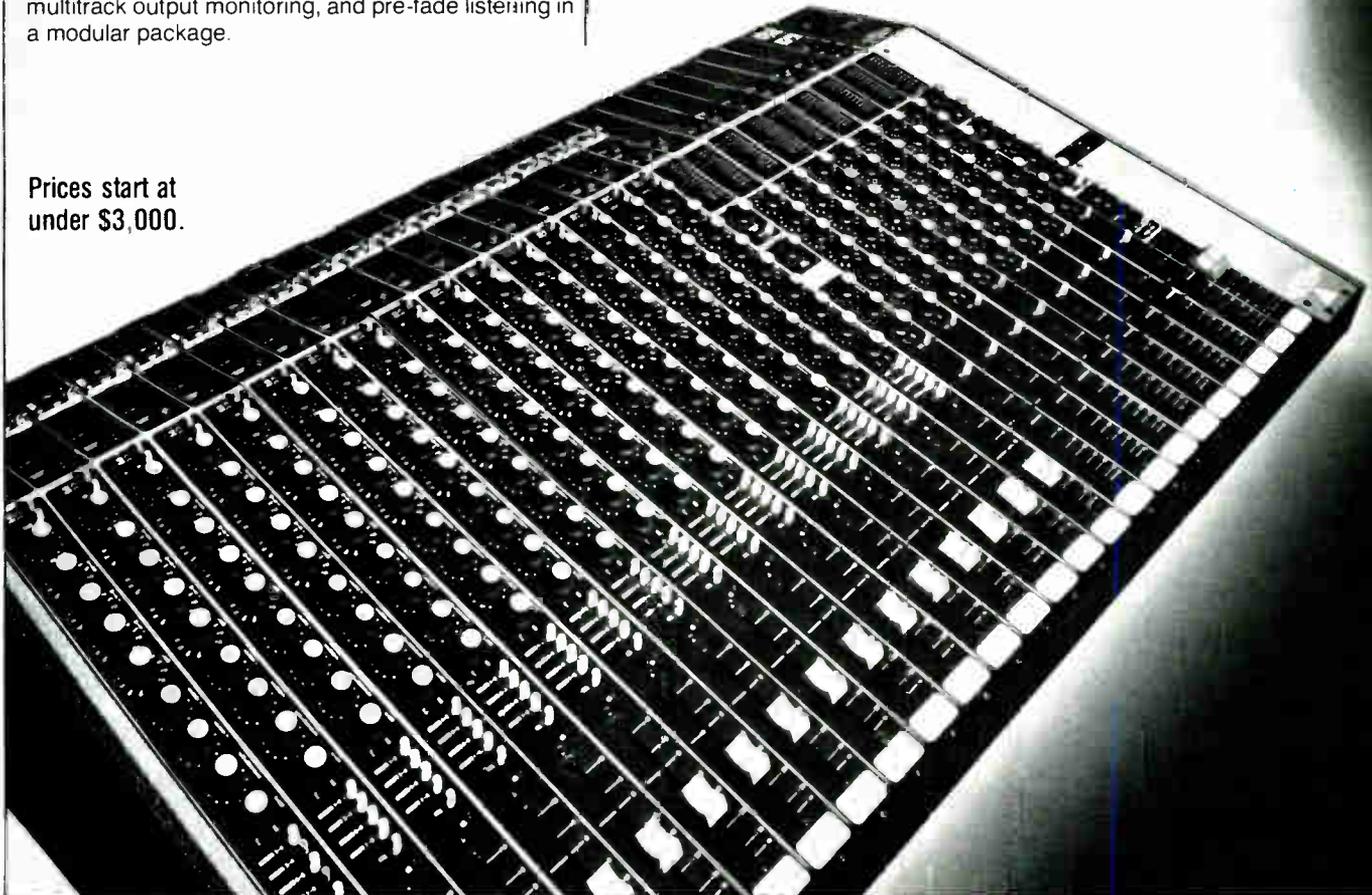
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Circle #014 on Reader Service Card

by Ken Pohlmann

About the only thing as sophisticated as the recording equipment in a contemporary recording studio is the diagnostic gear in the maintenance room needed to keep the studio running. The quality of recording hardware has improved markedly over the years as new technology has been applied to the century-old problem of recording and reproducing sound. That continued upgrading in quality necessitated a parallel evolution in the quality of maintenance equipment. Not only has there been a growing need for accuracy in audio measurements, but also a demand for faster and simpler measurement techniques, an especially challenging demand in light of the trend for greater complexity in recording hardware. In other words, the more complicated our recording devices become, the greater the need for efficient means to maintain them. For example, the incredible sophistication under the lid of your recording gear which permits one button does-it-all operation, demands an equally sophisticated, one button does-it-all repair, otherwise the recording gear will be obsolete before you find the problem. Fortunately, the designers of audio diagnostic equipment have responded to the challenge. If maintenance engineers aren't exactly winning the battle against technology, they are at least given enough of their own technology to have a fighting chance.

Rather than venture into a general discussion of troubleshooting philosophy, or attempt a dissertation of

Test Equipment for Audio Diagnostics



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Hewlett-Packard 8903A Audio Analyzer

measurement techniques, it might be more advantageous to examine the diagnostic equipment itself, since that gear embodies in a practical sense all of the above theorizing. As one might expect in an international industry as diverse as the audio industry, there are similarly diverse ways to maintain the workings of the industry's equipment. Thus I should state the following survey is in no way a complete examination of

all the diagnostic products available. Rather, the selection attempts to be fairly representative. Also, because of the predictable redundancy in fiercely competing products, I have arbitrarily chosen the Hewlett-Packard Audio Analyzer as our beginning point of discussion, and as illustration of the operation of diagnostic products in general.

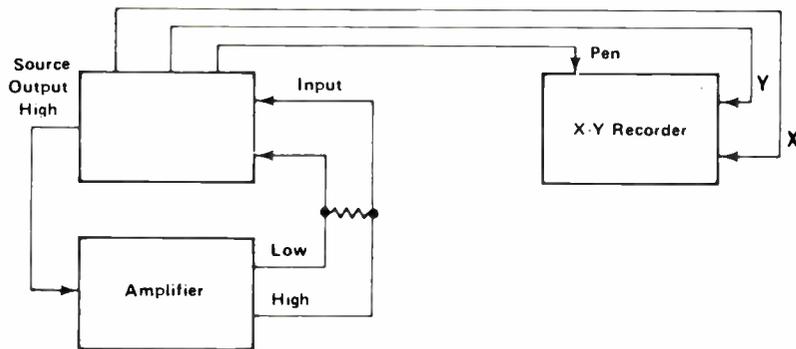
The Hewlett-Packard Model 8903A Audio Analyzer is an autoranging system of seven instruments, including a programmable signal source, distortion analyzer, and reciprocal frequency counter, as well as a voltmeter and various filters and RMS detectors. It operates under microprocessor control to step through sequences of measurement and calculations; in addition, it is HP-IB programmable. It has applications in audio testing, transceiver testing, and automatic systems operating in a signal range of 20Hz to 100kHz. Its repertoire of measurements include AC and DC level, distortion, frequency response, signal-to-noise ratio, and ratio of signal plus noise plus distortion in a receiver's output (SINAD).

The architecture of the 8903A is relatively simple; the system essentially consists of a distortion analyzer with a tunable notch filter to delete the fundamental component of the measured sig-

(continued on page 28)

AMPLIFIER TESTING

Figure One



When used with an X-Y recorder, the 8903A makes fully automatic swept measurements of frequency response and distortion vs. frequency.

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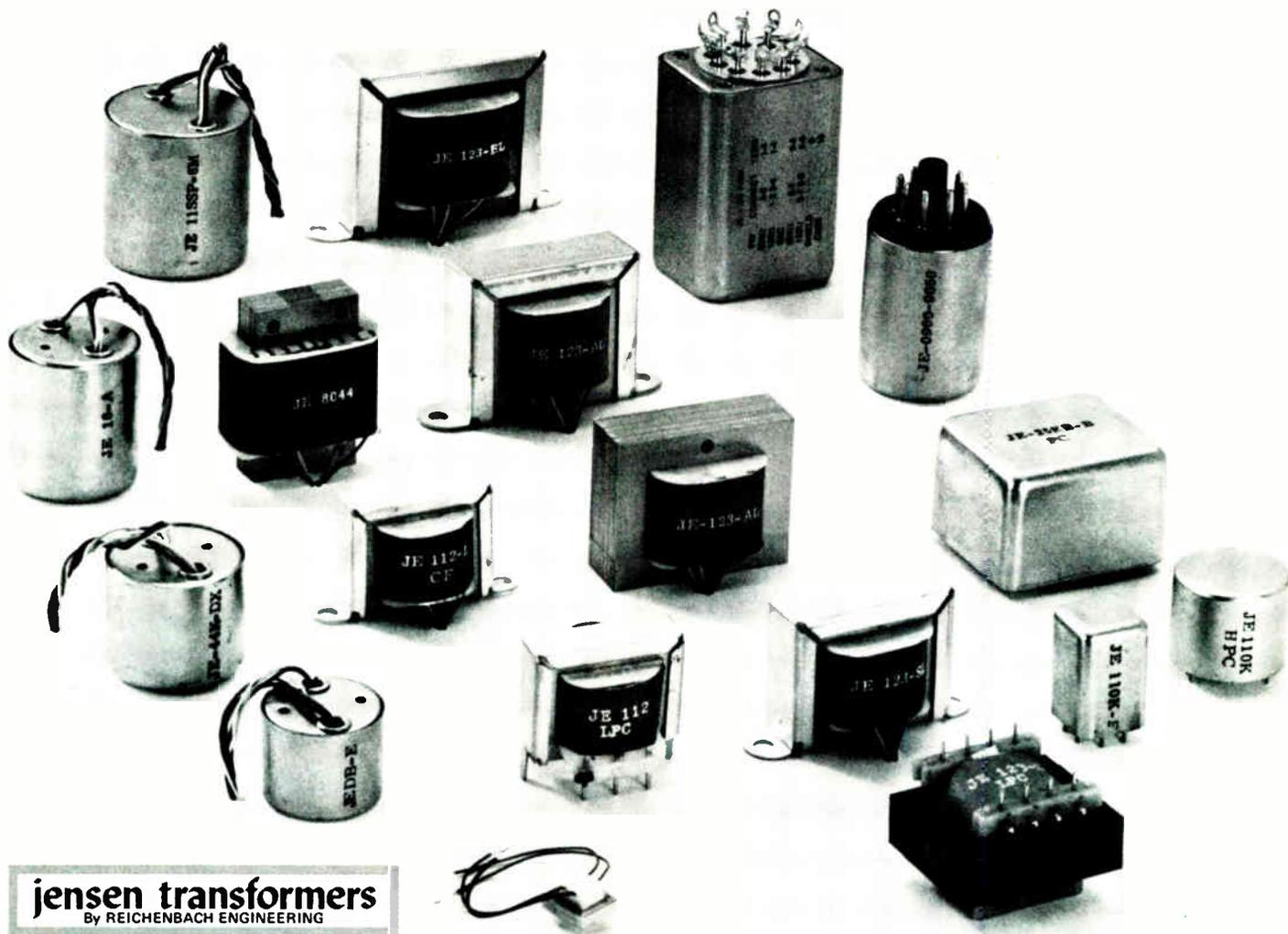
We control every facet of design and construction, from core alloy up, using sophisticated computer modeling techniques. With 5 years software development background, including an AC circuit analysis for Hewlett-Packard's 9845 desk top computer, we now market our own advanced circuit optimization programs. Because Jensen transformers are designed to function as an integral part of the

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SPECIAL REPORT

accomplishes over 86,000 operations in tuning to and verifying the frequency. Optimal convergence is assured with the repeatable, optimized technique; even if the amplitude, frequency, or relative distortion of the measured signal changes, operator interaction is not required. Repetitive measurements are obviously facilitated.

The advantages of microprocessor-based control are evident in audio testing. For example, in the distortion mode the processor automatically tunes to the input signal and varies the sweep rate with frequency, slowing down at lower frequencies where settling times are longer, to ensure accurate results. Since tuning is independent from the source, one frequency can be generated while measuring the distortion of another. In swept measurements the processor controls all sweep and timing requirements; the analyzer steps the source frequency while making AC level or distortion measurements and scales the data at the XY recorder outputs; outputs are always 0 to 10V. Entered start and stop frequencies determine the X axis scaling, and selected measurement units and values entered determines the Y axis scale. The analyzer steps in log increments selectable from 1 to 500 points/decade. Automatic distortion measurements can be obtained of typically less than 0.003% (-90dB) between 20Hz and 20kHz at 1V level and flatness measurements typically to 0.5% (0.05dB) over the same range.

An example of an 8903A set up for fully automatic swept measurements of frequency response and distortion versus frequency is shown in figure 1.

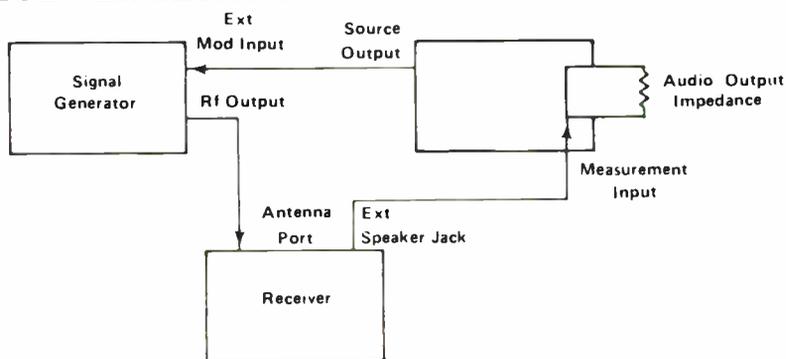
The rapid count mode of the 8903A, when used with the 9825A calculator as a controller, can be used to determine the RMS frequency variation of a tape recorder; that is, wow and flutter. This set up is shown in figure 2.

Tape recorder signal-to-noise, frequency response, distortion, and channel separation can be performed on the 8903A without additional equipment. However, adherence to measuring standards may necessitate the filtering of the measured signal. The set up is shown in figure 3.

FM receiver testing, in which parameters such as audio power, SINAD, signal-to-noise, distortion, and frequency response can be accomplished as shown in figure 4. A common signal generator would suffice for in-channel tests, a high-performance

(continued on page 32)

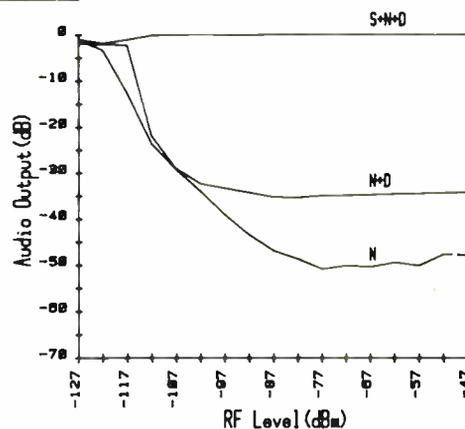
RECEIVER TESTING Figure Four



FM Receiver
Model XYZ

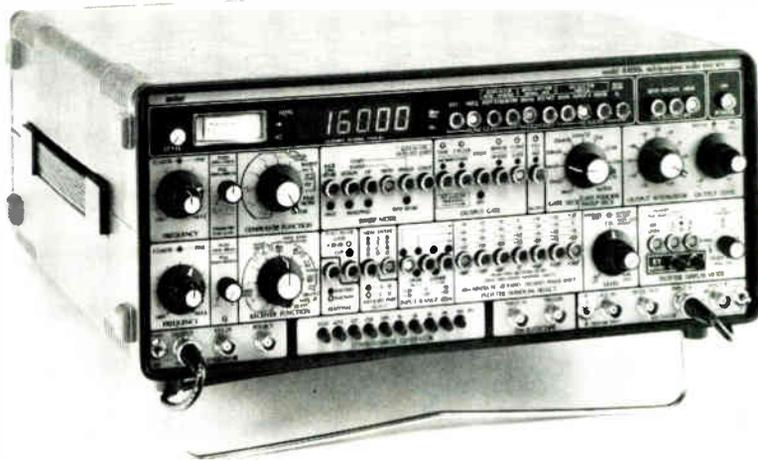
Receiver Tests

Sensitivity=	0.45 μ V
Audio power=	5.12 watts
Signal-to-noise=	48.1 dB
Distortion=	1.95 %
Mod. acceptance BW=	7.2 kHz



The 8903A Audio Analyzer modulates the signal generator and measures receiver parameters like audio power, SINAD, signal-to-noise, distortion and audio frequency response. Used with a signal generator like the HP 8656A, the 8903A makes most in-channel receiver tests. Adding a high performance signal generator such as the HP 8640B or 8662A gives out-of-channel testing capability.

FIGURE 4: FM RECEIVER TEST



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Amber Electro Design Model 4400A



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SPECIAL REPORT

(continued from page 30)

generator would be required for out-of-channel tests.

The Hewlett-Packard 8903A is thus representative of contemporary trends in diagnostic equipment. The days of monolithic, monopurpose gear are perhaps numbered in the light of the popularity of multifunction equipment; when a single unit can outperform a loaded test bench, the choice seems obvious. Also, the availability of modular, multifunction equipment extends even further the flexibility of testing gear. However, even the most seemingly complete package cannot do everything, as of yet. Thus there is available a variety of diagnostic instruments, each with its own idea of expertise in the matter of calibrating, maintaining, and testing audio equipment. The following is a survey of some of the weapons in the modern arsenal in the struggle against down-time:

Amber Electro Design Ltd.

offers a family of diagnostic equipment, centered around the Amber 4400A multipurpose audio test set. The 4400A provides a generator, receiver and meter section for testing. Included in the generator section are a function generator, log sweep generator, noise generator, tone burst generator, and comb generator. The receiver section contains a digital plot circuit. Plots of amplitude or phase versus time or frequency may be stored in four memories for external display. A wide variety of scale selection, display presentation, and sweep methods are available. The meter section contains a circuit for digital frequency and level measurements with a resolution of 0.01dB. Weighing networks and a true RMS detector response permit standardized noise measurements. A multimode filter section with variable Q may be configured as band pass or cut, and low or high pass. Also, a spectrum analyzer with constant percentage bandwidth and log frequency sweep is included. Utilizing the combined circuitry, measurements such as noise floor, crosstalk, RT60, frequency response, and speaker impedance versus frequency, are easily accomplished.

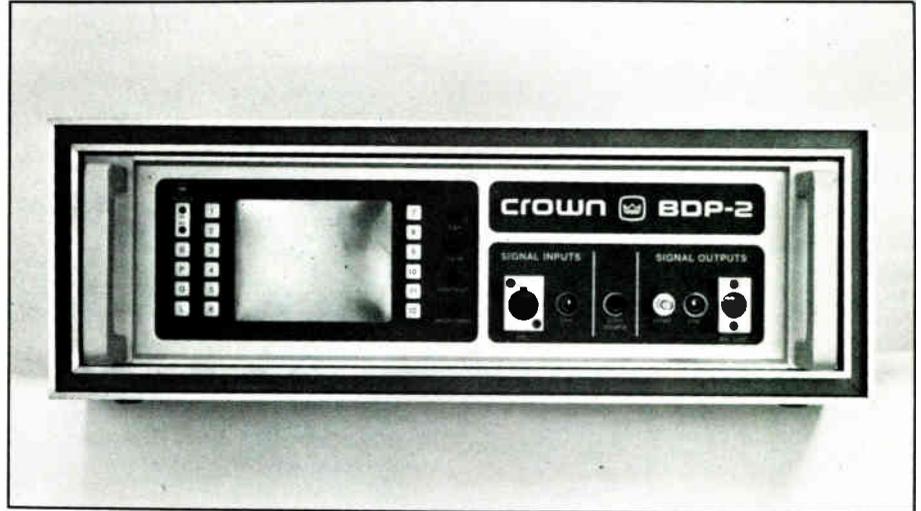
Also in the Amber family are the model 358 high resolution frequency meter, model 3501 distortion and noise measuring system with measurement capacity to below 0.0005% (-106dB), and the model 4500 automatic distortion measuring system with autoranging and autotuning.

Brüel & Kjær manufactures a comprehensive line of instrumentation

including signal generators, measuring microphones, sound level meters phase and flutter meters, frequency analyzers, and many kinds of recorders. Of special interest to recording studio troubleshooters is the B&K 2131 digital frequency analyzer. An instantaneous graphical display is shown on a CRT to provide dynamic measurement. Digital filtering, detection and averaging methods accomplish both octave and one-third octave percentage bandwidth

band, RMS power spectrum. A 1024 sample input memory is used to record the time function, and a line bandwidth of 0.25% of the selected frequency range is accomplished. The 2033 contains a 10240 sample memory and a times-ten zoom for high resolution examination of any part of the displayed spectrum.

Crown's BDP-2 audio micro-computer provides a color graphics output of its data on a full NTSC-compatible color display. Programs are stored on EPROM's placed on removable boards to facilitate capability upgrade, and RAM memory is similarly



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Crown BDP-2 Audio Micro Computer

frequency analysis in real time. The unit can store analyzed spectra or spectrum data entered independently through the IEEE 488 interface bus for display and comparison with real time data. There are 42 one-third octave channels with 7 pole Chebyshev digital filters with center frequencies from 1.6Hz to 20kHz. Alternatively, 14 octave channels with 12 pole Chebyshev filters may be employed to measure center frequencies from 2Hz to 16kHz. The 11 inch CRT display shows 60dB of amplitude range and internal alphanumeric generators display scales with dB graduations and channel numbers. RMS digital detectors respond to continuum, transient and impulse input signals with a 9dB crest factor allowance. Hold and maximum hold modes may be used to retain displayed data. The 2131 has analog outputs to level or XY recorders. With an external IEC/IEEE controller, one-twelfth octave analysis is possible.

Also available from B&K are the 2031 and 2033 narrow band real time analyzers. These analyzers use Fast Fourier Transform techniques for narrow band analysis of signals. The 2031 generates a 400 line, narrow

expandable. Data is outputted with as many as eight simultaneous variables in four colors. Up to 64 discrete channels of information can be displayed, such as multitrack program material. A full 80 dB of data can be displayed at one time and 130 dB of data can be scrolled for selected viewing, stored and recalled, and permanently stored on cassette. In addition to a pink noise source, designers have introduced a DGFS source (Digitally Generated Flat Spectral) which is a pulse, rather than noise source with a crest factor to more closely approximate musical sources. The BDP-2 permits RTA for environmental and system testing, as well as RT60 measurements. Instantaneous equalization, room reverberation and reflection analysis, loudspeaker placement, one-third octave spectrum analysis, ambient noise level and spectra, critical distance determination, and multi-microphone monitoring can all be accomplished. Frequency response, signal-to-noise, dynamic range, and channel separation measurements are also possible.

Also available from Crown is the RTA-2 real time audio analyzer for

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BBSM-6F



BBSM6

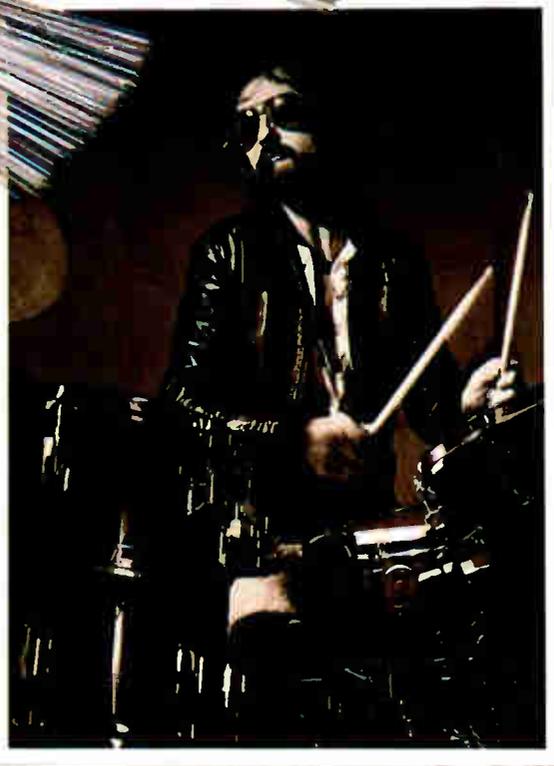


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The Headset Mic is available in two versions. The standard SM10A (microphone only) and the SM12A which features a receiver for use as a monitor.

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Circle #023 on Reader Service Card
World Radio History



(continued from page 32)

measurements in third and octave bands. Its data is displayed on a 5 inch scope, and an internal pink noise filter is contained.

The **EMR-Schlumberger** EMR 1510-02 provides two standard filter characteristics, rectangular and Hanning, as determined by the choice of window functions. The equivalent filter-shape of the analysis becomes the Fourier Transform of the window. A self-contained oscilloscope display shows measurements as well as control selections to permit comprehensive scope photographs. A 256 line spectrum analysis can be accomplished in real time to 2.56 kHz, and a high speed analysis to 25.6 kHz. A dual 1024 word memory permits simultaneous analysis and updating. Through floating point arithmetic the 1510-02 yields a dynamic range of greater than 60 dB and accuracy of 0.3 dB plus 0.1% of full scale. The 1510-02 utilizes a 6 pole Chebyshev input lowpass filter and samples at a rate four times that of the maximum analyzed frequency to minimize spectral energy in the alias bands. A 4 digit LED display shows the value of amplitude and frequency of any selected channel, or time remaining to complete a spectrum averaging function. Analog and digital interfaces provide for remote scope display, XY plotting and other functions.

IVIE manufactures several inexpensive audio diagnostic products. The IE-30A is a spectrum analyzer and sound level meter in one package. The analyzer provides one-third octave measurements from 25 Hz to 20 kHz in 30 ISO bands using 3 pole-pair filters, with a relative filter flatness of ± 0.5 dB. Display is provided on a thirty channel 480 LED display with selectable ranges and automatic intensity adjustment. Dual involatile memories will store or accumulate a display pattern. The sound level meter uses four modes of fast, slow, impulse, and peak, with a range from 3 dBA SPL to 149 dBA SPL. A 4 digit LED readout with 0.1 dB resolution is provided.

The IE-17A accessory provides microprocessor control for the IE-30A. The IE-17A can measure reverberation time in one-third octave or octave bands, and store, display and plot reverberation time over the range of 10 milliseconds to 100 seconds with a 10 millisecond resolution. Slope changes for every segment of the decay curve are displayed. A frequency marker is generated in 0.1 dB increments. Pulsed, nonpulsed, tracking, or broad-

band measuring features are available for time-related measurements. Using a time gate, room delay reflections may be isolated and measured.

Also available from IVIE is the IE-10A octave analyzer and sound level meter, and the IE-20B pink and white noise generator.

Klark-Teknik offers the DN60 real time spectrum analyzer and the companion RT60 reverberation analyzer. The DN60 is microprocessor-controlled and features 30 one-third octave 2 pole-pair filters on I.S.O. frequencies

from 25 Hz to 20 kHz, which meet the IEC 225 requirements. Relative flatness is ± 0.5 dB. Data is outputted on a 30 x 16 high intensity LED matrix display with selectable display resolution and selectable display time constants, as well as on a separate SPL display. Three levels of memory permit storage of analyses. The unit also offers a peak/hold facility which can be displayed simultaneously with real time, processor controlled peak/averaging, three response times and processor-controlled exponential attack and decay times, selectable A curve weighting networks, internal pink and white noise sources, mic/line electronically balanced inputs with phantom power,



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LUNCHING WITH BONZAI

Ray Manzarek

The Door Across the Street



by Mr. Bonzai

This was a late lunching, in the Hollywood Hills on a Sunday afternoon. Ray's house is set above the silly streets of the city, secluded and surrounded by greenery, packed with art and sensual nouveau furnishings. Ray's piano, his "best musical friend," is a rare blonde, one of four made by the German company Sauter, and had a supporting role in the Peter Sellers film "The Party." It was purchased when "Light My Fire" hit No. 1 on the charts.

I first saw Ray Manzarek early in his career when he was performing at The Hullabaloo in Hollywood. I met him recently as a neighbor who lived across the street. Introduced as just "Ray," I chatted with him occasionally for six months, saw him taking out his trash, playing with his son Pablo—the normal everyday things. Finally, I got around to asking what he did and he

simply told me he was a musician and then fingered an imaginary keyboard. I asked him if he was with a band I might know of and abruptly learned he used to be with The Doors.

Today, Ray is producing the band "X" and their rock videos. With a masters degree in film from UCLA he is also making plans for a feature film.

WHAT IS THIS FILM ABOUT?

Love and Death in Chinatown—sort of a Romeo and Juliet love story, set in a New Wave club. It's about a Chinese girl who falls in love with a musician, but their love is star-crossed and cannot last on this earth; however, it will survive in the world of the ancestors on the other side. I'm modelling the role of the hero on John Doe, the lead singer in "X."

AND YOU'RE WRITING THE SCRIPT?

Yes, and I want to direct it. Music will play a very large part—I think that film and music go together;

it's a real marriage. The pacing of both are the same, the cutting and editing, and when you put the two together, pulsating against each other, or in harmony, you can create great power. DID YOU DISCOVER "X" IN A RAW FORM?

No, I saw them at the Whisky and they had it all together. It was just a matter of going into the studio with them and getting the right sound on the instruments, the right balance of guitar, voice, drums, and bass. WAS THE KEYBOARD THE FIRST INSTRUMENT YOU PLAYED?

Yes, I remember the trauma of my first piano lesson when I was seven years old in Chicago. My father took me on a Saturday morning and we went to see this old man in a darkened room. He showed me the music, with all these lines and dots, and I was completely mystified, baffled, but within a few weeks I caught on and about four years later I discovered black music and realized there was a beat and a rhythm.

DID THIS INSPIRE YOU TO COMPOSE?

No, just to play; it inspired me to improvise.

WHO IN YOUR LIFE HAS AFFECTED YOU THE MOST MUSICALLY?

That's tough to say—let's see—Stravinsky, Muddy Waters, Miles Davis, Elvis Presley . . . and Jim Morrison. Jim really affected me—working with him was terrific.

I GUESS EVERYBODY WANTS TO KNOW ABOUT HIM . . .

Yeah, they sure do. I don't blame them. The Doors are about as big today as they were in 1967—it's phenomenal.

HOW HAS L.A. CHANGED SINCE THE SIXTIES?

The whole country and the whole world have changed. In 1966, though, we were just the house band at the Whisky and you could pay your two or three bucks and see Frank Zappa and The Mothers of Invention and The Doors, Love and The Doors, The Byrds and The Doors, Them and The Doors. We played a whole week with Them, and on the last night there was a jam with both Morrisons on stage together.

WHAT HAPPENED TO JIM?

He died.

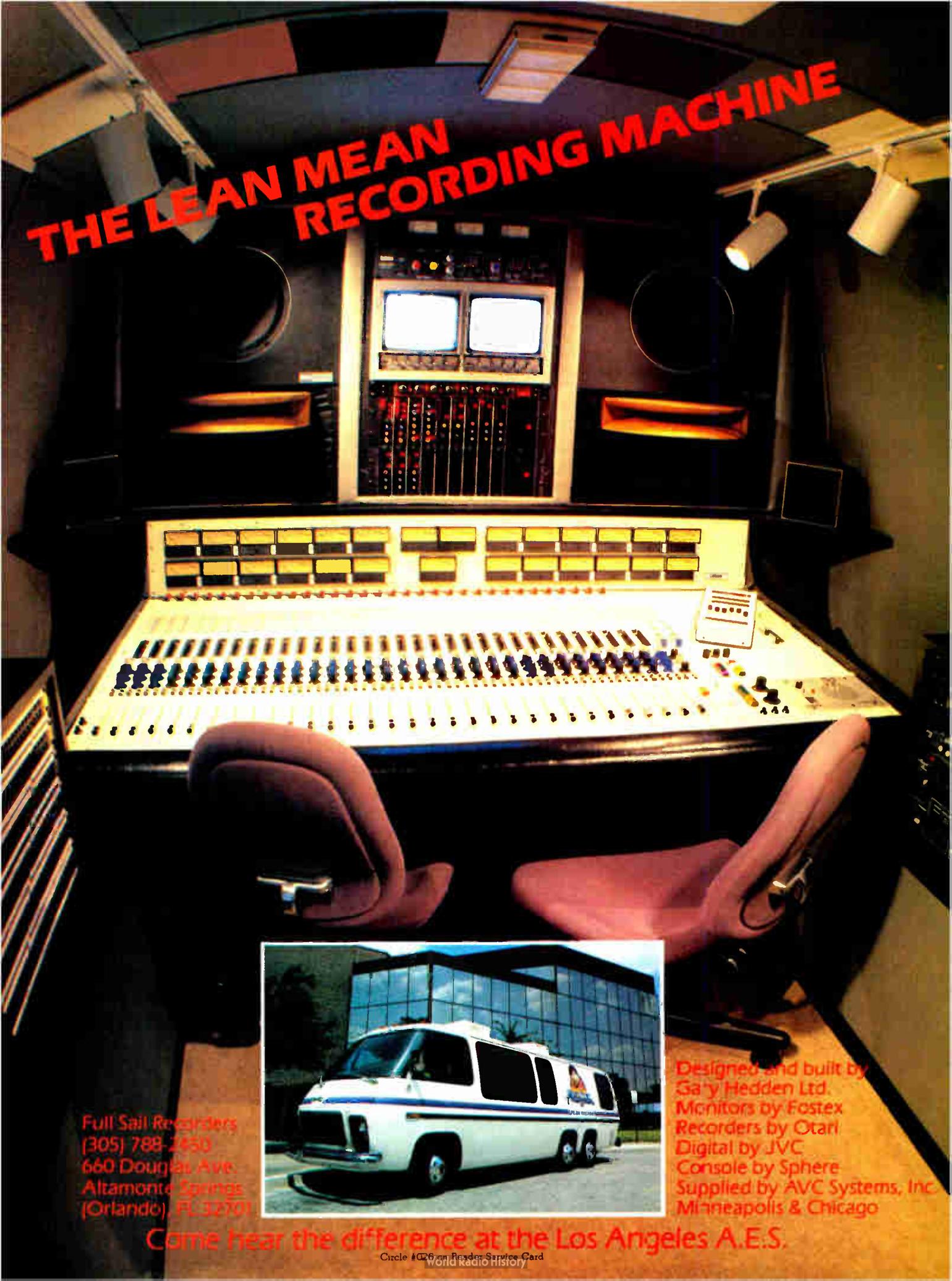
(I Poured another glass of Beaujolais for Ray, his wife Dorothy, and myself . . .)

BUT WASN'T HIS EARLY DEATH THE FINAL ACTING OUT OF SOMETHING IN HIS NATURE?

Well, he went to Paris. The last time Dorothy and I were there was for the 10th anniversary of his death. We

(continued on page 40)

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(continued from page 38)

had a party at the grave with John and Robbie and about 250 people, drinking wine, pouring wine on his grave, people singing and talking about Jim—talking to Jim. It was great, but after a week of Paris I was so exhausted and frustrated and humiliated at not being able to speak French or communicate that I thought that was what killed Jim Morrison. As much as he loved Paris, and Paris loved him—he couldn't communicate. He went to Paris to get away from everything and he didn't find anything. DOROTHY: He wasn't feeling well at the time.

RAY: He did have some problems—a cough, some liver trouble, he wasn't 27 when he died, he was 67. But I think that alienation destroyed him psychologically—Jim was a word man. It destroyed his will power. Morrison was a dominant male; he wanted to be the dominant male in every situation. He went there in March and he finally died in July. But when the music was right and he was right and everyone in the audience was of a like mind, it was fucking magic—time would stop. They would feed us; we would feed them. That's what has changed in L.A. and in music. I don't know if that feeling requires a naiveite on the part of the audience or a certain type of security, but as far as I'm concerned the point of existence is to harmonize into an enthralling, rapturous, and ultimately enlightening experience.

**IS THIS WHY YOU ARE INTERESTED
IN FILM NOW?**

It's something to do to pass the time until I die. I'm here on this planet—what am I gonna do? I love my wife, I love my kid, I've got a nice house and I had a rock and roll band and it was successful and a friend of mine died and he's now one of the immortals and OK, I'll make some movies. You're free as an artist to manipulate your audience any way you want. I want to make them feel real fucking good, and at peace with existence, with the infinite, and the cosmos. The Doors might have scared the shit out of people, Morrison might have been totally insane, but we were exploring an unordinary state of reality. The audience went along with us. There's Heaven, there's Hell—it's not just a "have a nice day" existence. There's madness, there's chaos. The universe is a very exciting place. (He laughed).

**IF YOU HAD THE LEAD IN A FILM
FROM THE PAST, WHO WOULD IT
BE?**

I'd play the lead in Shanghai Express, except I wouldn't leave Marlene Dietrich. But that film could never be remade. Josef von Sternberg is my favorite director... and Orson Welles, and Fellini, too. Just as L.A. is creating a new wave of music with The Blasters,

and "X," and Top Jimmy and the Rhythm Pigs, the Plugz... I think there could be a new thing happening in L.A. film.

**WHAT ABOUT ROCK VIDEO —
HOW WILL THAT BECOME AN ART
FORM?**

Well, it is already. I'll tell you what they are: they're cartoons. They're terrific. I will watch any rock video by anybody, anywhere, any time. No matter how bad they are, they end soon. We should have them in theaters instead of the lousy cartoons. But there's still nothing more fascinating than the story—what goes on in the human heart, or in the human mind as it attempts to either gain domination or to find love.

HAS YOUR LIFE BEEN A SUCCESS?

My life has been great. I have had such a *good* life.

WHY ARE YOU A SUCCESS?

Luck.

DOROTHY: There's more to it than that.

RAY: Well, I took a chance. My advice is to take the gamble and don't fall back on a secure thing. I dropped out of law school and went into film school and everyone said I was throwing my life away, but I met my wife in an art class and I met my lead singer. I made a leap of faith and learned that the basic cosmic vibrations of life are supportive and not destructive. When more people do it, it creates a vibratory support. That's the object of life and the object of art.

ARE YOU A SPORTS FAN?

Oh yeah—I watched UCLA go through the championship when Johnny Wooden was the coach. I watched every game.

**IS THERE A CORRELATION BE-
TWEEN STAR ATHLETES AND STAR
PERFORMERS—THE PRESSURE TO
PERFORM, TO ENTERTAIN?**

Sports and music... I played a lot of basketball when I was young, and it is an improvisatory sport, and for The Doors it was the same way. We would always leave room for improvisation, otherwise... I don't know how the fuck people can play the same songs, the same way.

**THEY DON'T WANT TO TAKE THE
LEAP.**

Without the leap it becomes utter boredom. A basketball team and a rock band are exactly the same—you pass the ball around. Take it, solo... Jim would pass the ball to me, I would pass it to Robbie... you just pass this energy around.)

(I ASKED RAY IF HE MINDED SIT-
TING FOR A DRAWING BEFORE I
LEFT. HE PASSED THE ENERGY TO
ME AND I PUT PEN TO PAPER AND
IMPROVISED AS HE GAZED AT A
BAS RELIEF FROM THE PALACE OF
THE PERSIAN KING DARIUS.)

1980 – STUDIO D

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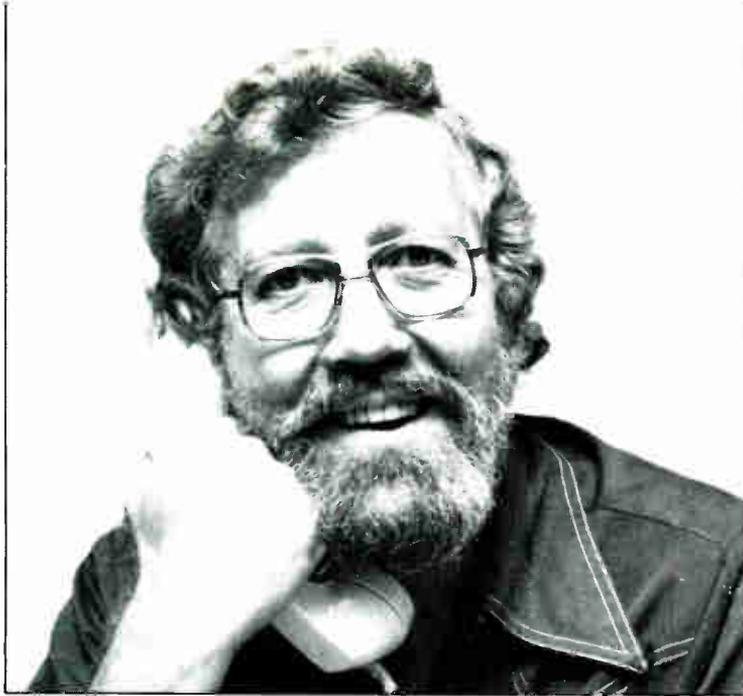


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G.C. [JEEP] HARNED

by Larry Blakely

Jeep Harned is the founder of MCI, a company which began producing professional audio equipment in 1959. Over the years, MCI has grown to become a major manufacturer of tape recorders and mixing consoles. More recently, the company was purchased by Sony, who was seeking an American facility to develop and produce new, ultra-sophisticated pro-audio gear. Here, in Jeep's own words, is the story behind MCI.

"I was born in Tulsa, Oklahoma on June 7, 1930, and raised in places all over the United States. My father was in the oil business and he worked for a company called Standard Oil of Oklahoma - an outfit that went under during the depression.

"At an early age I became interested in music and studied and played the cornet. I was into classical music, and acquired quite an extensive collection of classical recordings. After high school, I went to college and obtained a B.S. degree in civil engineering - I wasn't a particularly good engineering student and squeaked through school with about a C+ average.

"While in college I was an ROTC cadet, and immediately after graduation in 1952, I went into the army as a second lieutenant. This was during the Korean conflict and I went through officer's basic training in El Paso, Texas, graduating 11th out of some 240 second lieutenants from universities all over the United States.

"Most of the graduates were shipped to Korea, but about a dozen of us didn't get an assignment and we wondered what was happening. We

sat around Fort Bliss for about 3 or 4 weeks, until orders came down.

"It seemed that they were short of instructors in Electronics School and they were going to turn us into Electronics Instructors in 90 days. Out of our group of twelve, there was only one electrical engineer, with all the rest chemical engineers, civil engineers, mechanical engineers, etc. The Army set up a special "crash" course and ran us through it.

"As soon as we had finished the course, they had us up on the platform teaching. We covered basic electronics and then all the way through to very complex radar pulse and timing circuits, servo-systems, analog computers, etc. My classes consisted of about 50 enlisted men and officers, every day for approximately 14 months, the duration of this assignment.

"After eighteen months I came out of the army as a first lieutenant, and got a job with the Carter Oil Company (a branch of the Standard Oil Company of New Jersey). I was a "doodlebugger," which is oil slang for seismograph operator, starting as a trainee and then becoming an assistant operator. In the oil business you have to move around a lot, and I worked in two or three towns in Alabama, Mississippi, Montana, four cities in Wyoming, North Dakota, Louisiana, and finally in Tulsa, Oklahoma, where I worked in the research lab at Carter Oil's Headquarters. I stayed with Carter Oil for about a year and a half, and met my wife In Jackson, Mississippi while working for the company. I remember being in Montana, with winter coming and my wife pregnant, and deciding that the Gypsy life of the oil business was not good for a married couple, even if the pay was

sensational.

"My brother lived in Fort Lauderdale, Florida at the time and he said, 'Come on down and whatever you do, you'll do great at it.' So in 1955 we moved to Fort Lauderdale and found that it was an absolute, desolate, nothing of a place. I had walked away from a very good job to come down to Florida and now I just couldn't find employment. I went to Eastern Airlines, National Airlines, civil engineering firms, and every place that I could think of to apply for a job, and there just wasn't anything available. So I borrowed \$8,500 from my brother and opened a store called Music Center Inc., joining the then-infant high fidelity business. I sold equipment like AR, KLH, Fisher, McIntosh and, like most small businesses, I was underfinanced. I started doing service work and soon discovered that I made a lot more money from fixing other people's gear than I did selling it. Soon I was fixing amplifiers, tuners, record changers... just about anything.

"In 1959 Jack Sauls, a good friend of mine who is now deceased, walked into the shop with a record album. Jack had a great pair of ears and had just picked up this album at a recording studio in Miami. He wanted my opinion of the sound, so we put it on the turntable and we listened. It was the worst sounding record I had ever heard - just full of distortion. Jack said that a man by the name of Mack Emerman had just built this studio and had put everything that he owned into it. The studio had all custom built equipment and obviously Mack was having some problems with some of it; Jack said that he would arrange a meeting to see if I might be able to help him out. I said, "Okay," loaded

all my test equipment into my car and we went down to Criteria. Mack's new studio was very pretty. The equipment was flat from DC to daylight, but some of it was oscillating and motor-boating, which caused considerable audio distortion. I had a Heathkit I.M. analyzer that I tweaked up, and it could read I.M. distortion down to about .05%. So I brought in my test equipment and started to measure the performance of the console, tape recorders and power amplifiers. The console was custom built with 16 inputs and three outputs, the tape recorders were three track 1/2 inch, and the power amplifiers were also custom jobs with four KT88's in push-pull parallel which would have provided about 120 watts.

"After considerable effort in attempting to make distortion measurements on the console, I was finally able to pad down the signal into the mike preamp (which had about 100dB of gain) far enough to prevent total overload and get a reasonable fader setting while delivering +4 output. At this point I was measuring 14% distortion before reaching the tape machine, with equalization flat and everything else at nominal. I then measured power and distortion out of the custom built power amps. The best one put out something like 14 watts at 10% and the worst one was putting out 1/2 watt at distortion so high that it was unmeasurable. It was at this point that both Mack and I realized that he had some problems. We discussed the meaning of distortion and its effect on the audible quality of a recording at some length and Mack made the deci-

sion to rebuild all the electronics in his control room. The goal: to bring distortion down to reasonable levels of approximately .1%. With my expertise in electronics I felt that I could improve the performance of some of Criteria's equipment, and I told Mack that I could design some better sounding gear for his studio. I knew that this was going to be a learning experience for me as I didn't know anything about recording consoles, so I asked Mack to be patient with some of my design efforts. Well, I got busy and started designing new preamps, new line amps and power amps, and after about a year we had rebuilt almost everything at the studio - including the record cutting chain. After these improvements were made Criteria started on its first big string of hits.

"Mack and Criteria got a reputation for getting a really solid low end from the equipment that I had

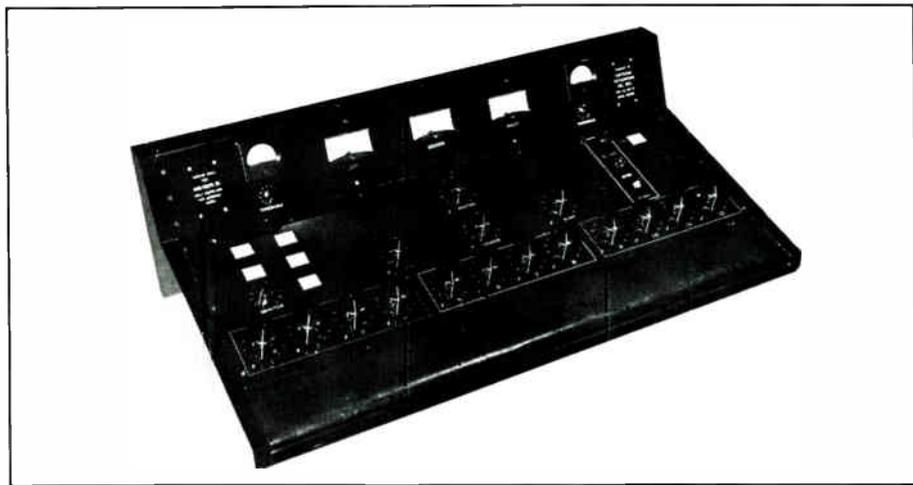
designed and built. Finding that decreasing the feedback increased stability at just a modest compromise in distortion, I simply designed some very stable tube circuitry with a little higher than the 'normal' distortion that others were getting with massive amounts of feedback. I was a good tube designer, and I also provided service for my equipment after I had built it.

"By the early 1960's I had people asking me to build consoles and other kinds of professional audio equipment, and I was always able to use Mack and Criteria as a combined 'sounding board/test bed' for new design concepts. I built a little mono mixer for a guy up in Jackson, Mississippi by the name of Bob McCree, and he cut a bunch of hit records on it. He just sat there in this little room in his house cutting hit after hit with this little mono mixer and that Altec A-7 stuck in his ear. I remember that he and his two partners came down and negotiated with me for three days on the price of that mono mixer, a unit that I built in about four days and sold to them for about \$1,000.

"Thinking that this business was really something, I'd grab a chassis and start punching holes in it, put in and wire a bunch of tube sockets, and go. I had designed some good sounding circuits that really worked, and I did this for about eight or nine years.

"By about 1964 or 1965, I was pretty tired of the hi-fi stuff, 'cause it was a pain and I never made any money on it. I guess I was a poor salesman, because I always told people what I thought about the stuff. In those days most of it was pretty bad.

"I had named my store Music Center Inc., and people were always calling me for guitar picks and sheet music... so in 1965 I went to the State of Florida and changed the name to MCI Inc. Then I was hit with



MCI Custom Console - 1962

Wayne Newton w/early (1968/69) 16 track recorder at TTG, Hollywood, CA.



|||||
a couple of burglaries that pretty much eliminated my inventory. One of the guys who burgled the place was an employee of mine, a technician who had been working for me for three or four months. He made a duplicate warehouse key, and one night just went in and cleaned it out.

"At this point I owed \$24,000, so I wrote all of my creditors and told them what my financial condition was, and that I intended to pay them back with interest if they could just be patient. I think that it took about six months, a period when I was doing industrial type sound work, installations, repairs and building custom equipment. At about the same time I got out of the retail business in one fell swoop by taking every piece of equipment that I had left and all the records in the shop and stacking them up by the front door with a sign that said "fifty bucks takes it all." The first guy into the store that morning almost fainted, but he said, "Don't sell it! I'll be right back." He was gone about twenty minutes and came back with fifty dollars, loaded the stuff up and went away.

"I got into the tape recorder business in an interesting way. I had built a console for Sidney Nation of King Records in Cincinnati and he, Mack Emmerman, and Bob Richardson had a bunch of Ampex 350 tape recorders with transports that still ran well, but electronics that were on the verge of quitting completely. So in 1968 Sid, Bob, and Mack got together and hired me to design and build some new "solid state" electronics for their old transports. My electronics proved to be quieter, had lower distortion, and they didn't have the 'Bias Rocks' common to so many of the earlier designs.

"I filled this order for 100 units and I thought that would be the end of it, but when the word got around the industry that there was this guy in Florida building these 'solid state' electronics, a lot more people became interested in them. All of a sudden I'm sitting there looking at orders for two or three hundred of these things. People bought my electronics to use with their older transports, and we continued to sell these for several years. And that's where it all started for MCI in the tape recorder business.

"Tom Hidley, who was chief engineer at TTG Recorders [in Hollywood] was one of the guys who had heard about the electronics. One night I got a phone call at home and he introduced himself and asked, 'Have you ever made a twenty four track?' I said, 'No, we've made 16's and 8's, but never a twenty four.' He asked, 'Is there any reason why I

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couldn't make a 24 track machine?' and I assured him that my electronics would work with a twenty four track, so he gave me an order for 24 electronics assemblies and associated power supplies - and then he asked me to find him some heads.

"I called up Lipps and told them about the special head configuration that we wanted, along with the coil inductance, gap lengths, and mechanical specifications. Then we built the electronics and shipped them to Tom, who took an Ampex 300 transport and converted it to handle two inch tape - which many people were doing in those days. To our knowledge, that TTG machine was the world's first 24 track recorder. Tom

put the ideas together and assembled it, and I have a picture of Wayne



MCI Compressor Limiter - 1961

Newton leaning up against that machine.

"At this time Wally Heider had all the sixteen track machines in Southern California, and now there was this new guy on the block with twenty-four tracks. Naturally this blew the whole scene apart and people were soon scrambling to get their hands on twenty-four track machines like it was a gold rush. It took Ampex and 3M a little time to react and get their 24 track machines on the market, and in the meantime we were building and selling electronics like crazy.

"We designed and built our first tape transport around 1970 or '71, which was the JH 10 16 track tape recorder. I did all the mechanical and audio design work and Jim Strickland did the tape tensioning and control logic design. Jim now heads up Accustat, one of the world's few manufacturers of full range electrostatic loudspeakers.

"We introduced the JH-10 recorder at the A.E.S. Convention in 1971. Initially the machine was available as either an 8 track or a 16 track, and later we offered it as a 24 track unit as well. MCI didn't start making a series of 1/4" machines until 1977, when we incorporated a new DC transport design.

"At the 1972 convention we introduced our "AutoLocator," which could ramp down to the "0" point with no overshoot. Since it was the first really accurate locating device, this original AutoLocator was the hit of the show. The key to its accuracy was an "up-down" counter circuit we had developed. We should have patented it, because today almost every one of our competitors uses this approach.

"1972 also was the year when we started building our first "production" console series, the JH-400's. This design evolved from some of Dave Harrison's ideas. I had known Dave from the days when he had worked at Criteria, and he also played in Wayne

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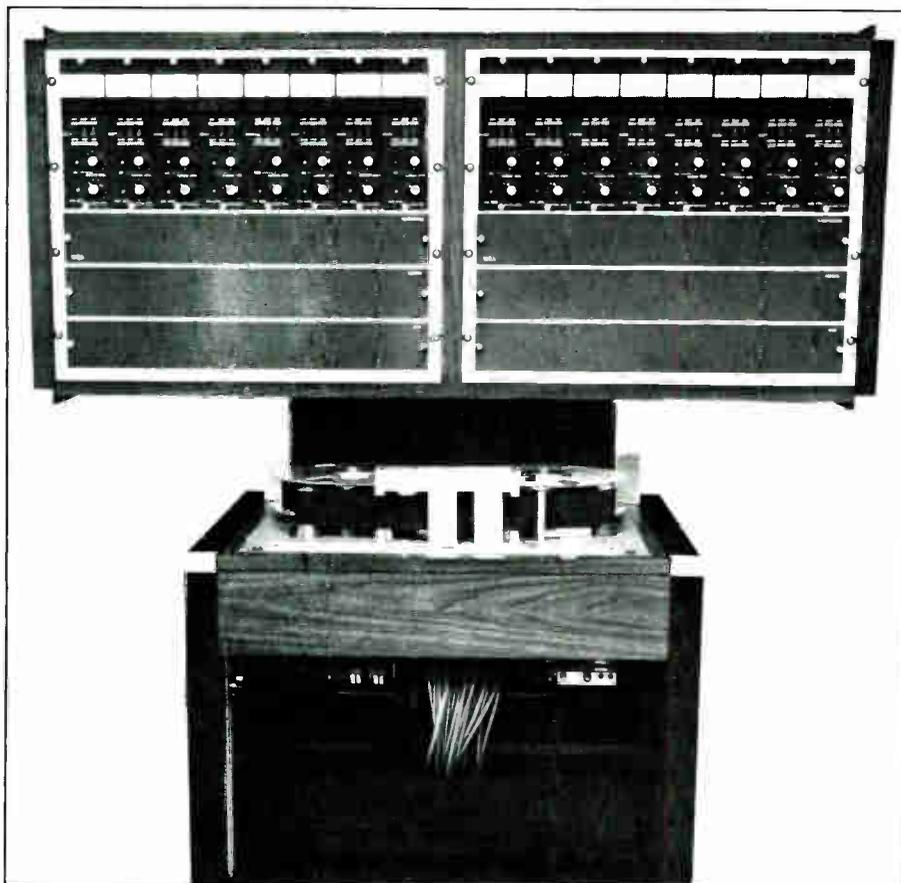
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World Radio History



Cochran's band in Miami. Then he did studio maintenance for Sid Nathan at King Records, and worked his way up to become studio engineer and manager. Sid also owned part of a recording operation in Nashville and transferred Dave there. When Sid died, the studio was wound down and went out of business, leaving Dave to start his own company, The Studio Supply Company.

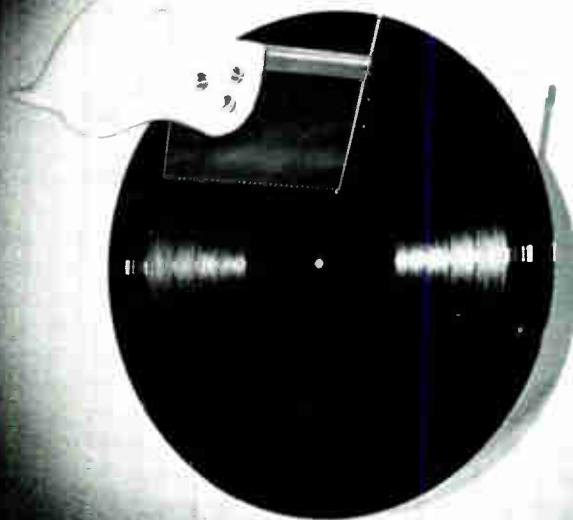
"At this time our dealer in Nashville was Dan Flickinger, but we dissolved our relationship after his accident. I then made Harrison's Studio Supply Company the Nashville dealer for MCI tape machines and he did quite well at it. Shortly thereafter Dave approached me about designing a new kind of console. He had some ideas, and I told him that if he would design it, MCI would build it. Dave came down to Florida and started drawing and laying tape, and we built a run of six consoles. These boards were quite unusual for their time — the track assigns were in-line with the monitor and main channel fader. The console was similar to Flickinger's earlier concept except that his boards

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had the track assignments off to the right of the channel area. After the first run of six, I decided to do some additional work on the design – changing some of the metal work and adding other circuitry. We also incorporated the Harris 911 IC op-amps which lowered costs and made the product more manufacturable. All in all, I think we built about two hundred of those 'Series 400' consoles between 1972 and 1977, at which time we brought out the JH-500 Series. The 500 Series had improvements such as a more elaborate equalizer with two mid-band EQ sections, high and low pass filters, more sends, additional returns, plasma displays for VU indicators, communications facilities and so forth. Now in a transformerless version, the JH-500D is still in MCI's console line.

"All the while MCI just kept growing and getting bigger. We brought out the "600 Series" on consoles, and new tape transport designs. Later we developed an *all DC* transport design with a DC capstan motor and DC motors for spooling. This transport was introduced in 1975 on the JH-100 tape recorders series, which we are still building today in updated versions.

"Most tape transports available

during the mid seventies still used big AC motors for capstan and reeling functions, relays for control logic, and there was a lot of AC floating around under the transport which often caused hum problems. MCI was the first to take the big step and design an all DC, servo controlled transport for use in recording studios, using low level control logic and op-amp circuitry. Today, almost all professional recorders follow this design approach first introduced by MCI. The reliability of these machines went way up, and their performance improved dramatically. These all DC transports would hold constant tension from the front of the reel to the back, eliminating the pitch and timing errors common to older designs. If a machine was aligned properly, you could record 10 kHz on the head of the tape, read it with your frequency counter, and then flip the reels over (placing the tone at the end of the reel) and read it on the tail and it will be within an accuracy of 2 Hertz (2 parts in 10,000).

"MCI experienced very rapid growth during these years. We were constantly buying a building, moving into it, outgrowing it in six months or so, and then buying another building. At one time we had manufacturing in

three different buildings, and we would run around picking up PC boards in one building, take them over to another building where the machines were assembled, and then bring the sheet metal over from yet another building. It was really something.

"We put in a precision sheet metal shop that is probably the most complete in the state of Florida. We had to put in our own machine shop because we required a precision that nobody else could give us, and we outfitted that shop with the latest in numerically controlled equipment, punches, mills, lathes, and so forth.

"Today, we build our own motors, make our own faders, printed circuit boards, have our own paint shop, do our own silk screening . . . in short, we have an almost completely integrated manufacturing capacity for professional audio equipment. We now have about 410 employees and our factory occupies about 200,000 square feet.

"As most of the people in the industry know, MCI was purchased recently by the Sony Corporation of America. I think that the things that attracted Sony and the others who had desired to purchase the company over the years was our strength in the marketplace and our complete manufacturing facilities. Sony and MCI make a good fit. Sony is very heavy in audio because that is the field that they started in. Their first product was a tape recorder, and all of their principals are audio people. They've made it big with video, but they've always had a great love for audio and their video needed our audio to round out their packages. This made the two companies fit together very nicely.

"With respect to digital tape recorders, Sony and Studer decided on the same standard. Now with Sony and MCI being the same company, there are three major tape recorder manufacturers using the same digital standard format. Ampex has not revealed what they are going to do as of yet, while 3M and Soundstream have their own digital tape recording formats.

"Sony has asked us to develop some very, very sophisticated pro-audio equipment. They're supporting us with engineers from Japan and our engineering staff has doubled and I wouldn't be surprised if it doesn't triple within a few more months. These things that we are working on are heavy design projects and they're going to be exciting. When some of these products start to come out in the next year or so, I think the pro-audio guys are really going to stand up and cheer."



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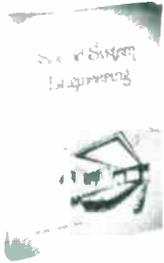
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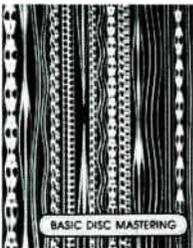
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Le Mobile Mystérieux



by Sam Borgerson

A certain air of mystery hovers around le Mobile. Maybe it's the French name, or the sleek black-and-chrome exterior (Jackson Browne says

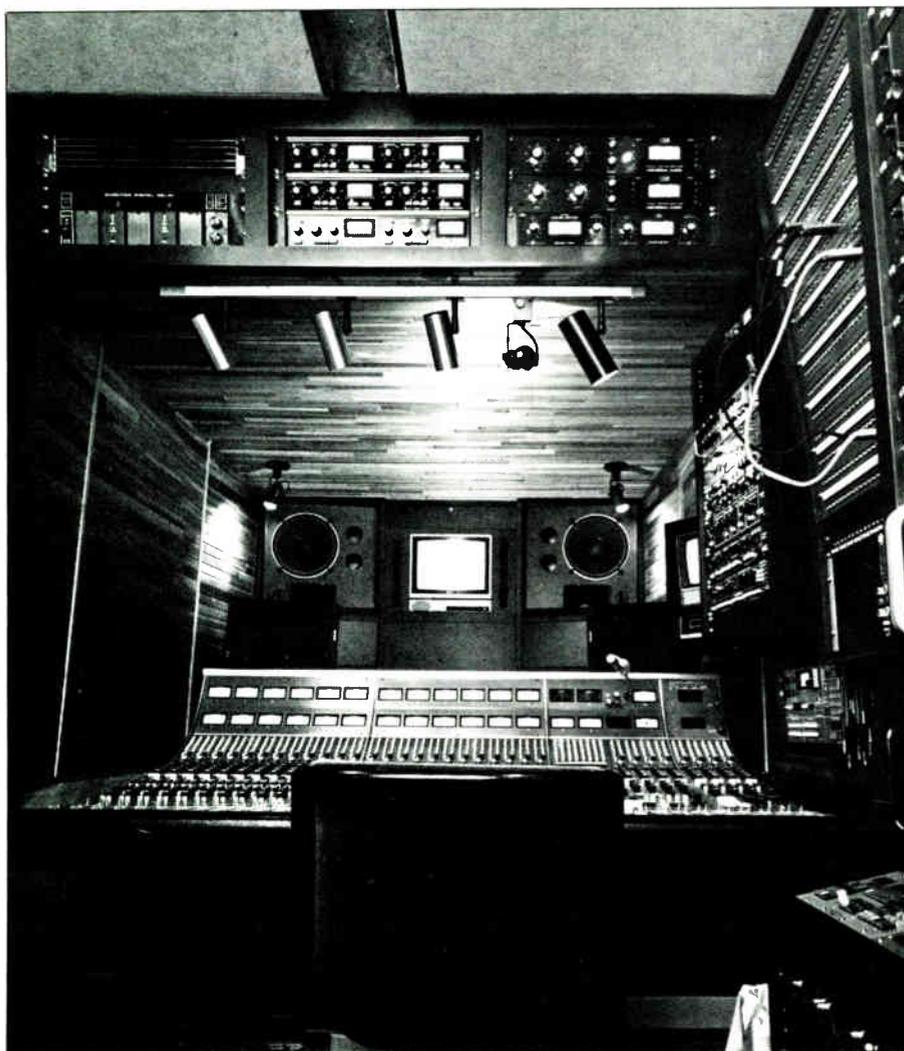
it looks like Darth Vader), or rumors of a fabulous hoard of equipment on board, or the elite group of clients, or the lingering uncertainty as to just where it came from and where you can find it now.

On closer examination, however, there's no mystery at all. The Gallic name is natural since owner/engineer Guy Charbonneau hails from French-Canadian Montreal, and le Mobile was originally based there. Although the truck itself is constantly on the move, you can always contact le Mobile by calling the New York booking office which is listed in the phone directory. As for the rumors of fabulous equipment, well, le Mobile does boast a Neve console and twin Studer A800 tape machines. But there's nothing mysterious about that; it just seems nobody else in North America has cared to go to such expense in equipping a remote truck.

For Guy Charbonneau le Mobile represents the ideal fusion of three lifelong obsessions: music, cars, and electronics. The son of a Montreal garage owner, Charbonneau was raised around cars and trucks. About age 12, when his fancy turned to hi-fi, he built his first stereo system from kits. His late teen years were dominated by high performance modifications on cars, and at 21 he went to work as a maintenance engineer for the Canadian phone company. Soon bored with the routine, he switched over to high end hi-fi sales, liked the gig, sold his Corvette, and bought the hi-fi store.

Not long afterwards, in 1973, a Montreal radio station stopped by to borrow some microphones for a live remote. Charbonneau asked to come along so he could make a master tape to play in his store. When his

(continued on page 52)



Le Mobile interior with Neve

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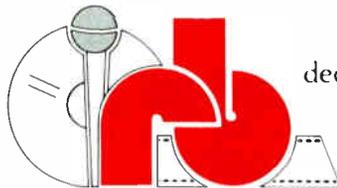
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(continued from page 50)

tape—made with an off-the-shelf Revox A700—turned out better than what the staff engineers had been doing, Charbonneau was hired to tape the rest of the broadcasts in the series.

Immediately hooked on recording, Charbonneau bought a basic Tascam system to get his feet wet in the business. But when he saw his first Studers at a broadcast show he was gripped by upgrading fever. He bought a 4 track Studer a week later and a 2 track machine within two months. A year later he sold the hi-fi store, bought a 16 track Studer pre-wired for 24, a Neve console, and a GMC truck with a 14' box. He was ready for the big time—even though he only had one steady customer: the same radio station he'd started with.

Fortunately, business picked up quickly as word spread across eastern Canada. Upgrading continued and by 1977 the truck's added equipment was overflowing in the cramped interior. Although big-money clients were still few and far between, Charbonneau—a born risk-taker—took another chance and bought another new GMC, this time with a 22' box. After 8 months of construction, acoustic design, meticulous woodworking, and equipment installation, the new truck was ready to roll. And in 1978, le Mobile became the very first recording facility *of any kind* in North America to take delivery on a Studer A800.

But why go to such lengths with a remote truck? "When I designed le Mobile I was still working primarily in Canada," Charbonneau explains. "There's not enough work there to keep busy doing only remotes. So I had to design it to be a full-fledged studio as well. I didn't look at other mobiles before I built it because I didn't want to be limited by what the others were designed to do."

For the past five years, le Mobile has gone through several stages of re-working. "The design today is a result of listening to everybody who has been working in the truck. If somebody says, 'It sure would be nice if you had this or that, the week after I usually have it.'"

Charbonneau's perfectionist attitude paid off quickly when he first visited New York in 1978 on an assignment for the Canadian Broadcasting Corporation. He wanted to get some work from Phil Ramone, so he drove le Mobile over to A&R studios hoping to pay him a visit. Ramone was out at the time, but engineer Jim Boyer looked at the truck, was flabbergasted, and immediately hauled everybody else out of the studio to peek inside the Canadian Wunderwagen.



Guy Charbonneau with A800's

Two months later Ramone called and booked le Mobile for the Paul Simon *One Trick Pony* soundtrack, and thereafter Charbonneau found himself working regularly for a prestigious roster of top acts. Recent projects handled by le Mobile include Journey (the live LP), Loverboy, The Police, Peter Dinklage, Billy Joel, Foreigner, Pat Benatar, Genesis, the Doobie Brothers, Toto, Kansas, Rush,

Lena Horne on Broadway, John Hall, and Dolly Parton.

Although the bulk of le Mobile's work is recording basic tracks—either live or, as with the latest Frampton LP, at the artist's home—the truck is gradually being accepted as a mixing room. Part of the mixing for *Songs from the Attic* was done while the truck was parked at Phil Ramone's house. More recently Charbonneau

tried a novel experiment with Paul Dean of Loverboy. He brought the truck to Dean's Vancouver apartment, ran a power cable up the stairs, unplugged the kitchen stove and plugged in the truck, and set about mixing a TV special. They ran a line out to Dean's stereo and, when they had a mix they liked, Dean listened from the comfort—and familiar audio environment—of his living room

couch. If he wanted some fine tuning, he'd simply relay suggestions to Charbonneau over the intercom.

"I don't push the idea of mixing in the truck," says Charbonneau. "I prefer to let people discover the idea themselves. Most people are reluctant to accept it because most trucks are not designed for it."

Whether for mixing or tracking, the demand for le Mobile's services

convinced Charbonneau that a better future lay south of the Canadian border. His legal and accounting address is now Hermitage, Tennessee (near Nashville), but all booking and scheduling is handled out of New York by Abe Hock of Olympic Entertainment. Charbonneau still keeps a home and hearth in Montreal, but he's usually with the truck out somewhere—anywhere—on the wide North American continent.

Charbonneau admits that this geographic ambiguity has been confusing and may have cost him some business. He is even considering consolidating his home and offices in one city, perhaps on the West Coast. "I don't particularly like the winter," he confesses. "I like to ski, but I don't like to ski with the truck." ■

LE MOBILE EQUIPMENT

Console: Neve 8058, Necam ready. **Tape Decks:** 2 Studer A800 24 trk; 2 Studer B67 2 trk; 6 Technics M85 MKII cassette. **Synchronizer:** Studer TLS 2000. **Noise Reduction:** Dolby 24 trk+ 2 trk. **Reverb:** EMT 250 and 244 digital. **Limiters/Compressors:** UREI LA3A (2); 1176LN (2); dbx 160 (6); Neve 32264A (4). **Outboard Gear:** Eventide 1745M DDL; H910 Harmonizer; H949 Harmonizer; FL201 Flanger; Marshall 5002 Time Modulator; Lexicon Prime Time and PC41 DDL; Kexex (8); Orange County Vocal Stressor; Orban 516 ED De-esser; Ashly SC66 parametric EQ; Helios

stereo parametric EQ. **Monitors:** custom 3-way JBL and Visonik David 9000 with UREI 529 EQ and 5 Crown stereo amps. **Foldback:** AKG K240 (10) and Sony DR7 (8) headphones; 6 Crown D75 amps. **Microphones:** 90 assorted AKG, Neumann, Sony, Schoeps, EV, Shure, Sennheiser, etc. **Video:** Panasonic color camera, B&W camera, B&W monitors (2); Sony color monitor and BVU800 VCR. **Miscellaneous:** 3 multicable sets for up to 104 mic pairs plus high level, intercom, and video feeds; refrigerator; couch; electronic air filtering; hydraulic levelling jacks, etc.



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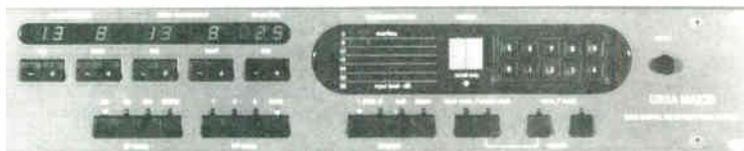
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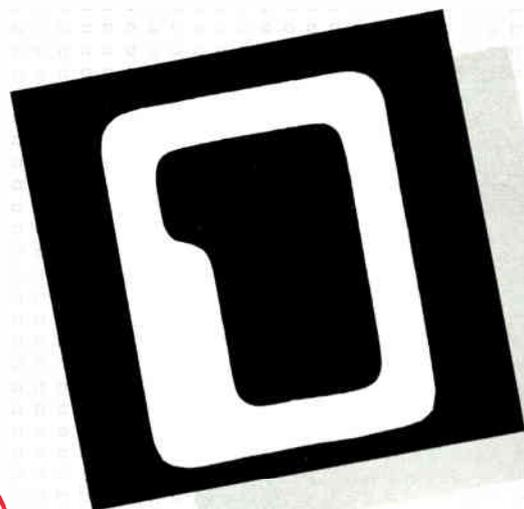
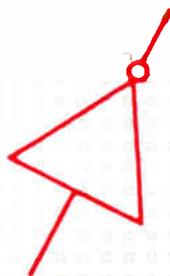
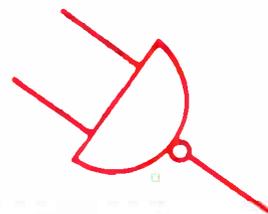
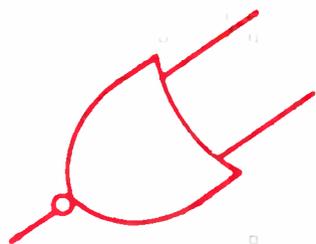


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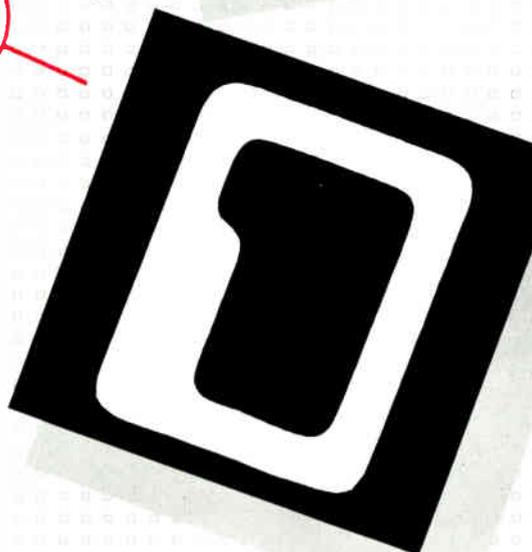
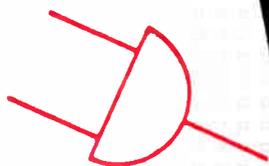
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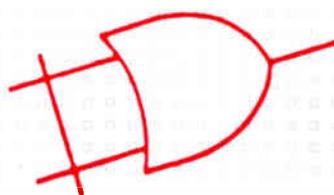
PART THREE FLIP~FLOPS



DIGITAL



DISCUSSIONS



by Ken Pohlmann

H

enry Ford, a gentleman who irrevocably changed the course of history, once advised his biographers that "history is bunk." Eventually, after life, when the universe and everything has been returned to nothingness, he will probably be proved to be correct. But for now, history remains an important consideration. History is especially important to computers because every

computer must contain a set of circuits whose current behavior is dictated by its past history of behavior. In other words, a computer must have a memory.

Last month, I considered combinational circuits – extremely useful kinds of networks, but ones whose current output depends only on their current input. Now let's consider sequential

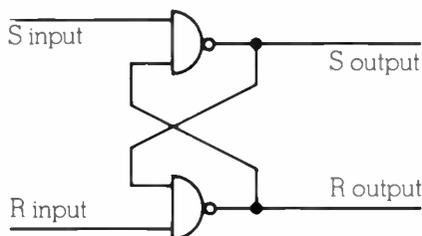
circuits, types of circuits which can store information. Their outputs depend on both present and past inputs, that is, a sequence of inputs, hence the name. There are many ways to store information and the mass storage systems such as disk and tape are quite sophisticated. But a very primitive method is perhaps the most important of them all – it involves the use of combinational circuits

in a special configuration which enables them to store data. These types of circuits are called flip-flops.

As in every other good idea, there's a trick involved in this technique, in fact there are two tricks. The first is the employment of a fact of digital life called propagation delay. Every elemental piece of a digital system is constructed of some hardware, be it diodes, discrete transistors, integrated transistors, or whatever. And every kind of circuit requires an incremental amount of time to perform its function. Even a lowly inverter gate needs time for its output to reflect the inverted condition of its input. With current technology it's not a long wait; ECL propagation delays are on the order of one nanosecond, but the delay is still of great consequence. The second trick involved in flip-flops is that of regenerative feedback. The use of time delay and feedback together is the way a combinational circuit gets historical.

A flip-flop is a bi-stable system. It has two stable and opposite states. It remains in one state until something changes it to the other state. Ideally it cannot possess an intermediate state because regenerative feedback always forces it to seek one of its stable states. Let's initially consider one kind of flip-flop and define the two states as the set state (S, by definition storing a binary 1) and the reset stage (R, by definition storing a binary 0). Simple enough; however, consider that either side of the flip-flop can provide a logic 1 or 0 state. In other words, in the set stable state, the S output is 1 and the reset output is 0. In the reset stable state, the set output is 0, and the reset output is 1. The two outputs are always in mutual negation. They change state only when an input is received on the opposite state input. For a series of set inputs, for example, the flip-flop would only be set once.

Let's consider a practical circuit, a flip-flop constructed of two cross coupled NAND gates. The feedback mechanism should be obvious:



Its operation is deceptively simple. In general, this type of flip-flop changes state by applying a momentary logical 0 to one of its inputs. But let's be more specific. To begin, assume the two inputs are at logical 1, and assume that the S output is at 0, and the R output is at logical 1. If the S input is brought to 0, the S output becomes 1 and the R output becomes 0. The S output will remain at 1, even if the S input

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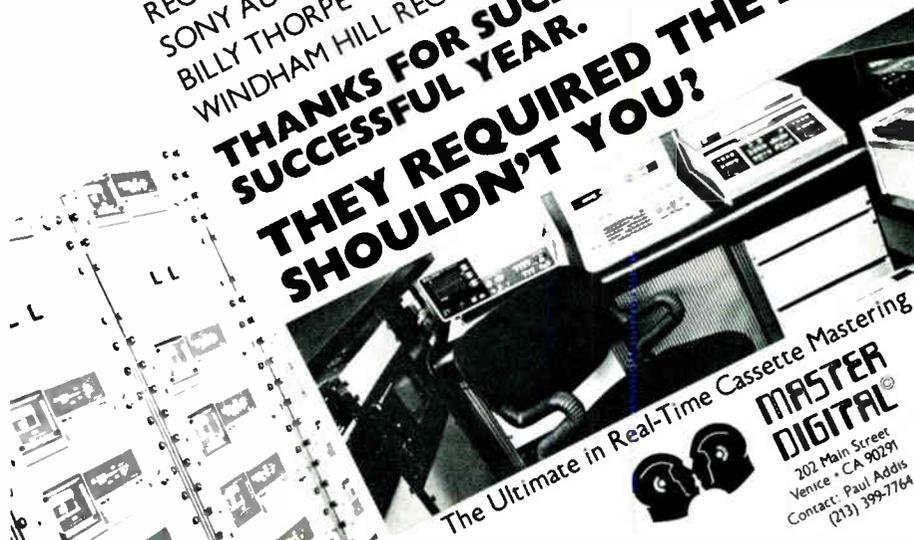
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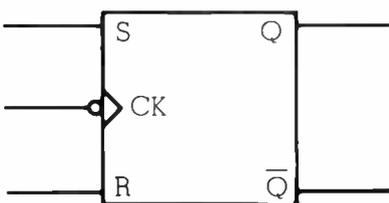
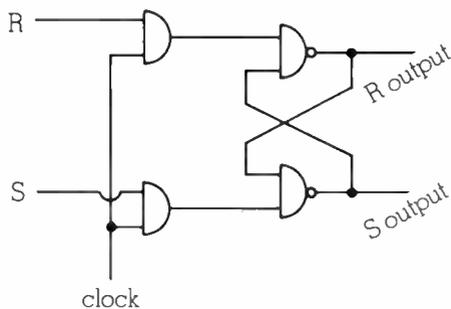


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Circle #038 on Reader Service Card

returns to 1. The flip-flop, now in its set state, could be reset by putting a 0 on the R input. And it would remain in that state until a 0 is applied to the S input. Storage has been accomplished, thanks to our time trick. The set output equals the set input so long as S and R are complemented. But amazingly enough, changing R or S to 0 doesn't affect the outputs; in other words, the data remains stored. That change on the R or S inputs cannot affect its respective NAND gate because the gate's other input stays put, held by the other NAND's output. Thus, the NAND gates hold each other in the present state when either input changes to 0, as long as the other input *remains* at 0. Thus, in spite of the changes at the inputs, the data is safe. It's a clever circuit. The only problem occurs when both S and R inputs are set to 0. This indeterminate state tries to put both outputs to 1, an illegal condition.

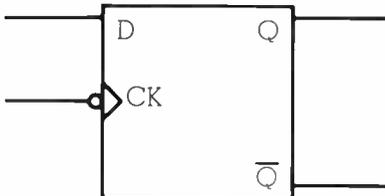
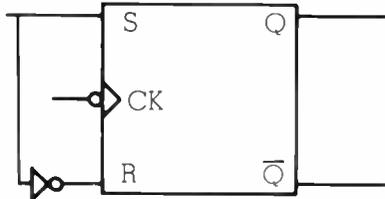
There are several ways to solve that, and other problems inherent in this basic SR flip-flop. A better approach utilizes transition changes rather than level changes at the inputs to control the device. For example, a trailing edge transition, from logic 1 to 0, would be applied to the R or S inputs to reset or set the flip-flop, with the transition itself, not the logic level, doing the triggering. The opposite transition, a leading edge from 0 to 1, would not be recognized. In general, edge triggering is much more commonly used than level triggering, because of reliability of triggering. Also, to guard against erroneous triggering, flip-flop inputs are often gated with an AND circuit. A clock pulse is applied to coincide in time when the flip-flop is ready to assume a new state. The flip-flop cannot be triggered unless the clock pulse permits it. A diagram for an SR clocked flip-flop, a symbolic representation, and a transition table are shown below:



S ₁	R ₁	Q ₂
0	0	Q ₁
0	1	0
1	0	1
1	1	INDETERMINATE

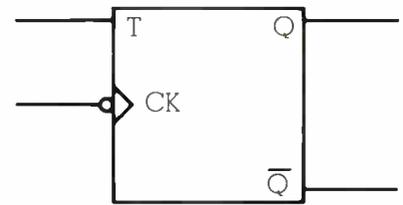
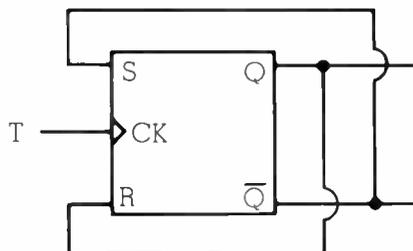
This transition table is a little confusing. Subscript 1 indicates that state before a clock pulse and subscript 2 indicates the state after the pulse. The first line shows that after a clock pulse, as we have seen, the output is unchanged from its previous state.

SR flip-flops are pretty useful, except for that troubling indeterminate problem. There are three other kinds of flip-flops which avoid that pitfall. One technique to avoid indeterminate states is to provide the flip-flop with only one input line. D and T flip-flops illustrate this idea. With a D, or delay, flip-flop, the output is dictated by the input concurrent with a clock pulse. If the D input is 0, the output will be 0 regardless of the output value before the clock pulse. D flip-flops are often used to delay data one clock period. They can be fashioned from an SR flip-flop:



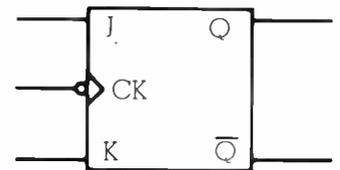
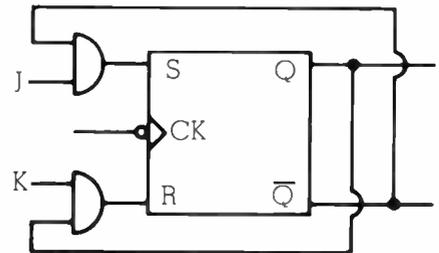
D ₁	Q ₂
0	0
1	1

The T, or toggle, flip-flop produces an opposite output each clock period; it has no need for data inputs. The clock input is its toggle input. They are often used to construct counters. For example, the popular TTL chip, the 7493 ripple counter, uses T flip-flops:



T ₁	T ₂	Q ₂
0	0	Q ₁
0	1	Q ₁
1	0	$\overline{Q_1}$
1	1	Q ₁

The JK flip-flop is an improved SR; it has all the same properties of the SR except in the indeterminate condition of two logical 1 inputs. In this condition, the JK toggles with the clock pulse like a T flip-flop. A JK can be made from an SR by adding an additional feedback path to insure that the inputs to the SR can never both be logical 1:



J ₁	K ₁	Q ₂
0	0	Q ₁
0	1	0
1	0	1
1	1	$\overline{Q_1}$

Flip-flops constitute the most basic kind of computer memory. They appear in large scale memory circuits as static RAMs and are endearing because they can hold a bit for any length of time (as long as power is applied) without further addressing or clocking. There are other dynamic types of memory available which use charge storage, but that's another story. Also, flip-flops are extremely useful as components in other digital building blocks such as latches and counters. Technology families such as TTL rely heavily on the unique advantages of the flip-flop. Next time I will continue with that evolutionary step upward. ■

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Making Music For The Movies

S T U D I O • M

by Nina Stern

The music industry may have experienced more than just the summer doldrums, but Hollywood is enjoying a box office boom which is setting all-time records. Greatly benefiting from the public's renewed love affair with the movies is L.A.'s famed Record Plant, the first independent recording studio to set up a separate film scoring division (March, 1981), whose staff is headed by Dan Wallin, one of film's leading scoring and dubbing engineers.

The pride of Record Plant Scoring, Inc. is Studio M on the Paramount Pictures lot, located in the center of "Old Hollywood," which officially opened its doors on June 28, 1982. Featuring a completely re-equipped and acoustically re-designed main stage and control room, Studio M brings digital age recording technology to the film industry at a time when many on-lot scoring facilities still offer only 3 track capability.

Being on the Paramount lot and having Dan Wallin as chief engineer have given the Record Plant "instant certification from the film business,"

according to Record Plant impresario Chris Stone.

"Dan Wallin led us into this business," he says, "and today we have a great chance at becoming the leading scoring company in L.A. Even though several of our competitors are now getting into film and TV work, we believe our head start and financial investment will allow us to retain the premiere position."

It was the "diversify or die" dictum which triggered Stone's taking a fresh look at the untapped opportunities in motion pictures and television several years back. By the late '70's, record sales had leveled off, offering little incentive for expansion to entrepreneurs like Stone who found themselves with a dwindling list of repeat clients.

Wallin, a longtime acquaintance of Stone, who championed the cause of advanced audio technology in film soundtrack recording, had urged him some years earlier to broaden the Record Plant's business by entering that field. By 1980, Stone was ready to make the jump.

He says what ultimately con-

vinced him was the realization that the Record Plant could offer a degree of technical expertise in sound recording unmatched on any big studio lot.

"Music has always been viewed as an unfortunate necessity by the film industry," says Stone, "and as a result, we're generations ahead of them in our knowledge of recording technology. With the addition of Dan Wallin's professional background and reputation, we can offer the best of both worlds."

Wallin is a nearly forty-year veteran of radio, television and films, whose earliest experience was gained from engineering live radio broadcasts from L.A. clubs such as the Moulin Rouge and the Palladium. Today, his list of film and TV credits reads like an entertainment industry Who's Who.

During the first year of Record Plant Scoring, Inc.'s operation, the bulk of their projects were handled at the Plant's 3rd Street studios' Rooms C and D. A complete projection system, serving both rooms, was installed above D, without disturbing the existing setup below. Generally, scoring dates at 3rd Street are scheduled

during the day, and records at night; the recent installation of total recall on C's main SSL console solves the problem of lockouts. Projects completed since the launch of the scoring division in March, 1981 and prior to the opening of Studio M at Paramount include *Star Trek II*, *Rocky III*, *The Best Little Whorehouse in Texas*, *An Officer and A Gentleman*, *Annie* and *The World According to Garp*.

With the establishment of the scoring division, the need for a much more spacious studio soon became self-evident. Stone recalls that "...most of Dan's clients were too big for C, which holds 50 to 55 persons.

"In my eyes, it was one of the largest rooms I'd ever seen," he says, "but with film scoring, more often than not you're dealing with legitimate, 120-piece orchestras."

To accommodate these full-sized symphonic groups, they began to rent a number of the large stages around town, such as CBS Cinema Sound in the San Fernando Valley and TBS (The Burbank Studios), which Wallin had partly designed for Warner Bros. while he was on their staff. It was during this period that Stone discovered the Glen Glenn Sound facility on the Paramount lot which was to become the Plant's Studio M.

Leased from Paramount by Glen Glenn, the legendary, multi-award winning film sound company, "Stage M," as it was called, had fallen into disuse, since in recent years Glen Glenn's efforts were largely in post-production. In fact, the basic Stage M installation had not been improved since 1969, and was rejected by Stone and Wallin for any of their then on-going projects.

But viewed as a diamond in the rough, they saw it could offer infinite potential from the standpoints of size and location. Capable of seating orchestras of up to 120 members, Stage M also could provide the immediate access to the film community which Stone regarded as a key to sealing the Plant's success in the scoring business.

After months of negotiations, an agreement was reached in April 1982 between Stone, Glen Glenn Sound's Joe Kelly, and the executives of Paramount Pictures, stipulating, in part, that the Plant would completely re-equip and acoustically re-design the facility. A further element includes the Record Plant's agreement to engage in on-lot scoring only, while Glen Glenn would offer post-production services. With this arrangement, they are able jointly to provide a total production package, from the Plant's remote recording and scoring,

through Glen Glenn's looping and dubbing.

The refurbishment of Stage M was completed in record time from the signing of the agreement in April to the new Studio M's unveiling in June. It became the realization of a career-long dream Dan Wallin had of designing the "perfect" scoring room.

"When we got a hold of Stage M, I told Chris we should tear it out and start from the beginning, and he agreed," says Wallin. "I drew out the basic plans and we contracted with an architectural and construction firm to execute them. The entire area was gutted, and amazingly, the building took only three months, including

installation of the electronics."

The design goal: to achieve the absolute flexibility or "variable acoustics" necessary to record all types of music, from symphonic to driving rock and roll.

"When I worked in live radio many years ago, I found the rooms which worked best were broken up, had natural trappings: curtains, booths and so on. The idea of the wedges and louvres here at Studio M was to simulate all the 'broken up' walls I'd liked in those rooms."

A series of louvres and doors winds around the lower circumference of the main stage in Studio M, behind which is a complete trap system. The

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Dan Wallin at the controls in Studio M

louvres are Helmholtz-slotted and can be adjusted down to the quarter-inch, according to Wallin.

"The low end trapping in here is really efficient; all standing wave or low frequency stuff goes into the lower slots, and all the vertical slots are tunable.

"If you want total damping, you can open those doors and it gets *very* dead—it's the quietest room I've ever been in. If you put a mike in there, you're not really sure it's on if nobody's around."

At the far end of the huge (55' x 85') room is the space assigned to percussion instruments, where the newly-built low false ceiling has been wedged.

"My feeling is, you need to give enough so that the percussionists can hear themselves. I wanted to move the sound horizontally so all the excessive low-end would go into the traps.

"Basically," Wallin continues, "I didn't want to hear that sound off the ceiling again, out of phase, coming at me after I'd picked it up directly. From the edge of the wedges, towards the booth, it's all absorptive."

The control room features an impressive array of state-of-the-art brand name and custom Record Plant equipment. Most unique is the Plant's proprietary eight buss film submix console which relays all the recorded

musical information to a 35 millimeter mag recorder.

Designed by the Plant's technical operations manager, Pen Stevens, this "sidecar" provides eight echo sends, eight monitor sends, and six cue sends, as well as inputs and assigns for dialogue and clicks. It is totally interfaced with the main console, an automated SSL Series 4000E 40-input system that busses out to either 24-track analog or 32 track digital machines, giving the engineers total control of everything in the chain just by hitting four or five buttons.

Additional electronics include a 3M 79 24 track, Ampex ATR 2 track, and Ampex AG 440C 4 track analog machine, and standard outboard stock such as UREI limiters and Eventide digital delay units.

The control room monitor design was conceived by Wallin and carried out by Bruce Maddocks, a Record Plant audio engineer. "I tried to find monitors," Wallin says, "but couldn't find anything I liked except the ones I'd used at TBS, which were JBL 4320 boxes and components."

What they've installed at Studio M are five two-way systems, each loaded with dual JBL 2235 15-inch low frequency loudspeakers and 2241 compression drivers. Bi-amplified crossover is achieved with White Series 400 1/3 octave equalizers,

powered by BGW 700 amplifiers.

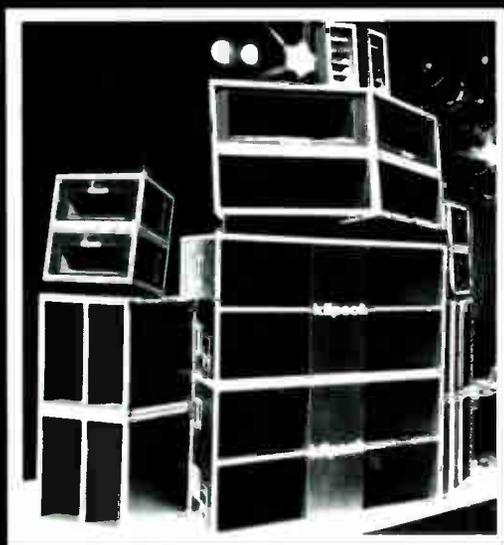
Stone invested \$800,000 in the re-design of Studio M, and his instinct seems to be paying off well. At latest word, the facility is booked solid for three months with feature films. Rooms C and D at the 3rd Street studios continue to be utilized for dates requiring smaller ensembles, i.e. for television scoring, although one of the biggest projects currently booked at Studio M is the soundtrack for *Winds of War*, a costly 10-hour TV mini series scheduled for the '82 - '83 season.

Convinced that the boom in film and TV production is here to stay, Stone is looking to expand his operation into additional existing facilities around Los Angeles. Negotiations are already underway between the Plant and several major film studios for acquisition and refurbishment of other on-lot properties.

For years, the quality of film sound lagged behind the revolution taking place in recording studios of America, just as theater owners have been hesitant to make the investment in high quality sound systems for their motion picture houses. But as the public's taste for good sound has been refined over the past decade, Hollywood finally appears to have discovered that music can help sell tickets, too. ■

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Tape Tension

DIAGNOSING MECHANICAL PROBLEMS IN AUDIO RECORDERS

by **Wayne B. Graham**

Due to the electronic nature of professional audio recorders, audio engineers are usually most familiar with the electronic specifications of their machines. They know the specifications for signal to noise, frequency response, head room, wow and flutter, and "latch in" or start time. Many engineers don't, however, recognize the correlation between mechanical problems in the tape transport and the subsequent ability to achieve the stated electronic specifications.

The only purpose for the mechanical portion of the tape transport is to move the tape:

(1) at a constant, predetermined speed past the heads,

(2) to provide tape to head contact force,

(3) and to take up or pack the tape to allow more than one use.

Virtually all of the mechanical transport problems and even some of the electronic malfunctions can be diagnosed by measuring dynamic tape tension with an in-line tape tension gage.

There are essentially 4 basic design types for professional audio recorders; however, the numerous older transports will be our main concern in this article. The four types are:

(1) The pinch roller/capstan, constant **torque** holdback and take-up (this is the type we will study in depth here).

(2) The pinch roller/capstan, constant **tension** holdback and either constant torque or tension take-up.

(3) The "pinch rollerless" design, providing the constant tension on both supply and take-up (i.e. Ampex, ATR, 100,200).

(4) The dual-capstan type, controlling tape speed and tension at the heads by two sets of capstans—one set prior to the heads, the second set after the heads.

The constant tension machines are quite easy to diagnose since an in-line tension gage should read "the same" with any amount of tape on the supply reel. This can be checked by placing a full supply reel of tape on the machine and then measuring tension at three critical locations on the transport, with a full, half full, and a nearly empty

supply reel,

(1) at a point just exiting the supply reel,

(2) at a point just entering the take-up reel,

(3) and at a point just ahead of or just past the head area.

Consult the service manual or manufacturer for the magnitude of these readings; however, the magnitude should remain constant for each point selected (constant tension) at the beginning, half way through, and at the end of a supply reel of tape.

Tension oscillations in the head area detect the presence of a malfunction which will most probably be the cause of a wow and flutter problem. The tension gate pointer should look like it is "stuck" when placed either immediately before or immediately after the head area. The frequency of oscillation will often give a strong indication of where in the transport the "problem" is being created.

Fig. 1 shows the elements in the more common, older professional audio recorders. We have selected this type for several reasons:

(1) it represents the majority of machines still in the field,

(2) typically these are older machines and therefore may need immediate help,

(3) they have numerous potential problem areas that, once understood,

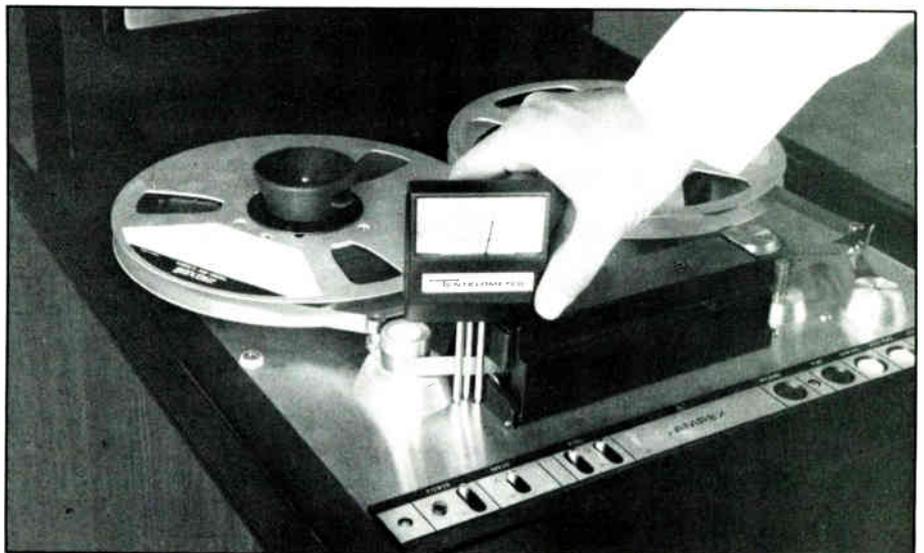
allow us to more easily understand the newer, more sophisticated transport designs.

- (1) Supply reel
- (2) Flywheel idler
- (3) Head area
- (4) Pinch roller
- (5) Capstan
- (6) End of tape sensor
- (7) Take-up reel

(SEE FIG. 1)

Head to tape contact is provided by holdback force applied by the supply reel. This holdback force can be passive, comprised of a felt or cork clutch providing a certain drag; or active, consisting of an electrical motor "trying" to rotate in a direction opposite to the tape direction. To determine whether you have an active or passive holdback system, simply move the "end of tape sensor" to its normal running position while pushing "Play." If the supply reel starts to rotate, it's a sure indication your machine has an active holdback system; holdback tension is determined by the voltage applied to the motor. Holdback tension in a passive system is determined by how tight the friction clutch is engaged. Whether of the active or passive type holdback system, let us proceed. Place a full reel of tape on the supply hub and thread tape properly through the machine on-

Measuring tape tension with a Tentelometer



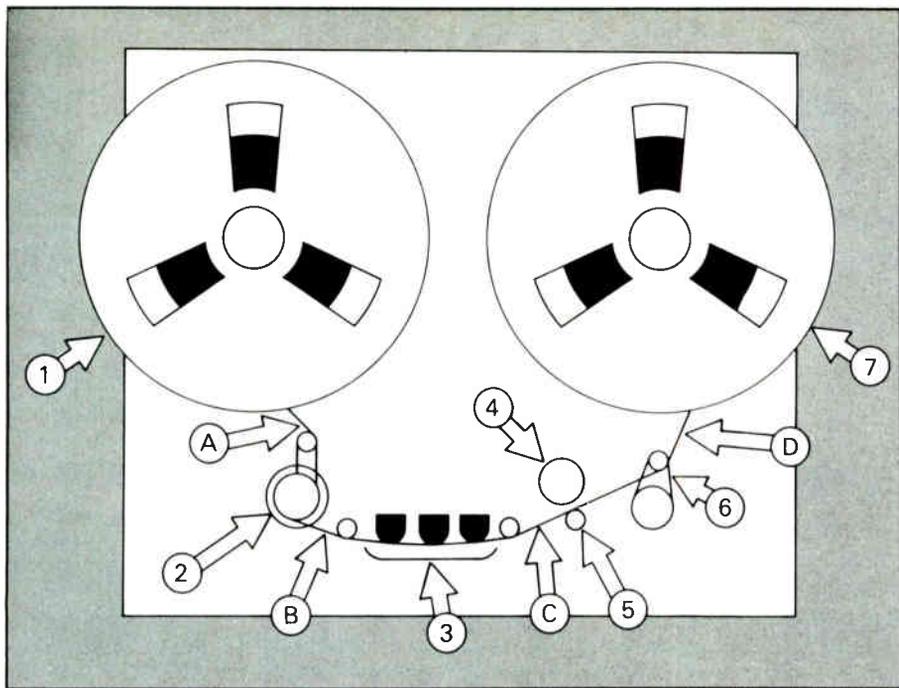


Fig. 1

to the take-up reel. Place the machine in "Play." Insert an in-line tape tension gage onto the type at a point just exiting the supply reel (see point (A) in Fig. 1). Record the reading obtained, in either grams or ounces. (American machines typically use ounces, Japanese and European machines typically use grams.) Note whether the reading is oscillating. A very faint but rapid oscillation may be caused by dirty bearings in an active system, or by dirty bearings or clutch material in a passive system. Record also the diameter of the tape pack (not the reel flange). Decide now whether to use units of inches and ounces or grams and centimeters.

We now have sufficient information for determining holdback torque.

EQUATION 1

$$\text{Torque} = \text{Tension} \times \frac{(\text{Tape pack diameter})}{2}$$

As we will see, torque, not tension, remains constant throughout the entire supply reel.

Now, fast forward the tape to approximately half way through the supply reel, (there should be an equal amount of tape on the take-up reel). Again measure both the tension at point (A) and the pack diameter. Place these numbers in equation 1 to verify that the system is of the constant torque and not the new constant tension design.

The tension can now be determined for any pack diameter simply by dividing the torque value by the tape pack radius. (Remember radius equals diameter divided by two.) Thus, if the instruction or service manual shows a pull tension on a string wrapped around an empty reel, we can check these torques and tensions by dividing

the torque we just calculated by the empty hub radius to see if the measured tension conforms to the factory specification.

Now insert the in-line tension gage (at point (B) in Fig. 1) into the tape path just prior to the audio heads. Tension oscillations at this point may indicate dirty or faulty bearings in the flywheel idler. This can be determined by stalling the idler with the finger placed on its top and noting if the oscillation disappears. It is normal for the tension at point (B) to increase compared with the reading at point (A) and to increase still further when stalling the flywheel idler.

The tape is essentially being pulled by the pinch roller/capstan, thus the tension keeps increasing at each tape guide or head on its way to the capstan.

We now insert the tension gage into the tape path just past the head area (point (C) in Fig. 1). This should confirm that the tension continues to increase as a result of tape drag, on its way to the capstan. Noting the difference in tension readings at points (B) and (C) for various brands of tapes will give you a reading of tape "sticktion" or drag for various formulations. Basically the more tape drag, the higher the scrape flutter, at the heads, in the machine.

A stronger oscillation at point (C) than that at point (B) may indicate a flat spot on either the capstan or the pinch roller. Again the frequency of oscillation is a good indication of the source of the problem.

To test the pinch roller to capstan pressure, merely insert the tension gage at point (C) and note the indicator reading while assisting, or tapping the take-

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up reel. If changes are detected on the tension meter, it is a good indication of insufficient pinch roller to capstan pressure and subsequent slippage of tape past the capstan.

It is interesting to note the dynamic start-up tension at the heads. Turn the machine to "Stop," making sure all components in the tape path have come to a complete rest, including the flywheel idler. Insert the tension gage again at point (C), press "Play" and observe the tension as the machine comes up to speed. The better machines bring the tension up to speed quickly and smoothly, without the pointer "banging" the high end of the scale. Typically it takes several seconds to accelerate the flywheel idler to running speed, thus you can "see" the introduction of "wow and flutter" as this idler is reaching speed. This is a graphic demonstration of why you would want the transport up to speed before recording commences and also points out a possible problem during editing.

Finally we are ready to measure our take-up tension, and compute take-up torque. Insert the tension gage over the tape just prior to the take-up reel (point (D) in Fig. 1). The torque can again be determined by use of equation 1. Knowing the torque allows us to compare with the factory specifications.

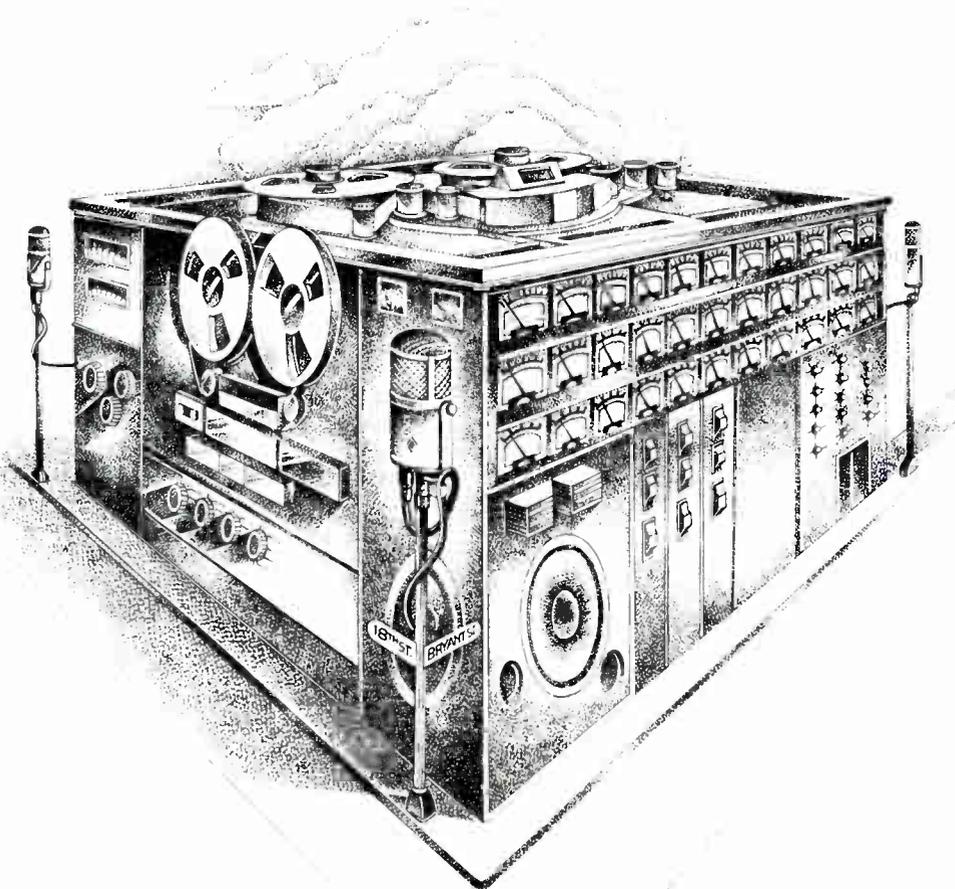
Constant torque machines require that compromises be made in setting up "proper" tensions. Since the tension increases in proportion to the decrease of the radius, this may cause the tension to change by a factor of 2 or 3 from one end of the reel to the other. If we set up the "optimum" head-to-tape contact with a full supply reel (minimum tension condition), by the end of the supply reel the tension, and thus head-to-tape forces, are 2 to 3 times that required for proper signal output. If tensions are set optimally at mid reel, there is insufficient head-to-tape contact with a full reel, with subsequent loss of high frequencies, and higher than required head-to-tape forces with a nearly empty reel.

This concludes the check-out of the mechanical tape handling portion of the transport. Final analysis should still be made with a wow and flutter meter, using a standard reference tape.

The service manual for your particular machine should provide the method for correcting machines to proper specifications. When in doubt, you may want to refer the machine, complete with your diagnosis, to a competent repair facility. You will now know how to check to make sure that repairs were made properly. Good recording! ■

Wayne B. Graham is General Manager/Sales for the Tentel Corporation of Campbell, California.

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NEW PRODUCTS 1982

INVOICE

QUANTITY	DESCRIPTION	AMOUNT
	<i>Amplifiers</i>	



MODEL 800 STEREO POWER AMPLIFIER
Amplified Music Products

AMPLIFIED MUSIC PRODUCTS CORP
8440 Paso Robles Ave., Northridge, CA 91325
(213) 701-0249

Product Name: AMP MODEL 800 STEREO POWER AMPLIFIER

Contact: Victor F. Smith, VP

Date Product Introduced: 1982

Product Description & Applications: The AMP Model 8000 at 200 watts per channel into 8 ohms, uses a fully discrete circuitry you need. Huge heat sink on both sides and rear allow high power operation without noisy fans (good for studio use). Each channel has a gain control, a 15 dB boost, a 60 dB clipping indicator. The 5 1/4" rack mount unit weighs only 31 lbs. The 8000 offers rugged construction, clean design, and high reliability at an attractive price.

Basic Specifications & Suggested List Price: Power output is 200 watts into 8 ohms, 350 watts into 4 ohms. Minimum power is 440 watts per channel into 4 ohms. THD is 1% from 50 milliwatts to rated power. Hum and noise are 104 dB below rated output. Frequency response is 10 Hz to 100 kHz. \$750 retail.

ASHLY AUDIO
100 Fernwood Ave., Rochester, NY 14621
(716) 544-5191

Product Name: FET-200 MOS-FET POWER AMPLIFIER

Contact: Gregory A. Green, National Sales Manager

Date Product Introduced: 1982

Product Description & Applications: Takes up only 5 1/4" of rack space and providing 100 watts per channel at 8 ohms, 175 watts per channel into 4 ohms and 350 watts into 2 ohms required more. The FET-200 is a fully complementary, push-pull amplifier with totally discrete high voltage wide bandwidth electronics. Inputs are bridged, a true balanced (balanced) symmetrical output with both 1/4" jacks and XLR type connectors of both sexes to facilitate linking several amplifiers together. Stereo mono and bridged modes are user selectable by means of rear panel switches. Two 10 segment, 27 dB range LED meter displays provide an easily viewed indication of power levels.

AUDIENCE, INC.
P.O. Box 345384, Dallas, TX 75234
(817) 497-2017

Product Name: HMX-260B

Contact: Gail Hawkes

Date Product Introduced: 1982

Product Description & Applications: A small monitor or head phone amplifier capable of delivering 60 watts/8 ohms per channel stereo or 200 watts mono (bridge) 1/4" rack mount 4 bays. Performance includes S/N over 100 dB, THD less than 0.7%, typically 0.4% input impedance of 10k ohms nominal (with heavy duty power supply in 4 1/2" rack).

Basic Specifications & Suggested List Price: 5,315 Available from dealers coast to coast.

BGW SYSTEMS, INC.
13130 S. Yukon St., Hawthorne, CA 90250
(213) 973-8090

Product Name: BGW6000 PROLINE POWER AMP

Contact: Irwin L. Key, Exec. Dir.

Date Product Introduced: 4/82

Product Description & Applications: Proline 6000 is a low profile, 1/2" rack mount package. Uses ultra low noise discrete circuitry. Transient free turn on and turn off. Built using a welded steel chassis, uses 4 channel output devices for reliability and optimum gain, interlocks for convenience. Very cost effective amp for recording studios and broadcasting stations.

Basic Specifications & Suggested List Price: 100 watt minimum into 8 ohms from 20 Hz to 20 kHz with 0.10% THD. 150 watts minimum into 4 ohms, intermodulation dist. less than 0.02%. Input sensitivity: 2 mv. Dimensions: 19" by 12" by 2 1/2". Weight: 25 lbs. \$575.

BIAMP SYSTEMS, INC.
P.O. Box 728, Beaverton, OR 97075
(503) 641-6767

Product Name: 1200

Contact: Gail Martin, Marketing Director

Date Product Introduced: 9/82

Product Description & Applications: The 1200 features high speed complementary design with symmetrical positive and negative slow rates for reduced D/D and TIM distortion. BIAMP Systems' auto limit/complementary soft clipping limiter which virtually eliminates distortion in the amplifier clipping will deliver full power at 4 ohms into a purely reactive load assuring complete stability when driving complex speaker loads. Additional features include independent channel D/D, speaker protection, balanced stacking inputs, XLR connections and stereo or mono operation.

Basic Specifications & Suggested List Price: Power output: 1200 w/8 ohms, 1900 w/4 ohms, 2200 w/2 ohms. Power output: bridge mode 560w/4 ohms. Frequency response to 1dB: 10 Hz to 40 kHz. Slow rate 4 usec. THD for 8 ohm load is less than 0.05% 20 Hz to 20 kHz. IM distortion: SMPTE method less than 0.05%. S/N ratio better than 100 dB. \$650.

BIAMP SYSTEMS, INC.
P.O. Box 728, Beaverton, OR 97075
(503) 641-6767

Product Name: 2400

Contact: Gail Martin, Marketing Director

Date Product Introduced: 9/82

Product Description & Applications: The 2400 features high speed complementary design with symmetrical positive and negative slow rates for reduced D/D and TIM distortion. BIAMP Systems' auto limit/complementary soft clipping limiter which virtually eliminates distortion in the amplifier clipping will deliver full power at 4 ohms into a purely reactive load assuring complete stability when driving complex speaker loads. Additional features include independent channel D/D, speaker protection, balanced stacking inputs, XLR connections and stereo or mono operation.

Basic Specifications & Suggested List Price: Power output: 2400 w/8 ohms, 3200 w/4 ohms, 4000 w/2 ohms. Power output: bridge mode 1,200 w/4 ohms. Frequency response to 1dB: 10 Hz to 40 kHz. Slow rate 50 usec. THD for 8 ohm load is less than 0.05% (20 Hz to 20 kHz). IM distortion: SMPTE method less than 0.05%. S/N ratio better than 115 dB. \$950.

BOGEN DIVISION/LEAR SIEGLER, INC.
Box 500, Paramus, NJ 07652
(201) 343-5700

Product Name: C100B/60B 35B

Contact: Bob Schindhelm, Nat'l Sales Mgr., Dist. Products

Date Product Introduced: 4/82

Product Description & Applications: Solid state public address amplifiers rated at 35w/60w and 100w. Capability for both high and low impedance microphone. Mic/phone pre-processor. Switchable mic/aux input allows choice of two microphones and an auxiliary or one microphone and two auxiliary inputs. A true mixer. Invariant bass and treble controls. Independent volume controls for each input. RF microphone filters. Output for standard speaker impedances and 25v center tap and 70v non-star voltage systems and for WMT transformer to match output to 600 ohm tel. line. Auxiliary power receptacle on rear chassis.

Basic Specifications & Suggested List Price: Frequency

response: C15B and C60B: 100 to 20,000 Hz \pm 2dB. C100B: 50 to 10,000 Hz \pm 2dB. Hum and noise: Mic: \pm 0dB below rated output, Aux: 70dB below rated output. Sensitivity: Mic hi Z input: 100 mv/67 ohm; Aux input: 150mv. Tone control: input impedance: 10 kHz \pm 1dB. Bass at 100 kHz \pm dB. All silicon semiconductor. Suggested list prices: C15B: \$405, C60B: \$472, C100B: \$440.

FOSTEX ELECTRO ACOUSTIC SYSTEMS
620 King Edward St., Winnipeg, Manitoba, Canada R3H 0P2
(204) 775-8513

Product Name: FX300 AND FX600 POWER AMPLIFIERS
Contact: Interlase Audio Inc., Anthony F. (Toby) Sal, U.S. Sales Manager

Date Product Introduced: 8/82

Product Description & Applications: Fostex FX 300 and FX600 Power Amplifiers are designed to produce the sonic accuracy demanded in critical studio applications while providing the durability and reliability associated with only the finest road amplifiers. Both amplifiers feature center beam construction, massive toroidal power transformers, large heat sinks, stepped input attenuators, 40dB low power display and peak overload indicator. The FX 300 and FX600 are fully protected against shorts, overloads and overheating. The amplifiers can be bridged by a rear panel switch and feature dual XLR and phone input connectors.

Basic Specifications & Suggested List Price: FX 300 specifications: power output 8 ohms 100w, 4 ohms 150w, 2.5 ohms 200w. Bridged 8 ohms 300w. Total harmonic distortion 0.05% intermodulation distortion 0.05%, S/N ratio 97dB, transient response 1.5 usec. fall time, damping factor 150 min. weight 27.5 lbs. FX600 specifications: power output 8 ohms 200w, 4 ohms 300w, 2.5 ohms 450w, bridged 8 ohms 600w, total harmonic distortion 0.05%, intermodulation distortion 0.05%, S/N ratio 95dB, transient response 1.5 usec. fall time, damping factor 150 min. weight 36 lbs. Suggested list price FX300: \$600. Suggested list price FX600: \$690.



ROSS SYSTEMS POWER AMP
International Music Corp.

INTERNATIONAL MUSIC CORPORATION
1316 East Lancaster, Fort Worth, TX 76102
(817) 336-5114

Product Name: ROSS SYSTEMS

Contact: Pete Wood, General Manager

Date Product Introduced: 6/82

Product Description & Applications: Power amplifiers, stereo with bridge mono switching, total modular construction, positive pressure cooling via front loaded fan. 70 volt line capability for use on stage in studio or with sound distribution systems to power either main or monitor systems. Operable into 2, 4 or 8 ohms. Available in 200 or 500 watt versions (rated at 4 ohms).

Basic Specifications & Suggested List Price: THD less than 0.2% IMD less than 0.48% Freq. resp. \pm 2dB 2 Hz to 20 kHz. Slow rate greater than 40 volts per micro second. Balanced and unbalanced inputs. Outputs, 5 way binding posts and 1/4" phone jacks. Input impedance: balanced and unbalanced 10k ohms. \$569.50 (SPA 200) \$849.50 (SPA 500).

MESA/BOOGIE, LTD.
1317 Ross St., Petaluma, CA 94952
(707) 778-6565

Product Name: MESA/BOOGIE M-180

Contact: Frank Goodman, Sales
Date Product Introduced: 8/82

Product Description & Applications: The MESA Boogie M-180 is an all tube rack mount power amplifier intended for musical instruments and sound reinforcement applications. Six MESA STR415 output tubes plus a proprietary driver circuit furnish a dynamic musical performance that appears to go far beyond rated output. By direct comparison the M-180 has a characteristically natural ambience while sounding louder, clearer, warmer and more articulate than transistor amps boasting more than triple the power.

Basic Specifications & Suggested List Price: The MESA Boogie M-180 accepts foreign AC power including Japan. It has 180 watt mid band power capability into 4 or 8 ohms, a 3 speed cooling fan, extremely rugged seven inch rack construction and is hand built in the U.S. It is available direct and is unconditionally guaranteed. \$580.

MESA/BOOGIE, LTD.
1317 Ross St., Petaluma, CA 94952
(707) 778-6565

Product Name: M-190

Contact: Frank Goodman, Sales
Date Product Introduced: 8/82

Product Description & Applications: The MESA Boogie M-190 is an all tube fully featured version of the M-180 and includes balanced low Z input XLR's and switchable attenuator, 22 step precision hi Z input attenuator, LED power status ladder, XLR output connectors, 4 phone jacks and gold binding posts plus a totally separate and regulated high voltage screen supply. Intended for PA, keyboards and studio playback, the M-190 is extremely articulate, well focused and achieves a new standard of sonic performance.

Basic Specifications & Suggested List Price: The MESA Boogie M-190 accepts foreign AC power including Japan and furnishes 190 watts mid band output power with extraordinary dynamic range. Regulated, direct coupled tube driver circuitry has no phase shift between 30 and 10 kHz. Hum and noise are inaudible. Available direct and unconditionally guaranteed. \$750.



PRO700 POWER AMPLIFIER
Phase Linear

PHASE LINEAR
Division of International Jensen Inc.
20121 48th Ave., West, Lynnwood, WA 98036
(206) 774-3571

Product Name: PHASE LINEAR PRO700 POWER AMPLIFIER

Contact: Peter Horsman, Nat'l Sales Mgr., Pro. Div.
Date Product Introduced: 6/82

Product Description & Applications: The PRO700 power amplifier features almost 600 watts per channel at 4 ohms. The 7 rack mount front panel includes stepping input attenuators, individual channel LED level display meters with range select and overload indication. This is a road version of the well known model 700 home entertainment product that established its renown with many of the foremost sound reinforcement companies. The "living room" designed cocoon and aluminum chassis have been replaced by dual high volume fans and steel chassis.

Basic Specifications & Suggested List Price: Power ratings: 360 watts 8 ohms, 550 watts 4 ohms. Frequency response: 13 Hz to 40 kHz +0/-1dB. Noise: 100dB. Sensitivity: 1.5v for full power. Slow rate: 20v/us and phase shift 0° at 20 Hz, 18° at 20 kHz. Retail \$1,395.

QSC AUDIO PRODUCTS
1926 Placentia Ave., Costa Mesa, CA 92627
(714) 645-2540
Product Name: SERIES THREE MODEL 3500

Amplifiers



SERIES THREE MODEL 3500
QSC Audio Products

Contact: Barry Andrews, President

Date Product Introduced: 6/82

Product Description & Applications: The 3500 is the highest power version of a new series of power amplifiers designed for studio reference and high quality sound reinforcement. The amplifier delivers 285 watts per channel at 8 ohms and 425 per channel at 4 ohms. The low profile rack size occupies only 2 rack spaces (3U). The 3500 is built in the true dual mono fashion meaning there are two mono amplifiers sharing a common class and AC cord. Other features include front removable channels, recessed controls, and provision for active and passive input modules.

Basic Specifications & Suggested List Price: Power at 8 ohms: 285 watts continuous. Power at 4 ohms: 425 watts continuous. Power at 2 ohms: 625 watts at 1 kHz. Dynamic headroom: 4dB IMD less than 0.02%. Frequency response: 10 Hz to 20 kHz ±1dB. 8-400 kHz +1/-3dB. Noise: 100dB. Delayed gain controls. LED power protect, 40dB/6dB, clip and thermal warning indicators. All electronics on channel modules. Warranty: 3 years. \$1,298.

R.T.S. SYSTEMS INC.
1100 W. Chestnut St., Burbank, CA 91506
(213) 843-7022

Product Name: SYSTEM 2500

Contact: Douglas Leubien, President

Date Product Introduced: 4/82

Product Description & Applications: System 2500 is a card cage amplifier system designed to house up to ten circuit cards across a standard 19" rack mount frame requiring only 5 1/2" rack height. This system is completely self-contained and comes standard with dual power supply and automatic change over. Initially available is the model 2510 1 x 6 Audio Distribution Amplifier circuit card with electronically balanced input and six transformer balanced outputs.

Basic Specifications & Suggested List Price: Frequency response: (3dB ref. +4dBm) 5 Hz to 150 kHz. Max. output (uniform +32dB): Max. output (form. 1600 ohms all outputs) +27dBm. Total harmonic dist. (20 Hz, 20 kHz at +4dBm) 60dB 0.1% Gain adj. range: 3dB. Comp. gain range: 40dB to +24dB. Signal to noise ratio: max. gain 70dB, min. gain 80dB ref. 0dB. 20 kHz bw. Output impedance: 80 or 4 ohms (20 Hz to 20 kHz).

STUDIOMASTER INC.
1365-C Dynamics St. No., Anaheim, CA 92806
(714) 528-4930

Product Name: MOS-FET 250 POWER AMP

Contact: Vince Basse, Product Director

Date Product Introduced: scheduled for 1/83

Product Description & Applications: The MOS-FET 250 is a 19" rack mount power amp using MOS-FET output devices for clean high frequency response and cool operating temperatures. MOS-FET technology reduces crossover distortion with an increase in slew rate, and a lowering of I.M. & T.I.M. distortion.

Basic Specifications & Suggested List Price: Frequency: +0/-3dB 10 Hz to 70 kHz. Hum & noise: 105dB power output 80 watts ch. at 8 ohm, 125 watts ch. at 4 ohm. THD less than 0.02% at any frequency and at any level below clipping. Suggested retail price: To be announced.

STUDIOMASTER INC.
1365-C Dynamics St. No., Anaheim, CA 92806
(714) 528-4930

Product Name: MOS-FET 800 POWER AMP

Contact: Vince Basse, Product Director

Date Product Introduced: scheduled for 1/83

Product Description & Applications: The Studiomaster MOS-FET 800 combines MOS-FET technology and stability in a 19" rack mount package with 800 watts RMS of power. MOS-FET devices provide greater slew rate, lower I.M. & T.I.M. distortion and cooler operating temperatures.

Basic Specifications & Suggested List Price: Power ratings: 240 watts/channel at 8 ohms, 400 watts/channel at 4 ohms, 600 watts/channel at 2 ohm, stable into all loads. Protection: IXC (crow bar) open & short circuit, thermal and surge protected. Price: To be announced.

THRESHOLD CORPORATION
1832 Tribute Rd., Suite E, Sacramento, CA 95815
(916) 927-5061

Product Name: S-900 Amplifier

Contact: Michael Adambeck, Director of Marketing

Date Product Introduced: 1/82

Product Description & Applications: Non-inverting audio power amplifier employing patented STASIS circuitry to create a tandem output stage consisting of a linear state system dominating performance accuracy and connected directly to the load, operating in conjunction with a powerful current mirror bootstrap that sources the working power and is also connected directly to the load. No overall corrective feedback is employed around the amplifier system. The STASIS amplifiers have been found in professional applications such as the JVC audio center, where they are used to drive the cutting heads, and in monitoring applications in recording studios.

Basic Specifications & Suggested List Price: Dual channel non-inverting power amplifier. The power output stages consist of 22 single diffused transistors rated at 250 watts each per channel. Less than 1% THD or IM distortion with a 4dB power bandwidth from 1 Hz to over 100 kHz. Maximum current dissipation is 22 amperes per channel. Power is sourced through a one kilowatt toroidal transformer and 12,000 microfarads capacitor. Slow mode is 80 volts/microsecond. No output motor. Manufactured in U.S. \$2,995.

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NEW PRODUCTS 1982

INDEX

QUANTITY	DESCRIPTION	AMOUNT
	<i>Microphones</i>	



C-460B
AKG Acoustics

AKG ACOUSTICS
77 Selleck St., Stamford, CT 06902
(203) 348-2121

Product Name: C-460B
Contact: Peter Welikoff, National Sales Manager
Date Product Introduced: 6/82
Product Description & Applications: The C-460B system advances the famous AKG C-450 modular condenser microphone system into the digital age, featuring extended dynamic range, improved low self-noise, universal phantom power (9 to 52V) with minimum current consumption and a unique built-in switching for bass roll-off and attenuation. The C-460B is compatible with almost every existing C-450 system capsules and accessories including the new CK hypercardioid capsule. The C-460B has been designed for tomorrow's requirements and is at the leading edge of microphone technology.
Basic Specifications & Suggested List Price: The C-460B pre-amplifier has a frequency range of 5 to 30,000 Hz, a dynamic range of 125dB, a sound pressure level of 150dB, a signal-to-noise ratio of 15dB (with CK 1 capsule), power requirements of 9 to 52 volts, current consumption of less than 1mA, a recommended load impedance of 500 ohms, weighing 4 lb, measuring 0.8 x 5.9 inches, with bass roll-off of 12dB at 50, 70, and 150 Hz with up to 20dB attenuation at each setting. \$325

AUDIO-TECHNICA U.S., INC.
1221 Commerce Drive, Stow, OH 44313
(216) 686-2600
Product Name: AT838G DYNAMIC UNIDIRECTIONAL GOOSENECK MICROPHONE

Contact: Bob Herrold, Product Manager
Date Product Introduced: 6/82
Product Description & Applications: The Audio Technica AT838G gooseneck microphone is specifically designed as a talk back microphone for mixing consoles, and therefore features a 3 pin audio connector that mates with the appropriate 3 pin panel jack connector. Sound reproduction of the AT838G in its intended uses is excellent.

Basic Specifications & Suggested List Price: Freq. response 100-10,000 Hz, polar pattern cardioid, sensitivity 63dBm, impedance 600 ohms, length 19", overall \$143

BEYER DYNAMIC, INC.
5-05 Burns Ave., Hicksville, NY 11801
(516) 935-8000
Product Name: BEYER DYNAMIC M300

Contact: Paul Murphy, General Manager
Date Product Introduced: 7/82
Product Description & Applications: M 300 Unidirectional Dynamic Microphone. Designed specifically for the rugged demands of musicians, singers and entertainers, with a contoured frequency designed for these vocal applications. \$ 185 US. Handheld wireless microphone. Designed for use by discriminat-

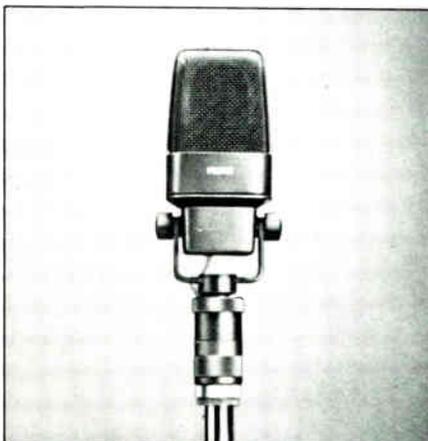
ing professional performers or anyone who must have superior sound quality without a mic cable.

Basic Specifications & Suggested List Price: M 300 - Cardioid pickup pattern, moving coil design. Pressure gradient operating principle. Frequency response 50-15 kHz. Directivity at 180°: 1 kHz 20 dB. Output level at 1 kHz: 1.2 mV/PA. Sugg. retail \$124.95/\$185 US. Two adapters and three mic heads available. Built-in limiter. Up to three frequencies. Usable 74dB and 140dB SPL. No suggested retail available at press time.

CROWN INTERNATIONAL, INC.
1718 W. Mishawaka Rd., Elkhart, IN 46517
(219) 294-5571
Product Name: PH-4, 48 VOLT PHANTOM POWER SUPPLY

Contact: Clay Barclay, Product Manager
Date Product Introduced: 10/82
Product Description & Applications: The Crown PH 4 supplies 48 volts of DC phantom power for all types of microphones. The PH-4 system consists of a master unit (PH-4) with connections for up to four microphones plus slave units (PH-4S), each of which adds capability for another four microphones. The slaves areaisy chained with cables supplied by Crown. A master PH 4 unit will supply up to 100 milliamperes of current, enough to power up to about twelve condenser microphones, or up to about twenty Crown PZM® models. The PH-4 system improves microphone performance in many set ups, since a full 48 volts is available to provide the power needed for optimum dynamic range with all kinds of microphones.

Basic Specifications & Suggested List Price: Both master and slave units contained in rugged aluminum chassis 12" wide, 7", deep (with connectors) and only 1 1/4" high to conserve valuable rack space. Optional "ears" are available for EIA 19" rack mounting. All connections (in and out for four microphones per unit) are three pin XLR. Suggested list price for the PH 4 is \$179, for the PH-4S \$129.



M11RP PRINTED RIBBON MICROPHONE
Fostex Electro Acoustic Systems

FOSTEX ELECTRO ACOUSTIC SYSTEMS
620 King Edward Street, Winnipeg, Manitoba,
Canada R3H 0P2
(204) 775-8513

Product Name: M11RP PRINTED RIBBON MICROPHONE
Contact: Interlake Audio Inc., Anthony F. (Toby) Sali, U.S. Sales Manager
Date Product Introduced: 8/82

Product Description & Applications: The Fostex M11RP is a high quality broadcast, recording microphone with a cardioid pattern and features the Printed Ribbon RP system, a system which produces the sonic delicacy of a high quality condenser with the warmth of a ribbon microphone. The RP system removes the requirement for phantom power and reduces distortion to vanishing levels by using a unique bidirectional capsule to the M11RP. The rear pickup pattern is very smooth and linear, allow-

ing near perfect cardioid performance.

Basic Specifications & Suggested List Price: The M11RP comes complete with isomount holder. The M11RP is a new addition to the present Fostex Printed Ribbon Microphone line of six other broadcast, recording, and stage microphones. The frequency response of the M11RP is 40 Hz to 18 kHz, sensitivity 51dB, distortion less than 0.1% 3rd harmonic distortion at 130dB SPL. \$599

PEARL INTERNATIONAL, INC.
408 Harding Industrial Dr., Nashville, TN 37211
(615) 833-4477
Product Name: PHANTOM POWERED CONDENSER MICROPHONE, CR-57
Contact: Todd S. Mauer, Marketing Manager/Electronics Division

Date Product Introduced: 4/82
Product Description & Applications: A superb, professional, studio quality phantom powered electret condenser microphone. The performance characteristics make it most useful for recording broadcast and stage applications.

Basic Specifications & Suggested List Price: Pearl exclusive condenser element isolation system minimizes stand borne mechanical noises. IC and silicon transistor amplifier. No output transformer for significantly low distortion characteristics. Freq. resp. 15-22,000 Hz. Pearl exclusive gold plated special synthetic material diaphragm for extremely wideband flat response. Unusual wide dynamic range 118dB. Lowest equivalent noise level 24dB SPL and highest output clipping level. High sensitivity 62dB ±2dB at 1 micobar, 1000 Hz. \$216

PEARL INTERNATIONAL, INC.
408 Harding Industrial Dr., Nashville, TN 37211
(615) 833-4477

Product Name: DYNAMIC MICROPHONE, DX-98
Contact: Todd S. Mauer, Marketing Manager/Electronics Div
Date Product Introduced: 6/82

Product Description & Applications: This is a Super Pro microphone because of its sturdy construction. The performance characteristics make it most useful for recording broadcast and stage applications.

Basic Specifications & Suggested List Price: Built-in super effective filter suppresses wind, pop and breath noises. Low frequency is rolled off to insure flat and precise reproduction of close up music and vocals. "Presence Boost" for crispness, required for critical announcing, narration, vocal music and rhythm pickups. Pearl cartridge isolation system minimizes stand borne mechanical noise. Polar pattern-cardioid, rotationally symmetrical about microphone axis, uniform with frequency. Freq. resp. 50-18,000 Hz. Sensitivity 76dB at 1000 Hz. 1 micobar open circuit. Maximum sound pressure level 140dB SPL. \$157

TELEX COMMUNICATIONS, INC.
9600 Aldrich Ave. S., Minneapolis, MN 55420
Product Name: TELEX WIRELESS MICROPHONE SYSTEMS WHM-300, WHM-400, WLM-100, FMR-1
Date Product Introduced: 1982

Product Description & Applications: WHM 300 Electret Hand Mic/Transmitter. Handheld wireless microphone with flat response electret cardioid microphone element. Crystal controlled, 1,000 feet line-of-sight range. WHM 400 Dynamic Hand Mic/Transmitter. Handheld wireless microphone with tailored response dynamic cardioid microphone element. Crystal controlled with 1,000 feet line-of-sight range. WLM-100 Belt Pack Transmitter. Belt pack transmitter for use in broadcast, public address or other hand's free wireless communications. Crystal controlled, 1,500 feet line-of-sight range. FMR-1 Diversity Receiver. Receiver for use with any of above transmitters. Built-in diversity reception capability. Front panel VU meter for modulation adjust.

Basic Specifications & Suggested List Price: WHM 300 Mic/Transmitter. Frequency response 50-15,000 Hz. Signal-to-noise 80-90dB. Transmitting frequency 150-176 MHz. WHM 400 Mic/Transmitter. Frequency response 50-15,000 Hz. Signal-to-noise 80-90dB. Transmitting frequency 150-176 MHz. WLM 100 Transmitter. Frequency response 50-15,000 Hz. Signal-to-noise 80-90dB. Transmitting frequency 150-176 MHz. FMR 1 Receiver. Receiver has both 600 ohm line level and mic level audio output. Supplied with 117 Vac power supply and can operate on 12 Vdc.

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Reinforcement
Eng., Sales,
Technical Asst.
Background:
B.A. Broadcast,
Film,
Syn-aud-con
Grad., JBL Cert.
Repair Tech.

DALE MADER
Sound
Reinforcement
Installation,
Custom
Fabrication,
Technical Asst.
Background:
Live Sound &
Rec. Eng.,
Professional
Musician.

WOODY SMITH
V. P.
Rec. & Sound
Reinforcement
Eng., Studio
Design, Service.
Background:
B.S. Elec. Eng.,
Syn-aud-con
Grad., Trained
for service by
Crown, Ampex,
Tascam.

LINDA SMITH
Sales Asst.
Background:
Rec. Eng.,
Concert Sound
Eng.

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IVIE • JBL • KINETEK • LEXICON • MARSHALL • MRL • MICMIX • NEOTEK • OMNICRAFT • ORBAN • QUANTUM • REVOX • ROLAND STUDIO SYSTEMS
SENNHEISER • SHURE • SONY • SOUNDCRAFT • STAR • TANGENT • TASCAM • TEAC • TECHNICS • UREI • WHITE

Circle 1045 on Reader Service Card

NEW PRODUCTS 1982

PRODUCT

QUANTITY	DESCRIPTION	AMOUNT
	<i>Mixing Consoles</i>	

ALLEN AND HEATH BRENNEL USA LTD.
652 Glenbrook Rd., Stamford, CT 06906
(203) 964-1488

Product Name: ALLEN AND HEATH BRENNEL 21 SERIES
Contact: Chuck Augustowski, Sales Manager
Date Product Introduced: 6/82

Product Description & Applications: The Allen and Heath 21 Series is a range of compact portable low cost mixers featuring the essential systems for both small PA mixing and stereo recording. The 21 Series Product Range all feature a dual purpose main output configuration: the stereo output of the mix from the input channels; the mono reduction of the stereo output. Three versions are available featuring 6, 12 and 18 input channels. All are presented as well finished products equally suited to studio or portable use. The power supply is external from the mixer chassis. All are designed and made on the simple front panel construction technique with separate PCB assemblies for each input and output.

Basic Specifications & Suggested List Price: 6/12/18 input channels (pre output pre EQ pre input later) echo output post later, post EQ, stereo monitor output with PFL override, 2 separate echo returns, peak LED overload indicators on each input channel, 2 VU meters, full tie line system for linking boards together, patch points on all input channels. Model 6/21 \$1460 Model 12/21 \$1660 Model 18/21 \$2170

ALLEN AND HEATH BRENNEL USA LTD.
652 Glenbrook Rd., Stamford, CT 06906
(203) 964-1488

Product Name: ALLEN AND HEATH BRENNEL 82 SERIES
Contact: Chuck Augustowski, Sales Manager
Date Product Introduced: 8/82

Product Description & Applications: The Allen and Heath 82 Series is a range of low-cost mixers designed to provide all the essential features necessary for 8 and 16 track recording, theatre sound and mobile sound reinforcement. Three models are available: 12 into 8 into 2 with 8 track monitoring, 16 into 8 into 2 with 8 track monitoring, 16 into 8 into 2 with 16 track monitoring. Also available is an 8 input expander usable with any mixer with access to its mix busses. Advanced low noise circuitry boasts a high slew rate of 1.5 volts per micro second. All models use an external power supply to keep hum to a minimum. Comprehensive monitoring is used throughout.

Basic Specifications and Suggested List Price: 8 buss outputs plus 1 R outputs, 3 aux send circuits with aux 2 switchable prepost later, pre later aux circuits are pre EQ with internal jumper to switch circuit to post EQ. Patch points on all input channels, 8 buss outputs, and main R outputs. LED peak overload indicators on all input channels, full tie line system for linking boards together, 2 fully assignable echo returns, 10 meters on 8 track boards, 18 meters on 16 track boards. Suggested list prices: 12/8/2H \$4450 16/8/2H \$4900, 16/8/2L \$5070, 0, 8 input expander \$1800

AMERIMEX CO., INC.
10700 Katella Ave., Anaheim, CA 92804
(714) 636-6220

Product Name: STUDIOMIXER
Contact: Doug Browne
Date Product Introduced: 9/82

Product Description & Applications: Two new professional mixers are being introduced. Number 1 is a monitor mixing console with 12 separately matrixed busses x 1 master output (for the operator's headphones and side stage monitor). This console is available, through our modular construction from 12x12x1 through 37x12x1 configurations and complements our 8 out monitor console as the perfect big brother. Our concert and recording series mixers are now available with 16 submaster operation giving a 16 track studio the possibility of acquiring a fully matrixed 12 submaster 22 buss recording console at an unbelievable price. For example a 32x15x4x2x2 console is priced below \$10,000.

Basic Specifications & Suggested List Price: Detailed specs are available on request and are acceptable industry standard noise levels. We offer exceptional headroom for concert or recording use. Price examples for Studiomixer II Consoles: Concert Mixers 16x4x4x2 \$4425 16x6x4x2 \$4695 24x6x4x2 \$6425, 32x8x4x2 \$7865 Recording consoles w/ full monitoring 12x8x4x2x2 \$4570 16x6x4x2x2 \$5515 32x16x4x2x2 \$9850 Professional monitor mixers 20x8 \$4900, 20x8x1 \$5100 42x12x1 \$9400

AUDIOARTS ENGINEERING
5 Collins Rd., Bethany, CT 06525
(203) 393-0887

Product Name: MX-8 SERIES MIXING CONSOLE
Contact: Gary Snow
Date Product Introduced: Fall 1982

Product Description & Applications: The MX 8 is an 8 buss reinforcement and theater console of plug-in modular design. Standard features include three band sweepable equalization, high pass filter, phantom power, phase reversal switching, with 6 buss out and stereo main out, four effects monitor sends and eight 11x1 matrix mixing sections. Balanced mic and line inputs are included, along with direct outputs, patch points on all input, group and output modules, and with metering for buss matrix sends and solo sections. Exclusive Audioarts Engineering M104 precision conductive plastic faders are featured. Standard main frames are available for 24, 32 and 40 input configurations.

Basic Specifications & Suggested List Price: Freq resp: 20 Hz to 20 kHz, ± 1 dB THD less than 0.08%, Dynamic range 100dB. Prices range from \$10,000 to \$20,000.

AUDIOARTS ENGINEERING
5 Collins Rd., Bethany, CT 06525
(203) 393-0887

Product Name: 8X SERIES MIXING CONSOLE
Contact: Gary Snow
Date Product Introduced: Fall 1982

Product Description & Applications: The 8X recording console is Audioarts Engineering's latest plug-in modular design, intended for eight track recording. It features three band sweepable equalization, high pass filter, phase reversal switching, phantom power, two effects sends, one cue send, stereo monitor, and has patch points, direct outs, group outs, and buss outs on all input channels. Pre-fader listen, post-fader listen, and tape solo are also standard. Faders are Audioarts Engineering's exclusive M104 precision conductive plastic. All mic, line, buss and send outputs are electronically balanced to assure compatibility with today's high performance multitrack tape recorders.

Basic Specifications & Suggested List Price: Freq resp: 20 Hz to 20 kHz, ± 5 dB THD less than 0.08%, Dynamic range 100dB. Prices range from \$5,000 to \$15,000 in mainframe configurations from 16 to 24 to 42 inputs.

AUDITRONIX INC.
3750 Old Getwell Rd., Memphis, TN 38118
(901) 362-1350

Product Name: 700 SERIES MULTICHANNEL AUDIO MIXING CONSOLE

Contact: Larry Lamoray, Marketing Manager
Date Product Introduced: with new design input modules & output circuitry - 1982

Product Description & Applications: A multichannel console ideally suited for audio for video application. Models are available with up to 36 inputs and 8, 16 or 24 outputs. Standard features include VCA grouping (6 groups standard, up to 9 optionally), 3 band EQ plus HP & LP filters on each input, 2 foldback and 4 effects sends, 4 effects returns, stereo and dual mono mix outputs, complete monitoring and patchbay facilities. Automation, special shallow mainframes for mobile installations and remote patchbay facilities are optionally available.

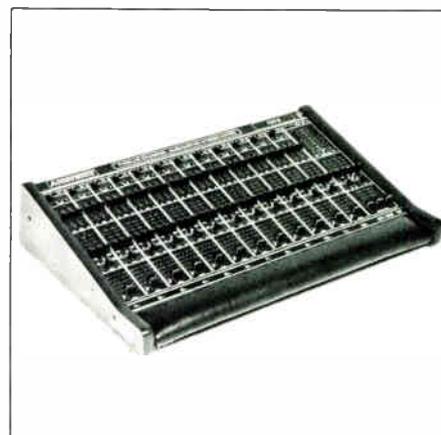
Basic Specifications & Suggested List Price: Active differential inputs, proprietary design output circuitry yielding transformerless specifications while maintaining the isolation benefits of a transformer. Model 740/36 (36 in/24 out) \$69,904 list.

AUDIOTRONIX CORP.
7552-C St. Clair Ave., Mentor, OH 44060
(216) 942-7875

Product Name: AUDIOTRONIX 700 SERIES
Date Product Introduced: 6/82

Product Description & Applications: Introducing from Audiotronix the new 700 Series submaster mixers. Available in 12 and 16 channel, the outstanding features are all high quality dust covered slide pot format for ease of operation and compactness, color coded finger tip knobs, balanced in and out, peak LED indicator, pre and post aux allows dual monitors or dual submasters assignable by pan mixed to main, excellent for sound reinforcement or recording.

Basic Specifications and Suggested List Price: Freq resp:



AUDIOTRONIX 700 SERIES
Audiotronix Corp.

15dB 20 Hz - 20 kHz Distortion less than 1% THD and 1% IMD 30 Hz to 40 kHz Equalization hi band ± 15 dB 8 kHz shelving, mid-band ± 15 dB 2 kHz peak dip, lo band ± 15 dB 150 Hz shelving S/N ratio 70dB 20 20 kHz faders at 10 - 85dB 20-20 kHz faders at 0 - 51 199



MODEL HC40-24 HOUSE CONSOLE
Jim Gamble Assoc.

JIM GAMBLE ASSOCIATES
P.O. Box 7047, Tahoe City, CA 95730
(916) 583-0138
Product Name: MODEL HC40-24 HOUSE CONSOLE, SC32-16 STAGE CONSOLE
Contact: Jim Gamble, Owner

Date Product Introduced: Modified | 82
Product Description & Applications: Custom designed audio mixing consoles for the entertainment industry. From 24 to 56 inputs, 24 buss (16 submasters and 8 effects sends) for the house mix, and 16 outputs for the stage mix. Digital spectrum analyzer and pink noise, programmable mute and selectable solo priority. Full parametric EQ on inputs and outputs. Transformerless.
Basic Specifications & Suggested List Price: Freq resp: 2 Hz to 150 kHz (4dB points) Distortion: 0.06% at 1 kHz typical Phase shift: 5 degrees 10 Hz to 20 kHz Noise: 85dB typical in normal operation 40 input house console \$70,000 32 input stage console \$60,000

Mixing Consoles

HILL AUDIO LTD.

2175 Mallul Dr., Suite 256, Anaheim, CA 92802
(714) 971-3306

Product Name: J SERIES 2 SOUND REINFORCEMENT/STUDIO CONSOLE

Contact: Dave Ash, Operations Manager U.S.
Date Product Introduced: 3/82

Product Description & Applications: Modular aluminum extrusion mainframe 8 band EQ (40, 100, 250, 700, 1.75, 4.75, 7.5 and 15), 6 aux sends, 8 independent line returns with 3 band EQ independent stereo mix on subwoofers direct outs and patch on all channels P/G faders status LEDs on functions switches 12 way LED display throughout, phantom power phase reversal, transformer balanced. Designed for Sound Reinforcement use but suitable for 16 track studios

Basic Specifications & Suggested List Price: Level +24dBm Headroom input 30dB (others) 18dB Gain -30 to +70 overall +80dB Noise 130dB (A) EIN Distortion typically better than 0.004% mid THD 0.01% wideband THD 16 Hz 2.88444, 24 Hz 5.11612, 32 Hz 2.514 480

HILL AUDIO LTD

2175 Mallul Dr. #256, Anaheim, CA 92802
(714) 971-3306

Product Name: K SERIES 2 MULTI-TRACK CONSOLE

Contact: Dave Ash, Operations Manager U.S.
Date Product Introduced: AES show Anaheim 10/82

Product Description & Applications: 6 band EQ sweepable 2 octave HP filter EQ defeat 2 programmable mute systems P/G faders constant voltage pan 24 track routing prepost EQ inserts insert defeats 12-way LED throughout (pre post fade and peak/VU), monitor section with 3 band EQ, feeds to 4 aux busses, P/G faders, group section with stereo monitor P/G faders Patchbay fitted as standard. Designed for 24 track recording but light weight will allow live use

Basic Specifications & Suggested List Price: Headroom (input) 8dB (others) 18dB Gain (input) 30 to +70 (group) 0 to +5 Noise better than 130 (A) EIN channel/group output Distortion THD less than 0.02% wideband (0.01% typ.) 24 16 2 \$17,300 32 24 2 \$26,000 (proposed pricing)

INTERFACE ELECTRONICS

6710 Alder, Houston, TX 77081
(713) 660-0100

Product Name: MODEL 400B 10:4:2 MIXER

Contact: Louis Stevenson, President
Date Product Introduced: 1/82

Product Description & Applications: Model 400B is a compact high performance mixer designed primarily for sound systems making four submixes of the 10 inputs then mixing down to 2 (stereo) outputs in addition making four auxiliary mixes suitable for monitoring on stage. Inputs are fully instrumented for professional use, including phantom power, three equalizers including tuneable mid operators monitor with solo cutoff filters phase reverse, input pads, module on off. Meters and operator's monitor can also observe the auxiliary sends. Inputs are 200 ohm balanced, outputs are 600 ohm unbalanced, transformers optional.

Basic Specifications & Suggested List Price: Response within 1dB 20 to 30,000 Hz, equalizers boost or cut up to 12dB mid tuneable 200 to 20,000 Hz distortion below 1% THD 400 Hz +3 VU normal output (0dBm = 775 V RMS, with 20dB headroom. Price \$5,500 (10 inputs) \$5,400 (16 inputs) or \$7,400 (24 inputs)

INTERNATIONAL MUSIC CORPORATION
1316 East Lancaster, Fort Worth, TX 76102
(817) 336-5114

Product Name: ROSS SYSTEMS

Contact: Pete Wood, General Manager
Date Product Introduced: 6/82

Product Description & Applications: 12 & 16 channel mixing consoles for use on stage or in studio for main and/or monitor mixing. Offered in both 12 & 16 channel versions. All graphic concept with self-cleaning faders featuring input attenuation 3 band EQ mon rev eff and prepost switchable aux send on each channel in addition to sub assign and cue switch. Headphone jack, switchable LED meters 2 subs 1 main eff rev pan balanced in and out

Basic Specifications & Suggested List Price: Freq resp 15dB 20 Hz 20 kHz Distortion less than 1% THD 1% IMD S/N ratio 85dB with all faders at max Crosstalk greater than 55dB (1 kHz) EQ hi \pm 15dB, 8 kHz shelving, mid \pm 15dB 2 kHz peak up, low \pm 15dB 150 Hz shelving

MCI

A Division of the Sony Corporation of America
1400 W. Commercial Blvd., Fort Lauderdale, FL 33309
(305) 491-0825

Product Name: JH-800

Contact: David Moore, Communications Manager
Date Product Introduced: 3/82

Product Description & Applications: General purpose 12 input 121 stereo output portable mixing console. Designed for mobile recording, film teleproduction and broadcast applications the JH 800 features MCI quality in a smaller mixer with 4 VCA subgroups, user programmable mixing and signal routing functions. Each in line design I/O module has a three band equalizer, 4 effects send controls and an individual channel line output. Two stereo limiter compressors are included and VU/PPM metering of mix sends and compression is provided, as well as a built in tone oscillator warble tone noise generator. A complete communications system provides slating (talk to cue foldback) functions as well as selectable communication to any or all of three outputs, and includes a built in microphone.

Basic Specifications & Suggested List Price: Microphone pre-amplifier input impedance per DIN 45410 transformerless, HF rejection greater than 1500 ohms off; at 1 kHz Maximum input level +10dBv ref 775v rms Equivalent input noise 128dBv ref 775v rms Distortion less than 1% IM less than 05% THD Gain 10 to 20 dB in 5 dB steps Line input per DIN 45410 input impedance transformerless HF rejection greater than 7k ohms diff at 1 kHz Maximum input level +28dBv ref 775v rms Equivalent input noise 95 dBv ref 775v rms Line Output Output impedance less than 60 ohms unbalanced at 1 kHz Maximum output level +22dBv ref 775v rms Source selection microphone preamp line input or equalizer output Dimensions height 24.1 cm (9.5") width 58.4 cm (23") depth 61.0 cm (24") List price \$12,000 \$15,000 depending on options

NEI

934 N.E. 25th Ave., Portland, OR 97232
(503) 232-4445; TWX: 364412:INTA

Product Name: MODEL 811P POWERED MIXER

Contact: H.C. (Bud) Garrison, President
Date Product Introduced: 6/82

Product Description & Applications: 8 channel powered mixer with 2-100 WRMS amplifiers bridgeable to 1 200 WRMS amplifier. The 811P is a self-contained mixer amplifier combination that's perfect for schools, churches, clubs and touring musicians that demand the very best quality and performance in a portable mixing system. The 811P features include a full 10 band graphic equalizer (on standard ISO centers)

Basic Specifications & Suggested List Price: Freq resp 20 Hz 20 kHz \pm 1dB THD 1% at 1K Maximum input level 20dB mic 70dB (line level) Input impedances 100 150 ohms (mic) 43K (line) Maximum output level preamp 22dB into 600 ohms Output impedances 600 ohms Equalizer \pm 12dB at 41.5 63, 125, 250, 500 1K 2K 4K 8K 16K ISO centers) \$950

NEOTEK CORPORATION

1158 West Belmont Ave., Chicago, IL 60657
Product Name: SERIES I

Contact: Greg Braithwaite, Sales Manager
Date Product Introduced: 9/82

Product Description & Applications: The newly redesigned Series I is a family of consoles which may be configured to suit many applications. Input features include a plug-in mic line module with three band EQ, four auxiliary buss sends 8 track assignment and four inch conductive plastic fader. A four band parametric EQ version and a stereo line input module are also available. Output module options suit recording, with full control room studio functions sound reinforcement, or broadcast production with live mic sense, headphone cue, and related features.

Basic Specifications & Suggested List Price: Console prices begin at \$7,700 (those with four band parametric EQ are slightly higher. Broadcast versions are comparably priced) and consoles to 40 x 8 are available. Options include custom patch bays stand and matching hardwood cabinetry.

NEOTEK CORPORATION

1158 West Belmont Ave., Chicago, IL 60657
(312) 929-6699

Product Name: SERIES II MULTITRACK RECORDING CONSOLE

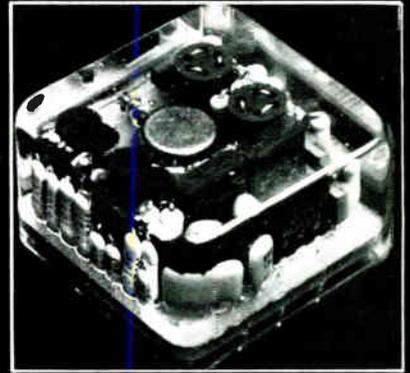
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990

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Electronic design by Deane Jensen,
Jensen Transformers

Packaging and production design by
John Hardy, Hardy Co.



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- CAPITOL RECORDS, INC
- 20TH CENTURY FOX
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- K-DISC MASTERING
- DE MEDIO ENGINEERING
- JENSEN TRANSFORMERS
- BONNEVILLE PRODS
- WFMT, Chicago
- ABC-TV

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THE HARDY COMPANY
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Evanston, IL 60204 USA
(312) 864-8060



ROSS SYSTEMS MIXING CONSOLE
International Music Corp



SERIES II MULTITRACK RECORDING CONSOLE
Neotek Corporation

Contact: Greg Braithwaite, Sales Manager
Date Product Introduced: Early 1982
Product Description & Applications: Series II Multitrack Recording Consoles offer an operating system based on efficient in-line monitoring facilities which give maximum convenience and flexibility. The audio circuit design is identical to the Series III C, so the superlative sonic quality in uncompromised input module features include four band multi-mode parametric EQ, four auxiliary busses, stereo and mono solos, and optional VCA grouping or full automation. Complete peak VU metering and patch bay with metal frame jacks and shielding wiring are standard.
Basic Specifications & Suggested List Price: Series II are available in 16 and 24 track versions with up to 56 inputs. A standard 28 x 24 lists at approximately \$23,500, including four inch conductive plastic faders, 26 light column meters in integral meter bridge, and complete 24 track patch bay.

NEOTEK CORPORATION
 1158 West Belmont Ave., Chicago, IL 60657
 (312) 929-6699
Product Name: SERIES III C MASTER RECORDING CONSOLES

Contact: Greg Braithwaite, Sales Manager
Date Product Introduced: 5/82
Product Description & Applications: Series III C Multitrack Recording Consoles employ today's most advanced transformer-less technology, resulting in unmatched sonic accuracy. Solid state switching of signals gives multiple mute groups, in-plate solo (as well as stereo and mono solo) and other advanced functions even before automation is added. Input modules include four band multimode parametric EQ, one stereo and four mono auxiliary busses, eight stereo subgroups with eight additional echo busses, and high resolution peak VU metering, VCA subgrouping and automation are optional.

Basic Specifications & Suggested List Price: Series III C Consoles are offered in 24 and 48 track versions with a number of standard frame sizes up to 56 inputs. A full featured 28 x 24 lists at about \$40,000, a variety of optional features including custom cabinetry are available.

NEOTEK CORPORATION
 1158 West Belmont Ave., Chicago, IL 60657
 (312) 929-6699
Product Name: SERIES I THEATER SYSTEMS CONSOLES
 Contact: Greg Braithwaite, Sales Manager
Date Product Introduced: 9/82

Product Description & Applications: The new Theater System Consoles are the latest evolution of the line that has been described as the best designed consoles specifically for theater effects and sound reinforcement. Each input module features two microphone and one balanced line inputs, flexible three-band EQ, four auxiliary busses, four inch fader or VCA module, and pan mono assign to 12 preset masters. The preset masters drive a pot matrix to any specified number of output masters including two for operator monitoring.

Basic Specifications and Suggested List Price: Standard features include dual quad panners, two tape machine remotes, and complete metering. Optional features offer many jumper and patch options that allow custom systems design. A typical Theater Systems console with 14 inputs and 10 master outputs lists at about \$12,200.

PEAVEY ELECTRONICS
 711 "A" Street, Meridian, MS 39301
Product Name: MD-SERIES MIXERS
 Contact: Spring 1982

Date Product Introduced: The Peavey MD Series Mixers are available in 8, 12 or 16 channel versions. These stereo mixing consoles represent the best combination of the latest technological advances, performance, and versatility available in a moderately priced stereo mixing console.

Product Description & Applications: Each channel features low

Mixing Consoles

7 balanced and high Z unbalanced microphone inputs, input sensitivity gain controls, 3-band active EQ, three monitor sends, post-reverb effects send, stereo pan control, calibrated level slider and send and return jacks. The master section features assignable LED color display stereo send jacks with level controls, SUM output at independent monitor mixing, complete patch bay and reverb effects sends to monitor busses.

SOUND WORKSHOP PROFESSIONAL AUDIO PRODUCTS, INC.
 1324 Motor Parkway, Hauppauge, NY 11788
 (516) 582-6210

Product Name: SERIES 30 STEREO INPUT MODULE
 Contact: Emil Handke, Sales Manager
Date Product Introduced: 10/82

Product Description & Applications: The new Series 30 Stereo Input Module is designed for the production studio requiring high quality signal control and processing in stereo format. The Stereo Input Module consists of line pre-amp, three line and equalizer, stereo and mono, and audition buses, two echo busses, EFL, PFL, meter, and switch, a patch bay and four external jacks and tape machines, all in a single module width. This new module, along with the new Stereo Output Module, being introduced at the same time, brings a total of Series 30 Console Mastering, in-line combination with Sound Workshop's existing Series 30 Mono Input and Output modules.

Basic Specifications & Suggested List Price: Contact Sound Workshop for further information regarding specifications and applications. Suggested list price for the unpaired set.

SOUNDCRAFT INC.
 20610 Manhattan Place, Suite 120, Torrance, CA 90501
Product Name: SOUNDCRAFT ELECTRONICS, SOUNDCRAFT MAGNETICS

Contact: Wayne D. Freeman, Sales & Mktg. Manager
Date Product Introduced: 1/82
Product Description & Applications: Soundcraft Professional Series consoles, 24 input, 24 track monitoring, includes metering, patch bay, 24 track monitor module, and floor stand.
Basic Specifications & Suggested List Price: Introductory pricing \$19,950.

SOUNDTRACS INC.
 262A Eastern Parkway, Farmingdale, NY 11735
 (516) 249-3669

Product Name: SOUNDTRACS OMNI 16
 Contact: John Carroll, Vice President/Marketing
Date Product Introduced: 7/82

Product Description & Applications: A 16 line 4 sound reinforcement multitrack board available either in a full size or table-top studio version. Modular internal construction is of the highest standard and integrates many unique features including a mon mix switch on input channels which routes via a separate buffer with variable gain, allowing mixing of 16 line inputs from a 16 track machine. Master to master links and 56 way multi-core connections enhance this total solution to PA multitrack recording in one sensibly priced package.

Basic Specifications & Suggested List Price: Balanced XLR type connectors on inputs/output; (+20dB, +5dB) Unbalanced line inputs. Three state 11dB parametric EQ (inputs: ±15dB, High pass filter 100 Hz). Solo switching, +15dB Peak indicators, 12 element LED meters, 1 kHz oscillator, Signal to noise with inboard PSU) better than -12.9 dBm. Direct outputs on studio version. Flight case model \$511. Studio version \$5272. 24 channel version price on application.



SPECKMIX 18
Speck Electronics

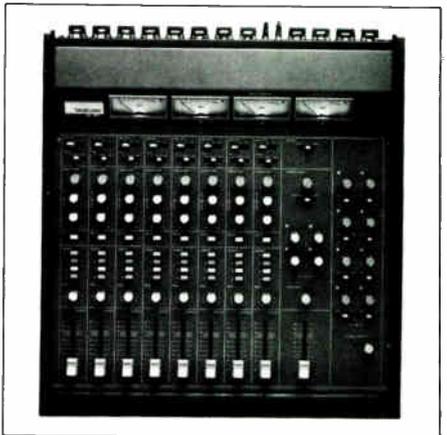
SPECK ELECTRONICS
 12455 Branford St., Unit 2, Arleta, CA 91331
 (213) 897-4188
Product Name: SPECKMIX 18
 Contact: Vince Poliss

Product Description & Applications: The new Speckmix 18 recording console features 18 completely independent channels, eight mix and buss outputs, 8 track pannable assignable six frequency 3 band equalizers, low noise transformerless microphone inputs, control room and studio playback facilities and 100 prompts independent stereo mixdown buss. +4dBm operating levels, stylish European style front panel and solid oak sides.
Basic Specifications and Suggested List Price: \$4,475.

SUNN MUSICAL EQUIPMENT COMPANY
 19350 SW 89th Ave., Tualatin, OR 97062
 (603) 638-6551
Product Name: SUNN SPL 4424 (24 CHANNEL) AND SPL 4416 (SIXTEEN CHANNEL) MIXERS

Contact: Terry H. White
Date Product Introduced: 6/82
Product Description & Applications: Designed for studio or live mix applications, the new SPL 4416 and SPL 4424 mixing consoles from Sunn are perhaps the most feature complete mixers ever produced by a major manufacturer. It is obvious at a glance that these four outboard mixers were conceived and designed by sound engineers who understand how a mixer must function in all real life situations.

Basic Specifications & Suggested List Price: SPL 4424 24x4 mixing console \$6,495. SPL 4416 16x4 mixing console \$4,995.



M-30 AUDIO MIXER
Tascam Professional Products Division

TASCAM PROFESSIONAL PRODUCTS DIVISION
 TEAC Corporation of America
 7733 Telegraph Rd., Montebello, CA 90640
 (213) 726-0303

Product Name: M-30 AUDIO MIXER
 Contact: Lewis Boss, Customer Relations Manager
Date Product Introduced: 3/82

Product Description & Applications: The M-30 is 8 in by 4 out with 11 independently assignable pre- and post-fader tapable stereo 8 x 2 submixer and 4 x 2 stereo monitor mixer. Features include 8 main 8 tapable stereo mixers and 8 line ins with 2 band parametric sweep-type EQ plus 12 5k fixed input mute direct and cue outs, 2 patchable phono preamps, input channel and buss accessory patch points and overload indicators, buss and submix inputs.

Basic Specifications & Suggested List Price: Freq. resp. 30-20 kHz, ±2dB SN ratio, greater than 75dB weighted 70dB unweighted, Crosstalk greater than 60dB at 1 kHz, THD less than 0.1%. Fader attenuation greater than 60dB. Power supply: internal bipolar ±15 volt D.C. \$1,300.

TRIDENT (USA)
 652 Glenbrook Rd., Stamford, CT 06906
 (203) 357-8337

Product Name: VFM MIXING SYSTEM
 Contact: Ken Gray, V.P. President/USA
Date Product Introduced: 8/82

Product Description & Applications: Trident's VFM mixing console are the first totally modular mixers in their price range, for recording PA, stage theatre and other uses. Configurations in the line range from 20x8x16 to 16x8x16. All models are available in either recording or PA version at no extra cost. All models feature full stereo stereo operation and line inputs, 12 segment LED column meters and pre-fader listening capability. Modular construction permits fully accessible patching, submixing and bank saving.

Basic Specifications & Suggested List Price: Available in 20x8x16, 16x8x16x4. Mic. Input impedance: 200 ohms (12k w/20dB pad). Maximum gain 70dB. Freq. resp. ±1dB 25 Hz to 20 kHz, Noise: 125dBm (20 Hz to 20 kHz). Line Input impedance: 50k ohms (unbalanced), Gain: +30dB 15dB. Freq. resp.

Mixing Consoles



VFM MIXING SYSTEM
Trident (USA)

±1dB 25 Hz to 20 kHz, Noise better than -75dB at unity gain
Output Standard on level +4dBm, Maximum output
+21dBm, Overall system gain: 75dB, Output impedance: less
than 100 ohms Price 20x8x16 \$5,000, 16x8 \$3,500, 16x4
\$3,000

VALLEY PEOPLE, INC.

2820 Erica Pl., P.O. Box 40306,
Nashville, TN 37204
(615) 383-4737

Product Name DYNA-MIC/MITE (MODEL 412) MIXER

Contact: Liz Clark, Sales & Mkt. Coordinator

Date Product Introduced: 2/82

Product Description & Applications: The Dyna-Mic/Dyna-Mite combination, Model 412, is the complete portable mixer. Transformerless brilliance is added to a variety of input impedances and levels and optimized for routing through the on-board 3-band EQ section and/or the powerful processing modes available in the Dyna Mite. The signal then appears at the single output enhanced by the transparent, low-noise and distortion-free processing which only a professional processor of this caliber can deliver.

Basic Specifications & Suggested List Price: Dyna Mic: Input impedance: switchable for mic, line and instrument. Distortion (TH or IM) less than 0.5% Freq. resp. (no EQ) ± 5dB, 20 Hz - 20 kHz. Maximum output +21dBm (600 ohms). Mic gain: 26dB to 40dB nominal. Dyna Mite: Maximum input +24dBv. Stereo distortion less than 0.4% S/N ratio: 90dB at +4dBv in/out at +4dBv threshold. Freq. resp. + -1dB, 10 Hz - 50 kHz. Price \$535

WALKER AUDIO VISUAL ENGINEERING

1823 Commercenter West, San Bernardino, CA 92408
(714) 884-1294

Product Name: WAVE MONITOR CONSOLE - II

Contact: Daniel Minnich

Date Product Introduced: 3/82

Product Description & Applications: Totally modular, 1 to 32 inputs, 1 to 8 outputs, transformerless balanced mic inputs, 3 color 3 level LED meter on each input. 4 aux groups for sub-mix are available. selectable headphone monitoring of any input, aux group or output, 2 independent talkback microphone inputs, 48v phantom powering.

Basic Specifications & Suggested List Price: 20 Hz to 20 kHz + 5dB, Equivalent input noise: 129dBv, Microphone input over-load +15dBv, Balanced output +18dBm

YAMAHA INT'L CORP. - COMBO DIVISION

6600 Orangethorpe, Buena Park, CA 92620
(714) 522-9011

Product Name: M406 PROFESSIONAL SOUND MIXER

Contact: Douglas Buttleman, Artist & Public Relations Manager, Phil Moon, Director of Advert. & Public Relations

Date Product Introduced: 2/82

Product Description & Applications: The M406 is a 6 channel rack mountable, stereo output, sound reinforcement mixer. Its straightforward features and superb audio performance make it an excellent choice as the sole mixer in a small club, meeting room, school, church or similar location. Features include three band EQ on each channel, phantom power, stereo program with right and left master controls, two effects inputs each with level and pan controls.

Basic Specifications & Suggested List Price: Freq. resp. to -3dB 20 Hz - 20 kHz. Harmonic distortion: 0.5% at +10dB. Noise (mic to program): -67dB at nominal. Suggested list price: \$995, Optional security cover: \$40

YAMAHA INT'L CORP. - COMBO DIVISION
6600 Orangethorpe, Buena Park, CA 92620
(714) 522-9011

Product Name: M1532 MIXER

Contact: Doug Buttleman, Artist & Public Relations Manager, Phil Moon, Director of Advert. & Public Relations

Date Product Introduced: 2/82

Product Description & Applications: The M1532 has 32 input channels, 13 mixing busses (including a four by five matrix) and 17 outputs plus 40 patch in/out points. Each input channel has a pair of switch-selectable XLR connectors, either of which is usable with mic or line level sources. Each channel's EQ offers 15dB of boost or cut at any of 16 frequencies. Of the M1532's 13 busses, 4 are for program, 2 foldback, 2 echo, 4 mix matrix and one cue. The M1532 may be used for stereo or portable sound reinforcement, or any critical sound mixing application.

Basic Specifications & Suggested List Price: Total harmonic distortion: less than 0.5% at +10dB, 20 Hz - 20 kHz. Freq. resp. 0 - 3dB 20 Hz - 20 kHz. Features include test oscillator, talkback, 11 VU meters, phantom power, peak indicator on each channel \$18,000

MIXING CONSOLES AUTOMATION SYSTEMS

MELKUIST, LTD.

35A Guildford St., Luton, Beds., U.K.
0582 416028; TWX 825828 (UK)

Product Name: MELKUIST EVENT SELECTOR

Contact: S.J. Price, Director

Date Product Introduced: 7/82

Product Description & Applications: SMPTE based event triggering device giving any combination of thirty-two floating relay closures at up to two hundred fifty cue points. Full editing facilities for cue points, battery supported memory, tape storage option. Melkust STH00 peripheral with same facilities available.

Basic Specifications & Suggested List Price: STH00 Peripheral: 2550 Pounds Sterling. Standalone unit: 4150 Pounds Sterling. Tape storage option: 175 Pounds Sterling.



DISKMIX AUTOMATION STORAGE/EDITING SYSTEM
Sound Workshop Professional Audio Products

SOUND WORKSHOP PROFESSIONAL AUDIO PRODUCTS, INC.

1324 Motor Parkway, Hauppauge, NY 11788
(516) 582-6210

Product Name: DISKMIX - THE AUTOMATION STORAGE/EDITING SYSTEM

Contact: Michael Tapes, President

Date Product Introduced: 6/82

Product Description & Applications: DISKMIX is a floppy disc based computer system which provides comprehensive storage and editing functions to existing automated consoles. The system is SMPTE time code locked and interfaces easily with MCI JH50, Sound Workshop ARMS and Valley People 65K automation systems. Storage is available for up to 64 complete mixes. These mixes may be recalled and/or merged via the extensive off-line editing programs. The merges can encompass complete mixes or partial mixes allowing selection of fader channels, mute channels and time range. DISKMIX is also available with ARMS automation for retro fit into existing manual consoles.

Basic Specifications & Suggested List Price: DISKMIX consists of two rack mount chassis, one housing the DISKMIX host computer and two 8-inch DSDD disk drives (two mega-bytes on line), the other the power supplies and a keyboard/computer with CRT monitor. Options include RS 232, RS 422, and IEEE 488 ports for future functions and control \$19,900

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Los Angeles Trade-Technical College



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NEW PRODUCTS 1982

INDEX

QUANTITY	DESCRIPTION	AMOUNT
	<i>Monitor Speakers</i>	

CALIBRATION STANDARD INSTRUMENTS

P.O. Box 2727, Oakland, CA 94602

(415) 531-8725

Product Name: MDM-4P MIXDOWN MONITOR

Contact: Ed Long

Date Product Introduced: 6/82

Product Description & Applications: The MDM 4P has been designed by E.M. Long Associates for use as a Nearfield Monitor™. Its compact dimensions allow it to be placed close to a mixing console or disc cutting system. The MDM 4P includes the new Protek™ system which allows it to be used with amplifiers of up to 300 watts/channel. Each MDM 4P is subjected to over 20 different tests, is sold in matched pairs, and comes with its own response curve.

Basic Specifications & Suggested List Price: Freq. resp. ±3dB 70 to 17k Hz. Matched pair response ±5dB. Time offset: less than 100 us. 200 Hz to 16 kHz. Sensitivity: 80dB/volt/meter. Power required: 1 watt for 89dB SPL at 1 meter. Dimensions: 19" x 13" x 9 1/4". Weight: 25 lbs. \$740/pair.

CALIBRATION STANDARD INSTRUMENTS

P.O. Box 2727, Oakland, CA 94602

(415) 531-8725

Product Name: MDM-TA3P

Contact: Ed Long

Date Product Introduced: 6/82

Product Description & Applications: The MDM TA 3P is a compact, full range, Time Align™ monitor designed by E.M. Long Associates for use at a distance from the mixing console or disc

cutting system. It is designed to be mounted against or flush into a wall. The MDM TA 3P includes the new Protek™ system which allows it to be used with amplifiers of up to 300 watts/channel. A switched mid and treble scheme allows settings for original recordings and test pressings.

Basic Specifications & Suggested List Price: Freq. resp. ±2dB 60 to 20k Hz. Matched pair response: ±5dB. Time Alignment™: ±15 us. 200 - 16k Hz. Sensitivity: 82dB/volt/meter. Power required: 1 watt for 89dB SPL at 1 meter. Dimensions: 19" x 16" x 11 1/4". Weight: 35 lbs. \$1,140/pair.

COMMUNITY LIGHT AND SOUND

5701 Grays Ave., Philadelphia, PA 19143

(800) 523-4934; (215) 727-0900

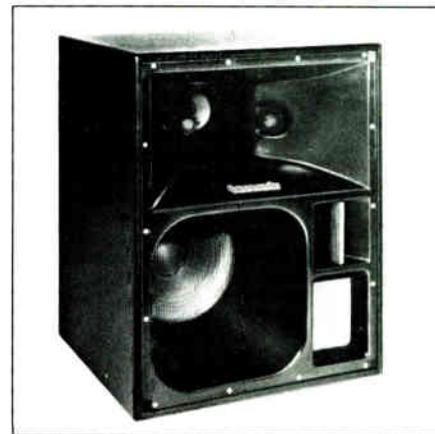
Product Name: RS440 4-WAY LOUDSPEAKER SYSTEM

Contact: Thomas C. Walter, Director of Sales

Date Product Introduced: 2/82

Product Description & Applications: The RS440's efficient design packs a full 4-way, horn-loaded system into an extremely compact enclosure. Its one-piece, "coherent wavefront" fiber-glass facelate and unique horn-loaded cone midrange help maintain excellent transient characteristics and produce clear, natural vocal and instrumental sound quality. Accessories include a kit of handles and corners and a decorative grille. The RS440 is also available in kit form (no enclosure).

Basic Specifications & Suggested List Price: Power handling: 200 watts. Freq. resp.: 45 Hz to 18k Hz, ±4dB. Sensitivity: 104dB/1 watt/1 meter, voice-band. Impedance: 8 ohms nominal. Crossover: 4-way 1C at 380 Hz, 1100 Hz and 12k Hz. Dimensions: 33"H x 25 1/2"W x 24"D. Weight: 140 lbs.



RS440 4-WAY LOUDSPEAKER SYSTEM
Community Light & Sound

ELECTRO-VOICE, INC.

600 Cecil St., Buchanan, MI 49107

(616) 695-6831

Product Name: SENTRY® 500 PROFESSIONAL MONITOR SYSTEM

Contact: Greg Salsby, Market Development Manager, Professional Products

Date Product Introduced: 7/82

Product Description & Applications: The Electro-Voice Sentry® 500 Professional Monitor Speaker is an incredibly accurate audio reference for the broadcast and recording studio engineer. The result of months of listening field testing and refining, the Sentry® 500 features frequency accuracy over a constant, predictable beamwidth. Called "Constant Directivity," this feature allows listeners to hear the same accurate sound from any listening position within the Sentry® 500's 110-degree horizontal and vertical coverage angle. The Sentry® 500's time coherent, crossover design and transducer geometry limit phase variation to ±10°/3000-5,000 Hz.

Basic Specifications and Suggested List Price: The Sentry® 500 features frequency response from 48 Hz to 18 kHz, extendable with the SEQ 500 equalizer kit down to 28 Hz. The Sentry® 500 is very efficient (96dB out at one meter for only one watt in) but can handle up to 100 watts input for hours (with short term peak inputs of 400 watts). Accessories for Sentry® 500 include the SEQ 500 equalizer kit and a wall mounting bracket kit \$458.

FOSTEX ELECTRO ACOUSTIC SYSTEMS

620 Kind Edward St., Winnipeg, Manitoba,

Canada R3H 0P2

(204) 775-8513

Product Name: LS2/V AND LS3/V LABORATORY SERIES MONITORS

Contact: Interlake Audio Inc. — Anthony F. Tohy, Sales, U.S. Sales Manager

Date Product Introduced: 8/82

Product Description & Applications: Fostex LS2/V and LS3/V are new additions to the Laboratory Series Monitor Line. Both monitors are finished in handsome teak and all are floor standing designs for use in studios and other applications where soft mounting is not possible. Common features of the LS2/V and LS3/V include a solid teak hardwood horn, a unique defraction tweeter for extended response, and a high quality crossover network employing air-core inductors and film capacitors. The LS2/V uses a cast frame 12" woofer, while the larger LS3/V employs a 15" woofer for extended bass.

Basic Specifications & Suggested List Price: All driver components have edge-wound voice coils with powerful alnico magnets for low distortion and high efficiency. Both monitors come complete with removable grilles. LS2/V specifications: 45 20k Hz response, 98dB sensitivity (1W/1M), 8 ohms, 37" x 19" x 20" (HxWxD), 94 lbs. \$1,899 each. LS3/V specifications: 40 20k Hz response, 100dB sensitivity (1W/1M), 8 ohms, 46" x 24" x 30" (HxWxD), 176 lbs. \$2,249 each.



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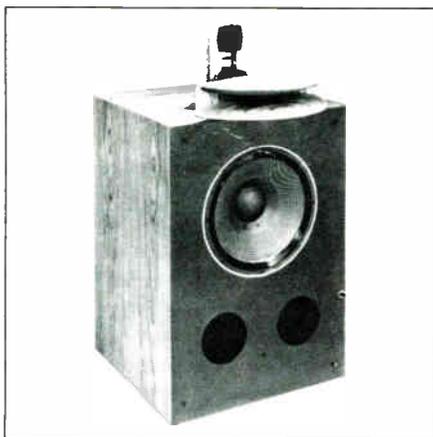
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BRYSTON MARKETING LTD
57 Westmore Dr., Rexdale Ont., Canada M9V 3Y6
(416) 746-0300

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LS2 V AND LS3 V LABORATORY SERIES MONITORS
Fostex Electro Acoustic Systems

FOSTEX CORPORATION OF AMERICA
15431 Blackburn Ave., Norwalk, CA 90650
(213) 921-1112

Product Name: 6301 PERSONAL MONITOR

Contact: Mark Cohen, Vice President, Marketing/Sales

Date Product Introduced: 6/82

Product Description & Applications: The 6301 Personal Monitor will accept almost any line level source—from mixers and tape recorders to electronic instruments, even amplifiers. Integrated 10 watt amplifier may be used independently. Ideal for location recording and mixing. The 6301 is 7" x 5" and weighs only 6 lbs.

Basic Specifications & Suggested List Price: Freq. resp. 80 Hz to 13k Hz. Distortion 0.05% at 1 watt output. \$149 each.

JAMES B. LANSING SOUND, INC. (JBL)
8500 Balboa Blvd., Northridge, CA 91329
(213) 893-8411

Product Name: 4401 STUDIO MONITOR

Contact: Nina Stern, Public Relations Consultant

Date Product Introduced: 7/82

Product Description & Applications: The latest addition to JBL's internationally acclaimed Professional Series of studio monitors. Offering ultra compact dimensions and a newly developed 6 1/2" low frequency driver, the new two way 4401 shares performance characteristics with larger JBL monitors: precision clarity, wide dynamic range, and high efficiency. The 4401 is ideal for use as a main playback system in applications where space is at a premium or as a console mounted secondary monitor. The low frequency driver has been specially designed for optimum performance in a compact enclosure.

Basic Specifications & Suggested List Price: System Freq. resp. (±1dB) 70 Hz to 18 kHz. Power capacity 60W cont. prog. Sensitivity 88dB SPL/1W/1m. Nominal impedance 8 ohms. Crossover frequency 2.5 kHz. General Finish: oiled walnut. Grille color: dark blue. Dimensions: 14 1/4" x 9 1/4" x 7 1/2" depth. Shipping weight: 35 lbs. \$177 each.

JAMES B. LANSING SOUND, INC. (JBL)
8500 Balboa Blvd., Northridge, CA 91329
(213) 893-8411

Product Name: 4411 CONTROL MONITOR

Contact: Nina Stern, Public Relations Consultant

Date Product Introduced: 7/82

Product Description & Applications: A three way Professional Series loudspeaker system designed to meet the rigorous dynamic demands of advanced analog and digital recording technologies. The successor to JBL's legendary 4411—four years the standard among compact studio monitors—the 4411 offers precision accuracy, high power handling, and wide dynamic range for clear, natural music reproduction, even when driven at great volumes levels. Mirror imaged pairs optimize the system's stereophonic playback capability.

Basic Specifications and Suggested List Price: System Power capacity (continuous program) 150 W. Nominal impedance 8 ohms. Crossover frequencies 1 kHz, 4 kHz. Sensitivity 90dB SPL/1W/1m. General Dimensions 23 1/4" x 14 1/4" x 12 1/2" deep. Net Weight: 52 lbs. Finish: oiled walnut. Grille: dark blue fabric. \$498 each.

KLIPSCH AND ASSOCIATES, INC.
P.O. Box 688, Hope, AR 71801
(501) 777-6751

Product Name: KG'

Date Product Introduced: 5/82

Product Description & Applications: The KG' is a new advanced two way loudspeaker system with two drive components that work together to deliver the multiple frequency regions of music. The 8" polymer cone woofer delivers solid bass tones and operates up to 3000 Hz (well within the boundaries of midrange). The entire frequency range is free of distortion and dispersion characteristics are smooth and natural. The KG' is being used as a studio monitor and broadcast monitor.

Monitor Speakers

Basic Specifications & Suggested List Price: Sensitivity 94dB SPL/1 watt/1 meter. Maximum output: 114dB SPL (peak power input). Maximum continuous power input (5 watts). Recommended amplifier: 10 watts min.; 120 watts max. Freq. resp. 55 Hz to 20k Hz ±3dB. Dispersion: 100° vertical (6dB down points), 100° horizontal. Dimensions: 18 1/2" H x 11 1/2" D x 1 3/4" W.



833 STUDIO REFERENCE MONITOR
Meyer Sound Labs

MEYER SOUND LABORATORIES, INC.
2194 Edison Ave., San Leandro, CA 94577
(415) 569-2866

Product Name: 833 STUDIO REFERENCE MONITOR

Contact: Ralph Jones, Marketing Manager

Date Product Introduced: Available for delivery 12/82. Unveiled at L.A. AES Convention.

Product Description & Applications: The new 833 Studio Reference Monitor is a high-power, low-distortion loudspeaker system for critical studio applications. The 833 is sold only as a system, consisting of two loudspeaker enclosures and an active stereo electronics unit containing subsonic filter, frequency and phase response correction circuitry, and Meyer Sound exclusive Speaker Sense™ driver protection circuitry. Employing sophisticated frequency selective phase correction techniques, the 833 Studio Reference Monitor offers all the advantages normally associated with amplified systems while utilizing a passive crossover requiring only a single stereo amplifier. All components of the system are pre-tested and selected for lowest distortion, and each finished system is tested individually to assure consistent, reliable performance.

Basic Specifications & Suggested List Price: Freq. resp. 35-18k Hz ±3dB. System time delay (including electronics) ±450 microseconds from 100 to 15k Hz. ±1.5 us from 2 to 18 kHz. High frequency dispersion: 90° horizontal, 40° vertical, maximum SPL (with an amplifier rated at 250 W ch. into 8 ohms) 120dB continuous, 122dB peak. L.S. price (complete system without power amplifier) under \$1,000.

SYNDER SYSTEMS

16638 E. Warren, Detroit, MI 48224
(313) 881-5167

Product Name: SS15-3 AND SSM2-5

Contact: Ken Snyder, owner

Date Product Introduced: 8/82

Product Description & Applications: SS15-3 3 way P.A. speaker intended for use as concert P.A. (in clusters), side fill monitor, keyboard music and studio playback. SSM2-5 Personal monitor with extended bass response. Useful for drum keyboard, and P.A. monitoring.

Basic Specifications & Suggested List Price: SS15-3 15" (2.5" coil) speaker, 2.5" (1" coil) speakers in series, 12 x 6" horn (1" coil) and crossover. Twee and album in covering. 28 H x 24 W x 14 D. SSM2-5 2.5" full range speakers (C) watts RMS. Tuned port. Tolex with corners. 9 1/2" H x 14 W x 8 1/2" D. SS15-3 \$350. SSM2-5 \$100.

SOUNDTRACS INC. ENGLAND

262A Eastern Parkway, Farmingdale, NY 11735
(516) 249-3669

Product Name: SOUNDTRACS 16-6 MONITOR

Contact: Jeff Carroll, Vice President, Marketing

Date Product Introduced: 7/82

Product Description & Applications: A 16" sound field monitor, the monitor is built into a rugged portable floor case. Encapsulating all the necessary facilities for a personal monitor mix. The 16" output can be accommodated by standard XLR connector.

or a 38 way multiway connector. Additionally as the input impedance is 6k, male connectors (splitters) are built in for patching to the master desk or via a second 48 way connector. Monitor matrix is also standard for individual monitoring of each monitor mix.

Basic Specifications & Suggested List Price: Balanced XLR type inputs/outputs (+24dB, +55dB). 4 stage main parametric EQ (inputs) ±15dB. EQ in/out switch, channel mutes and solo switches, +15dB peak monitor, 3 way to 11.45 parametric EQ on output, phase reverse, 20 way master master link, 12 element LED meters on output. Noise (with inboard PSI) better than -100dBm. Distortion 0.015%. Recommended retail price \$419. 24 channel version, price on application.

TANNOY c/o BGW SYSTEMS, INC.
13130 So. Yukon Ave., Hawthorne, CA 90250
(213) 973-8090

Product Name: TANNOY SRM12B

Contact: Irwin Laskey, Hamt Han

Date Product Introduced: Updated 6/82.

Product Description & Applications: The SRM12B uses a single 1 1/2" dual concentric driver. This unique Tannoy construction with its single point sound source provides excellent phase coherence for proper stereo imaging. The Tannoy SRM12B is extensively used in broadcast studios, video production houses and recording studios throughout the world where accurate sound and high sensitivity are of utmost importance.

Basic Specifications & Suggested List Price: Maximum input power continuous (peak) 80W (±50W). Maximum output SPL at 1m anechoic chamber (peak) 111dB (116dB). Sensitivity 1 watt/1 meter 92dB. Impedance nominal (minimum) 8(6) ohms. Freq. resp. ±4dB 55-20k Hz. Dispersion at 10k Hz 90° conical. Dimensions 23 x 16 x 11. \$475.

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NEW PRODUCTS 1982

QUANTITY	DESCRIPTION	AMOUNT
<i>Signal Processors</i>		

ADA
2316 Fourth St., Berkeley, CA 94710
(415) 548-1311

Product Name: D1280 DIGITAL DELAY
Contact: Mike Maia, Marketing Director
Date Product Introduced: 3/82

Product Description & Applications: Digital Delay with up to 1280 milliseconds of delay at 15 kHz bandwidth. LED rate indicator display; delay time for accurate real-time on setting. Phase-reversal switch for positive and negative flanging. Remote control switch control of Repeat Hold and Effect In/Out. Regeneration Hi Cut (EQ) variable between .5 kHz to 10 kHz.

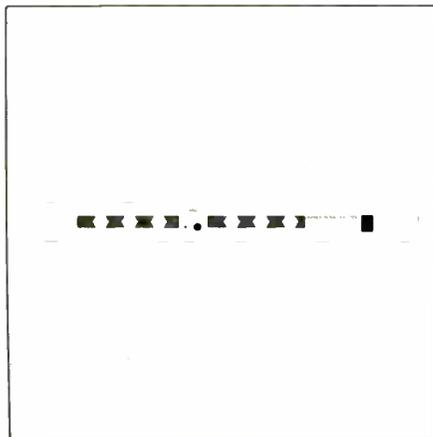
Basic Specifications & Suggested List Price: Delay Range: 0.150 ms to 1280 ms. Bandwidth: Delay: 20 Hz to 15 kHz. Dynamic Range: 90dB minimum, unweighted. Input: 1 Megohm single-ended. 1/4" phone jacks. Level meter and line level signals. Outputs: Direct and Effect. Single-ended. 1/4" phone jacks. Impedance: 400 ohm. (+20dBm maximum level) \$799.95

ADA
2316 Fourth St., Berkeley, CA 94710
(415) 548-1311

Product Name: TFX4 TIME EFFECTS
Contact: Mike Maia, Marketing Director
Date Product Introduced: 8/82

Product Description & Applications: Analog Delay designed specifically to have performance. Separate group of controls for each effect: Flanger, Chorus, Double, and Echo. Loudness controlled LED switching for selection of any one effect in any sequence. Remote switching of effect with TFX4 Controller. Multi-colored LEDs on TFX4 in three effect mode and phase inversion. Input Output Level controls for maximum signal to noise. LED Clip indicator. Effect and Direct Outputs.

Basic Specifications & Suggested List Price: Delay Ranges: Flanger: 0.26 to 4.1 ms. Chorus: 11.4 to 30 ms. Double: 40 to 70 ms. Echo: 50 to 200 ms. Dynamic Range: 90dB minimum, unweighted. Bandwidth: Flanger: .5 kHz. Chorus & Double: 12 kHz. Echo: 3.5 kHz. \$499.95



APHEX AURAL EXCITER TYPE 'B'

APHEX SYSTEMS LTD.
7801 Melrose Ave., Los Angeles, CA 90046
(213) 655-1411

Product Name: APHEX AURAL EXCITER TYPE 'B'
Contact: Paula Lintz, Marketing
Date Product Introduced: 10/82

Product Description & Applications: The Apex Type 'B' is an Aural Exciter™ designed for the serious semi-pro musician and sound contractor at an affordable price. Using the same principles as the famous Apex II studio unit, the Apex 'B' provides the same improved presence, intelligibility, brightness and clarity as its big brother, with minor variations in flexibility.

Basic Specifications & Suggested List Price: Two channels, unbalanced. 1/4" jacks in and out. Hi-Z Controls: drive, tuning and mix (each channel). Max. LO: +20dBm. Operating level: 0dBm nominal. Switch for: 10dBm. Size: 1 1/4" x 19" x 6". \$495

APHEX SYSTEMS LTD.
7801 Melrose Ave., Los Angeles, CA 90046
(213) 655-1411

Product Name: APHEX CX-1S STEREO COMPRESSOR/EXPANDER
Contact: Paula Lintz, Marketing
Date Product Introduced: 3/82

Product Description & Applications: The CX-1S is a self-powered rack mount pair of the popular CX-1 compressor/expander. Using the Apex .5-7A VCA, the CX-1S permits the user to do simultaneous compression/limiting and expansion on each channel with noticeable noise and distortion and absolute no clicks or pops. An LED bar graph shows input/output processing at a glance.

Basic Specifications & Suggested List Price: 2 channels. Stereo unbalanced. Lo-Z balanced I/O. Compressor controls: in/out threshold (-20 to +20dB); release time (50m sec. to 2.5 sec.). Expander controls: in/out threshold (-45 to +8dB); decay time (51 ms to 2.5 sec.); depth (0 to 100dB). Also master in/out master gain (-20 to +20dB). Noise: 85dBm. Distortion: less than 0.1%. Size: 1 1/4" x 19" x 8". \$1,295

APHEX SYSTEMS LTD.
7801 Melrose Ave., Los Angeles, CA 90046
(213) 655-1411

Product Name: APHEX EQF-2S SWEEP EQUALIZER/FILTER
Contact: Paula Lintz, Marketing
Date Product Introduced: 3/82

Product Description & Applications: The EQF-2S is a stereo rack mount pair of the well known EQF-2 modules. Each section contains three bands of sweep EQ with switchable peaking shelving, as well as an independent sweep Hi & Lo pass filter section.

Basic Specifications & Suggested List Price: 2 channels. Independent Lo-Z I/O balanced EQ tuning. Lo: 20-500 Hz, Mid: 250-500 Hz, Hi: 1k to 20k Hz. Filter tuning: hi pass: 200 to 500 Hz, lo pass: 1 to 20 kHz. Noise: -103dBm at low level +21dB output. Distortion: 0.1% THD typ. Size: 1 1/4" x 19" x 8". \$1,295

AUDI-ENCE
P.O. Box 345384, Dallas, TX 75234
(817) 497-2017

Product Name: RFS-3
Contact: Gail Hawkes or Bryant Hawkes
Date Product Introduced: 11/82

Product Description & Applications: This third reverb altering featuring plate delay line from Audi-ence incorporates the basic features required for a pro reverb at a budget price. Designed specifically for the popular compact mixers, usually of unbalanced design, this latest edition to the Audi-ence plates delivers stereo performance and compact size of 6x3x2x1 at 250 lbs.

Basic Specifications & Suggested List Price: Performance features include: 10k ohm input impedance, low noise state of the art high slew electronics, 600 ohm output impedance, response from 100 Hz to 15 kHz, variable. Variable decay is optional. Base list price of \$1,699. With variable decay \$1,789. Available from finer dealers from coast to coast.

AUDIO & DESIGN
(Audio & Design Recording, Inc.)
P.O. Box 786, Bremerton, WA 98310
(206) 275-5009 and TF (800) 426-6170
Product Name: F601 SUPER-DYNAMIC LIMITER
Contact: Nigel Branwell, Vice President Sales
Date Product Introduced: 6/82

Product Description & Applications: The F601 Superdynamic Limiter is a precision product having in excess of 100dB dynamic range (threshold to noise). Evidently PCM users are not entirely happy with 16-bit Performance when headroom and granular noise are considered a 90dB dynamic range is not so impressive. The F601 will be ideal in front of PCM Recorders, Disc Cutting Delay Lines, PCM Line Links and Broadcast Transmitters enabling full utilization without need for headroom. The F601 features Digital Switching facilities with last-use memory, a selectable Peak Transient Clipper on either or both channels, electronic balancing, selectable Side Chain pre-emphasis, dual mono/stereo operation. The front panel meter is switchable between Gain Reduction or VU Output and will show channel 1, 2 or sum of both. In addition a music/voice ratio facility is selectable, allowing a host of additional uses.

Basic Specifications & Suggested List Price: Clip level: +24dBm. Distortion: less than 0.15%. Ratios limit: 20:1. Clip per minute: 1. Freq. resp.: 20 Hz to 20 kHz ±0.5dB. Attack: 0.15 ms to 3 ms + Program Dependent. Release: 15 ms to 3 seconds + 2 Auto Modes. Signal to noise: 105dB. Metering indicates gain reduction or output switchable channel 1, 2, or sum of both. Packaging: 19" rack mount in one unit or rack space. Provision has also been made to integrate a delay line package as a further option. \$1,490



F601 SUPER-DYNAMIC LIMITER
Audio & Design

AUDIO/DIGITAL, INC.
85335 Sarvis Berry Rd., Eugene, OR 97405
(503) 687-8412

Product Name: TC-2 DIGITAL DELAY PROCESSOR
Contact: Gary Hardesty
Date Product Introduced: 7/82

Product Description & Applications: Designed to create all the usual digital delay effects plus many more effects unique to the TC-2. Effects such as Dynamic Pitch Tracking, second memory tap for triple tracking, positive and negative flanging, pitch shifted regeneration. The TC-2 can be remote controlled and programmed in a number of unique ways via a 36 pin rear panel connector. A four digit real time numeric display shows delay time in all manual and programmed modes. Rear panel interlocks include regeneration, patch points for EQ, limiting, etc.

Basic Specifications & Suggested List Price: Freq. resp.: 20 Hz. Dynamic range: at least 90dB. Distortion: less than 1% THD + noise. Delay times of over 3 seconds at full bandwidth (1.2 seconds standard, memory internally expandable). Two delay outputs plus phase inversion, mixing flange/chorus presets. Price: less than \$1,500

AUDIO ENVELOPE SYSTEMS, INC.
P.O. Box 113, Scottsdale, AZ 85252
Product Name: THE AXRAC MODULAR SIGNAL PROCESSING SYSTEM

Contact: Michael R. Schwartz, President
Date Product Introduced: 7/82

Product Description & Applications: Whether your axe is the recording studio sound reinforcement system, keyboard, bass or guitar, the axrac modular signal processing system will give you the professional tools you need at an obtainable price. Modules include equalizers, time delays, a powerful dynamic processor (combining the functions of a compressor/limiter, noise gate and de-esser in one module), switching systems, meters, auto-panner, stereo synthesizers, a reverb chamber, a modular electronic crossover network, a pedalboard preamp, and powered or non-powered rack frames.

Basic Specifications & Suggested List Price: AR HPF: Eight Module. Powered Rack Frame: \$260. AR 500 Auxiliary Insert Module: \$425. AR 100 Studio Preamp Module: \$260. AR 240 Sweepable Graphic Equalizer Module: \$425. AR 640 Dynamic Processor Module: \$325. AR 380 Stereo Synthesizer Module: \$190. AR 370 Auto-Panner Module: \$230. AR 540 Time Delay Processor Module: \$380.

AUDIO ENVELOPE SYSTEMS, INC.
 P.O. Box 113, Scottsdale, AZ 85252
Product Name: TC-101 TUBECUBE ACTIVE SIGNAL ENHANCEMENT PROCESSOR/DIRECT BOX
 Contact: Michael R. Schwartz, President
 Date Product Introduced: 11/81. Shipping began 7/82

Product Description & Applications: For every time you've wanted an electric keyboard to sound like a grand, a cheap acoustic guitar to sound like a classical instrument, wanted to add punch to a direct bass, or wanted a classic tube microphone to use on a vocal track, Audio Envelope Systems created the Tubecube. A powerful signal enhancement processor, packaged in a direct box format for use with microphone, instrument, or line-level signals, placed within the reach of any studio.

Basic Specifications & Suggested List Price: Tube tube specifications (Super Tweak version) Max. input level: instrument position 2V, line level position 20V, dip level 60V. Input impedance: instrument level 250K ohms, line level 1 Megohm. Output impedance: balanced output 150 ohms, unbalanced output 10K ohms. Distortion: clean position less than or equal to 0.15%, "ty" 0.05%. Noise: -10dB. Current consumption: 28 MA. Maximum \$200.

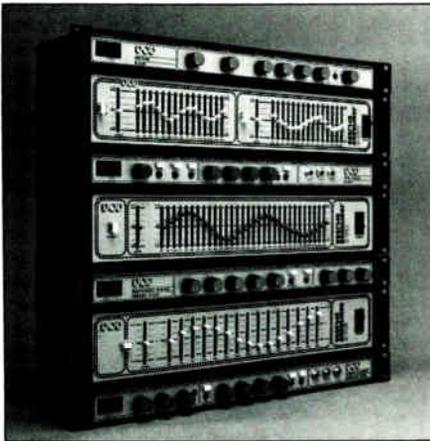


LAWSON L.P. II REVERB SYSTEM
B.A.E. Inc.

B.A.E., INC.
 976 Murfreesboro Rd., Suite 201,
 Nashville, TN 37217
 (615) 361-0470
Product Name: LAWSON L.P. II REVERB SYSTEM
 Contact: Randy Blevins, President
 Date Product Introduced: 10/82

Product Description & Applications: The LP 140 plate reverb is hand-crafted for consistently smooth response. The external dimensions have been reduced, while maintaining the plate size through a re-designed frame.

Basic Specifications & Suggested List Price: Output noise level: less than -71dBm (A weighted, input shorted). Decay time: 1 to 4 seconds.



R-830 DUAL 15 BAND GRAPHIC EQUALIZER
DOD Electronics Corp.

DOD ELECTRONICS CORP.
 2953 South 300 West, Salt Lake City, UT 84115
 (801) 485-8534
Product Name: R-830 DUAL 15 BAND GRAPHIC EQUALIZER

Contact: John Johnson, National Sales Manager
 Date Product Introduced: 5/82 (revised edition)
Product Description & Applications: The DOD R-830 is a solid state dual 15 band graphic equalizer which is designed for mount-

Signal Processors

ing in a standard 19" rack. This DOD R-830 is intended for acoustic and room equalization to minimize unwanted resonances and compensate for specific frequency sound absorption. The R-830 is mounted in a rack for extra rigid aluminum case with heavy top and end panels to resist warps and dents.

Basic Specifications & Suggested List Price: Frequency: 10-40 kHz. Total harmonic distortion: less than 0.01%. Signal to noise ratio: 95dB. Maximum input level: balanced: 20dBm (ref. 1mW/600 ohms), 10Vrms into 10k ohms. Maximum output level: unbalanced: 17dBm (ref. 1mW/600 ohms), 5Vrms into 10k ohms. Output impedance: balanced: 940 ohms. Output impedance: unbalanced: 470 ohms. Maximum input level: +20dBm (ref. 0.775 V). Input impedance: balanced: 66k ohms. Input impedance: unbalanced: 34k ohms. EQ control range: ± 12 dB. EQ center frequencies: 15 bands on standard 2/3 octave. ISO centers (25 Hz, 16 kHz). Level control range: ± 12 dB. In-Out switch: EQ bypass does not disturb balance and balanced output. I/O connectors: input: one 1/4" phone jack (balanced), one 1/4" phone jack (unbalanced). Output: one 1/4" phone jack (balanced), one 1/4" phone jack (unbalanced). Dimensions: 3" x 6" x 19".

DOD ELECTRONICS CORP.
 2953 South 300 West, Salt Lake City, UT 84115
 (801) 485-8534

Product Name: R-840 REVERB
 Contact: John Johnson, National Sales Manager
 Date Product Introduced: 5/82

Product Description & Applications: The DOD R-840 is a spring type reverberation unit with wide range input and output control, a four band EQ and mix control. It is intended for instrument as well as mixing board use. The DOD R-840 utilizes an Accutronics reverb and special equalization circuitry to achieve its unusually good performance.

Basic Specifications & Suggested List Price: Input impedance: 500k ohms. Output impedance: 500 ohms. EQ center frequencies: 200, 500, 1250, 2500 Hz. Decay time: 2.5 seconds. Frequency response: 40-20 kHz. Overall gain: 0.20dB. Size: 3 1/2" x 6" x 1 1/2". Weight: 5.5 lbs. \$229.95.



R-840 REVERB
DOD Electronics Corp.

EVENTIDE CLOCKWORKS, INC.
 265 West 54 St., New York, NY 10019
 (212) 581-9290
Product Name: SP2016 SPECIAL EFFECTS PROCESSOR/DIGITAL REVERB
 Contact: Suzanne Langlo, Marketing Services
 Date Product Introduced: Production unit introduced at NAB 1982

Product Description & Applications: The SP2016 is a totally programmable signal processor which can perform virtually every audio effect through the use of plug-in software modules. Effects include: Reverb, a wide variety of reverb effects (incl. room and plate reverb) with user control of all parameters; stereo reverb and dual independent mono channel reverb; Duplex echo, a digital version of multiple head tape echo; dual robot voice effects; musical combs; chorus effects; delay to 3.2 seconds; selective band filters to separate the signal into several bands, each independently adjustable for delay and amplitude; flanging, phasing, and more. New effects will be issued periodically and available individually or by subscription. Non-volatile user presets.

(continued on next page)

PRO-GRAPH PROGRAMMABLE GRAPHIC EQUALIZER



- 64 PROGRAM MEMORY CAPACITY
- 105dB GUARANTEED S/N
- REMOTE CONTROLLABLE
- 16 BANDS @ 2/3 OCTAVE SPACING
- BALANCED INPUTS & OUTPUTS
- VARIABLE INTENSITY SCREEN
- ± 14 dB CUT & BOOST RANGE
- MASTER/SLAVE LINKABLE

Design response curves, store them in memory, recall and display them instantly with precise repeatability--and all at the touch of a button. Free color brochure upon request.

polyfusion INC.

92 Benbro Drive
 Buffalo, NY 14225
 (716) 681-3040

store user set parameters. Self test mode confirms proper operation.

Basic Specifications & Suggested List Price: Full stereo in and out Freq resp 16 kHz (Some programs have 8 kHz bandwidth) Dynamic range greater than 90dB. Size 3 1/2" x 19" x 12"

EXR CORPORATION

3373 Oak Knoll Dr., Brighton, MI 48116
(313) 277-6122, 227-6128

Product Name: EXR EXCITER MODEL EXIV

Contact: Melanie Rogers, General Manager

Date Product Introduced: 10/82

Product Description & Applications: The new EXR Exciter Model EXIV utilizes EXR's distortion free Psychoacoustic enhancement process but adds several new functions to increase user control and versatility. The new EXIV has a continuously variable notch positioning control, adjustable process noise gating with threshold and release controls, and a new adjustable process limiter. The EXIV has balanced XLR connectors. A new minus 20dB level input/output switch improves signal to noise ratios at lower operating levels and allows the EXIV to be used at either line or microphone levels.

Basic Specifications & Suggested List Price: Max input/output level +21dBV (level switch off) +1dBV (level switch 20dB). Input instrumentation amp Impedance 40k ohm (balanced) 20k ohm (unbalanced). Output transformerless 150 ohm. Noise gate three hold range 45dBV 10dBV (+5dBV -30dBV). Process limit level range 10dBV (-30dBV). Size 19 rack mount, 1 3/4" height \$1,690

FOSTEX CORPORATION OF AMERICA

15431 Blackburn Avenue, Norwalk, CA 90650
(213) 921-1112

Product Name: 3070 GATED COMPRESSOR

Contact: Mark Cohen, Vice President Marketing Sales

Date Product Introduced: AES Show 1982

Product Description & Applications: Two individual channels are provided and may be linked for stereo. The compressor/limiter slope is continuously variable from 1:1 through Inf:1, with 32dB of gain reduction at the Inf:1 position. The 3070 can also be used as a noise gate with a 1:2 expander ratio. In the by-pass mode there is unity gain.

Basic Specifications & Suggested List Price: Front panel phone jacks, rear panel phono jacks, unbalanced. Attack time 0.2 to 20 ms (variable). Release time 50 ms to 2 sec (variable). Freq resp 20 Hz - 20 kHz \pm 1dB. S/N ratio 80dB unweighted, referenced to threshold level. \$450

FOSTEX CORPORATION OF AMERICA

15431 Blackburn Ave., Norwalk, CA 90650
(213) 921-1112

Product Name: 3180 STEREO REVERBERATION UNIT

Contact: Mark Cohen, Vice President Marketing Sales

Date Product Introduced: AES Show 1982

Product Description & Applications: A unique driving circuit and special spring geometry produce a truly natural sound. Two individual channels are provided, each has 3 springs. A limiter with LED overload indicator is located before the reverb transducer. Additionally a pseudo stereo output is available through a single channel to produce a stereo effect which is a useful tool during mixdown.

Basic Specifications & Suggested List Price: Front panel phone jacks, rear panel phono jacks, both unbalanced. Nominal input/output levels 10dB (0 3V). Reverberation decay time 3 sec at 1 kHz. Freq resp 20 Hz - 20 kHz \pm 1dB (dry), 200 Hz - 7 kHz \pm 3dB (reverb). S/N ratio 82dB weighted (dry), 62dB weighted (reverb). \$450

KLARK-TEKNIK ELECTRONICS INC.

262 A Eastern Pkwy., Farmingdale, NY 11735
(516) 249-3660

Product Name: DN 301 GRAPHIC EQUALIZER

Contact: Jack Kelly

Date Product Introduced: 10/82

Product Description & Applications: Mono 1/3 octave cut only graphic equalizer with high and low pass shelving filters. Used primarily for room equalization.

Basic Specifications & Suggested List Price: 30 Band, 15dB cut per band 25 Hz to 20 kHz. Output level +20dBm XLR inputs and outputs. \$950

KLARK-TEKNIK ELECTRONICS INC.

262 A Eastern Pkwy., Farmingdale, NY 11735
(516) 249-3660

Product Name: DN 700 DIGITAL DELAY

Contact: Jack Kelly

Date Product Introduced: 10/82

Product Description & Applications: Digital Delay one input, three independently adjustable outputs 0 - 430 msec/seconds with front panel digital readout and system lock out to prevent tampering. Used for installed systems with multiple sources and for primary delay in an effects system.

Basic Specifications & Suggested List Price: THD less than 1%. Dynamic range 90dB. Delay range 0 - 430ms. \$1,200

Signal Processors



MODEL 97 SUPER PRIME TIME
Lexicon, Inc.

LEXICON, INC.

60 Turner St., Waltham, MA 02154
(617) 891-6790

Product Name: MODEL 97 SUPER PRIME TIME

Contact: Virginia Casale, Marketing Admin

Date Product Introduced: Spring 1982

Product Description & Applications: The Lexicon Super Prime Time is the first digital delay processor to feature memory storage of all front panel settings. The combination of microprocessor control of all functions with a high quality wide bandwidth delay line with two independent outputs yields an instrument of unprecedented functionality for studio or stage use. Eight factory presets are provided with 32 non-volatile user memories. Tape interface is provided for off-line storage of user set-ups. Delay unit features 20 Hz to 20 kHz bandwidth at delay times up to 192 seconds. Comprehensive mixing and modulation sweep capabilities and unique control of regeneration levels by program dynamics.

Basic Specifications & Suggested List Price: Delay time 0.960 ms basic 0.1920 ms with optional Memory Extension, two delay outputs independently settable. Freq resp 20 Hz to 20 kHz. Dynamic range 85dB THD and noise 0.03% typ. Suggested list price Super Prime Time \$4170. Memory Extension Option \$220

LEXICON, INC.

60 Turner St., Waltham, MA 02154
(617) 891-6790

Product Name: PCM-42 DIGITAL DELAY PROCESSOR

Contact: Virginia Casale, Marketing Admin

Date Product Introduced: Fall 1982

Product Description & Applications: The Lexicon PCM 42 is a professional quality compact digital delay system featuring delay capacity up to 4.8 seconds, numeric readout of actual delay time, input overload protection, infinite repeat, comprehensive input and output mixing and multiple wavetorm sweep capabilities. Feedback and Mix Control jacks allow footpedal control of regeneration and effect output levels. Additionally the PCM 42 features a unique metronome clock output that allows performance tempos to be synchronized with delay times. Used with the Infinite Repeat function, the unit can store several measures of music, with overdubs, in memory while preserving rhythmic solidity and complexity.

Basic Specifications & Suggested List Price: Delay time 0.2400 ms basic 0.4800 ms with memory extension option. Freq resp 20 Hz to 16 kHz up to 2400 ms (with option) 20 Hz to 6 kHz up to 4800 ms (with option). Dynamic range 90dB THD & noise 0.06% typ. Suggested list price Basic PCM-42 \$1,495. Memory Extension Option \$250

LEXICON, INC.

60 Turner St., Waltham, MA 02154
(617) 891-6790

Product Name: 224X DIGITAL REVERB

Contact: Virginia Casale, Marketing Admin

Date Product Introduced: Spring 1982

Product Description & Applications: The Lexicon 224X is a state of the art reverberation processor featuring superb audio and reverberation quality with 15 kHz bandwidth and a uniquely flexible operating system. Basic reverberation programs include Concert Halls, Rooms, Chambers and Plates with complete user control over decay time, frequency contour, decay quality and four early reflections. Split reverb programs allow operation as two independent chambers with stereo outputs. Special effects include a unique Chordal Harmonic reverb program, dual multi-voice chorus/echo and a multi tap delay with separate mixing and EQ

for each output. There are more than 30 factory presets and 36 non-volatile user memories.

Basic Specifications & Suggested List Price: Freq resp 20.15k Hz. Dynamic range 84dB typ THD & noise 0.04% typ. Inputs 2 transformer coupled. Outputs 4 transformer coupled. Inter-channel crosstalk below 55dB. Reverberation time 0.6 sec to 70 sec. Suggested list price \$12,000. Includes 5 year software update subscription.

MICMIX AUDIO PRODUCTS, INC.

2995 Ladybird Lane, Dallas, TX 75220
(214) 352-3811

Product Name: MASTER ROOM XL-404 PLATE SYNTHESIZER

Contact: Bill Allen, President

Date Product Introduced: 10/8. AES

Product Description & Applications: The new Master Room accurately synthesizes the reverberation qualities and properties of a plate type reverberator. The XL 404 is a 5 1/4 rack mount system that provides the sound of a plate in a small package. The reverb decay time can be varied from 1 to 4 seconds without altering the sound characteristics of the plate reverberation. Four banks of EQ are provided to allow the user to vary the reverb sound. The XL 404 is a full stereo system that can be switched to monoaural operation, which doubles the reverb density.

Basic Specifications & Suggested List Price: The XL 404 is electrically balanced IN and unbalanced OUT. Output transformers are available as an option. Input/Output connections are made via XLR type connectors. Nominal operating level is +4 in, +4 out. Output noise is less than 90dBm/A on the direct channel. \$2,250

MXR INNOVATIONS, INC.

740 Driving Park Ave., Rochester, NY 14613
(716) 254-2910

Product Name: DIGITAL TIME DELAY MODEL 175

Contact: Joel Silverman, National Sales Manager

Date Product Introduced: 9/82

Product Description & Applications: The Digital Time Delay provides studio quality flanging, doubling, chorusing, simple reverb, echo and slapback in an easy to use and attractively priced format. One rack space high, the Digital Time Delay has stereo outputs and a red green LED scan indicator. Delay range is 31 to 320 ms. push button selectable, and can be swept over a 4 1/2 time period.

Basic Specifications & Suggested List Price: Price significantly lower than competitive units (\$500 US suggested price), the Model 175 offers true digital performance at analog prices.

MXR INNOVATIONS, INC.

740 Driving Park Ave., Rochester, NY 14613
(716) 254-2910

Product Name: PITCH-SHIFT DOUBLER MODEL 174

Contact: Joel Silverman, National Sales Manager

Date Product Introduced: 8/82

Product Description & Applications: The Pitch Shift Doubler is an exciting breakthrough in pitch infusor technology. 20 kHz frequency response with a dynamic range of 85dB has been achieved in a \$450 unit (US suggested price). Previously this type of performance was only available in units costing several thousand dollars. One rack space high, the Pitch Shift Doubler has stereo outputs and a red green LED scan indicator. Overload indicator. Pitch shift is continuously variable (+2 to +4 step) up or down. Some of the applications include stereo simulation stereo chorusing, true unison double tracking, vocal thickening, 1/2 string quart simulation, barbershop, thinning, 10:1 99 type effects, pitch correction in live broadcast sessions.

ORBAN ASSOCIATES INC.

645 Bryant St., San Francisco, CA 94107
(415) 957-1067

Product Name: MODEL 422A/424A GATED COMPRESSOR/LIMITER DE-ESSER

Contact: Sid Goldstein, Marketing Manager

Date Product Introduced: 7/82

Product Description & Applications: The 422/424A, The Studio Optimod™ is a multi function level control device which includes limiter, compressor, gate and de-esser. Based on circuitry originally designed for the highly successful Optimod FM broadcast compressor, the 422/424A provides extreme versatility and a remarkable sound. Its applications include anywhere that the dynamic range of the audio must be controlled such as multi-track recording, sound reinforcement, video film sweetening and post production, and broadcast production.

Basic Specifications & Suggested List Price: THD less than 0.05% at 1 kHz. system S/N 90dB typical. absolute peak output level of +76dBm. Unit is provided standard active balanced in and out. 422A is a mono unit. 424A is a two channel unit with stereo coupling capability. Channels track within \pm 3dB. 422A \$569. 424A \$899.

PHASE LINEAR

Division of International Jensen Inc.
20121 48th Ave. West, Lynnwood, WA 98036
(206) 774-3571

Product Name: 27 BAND GRAPHIC EQUALIZER

Contact: Peter Horsman, Nat'l Sales Manager, Pro. Div.

Signal Processors



27 BAND GRAPHIC EQUALIZER
Phase Linear

Date Product Introduced: 9/82

Product Description & Applications: The model E27 single-channel 27 band graphic equalizer is unique in that it utilizes state-variable filters to achieve amplitude change independent of band width. This design ensures 10 octave equalization throughout the adjustment range rather than the booster characteristic of small adjustment settings typical of currently popular equalizers. Other features include +12dB -15dB control range, switchable 40 Hz high pass filter, 20dB variable gain, passive bypass and balanced input and output.



RE 27 REALTIME EQUALIZER
Rane Corp.

RANE CORPORATION

6510-D 216th SW, Mountlake Terrace, WA 98043
(206) 774-7309

Product Name: RE 27 REALTIME EQUALIZER

Contact: Larry Winter, VP Marketing

Date Product Introduced: 9/82

Product Description & Applications: The RE 27 is a unique combination of a third octave equalizer and matching third octave realtime analyzer in a single package. Above each equalizer slider are a red, green and yellow LED, using the microphone and pink noise generator supplied, user simply moves each slider up or down until the green LED is lit. With all LEDs green, the system is normalized to ± 1 dB or ± 3 dB accuracy, switchable to either flat response or house curve.

Basic Specifications & Suggested List Price: State variable filters in both equalizer and analyzer. SN 107dB below +20dBm output. A weighted 10 v/ms slew rate. 45mm sliders for +12/15dB balanced/unbalanced input and output, THD 0.05%, ultra and subsonic filters +12dB gain, bypass, steel rack mount chassis 19" x 3.5" x 8.2" 15 lbs net weight \$799.

SYMETRIX, INC.

109 Bell St., Seattle, WA 98121
(206) 624-5012

Product Name: MODEL 301 TIME EFFECTS SYSTEM

Contact: Dane Butcher, Marketing Director

Date Product Introduced: 10/82

Product Description & Applications: The Symetrix Model 301 Time Effects System is a unique signal processor which combines under microprocessor control the functions of analog delay and reverb. The 301 makes use of a proprietary spring design which provides smooth natural reverb, even on transient program material. A six tap analog delay line is switchable under processor control, pre or post the reverb spring. Additional modes include delay and chorus.

Basic Specifications & Suggested List Price: Signal to noise greater than 90dB in any mode (utilizes internal dynamic noise reduction), bandwidth, typically 16 kHz 12 kHz minimum (band width is dependent upon operation mode), delay time, 100 ms max., reverb decay time, variable to infinity, inputs and outputs stereo, both unbalanced and balanced connectors provided \$595.

SYMETRIX, INC.

109 Bell St., Seattle, WA 98121
(206) 624-5012

Product Name: MODEL CL-150 COMPRESSOR/LIMITER

Contact: Dane Butcher, Marketing Director

Date Product Introduced: 10/82

Product Description & Applications: The Model CL-150 Compressor Limiter is the latest addition to the Symetrix family of gain processing devices. The CL-150 replaces the previous model CL-100. The new CL-150 has been designed as a versatile compressor limiter for virtually any application in professional audio where a high performance gain controller is needed. One totally unique feature of the CL-150 is its signal detection system which incorporates a proprietary combination of peak and RMS sensing which Symetrix refers to as "Fast RMS".

Basic Specifications & Suggested List Price: Distortion not greater than 0.4% at 10dB gain reduction, noise better than 83 dBdBU, unity gain 600 ohm source resistance, minimum attack time faster than 1500dBms, release time, variable up to 500ms, available gain reduction, 40dB ratios, variable to minus infinity, balanced input and output optional. Price \$329 unbalanced, \$469 balanced.

SYNTOX ELECTRONICS/EMSA

269 Locust, Northhampton, MA 01060
(413) 586-3777

Product Name: DUAL OUTPUT EFFECTS FILTER, MODEL 227

Contact: Everett Halner, Owner

Date Product Introduced: 1982

Product Description & Applications: The Synton 227 Dual Output Third Octave Filter is designed for electronic music studios where standard graphic equalizers do not offer adequate channel separation. The filter bank consists of 27 filters featuring 48 db octave roll off and two banks of 27 output level ladders deliver two outputs of separately filtered sound from a single input.

Basic Specifications & Suggested List Price: Filter spacing 1/3 octave. Range 40 Hz to 16 kHz. Two output master level controls. One input level control. Bypass switch. \$1,500.

TRIDENT (USA)

652 Glenbrook Rd., Stamford, CT 06906
(203) 357-8337

Product Name: LC-1 LIMITER/COMPRESSOR, CB9066 3-BAND PARAMETRIC EQUALIZER

Contact: Ken Bray, V.P. Trident (USA)

Date Product Introduced: 6/82

Product Description & Applications: Two pieces of outboard equipment with Trident's modular design and construction. A true stereo limiter with stereo coupling, the LC-1 provides continuous ly variable slope, fully variable attack and release settings. Separate illuminated VU meters for each channel for gain reduction and output levels. The CB9066 is a three band parametric EQ with variable control of frequency, amplitude, and "Q". Built in automatic compensation for all "Q" settings as well as separate variable high and low pass filters and slope. Individual bypass switches.

Basic Specifications & Suggested List Price: LC-1 Attack cont. var. 200 μ s to 2000 ms. Release cont. var. 25 ms to 0.5 s. Ratio 1:1 to 20:1. Input impedance 100k. Input cont. var. w/in 40dB range. Output typically 1500 ohm cont. var. w/in 40dB range. Max. output level +21dBm in 2k ohm + +17dBm in 600 ohms. Threshold internally set 20dBm. Distortion 0.3% THD w/20dB limiting. Price \$695 (CB9066 Freq. resp. ± 0.5 dB, 20 Hz - 20 kHz. Input imp. 20k ohms (unbalanced). Output imp. less than 5 ohms in 600 ohms. Max. output level +24dBm into 600 ohms. Distortion less than 0.05% THD at 24dBm. Noise better than 75 dBm with system in and all controls flat. Price \$650. Dimensions of both units 19" x 1 1/4" x 8".

UNICORD - DYNACORD

89 Frost St., Westbury, NY 11590
(516) 333-9100

Product Name: DYNACORD CLS-22 COMPACT ROTOR SYSTEM

Contact: Mithell Colby, Product Manager

Date Product Introduced: 6/82

Product Description & Applications: Rack mountable authentic sounding stereo rotary effect. Individual bass and treble rotors which accelerate and decelerate at different rates. Separate speed controls for each rotor. For live or studio operation. Unbalanced 1/4" phone jacks and connor jacks for connections direct to mixing

board or in line between instrument and amplifier.
Basic Specifications & Suggested List Price: Input level 50mV, 3V. Output level 775mV. SN ratio 76dB min. Single rack space \$595.

UNICORD - KORG

89 Frost St., Westbury, NY 11590

(516) 333-9100

Product Name: KORG SDD-3000 PROGRAMMABLE DIGITAL DELAY

Contact: Mithell Colby, Product Manager

Date Product Introduced: 10/82

Product Description & Applications: Programmable digital delay with 1023ms delay for studio or live use. Includes input and output attenuation for extensive matching to all types of instruments, amplification and mixing boards, effect+ effect- and direct outputs for versatile stereo capabilities. 4 position high and low cut feedback filters, square, triangle envelope and random modulation waveform for a uniquely realistic doubling effect. Plus nine programs and manual setting with tail out capabilities.

Basic Specifications & Suggested List Price: 20 17K frequency response at all delay settings +0.5dB -4dB 9 programs plus manual setting. 94dB dynamic range effect+ 110 dB direct. Nominal input level +6dBm, 10dBm, +dBm input impedance 470k ohm 47k ohm, 10k ohm. Nominal out level 20dBm, 10dBm, +dBm. Output impedance 600 ohms. Effect distortion 0.03% typical. Single rack space \$1,495.

URSA MAJOR, INC.

P.O. Box 18/50 Trapelo Road, Belmont, MA 02178
(617) 489-0303

Product Name: BX32 DIGITAL REVERBERATION SYSTEM—UPDATED PROGRAMS, E4-1

Contact: Stacy Durkin, Office Manager

Date Product Introduced: 6/82

Product Description & Applications: The second generation reverb program software (Edition E4-1) for the BX32 has been shipped at no charge to all registered BX32 owners and is incorporated in all current production units. It provides new versions of the 4 basic programs: Plate I, Plate II, Hall and Space and is easily field installed (socketed PROM IC's). The new programs feature reduced coloration, smoother decay, increased definition, and improved stereo image. Future updates are planned including an extension to 8 programs.

Basic Specifications & Suggested List Price: These updates will be delivered at no charge to BX32 owners.



BX32 DIGITAL REVERBERATION
Urso Major, Inc.

URSA MAJOR, INC.

P.O. Box 18/50 Trapelo Road, Belmont, MA 02178
(617) 489-0303

Product Name: BX32 DIGITAL REVERBERATION SYSTEM—REMOTE CONTROL

Contact: Stacy Durkin, Office Manager

Date Product Introduced: 7/82

Product Description & Applications: A compact hand-held remote unit for the BX32 is now available. It provides full sum parameters display of all reverb parameters, signal level, and register functions, as well as complete control over the BX32 from a remote location. The 3 1/2" high BX32 rack mount mainframe may also have full display and control simultaneously, or may be blank.
Basic Specifications & Suggested List Price: Pro net \$995.

WHITE INSTRUMENTS

P.O. 698, Austin, TX 78767
(512) 892-0752

Product Name: MODEL 4100A 2-CHANNEL, L-C ACTIVE, OCTAVE BAND EQUALIZER

Contact: Imory Straus, Mkt. Mgr.

Date Product Introduced: 10/82

Product Description & Applications: Too new for details. Write manufacturer for specific information.

(continued on next page)

1922



1982



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For 60 years
YALE ELECTRONICS
has been a major supplier of
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Signal Processors

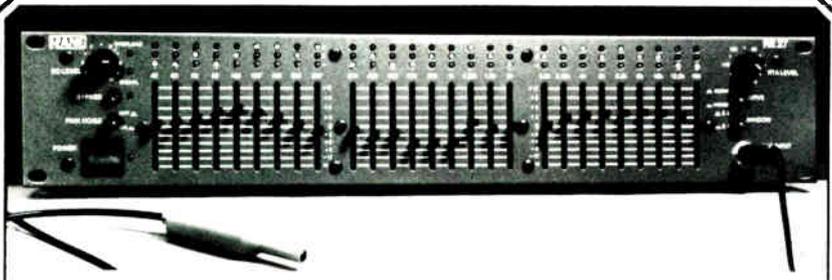


MODEL 4100A
White Instruments

WHITE INSTRUMENTS
P.O. 698, Austin, TX 79767
(512) 892-0752
Product Name: MODEL 4400 OCTAVE L-C ACTIVE
EQUALIZER
Contact Emory Straus, Mkt. Mgr.
Date Product Introduced: 10/82
Product Description & Applications: Write manufacturer for
specific information.



MODEL 4400
White Instruments



RANE Introduces the RE 27 Realtime Equalizer

The equalizer with a perfect ear, because yours isn't.

Unless at least one of your ears is calibrated, any equalizer without an analyzer is just a shot in the dark . . . a costly instrument capable of superb performance if you could just tell it what to do.

The RE 27 tells you exactly what to do. It's so easy to use that anyone can equalize a system to ± 1 dB accuracy in just a few minutes, start to finish, for reduced feedback and optimum sound quality wherever you perform. And the RE 27 comes with everything you need, including a calibrated condenser microphone.

"Great. But how much?"

\$799 complete, suggested list price.

"Ingenious!"

RANE CORPORATION 6510 216th SW.
MounLake Terrace, WA 98043
(206) 774-7309

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Correction —

In our August issue (pg. 52) there was an incorrect listing of OHMATRONICS ACTIVE DIRECT BOX. The Correct specifications are: maximum output level +20 dB into 50 ohms or higher.

We apologize for our oversight.



SUCCESS BY DESIGN.

The success of Soundtrek's Studio I was not an accident — it was planned, designed, constructed and equipped to be a success.

Working together, Flanner's Pro-Audio and Soundtrek created the reality of the 24-track Studio I from a dream and an idea. Sound quality, versatility, dependability and cost efficiency were the main concerns of Ron Ubel of Soundtrek. With the aid of an experienced designer and a skilled contractor, the staff of Flanner's Pro-Audio achieved these goals.

The most critical choice in equipment was the selection of the master recording console. Based on sonic excellence and professional functions, a NEOTEK Series III 28 x 24 custom console was chosen as providing unequalled value regardless of price. For similar reasons an Otari MTR-90 MkII 24-track Masterecorder was chosen, as well as support equipment from such respected manufacturers as U.R.E.I., McIntosh, Crown and many others.

Call us with your ideas, toll-free **800-558-0880**. We can design a success for you!



Studio 1

Construction By: D.A. Peterson,
Contractors, Omaha, Nebraska.
Design By: Steven Durr and
Associates, Nashville, Tennessee.
Installation By: Studio Service
Company, Omaha, Nebraska.



SOUNDTREK

3727 Broadway, Kansas City, Missouri 64111
(816) 931-8735



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Peak Free Performance

THE MODEL 610 COMPLIMITER™

*The SPECTRA SONICS Model 610 COMPLIMITER™
is the fastest, quietest, and lowest distortion
compressor/limiter available to the industry.*



The SPECTRA SONICS Model 610 COMPLIMITER™ is the only device available that performs the functions of peak limiting and volume compression, independently or simultaneously.

THE FASTEST ATTACK TIME

As the fastest of all peak limiting devices, the Model 610 has an attack time of 100 nanoseconds and a release time of less than 90 nanoseconds with no audible distortion.

THE LOWEST NOISE

The extremely low noise of the Model 610 provides a very low threshold capability of -40 dBv with a signal to noise ratio of not less than 80dB, + 4dBv output, unweighted, 20Hz to 20kHz.

THE LOWEST DISTORTION

The distortion of the Model 610 is typically less than .05%, 20Hz to 20kHz, + 16dBv.

VARIABLE COMPRESSION RATIOS

The Model 610 is capable of a *continuously* variable compression/limiting ratio of 1.1:1 to 100:1, thus enabling the widest possible range of slope control.

The Model 610 COMPLIMITER™ offers the professional unequaled performance as well as unlimited applications in recording, sound reinforcement, and broadcasting. For further information see your local SPECTRA SONICS dealer.



3750 Airport Road Ogden, Utah 84403 (801) 392-7531

Circle #055 on Reader Service Card



NEW PRODUCTS 1982

INDEX

QUANTITY	DESCRIPTION	AMOUNT
	<i>Tape Recorders</i>	

FOSTEX CORPORATION OF AMERICA
15431 Blackburn Ave., Norwalk, CA 90650
(213) 921-1112

Product Name: 250AV

Contact: Mike Green, Vice President Marketing Sales

Date Product Introduced: 8/82

Product Description and Applications: The Fostex 250AV is a 4-channel multitrack cassette recorder with built-in 4x2 mixer. Designed primarily for audio visual production and presentation, the unit features a 1 volt output to drive programmers and is compatible with both commercial and consumer formats. Extended mono plus stereo tapes can be played in a new stereo plus stereo tapes can be made.

Basic Specifications and Suggested List Price: Recorder. Tape speed: 1 1/2 ips. SN ratio: 69dB with integrated Delay C Noise Reduction. Freq. resp.: 40 Hz to 15 kHz \pm 3dB at 10V. Mixer: 4 m. Line input, 2 line controls in pair. Independent mono mix and 2 line outputs. Insertion points are provided. \$1,400.

KUDELSKI, S.A.

Route de Geneve, CH1033 Cheseaux-sur-Lausanne, Switzerland

c/o Nagra Magnetic Recorders, Inc., 19 West 44th Street, Room 715, New York, NY 10036

(212) 840-0999

Product Name: NAGRA T-AUDIO

Contact: Mr. Gerry Kovacs, Applications & Sales Engineer, NY

Date Product Introduced: 8/82 at the NAB Convention

Product Description and Applications: The Nagra T-Audio is a four speed transportable studio recorder incorporating a twin capstan open loop system ensuring very low wow and flutter and modulation noise. The twin capstan design is controlled by an internal tape tension sensor which maintains tape tension across the heads. The head stack is easily interchangeable for various applications and configurations. The T-Audio can be used in the transfer of all present synchronizing systems such as NeoFilm, Nagra FM sync, and SMPTE time code. Because of the sophisticated keyboard controls, tape handling and editing has been made very flexible. The keyboard controller is detachable and transport can be controlled.

Basic Specifications and Suggested List Price: Tape speeds: 40 ips, 15 ips, 7 1/2 ips, 3 1/4 ips. Wow & flutter: ANSI: 40 ips = less than or equal to $\pm 0.15\%$; 15 ips = less than or equal to $\pm 0.02\%$; 7 1/2 ips = less than or equal to $\pm 0.25\%$; 3 1/4 ips = less than or equal to 0.04% . Fast winding: 10 m. Rewinding capability: any speed. Input clipping level: greater than +14dB. Crosstalk: greater than 50dB at 1 kHz; greater than 40 dB at 10 kHz. Fringe efficiency: greater than 82dB with respect to maximum peak level of 1020 nW/m at 120 Hz. Freq. resp.: 15 ips: 40 Hz to 20 kHz \pm 1dB; 7 1/2 ips: 40 Hz to 15 kHz \pm 1dB. Special application (40 ips to copy): 50 Hz to 60 kHz \pm 1dB. Signal to noise ratio (with respect to 1020 nW/m): 40 ips: 77.5dB; 15 ips: 73.5dB; 7 1/2 ips: 72.5dB; 3 1/4 ips: Nagramaster FO: 77.5dB. Distortion measured at 160 Hz and 1600 Hz at 1020 nW/m: 15 ips: $H_1 = 0.7\%$; $H_2 = 1.0\%$. General Size: 15.75 x 15.5 x 14.4 weight: 44 lbs. U.S. list: depending on configuration and options: between \$9,000 and \$14,000.



X800 32 CHANNEL DIGITAL AUDIO RECORDER
Mitsubishi Electric Sales America, Inc.

search functions location by SMPTE or tape use codes in a clock frequency switch to an internal quartz crystal oscillator. AM external oscillator from a second X800 or the 24 mHz SMPTE clock signal.

Basic Specifications and Suggested List Price: Number of channels: PCM-32 analog cue - 1 address - 2 aux inputs - 1 Tape speed: 30 ips + 1 octave. Tape width: 1. Record time: 1 hour w/14 reel. Power supplies: 100, 117, 220, 240 VAC $\pm 10\%$ 50/60 Hz. Power consumption: 2 kWVA. Ambient temperature: 40°

100°F. Weight: approx. 550 lb. Tape counter: back; also SMPTE (switched). Line input level: +4dBm nominal, +19dBm maximum. Line input impedance: 10k ohm. Balanced recording. Line input connector: XLR 3 pin terminal. Line output level: +4 dBm nominal + 24dBm maximum. Line output impedance: suitable for 200 ohm load. Loading and balance. Freq. resp.: 40 Hz to 15 kHz ± 0.5 dB 20 Hz to 20 kHz + 5dB. Dynamic range: greater than 90dB (unweighted RMS). Distortion: less than 0.5%. Crosstalk rejection: min. 50dB (1 kHz). Wow and flutter: lower than can be measured. Counting rate: linear. Sampling rate: 48 kHz. Suggested list price: complete: \$70,000.



XE-1 ELECTRONIC EDITOR
Mitsubishi Electric Sales America, Inc.

MITSUBISHI ELECTRIC SALES AMERICA, INC.
Professional Digital Audio Division
7045 N. Ridgeway Ave., Lincolnwood, IL 60645
(800) 323-4216

Product Name: XE-1 ELECTRONIC EDITOR

Contact: Lou Dolecki, North America Sales Manager

Date Product Introduced: 8/82

Product Description and Applications: This unit offers unsurpassed editing capabilities as incorporated in the major playback and editing features of the standard X800A recorder. As well as a host of other features. A computer allows the reset of the reset level for precise start/stop timing. A synchronization system allows use of the X800A recorder for 4 channel non-linear playback. Internal SMPTE generator for precise synchronization and synch lines to allow visual inspection of edit point waveform memories are provided. Allow storage of 20 edit points. Editing of up to two edit points can be automatically programmed. Battery back-up allows long-term storage of data. A selection of variable rate static durations. Housed in a rack, the unit features a memory switch keypad, a CRT display for editing and a display and a processor. The processor can be rack mounted. High resolution monitoring for rehearsals and other features are offered.

Basic Specifications and Suggested List Price: PCM data input: 16 bit linear 48 kHz. Sampling rate: 48 kHz. SMPTE code: 48 point processor. 8-bit microprocessor. 48 point memory: 20 edit points. Cross-tape duration: 500 milliseconds. 10 m. steps. Power supply: 117 VAC $\pm 10\%$. Temperature range: 40° to 104°F. Dimensions: 25 H x 16 D x 17 W. Weight: 14 x lb.

OPTONICA

10 Sharp Plaza, Paramus, NJ 07652

(201) 265-5600

Product Name: DUAL TRANSPORT CASSETTE DECK

Contact: Kenneth R. Wigler, Marketing Services Manager

Date Product Introduced: 8/82

Product Description and Applications: Dual Transport Stereo Cassette Deck with speed during capability 1.5/3x Dolby B Noise Reduction. APSS Auto Program Search System. Dual Search Controls synchronized One-Touch Start Switch timer stand by. Tape number 2 program monitoring while recording. Tape selector metal (CR02) normal bias record mute button mic mixing special record head. SC Super C adjustment and play back head.

Basic Specifications and Suggested List Price: Motor: Tapes I & II FG servo motor. Heads: Tape I. Narrow-gap hard permalloy. SC (100 Hz) playback. Tape 2. Wide-gap hard permalloy. SC head for recording in a monitor mode. Double cap ferrite head. Freq. resp.: 100 Hz to 19 kHz. Freq. resp.: 100 Hz to 20 kHz. Crosstalk: $H_1 = 12$ dB; $H_2 = 15$ dB. $H_3 = 19$ dB; $H_4 = 20$ dB; $H_5 = 20$ dB; $H_6 = 20$ dB; $H_7 = 20$ dB; $H_8 = 20$ dB; $H_9 = 20$ dB; $H_{10} = 20$ dB; $H_{11} = 20$ dB; $H_{12} = 20$ dB; $H_{13} = 20$ dB; $H_{14} = 20$ dB; $H_{15} = 20$ dB; $H_{16} = 20$ dB; $H_{17} = 20$ dB; $H_{18} = 20$ dB; $H_{19} = 20$ dB; $H_{20} = 20$ dB; $H_{21} = 20$ dB; $H_{22} = 20$ dB; $H_{23} = 20$ dB; $H_{24} = 20$ dB; $H_{25} = 20$ dB; $H_{26} = 20$ dB; $H_{27} = 20$ dB; $H_{28} = 20$ dB; $H_{29} = 20$ dB; $H_{30} = 20$ dB; $H_{31} = 20$ dB; $H_{32} = 20$ dB; $H_{33} = 20$ dB; $H_{34} = 20$ dB; $H_{35} = 20$ dB; $H_{36} = 20$ dB; $H_{37} = 20$ dB; $H_{38} = 20$ dB; $H_{39} = 20$ dB; $H_{40} = 20$ dB; $H_{41} = 20$ dB; $H_{42} = 20$ dB; $H_{43} = 20$ dB; $H_{44} = 20$ dB; $H_{45} = 20$ dB; $H_{46} = 20$ dB; $H_{47} = 20$ dB; $H_{48} = 20$ dB; $H_{49} = 20$ dB; $H_{50} = 20$ dB; $H_{51} = 20$ dB; $H_{52} = 20$ dB; $H_{53} = 20$ dB; $H_{54} = 20$ dB; $H_{55} = 20$ dB; $H_{56} = 20$ dB; $H_{57} = 20$ dB; 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Hearing our full line is believing.

We've been helping the professional audio world to sound better since 1948. Every one of our products—from our low-cost portable to our top-of-the-line multi-track recorder—deliver that special Ampex Sound people love.

When it comes to professional audio, we've got you covered. Our audio family includes: the cost-efficient ATR-700, the worldly ATR-800 designed to meet

international broadcast standards, the incomparable ATR-100 1/4" and 1/2" mastering recorder, the rugged MM-1200 multi-track, and the advanced ATR-124 multi-track analog recorder. For details about any exciting member of our profes-

sional audio family, call your local Ampex representative, or contact Willie Scullion,

Ampex National Sales Manager, Audio-Video Systems Division, 401 Broadway, Redwood City, CA 94063 (415) 367-2911.

THE AMPEX SOUND

AMPEX

Ampex Corporation • One of The Signal Companies

Circle #056 on Reader Service Card



The 6120 is an original — not just a warmed-over copy of some other duplicator. It's brand new, and offers you more time-saving, quality features in one compact package than any other duplicator on the market today.

FAST

16-to-1 copying speeds from reel or cassette. Reel modules run at either 60 or 120 ips and cassettes run at 30 ips, which means you can copy up to eleven one hour programs in less than two minutes!

EFFICIENT

The 6120 accepts either 7" (178 mm) or 10½" (267 mm) reels, so you don't waste time rethreading from one reel format to another. All key setups and adjustments are made easily from the front of the system, so you don't have to waste time moving or disassembling the 6120. Accurate monitoring and precise adjustments of audio and bias levels are made possible even at high speeds, because of quick response LED level indicators. All cassette slaves are independent, so a jammed tape won't shut down the entire system, and a LED indicator warns you of an incomplete copy in case a cassette tape jams or ends before the master.

If you want good duplicates start with a great original

The new Telex 6120



You can produce eleven C-60 cassette tapes in less than two minutes!

EASY AUTOMATED OPERATION

The 6120 practically runs itself. The system features automatic end-of-tape stop and auto recue on the reel master, and a choice of manual or auto rewind on the cassette master, providing virtually uninterrupted operation. Changes in equalization are made automatically when you change speeds on the reel master, thereby reducing setup time and avoiding errors.

EXPANDABLE

The modular, building block concept lets you buy just what you need today and expand the system to meet your growing needs tomorrow.

Modules simply plug together. There's no need to add people or space as the system grows, because the 6120 is so compact that even a full system can be operated by one person.

QUALITY TRADITION

For over 20 years now, Telex has been the choice of those who are fussy about the quality of their duplicate tapes. The brand new 6120 is made in the U.S.A. in the

Telex tradition of quality, so parts and service are always available. To learn more about the 6120, write today for complete specifications and production capabilities.

While you're at it, make an appointment to see our special 6120 video tape presentation entitled "Beating Real Time".



TELEX®

TELEX COMMUNICATIONS, INC.

9600 Aldrich Ave. So., Minneapolis, MN 55420 U.S.A.
Europe: Le Bonaparte—Office 711
Centre Affaires Paris-Nord, 93153 Le Blanc-Mesnil, France.

- Send me literature
- I want an appointment to see the special 6120 video tape presentation.

TELEX COMMUNICATIONS, INC.
9600 Aldrich Ave. So.
Minneapolis, MN 55420

Name _____

Title _____

Company/Organization _____

Address _____

City _____ State _____ Zip _____

Best time to contact _____

Phone No. _____ Circle #057 on Reader Service Card



MTR-90-II
Otari Corporation

Product Name: MTR-90-II
Contact: John Carey, Product Manager
Date Product Introduced: 4/82
Product Description & Applications: Otari MTR-90-II is a microprocessor controlled pin-in-rollerless master multi-track recorder available in 1, 8, 16 and/or 24 track configurations. Electronic inserts and transport ballistics have been optimized for post production applications. The MTR-90-II is a recorder specifically designed to easily interface with any SMPTE based video editing system, machine controller or synchronizer.
Basic Specifications & Suggested List Price: Tape speeds: 30 ips & 15 ips. SN ratio 24 track 3 ips greater than 74dB. 15 ips greater than 71dB. Freq. resp. record/reproduce 30 ips 42-29 kHz +1.5 -4dB. Wow & flutter <0 ips less than 0.04%. Distortion less than 0.05% 3rd harmonic at 1 kHz at 250 nW/m. Prices: MTR-90II-8 \$21,950. MTR-90II-16 \$36,500. MTR-90II-24 \$41,950. MTR-90II-24-24 \$38,950.



STUDER A810 PROFESSIONAL/BROADCAST RECORDER
Studer Revox America, Inc.

STUDER REVOX AMERICA, INC.
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Product Name: STUDER A810 PROFESSIONAL/BROADCAST RECORDER
Contact: Bruno Hochstrasser, President
Date Product Introduced: 10/82

Product Description & Applications: Four speed (3 1/2, 7 1/2, 15, 30 ips) professional recorder featuring complete microprocessor control of all transport and switching functions. Digital control of audio parameters, bias level EQ eliminates transient internal distortion for up to 4 tape types with all data accessible to external systems. Zero locate button plus four additional programmable buttons for 4 address autolocate, start, locate, ladder, start, tape dump, etc. Servo controlled capstan motor, tape tension control, variable spooling speeds, real time center precision chassis and neural lock. Optional SMPTE time code system places code on center track or crosstalk better than 90dB using separate heads and synchronized with internal NDLE for permitting stereo audio with SMPTE code on 4 tape. Optional serial interface for external computer control.

STUDER REVOX AMERICA
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Product Name: REVOX B710 MKII
Contact: Larry Jaffe, Director of Marketing and Sales
Date Product Introduced: 6/82

Tape Recorders

Product Description & Applications: Four motor, three head microprocessor controlled cassette deck. Die cast aluminum alloy transport chassis, quartz regulated, Hall effect capstan motor, precision pivoting headblock for azimuth stability. Microprocessor control of spooling motors for constant speed fast wind, tape tension control and electronic braking. Other features include Dolby B and C NR, 4 digit LED counter, tape type sensors, mic line mixing, modular pin-in electronics.

Basic Specifications & Suggested List Price: SN better than 72dB at 3% distortion. Dolby C on wow & flutter 0.045% wtd peak, freq. resp. 40 Hz - 20 kHz (+2 - 3dB) with IEC II or IV tapes.



32 2-TRACK RECORDER/REPRODUCER
Tascam Professional Products Division

TASCAM PROFESSIONAL PRODUCTS DIVISION
TEAC Corporation of America
7733 Telegraph Rd., Montebello, CA 92343
(213) 726-0303

Product Name: 32 2-TRACK RECORDER/REPRODUCER
Contact: Lewis Ross, Customer Relations Manager
Date Product Introduced: 4/82

Product Description & Applications: Unit operates at 15 and 30 ips, features sync and is punch-in capable with 100% reel capacity stereo telephone feed input and output level controls, two RCA jack, unbalanced hi-Z inputs and outputs, and two phone jack, unbalanced hi-Z mic inputs. Common to each Series 40 Recorder/Reproducer are two high torque slotless DC reel motors, an FG-DC servo capstan motor, pitch control, LSI logic operated transport, computer controlled motion sensing logic and photo optical end of tape detection circuit.

Basic Specifications & Suggested List Price: Tape 1/4, 1.5 mil low noise, high output. Wow & flutter (Wtd) at 15 ips 0.05% RMS at 2 ips, 0.07% RMS. Freq. resp. (sync & repro) ± 3 dB at 100Hz at 15 ips = 40 Hz - 22 kHz at 2 ips = 40 Hz - 20 kHz. SN ratio (NAB A Wtd) at 15 ips = 68dB, at 2 ips = 66dB. Adjacent channel crosstalk better than 50dB down overall at 1 kHz (VUD) \$1,400.

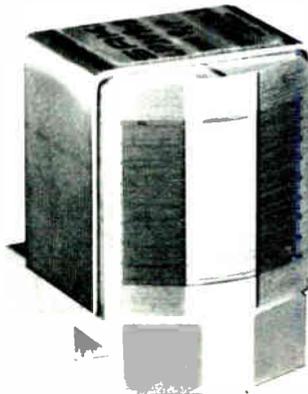
TASCAM PROFESSIONAL PRODUCTS DIVISION
TEAC Corporation of America
7733 Telegraph Rd., Montebello, CA 90640
(213) 726-0303

Product Name: 34 4-TRACK RECORDER/REPRODUCER
Contact: Lewis Ross, Customer Relations Manager
Date Product Introduced: 4/82

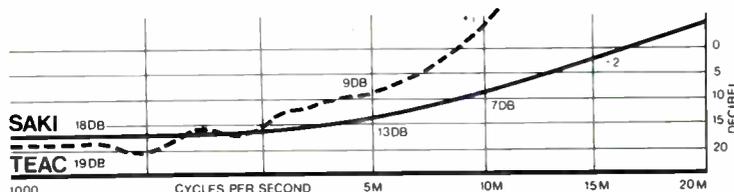
Product Description & Applications: Unit operates at 15 and 30 ips, features four illuminated VU meters and four RCA jack unbalanced hi-Z line inputs and outputs. Common to each Series 40 Recorder/Reproducer are full sync functions, full frequency response, auto sync, reproduce mode, FET switch and buffer, auto level and output select sections, zero return function, 100% motor and hi-Z, auto counter, slip up head, stereo synchronization, auto reverse and auto stop logic.

Basic Specifications & Suggested List Price: Tape 1/4, 1.5 mil, low noise, high output. Wow & flutter (Wtd) at 15 ips 0.05% RMS at 2 ips, 0.07% RMS. Freq. resp. (sync & repro) ± 3 dB at 100Hz at 15 ips = 40 Hz - 22 kHz at 2 ips = 40 Hz - 20 kHz. SN ratio (NAB A Wtd) at 15 ips = 68dB, at 2 ips = 66dB. Adjacent channel crosstalk better than 50dB down overall at 1 kHz (VUD) \$1,700.

A CURVE NO ONE ELSE CAN HIT



The New SAKI, low cross-talk, metal head for your TEAC 80-8



SAKI MAGNETICS, INC.

8650 Hayden Place, Culver City, CA 90230 213 / 559-6704 (TWX-910-328-6100)

Circle #058 on Reader Service Card

NEW PRODUCTS 1982

QUANTITY	DESCRIPTION	AMOUNT
	<i>Other Equipment</i>	

AARMOR CASE
420 North Dexter, Ionia, MI 48846
(616) 527-2120
Product Name **FLIGHT CASES**
Contact: Steve Foster, President

Date Product Introduced: Continued new designs 1982.
Product Description & Applications: A major line of aluminum and steel cases for military, police, fire, and other equipment. The cases are designed for rugged use in the field and are available in a wide variety of sizes and configurations. A wide selection of interior and exterior materials, aluminum, steel, and more, are available.
Basic Specifications & Suggested List Price: Aarmor cases are available in a wide variety of sizes and configurations. They are designed for rugged use in the field and are available in a wide variety of sizes and configurations. Aarmor cases are designed for rugged use in the field and are available in a wide variety of sizes and configurations.

ADAMS SMITH, INC
34 Tower St., Hudson, MA 01749
(617) 562-3801
Product Name **MODEL 1601 TAPE SYNCHRONIZER**
Contact: Harry F. Adams, President
Date Product Introduced: 1982
Product Description & Applications: The Model 1601 is a low cost, portable, expandable, microprocessor based tape synchronizer. It can be used for video, audio, and video production and post production. Also, it can synchronize two tape recordings with each other using a color SMPTE time code or reference signal with slave tape the master operation. It has a built-in capability for manual parking and very fast search functions. Data transfer rate permits digital data recording. It is used in a variety of applications.

Basic Specifications & Suggested List Price: 100V to 200V operation and 16 FM operation. It has a built-in capability for manual parking and very fast search functions. Data transfer rate permits digital data recording. It is used in a variety of applications.



SYNTHIA SYNTHESIZER
Adaptive Systems, Inc

ADAPTIVE SYSTEMS, INC
P O Box 9356, Newark, DE 19711
(302) 366-0478
Product Name **SYNTHIA SYNTHESIZER**
Contact: David A. Harris, Marketing Director
Date Product Introduced: 1982
Product Description & Applications: Synthia is a low price, portable, expandable, microprocessor based synthesizer. It is used in a variety of applications.

Basic Specifications & Suggested List Price: Synthia is a low price, portable, expandable, microprocessor based synthesizer. It is used in a variety of applications.

has a built-in capability for manual parking and very fast search functions. Data transfer rate permits digital data recording. It is used in a variety of applications.

ADC PRODUCTS
4900 W 78th Street, Minneapolis, MN 55435
(612) 835-6800
Product Name **BROADCAST JACKFIELDS PRE-WIRED PATCH PANELS**
Contact: Joe Treutler, Product Manager
Date Product Introduced: 4th, NAB 81
Product Description & Applications: Pre-wired patch panels for test, design and production audio systems. Space-time money and trouble. Can deliver from stock in two weeks depending on type and quantity. Standard 2x4 configurations: 48, 72, 96, 144, or 192 patch points. Normal 1/4" and 1/8" patch points. Rack or panel mount. Rack or panel mount. Rack or panel mount. Rack or panel mount.

Basic Specifications & Suggested List Price: Most popular model: 2x4 configuration, 48 patch points, 1/4" patch points, 1/8" patch points, 1/4" patch points, 1/8" patch points.



SONEX ACOUSTIC MATERIALS
Alpha Audio Acoustics

ALPHA AUDIO ACOUSTICS
2049 West Broad St., Richmond, VA 23220-2075
(804) 358-3852
Product Name **SONEX ACOUSTIC MATERIALS**
Contact: Name Acoustics
Date Product Introduced: 1982
Product Description & Applications: Sonex acoustic materials are made of a special foam and are available in a variety of sizes and configurations. They are used in a variety of applications.

AMBER ELECTRO DESIGN INC.
4810 Jean Talon West, Montreal, Canada H4P2N5
(514) 735-4105
Product Name **MODEL 3501 DISTORTION & NOISE MEASURING SYSTEM**
Contact: Wayne Joseph, President
Date Product Introduced: Spring 1982
Product Description & Applications: High performance, precision generator and analyzer for distortion, noise, and other audio signals. Analyzes and levels THD, analyzer, harmonic, IMD, SMPTE DIN, THF and IHF standards. Features automatic recalibration, optional, measured input/output, digital output, battery, sensitive voltmeter made for manual operation. Resistor and switch-line operation. Features: 1) The unit under test has no load.
Basic Specifications & Suggested List Price: System nominal distortion less than 0.005% (THD). Noise measurement max sensitivity: 100dBm. Maximum output (continuous): 400dBm (max 100 ohms). Auto null time less than 2 sec. Frequency range: 10 Hz to 100 kHz. Meter response: analog. Residual noise less than 10V. Price USA: basic instrument \$2,400, balanced input/output add \$250, battery add \$175. IMD add \$200.

ANCHOR SYSTEMS INC.
4510 Federal Blvd., San Diego, CA 92102
(714) 262-9901
Product Name **ANCHOR 100 SELF CONTAINED MINI P.A. SYSTEM**
Contact: Evan Lanfrum, Marketing Director
Date Product Introduced: 1982
Product Description & Applications: 30 watt mini PA system with low 20mV mic phone input. The output is a 4" full range driver in a wall mount. It is used in a variety of applications.



ANCHOR 200 SELF CONTAINED PA SYSTEM
Anchor Systems Inc

ANCHOR SYSTEMS INC
4510 Federal Blvd., San Diego, CA 92102
(714) 262-9901
Product Name **ANCHOR 200 SELF CONTAINED PA SYSTEMS**
Contact: Evan Lanfrum, Marketing Director
Date Product Introduced: 1982
Product Description & Applications: 30 watt mini PA system with low 20mV mic phone input. The output is a 4" full range driver in a wall mount. It is used in a variety of applications.

mounted may be used as P.A. system stage monitors, studio monitors, mobile or mobile video system or studio system monitors or main P.A. musical instrument monitor or practice amp.

Basic Specifications & Suggested List Price: Two 4" full range speakers, one Philips dome tweeter. Freq. resp. 100 Hz-15 kHz, music; 150 Hz-15 kHz, speech; 55 watts rms power, max SPL at 1m 104 dB SPL. Impedance 780 ohms balanced, phono 51 ohms unbalanced, 600 ohms. Dimensions 20 1/2" x 11 1/2" x 12 1/2" (H x L x D).



HAN-D-MAG HEAD DEMAGNETIZER
R.B. Annis Co.

R.B. ANNIS CO.
1101 N. Delaware St., Indianapolis, IN 46202
(317) 637-9282
Product Name: HAN-D-MAG HEAD DEMAGNETIZER

Contact: R.B. Annis owner
Date Product Introduced: 4/80
Product Description & Applications: The portable Hand-Mag available as a result of customer demand for a versatile, low power, Hand-Mag suitable for use with modern tape cassette recorders. We have a new, more powerful model with curved vinyl coated protective overalls that gives it a 2600 gauss magnet field, 4.5 standard markings. These special thin probe Hand-Mags are still the most powerful and video head demagnetizer available. They are rugged but compact and are designed for practical intermittent duty on 115 V 50/60 Hz.

Basic Specifications & Suggested List Price: Hand-Mag head demagnetizers with standard 4.5" x 1 1/4" probe are priced at \$29.70. Those with a 4" long probe are priced at \$27.70. The new 2600 gauss model probe models are priced at \$39.70. All units equipped with a thermal cut-off to prevent damage and overheating for longer and efficient use to power.

ANVIL CASES, INC.
4128 Temple City Blvd., Rosemead, CA 91770
(213) 575-8614

Product Name: ANVIL CASES & FORCE II CASES
Contact: Earl G. Hoopes, Product Manager
Date Product Introduced: 1/80
Product Description & Applications: Anvil's new Force II line of lightweight cases is designed to meet the field application requirement. They are made of a different material than many of the same material, which our line time time, and cost. Anvil AT A cases are available in three colors; these new Force II cases are a full 40% lighter than Anvil AT A cases. Available for a select list of models in the professional studio center element musical instrument and audio video instruments.
Basic Specifications & Suggested List Price: Line range is from \$100.00 to \$400.00. Anvil does not have a suggested retail price listing in the musical instrument category markets. See an Anvil Case dealer for his suggested retail prices.

ATLAS SOUND
Division of American Trading & Production Corp.
10 Pomeroy Rd., Parsippany, NJ 07054
(201) 887-7800
Product Name: OMNI SERIES MICROPHONE STAND EQUIPMENT

Date Product Introduced: 1/82
Product Description & Applications: The new Omni Series microphone stand equipment from Atlas Sound incorporates two significant engineering improvements designed to increase performance flexibility. The massive new Omni Series base allows three-way tube positioning fixed at standard 140°, 105° or 75° angles for unprecedented freedom of performer movement. The mass and special, tough insulating parts of the Omni Series base also provide maximum resistance to wobble. Also incorporated as an option is the unique new Atlas pioneered, veloured chrome finish which effectively resists glare caused by stage studio lighting. The new Omni Series consists of conventional floor stand models OS 100 (chrome finish) and OS 120 (veloured chrome finish) and the 3-way model OS 80 (chrome finish) and OS 85 (veloured chrome finish). Each unit flexibility when not in

Other Equipment

microphone stand equipment amplifiers, keyboard vocalists, etc. Atlas now offers the OS PB/V boom assembly. This special boom assembly combines the advantages of the new Omni Series base and veloured chrome finish with the flexibility of an extendable boom for boom arm.

Basic Specifications and Suggested List Price: OS 100, Series H: 20" tall, W: 17.5" as OS H Series H: 20" x 15" x 15" W: 16.5" OS H TV Boom H: floor, 48" length, 22" x 7" W: 17.5" as

ATLAS SOUND
Division of American Trading & Production Corp.
10 Pomeroy Rd., Parsippany, NJ 07054
(201) 887-7800

Product Name: SS SERIES LOUDSPEAKER EQUIPMENT STANDS AND ADAPTORS
Date Product Introduced: 1/80

Product Description & Applications: The new fully portable professional quality Atlas Sound loudspeaker equipment stands are designed for maximum stability and ease of operation. They provide elevated support for all professional monitor and PA speakers, stage and listening devices, amplifiers, boards and other control equipment. The SS Series equipment can accommodate all field requirements for live monitoring. SS 40 Series, heavy duty SS 70 Series, non extendable SS 40/SS 70 and extendable SS 4 X SS 70X installations. Extendable models SS 40X and SS 70X incorporate a quick lock system for rigid and secure tie-down fastening. For end user convenience, Atlas Sound now offers a wide range of top adapters for use with the new SS Series stands. The correct adapter for the proper specific application can now be selected individually and they are also interchangeable between.

Basic Specifications & Suggested List Price

	H	W	Base Dia	Storage H	Turn Dia
SS 40	48"	12 1/2"	40"	44"	15"
SS 70	55"	14 1/2"	48"	48"	15"
SS 40X	48 1/2"	12 1/2"	40"	49"	15 1/2" upper
SS 70X	55 1/2"	12 1/2"	48"	53"	15 1/2" upper



MC-220 MINICUBE
Audio Envelope Systems Inc.

AUDIO ENVELOPE SYSTEMS, INC.
P.O. Box 113, Scottsdale, AZ 85252
Product Name: MC-220 MINICUBE ACTIVE TRANSFORMERLESS DIRECT INJECTION BOX
Contact: Martin B. Schwartz, President
Date Product Introduced: 7/80

Product Description & Applications: Filling the need for a state-of-the-art direct box at a state-of-the-art economy price, the MC-220 Minicube is transparent, all solid state, powered, and required in a direct box construction, to make the previous choice for any recording or reinforcement application. Powered by either one nine volt battery or phantom powered, the MC-220's features include instrument amp line inputs, isolated Link X speaker, roll-off and ground lift switches, all housed in a recessed steel cabinet.

Basic Specifications & Suggested List Price: Freq. resp. ±10dB, 10 Hz to 10 kHz; Distortion 0.08% (9V battery) (1dB at 1 kHz); Noise -103dB in a limited 20 to 20 kHz; Clip level 9V battery +6dB, 48V phantom supply +20dB; Output level 1W impedance output any load; Balance out 100 ohm; Input level 575

AUDIO KINETICS, INC.
4721 Laurel Canyon Blvd., Suite 209,
North Hollywood, CA 91607
(213) 980-5717, Toll free outside CA: (800) 423-3666
Product Name: Q-LOCK
Contact: Steve Waldman, President
Date Product Introduced: Model 310 was introduced in 1981 - modified in 1982

Product Description & Applications: Audio Kinetics Q Lock 310 is a time code based audio synchronizer editor capable of interlocking and controlling any combination of video, audio and film recorders. Applications include multi track overdubbing, re-recording mixing to picture, sound effects assembly, sweetening and automated dialog replacement. Existing recorders do not require wide banding or shaft encoders. Time code generator readers are included with Q Lock 310.

Basic Specifications & Suggested List Price: Q Lock 310 can control up to 4 machines or can be cascaded to handle any numbers. Able to function with weak or discontinuous code. Prices start under \$13,000 for complete system including all interfaces and time generators readers.

AUDIO-TECHNICA U.S., INC.
1221 Commerce Drive, Stow, OH 44313
(216) 686-2600

Product Name: ATH202 ADJUSTABLE IN-LINE ATTENUATOR

Contact: Bob Herrold, Product Manager
Date Product Introduced: 9/82
Product Description & Applications: The Audio Technica ATH202 adjustable in-line attenuator features 10, 20 or 30dB of attenuation via a recessed switch. The input and output connectors are of the professional 3 pin variety. The ATH202 may be used with phantom power.

Basic Specifications & Suggested List Price: \$55

THE BTX CORPORATION
12 Huron Drive, Natick, MA 01760
(617) 653-0100

Product Name: THE CYPHER TIME CODE EQUIPMENT
Contact: Ron Nadeau, Director of Marketing and Sales

Date Product Introduced: Fall 1982
Product Description & Applications: The BTX Corporation announces its new Cypher system of time code products that simultaneously reads, generates and character inserts SMPTE/EBU VITC time code. The system is based on an intelligent micro computer that allows a full range of functions at reasonable cost. Modular design allows functionality to be increased by the addition of plug-in boards that can be installed in the field. Complete HS 42 interface makes the Cypher system compatible with all existing computers.

Basic Specifications & Suggested List Price: The system is fully compatible with both VITC and PAL video standards in both longitudinal and VITC formats. Size, position, brightness and background intensity of characters inserted into video are variable from the front panel of the unit. An optional relay board allows frame accurate triggering of sixteen events. Price from \$1,900.

CASES, INC.
1745 W. 134 St., Gardena, CA 90249
(213) 770-4444

Product Name: ABS-500 CASES
Date Product Introduced: 7/82
Product Description & Applications: This is yet another first from Cases Inc. of California. We answer your needs again, with the finest universal VCF case available. This attractive case can be used for carrying and transporting your delicate VCH's. Compare these features: special ribbed design for maximum strength, molded from thick high impact plastic, has two positive cam action locks, strong and attractive padded carrying handle, full length continuous piano hinge, strong, precisely radiused valance (aluminum trim between the lid and body), standard color, black, custom colors available for volume users, usable foam to foam (heavy) dimension 19 1/2" x 15 1/2" x 6", commercial high density shock absorbing foam lines the case. Case size 1D (wall to wall) 2 1/4" x 18 1/4" x 8 1/2". Custom interiors available. Contact factory with your special requirements.

Basic Specifications & Suggested List Price: \$150.00

CLEAR-COM INTERCOM SYSTEMS
1111 17th St., San Francisco, CA 94107
(415) 861-6786

Product Name: SB-412 ISO/IFB AND NEW 2 CHANNEL MAIN STATION MS-200
Contact: Edward M. Tizzer, Director of Sales
Date Product Introduced: 6/82
Product Description & Applications: The redesigned SB 412 incorporates both ISC and IFB options in a compact 4 1/2" rack mount package. The ability to access any of 12 channels and talent plus assign to any of 4 channels is built in. The MS 200 requires the popular CS 200K with all the popular features plus speaker, selectable talk, listen, program input and other practical additions.

Basic Specifications & Suggested List Price: SB 412 \$1,275 to \$2,500

COMMUNITY LIGHT AND SOUND
5701 Grays Ave., Philadelphia, PA 19143
(800) 523-4934; (215) 727-0900
Product Name: PC1594M PATTERN-CONTROL MID-RANGE HORN

Contact: Thomas C. Walter, Director of Sales
Date Product Introduced: 4/82

Product Description & Applications: The PC1594M is a constant directivity type 90° x 40° horn designed specifically for use with Community's M4 Midrange Compression Loudspeaker. Molded in one piece from hand-laid, balsal-reinforced fiberglass, the PC1594M features Community's high-frequency control vane (patent pending) and a unique cupped throat for extra strength. A detailed catalog sheet covering the PC1594M, the PC1564M, the PC1542M and the M4 Midrange Compression Loudspeaker will be available at the October AFS Convention.

Basic Specifications & Suggested List Price: Coverage pattern 90° x 40°. Operating frequency range 200 Hz to 4000 Hz. Throat size 4-inch cupped throat. Dimensions 28 1/2" H x 28 1/2" W x 4 5/8" D. Weight 55 lb. \$350

CHRISTOPHER MUSIC CONCEPTS
90 Glenn Way #8, Belmont, CA 94002
(415) 591-2800

Product Name: TOTE BOARD

Contact: Chris Camozzi, Designer
Date Product Introduced: 2/82

Product Description & Applications: The Tote Board is the first widely available, low cost, professional pedal board for mounting and transporting multiple effects pedals. It incorporates peel and stick 3M Dual Lock fastening tape for glueless mounting of effects along with a built in handle and durable slip cover to make the Tote Board a complete and portable pedal package.

Basic Specifications & Suggested List Price: With the Tote Board it is possible to mount all brands of effects. The Dual Lock fastening tape allows the removal and replacement of pedals for battery change or repairs by simply pulling them off and pressing them back on. The built in handle and slip cover omit the need for a separate storage case. 23" x 17" x 6" \$89.95



INSTRUMENT MIXING PREAMP R-810
DOD Electronics

DOD ELECTRONICS
2953 South 300 West, Salt Lake City, UT 84115
(801) 485-8534

Product Name: INSTRUMENT MIXING PREAMP R-810

Contact: John Johnson, National Sales Manager
Date Product Introduced: 5/82

Product Description & Applications: The DOD R-810 is intended for musicians who need a highly flexible preamp to drive a power amplifier or mixing board or both. The three input channels provide high quality mixing capability. The R-810 features four hand active equalization for tone control. All four controls are combining, so they are capable of considerable gain should it ever be needed.

Basic Specifications & Suggested List Price: Input impedance (all channels) 500k ohm. FX return impedance 500k ohm. Output impedance 470 ohm. XLR balanced output impedance 1k ohm. FX send impedance 1k ohm. EQ bands 125, 300, 720, 3000 Hz. EQ range ±18dB. Freq. resp. (tone flat) 30-25 kHz. S/N ratio 95dB. Size 1 1/4" x 6" x 1 9/16". Standard rack. Weight 5 lbs. \$199.95

EDCOR
16782 Hale Ave., Irvine, CA 92714
(714) 556-2740

Product Name: AUTOMATIC MICROPHONE MIXER

Contact: J.E. Morrison, V.P. Marketing
Date Product Introduced: Spring 1982

Product Description & Applications: Automatic mixing of up to 4 low-Z mics expandable to 7 units and 28 mics. Individual gain, attenuation and attack time control. Logic output and monitor output plus line or mic level output. Automatically adjusts system gain to eliminate feedback.

Other Equipment

Basic Specifications & Suggested List Price: Freq. resp. 20 Hz - 20 kHz. Distortion less than 0.3% THD. Hum and noise -72dBm. Turn-on delay 12 microseconds. Turn-off delay 700 milliseconds.

ELECTRO SOUND, INC.
160 San Gabriel Drive, Sunnyvale, CA 94086
(408) 245-6600

Product Name: DOLBY HX PROFESSIONAL HEADROOM EXTENSION SYSTEM

Contact: David Bowman, VP of Marketing
Date Product Introduced: 10/82

Product Description & Applications: The Dolby HX Pro headroom extension system is designed for use in the Electro Sound 8000 64 1 High Speed Tape Duplicating System. By instantly adjusting bias in accordance with program material, high frequency performance is enhanced, mid and low frequency distortion is reduced and the useful dynamic range of the tape is increased. Overall record levels can be higher thus improving the signal-to-noise ratio. 'Dolby' is a trademark for Dolby Licensing Corporation.

Basic Specifications and Suggested List Price: Available as a factory installed option on the Electro Sound System 8000 as well as a simple retrofit kit for current 8000 users, the estimated price will be \$2,975 per 8000 slave; however, final pricing will not be established until production release.

ELECTRO SOUND, INC.
160 San Gabriel Drive, Sunnyvale, CA 94086
(408) 245-6600

Product Name: ES1860 FULLY AUTOMATIC HIGH SPEED AUDIO CASSETTE LOADER

Contact: David Bowman, VP of Marketing
Date Product Introduced: 10/82

Product Description & Applications: The advanced design of the Model 1860 Fully Automatic High Speed Audio Cassette Loader allows a major breakthrough in output. Each of these new microprocessor-controlled Loaders is capable of producing 4400 C-60 cassettes per 8 hour shift. Multiple Loaders can be operated by a single employee. A system design approach provides easy interface with automated feed and off-load configurations.

Basic Specifications & Suggested List Price: Price will be determined upon production release.

FOSTEX ELECTRO ACOUSTIC SYSTEMS

620 King Edward St., Winnipeg, Manitoba, Canada R3H 0P2
(204) 775-8513

Product Name: T20 RP HEADPHONE

Contact: Interlake Audio Inc. — Anthony F. (Toby) Sali, U.S. Sales Manager

Date Product Introduced: 8/82

Product Description & Applications: The Fostex T20 Headphone utilizes the unique Printed Ribbon technique to produce extremely high output with low distortion and provide extreme durability. Long term comfort is one of the special features of the T20, a result of the lightweight fully adjustable headband and the large soft ear pads. The T20 is ideally suited for critical studio and broadcast use and is the workhorse of the Fostex line of four headphones. The T10 offers similar performance in an economical package, while the T30 and T50 are designed for monitoring applications only.

Basic Specifications & Suggested List Price: T10 specifications: sensitivity 91dB (1mW), response 20-25 kHz, maximum input 3.2 VAC, impedance 50 ohms \$49. T20 specifications: sensitivity 96dB (1mW), response 20-30 kHz, maximum input 3.2 VAC, impedance 50 ohm \$79. T30 specifications: sensitivity 96dB (1mW), response 20-35 kHz, maximum input 3.2 VAC, impedance 50 ohms \$99. T50 specifications: sensitivity 94dB (1mW), response 20-20 kHz, maximum input 3.5 VAC, impedance 60 ohms \$149.

GNOME SOUND
147-16 Cherry Ave., Flushing, NY 11355
(212) 358-5768

Product Name: "THE ACTIVATOR" PREAMP

Contact: S. Tomecek, Director of Marketing
Date Product Introduced: 1/82

Product Description & Applications: A preamp specifically designed to enhance the Fender Rhodes pianos. The unit features an EQ slope of over 55dB which removes lower mid and upper bass boom while adding the clarity and bell-like tones so popular today. Input is standard RCA plug out 1/4" plug and is direct bolt-in control replacement in all models.

Basic Specifications & Suggested List Price: Input Z = 470k. Output Z = 1.5k. Unit operates on 2 9V snap-in batteries. Has gain and tone controls. Tone is full bass boost at CCW and tapers to bass cut and treble boost at full CW position. Unit is unity gain at midpoint of all controls, has +5dB gain max. -65dB noise at max boost. Available direct only \$79.95.

THE JOHN HARDY CO.
P.O. Box AA631, Evanston, IL 60204
(312) 864-8060

Product Name: MPC-500C MICROPHONE PREAMP CARD

Contact: John Hardy
Date Product Introduced: 8/82

Product Description & Applications: The MPC-500C mic preamp card is a direct replacement for the stock MCI series 500C preamp. It combines the 990 discrete op-amp with the new Jensen JE-16 B mic-input transformer. The JE-16 B handles signal levels 10 to 15dB higher than the stock JE-115K-E, with greater linearity and less distortion, thanks to its lower impedance ratio (matched to the 990) and larger size. The 990 offers significantly better sound and specs than the stock 5534. On card regulation.

Basic Specifications & Suggested List Price: Transformer THD = 0.03% at 1 kHz, 0.6% at 30 kHz. Max. input at 1% THD +12dBv at 30 kHz, +17dBv at 50 kHz. CMRR greater than 85dB at 1 kHz. 990 specs THD = 0.03% typical, 0.6% max at 20 kHz. 75 ohm load. Max. output = +24dBv/75 ohm load. Slew rate = 18V/μs at 150 ohm load. 16V/μs at 75 ohm load. \$195.00 (single quantity).



990-18V & 990-12V AMPLIFIER
The John Hardy Co.

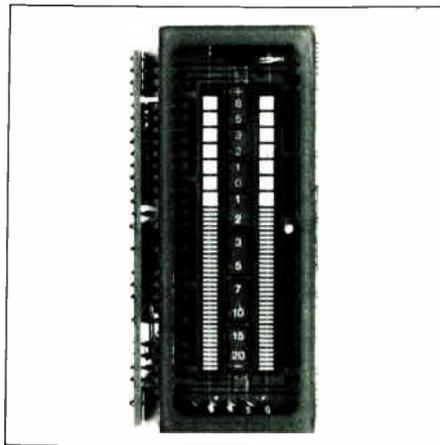
THE JOHN HARDY CO.
P.O. Box AA631, Evanston, IL 60204
(312) 864-8060

Product Name: 990-18V AND 990-12V DISCRETE OPERATIONAL AMPLIFIER

Contact: John Hardy
Date Product Introduced: 8/82

Product Description & Applications: The 990 discrete operational amplifier is available in two new versions: the 990-18V and 990-12V, for bi-polar 18 and 12 volts respectively. Other versions include the 990-24V and 990-15V, for bi-polar 24 and 16 volts respectively. Normally encapsulated in clear epoxy, the 990 is also available in black without labels for OEM applications. Superb performance in almost any audio application, the 990 sounds better!

Basic Specifications & Suggested List Price: F.I.N. 1337 dBV (unwtd. re: 0.775V, 20 kHz), slew rate 18V/μs with 150 ohm load, 16V/μs with 75 ohm load, output +24dBv with 75 ohm load (990-24V) \$46.95 (1 24 pieces).



V/F METER
Hutco Inc.

HUTCO, INC.
2913 Governors Drive, Huntsville, AL 35805
(205) 533-9232
Product Name: V/F METER (PCL886)

Other Equipment

Contact: Tip Turpin, Marketing Manager

Date Product Introduced: 2/82

Product Description & Applications: The PCB866 is a two channel peak level vacuum fluorescent display. It is a complete system in that it has a custom LSI circuit so all that is needed is the power supply voltage and audio input signal.

Basic Specifications & Suggested List Price: 20kHz to +8kHz range. One or 2 color scale. With and without peak hold memory. Power requirements +18Vdc, +30Vdc, 5Vdc or AC. Display area of 60mm x 116mm. Priced under \$200.00 in quantity.

IMMEDIA SOUND

11 Catherine St., Worcester, MA 01605

(617) 791-3366

Product Name: CR-35 CROSSOVER, POWER CLAMP

Contact: Jerry Kopoyan, Owner/Bill, Manager

Date Product Introduced: 6/82

Product Description & Applications: CR-35 Crossover stereo 3 way stereo, 5 way mono. Lowest priced crossover in USA. Power Clamp, stereo power limiter. Clamps amplifier output at set output.

Basic Specifications & Suggested List Price: CR-35 \$291.00. Power clamp \$284.00.

JRF COMPANY, INC.

17 Byram Bay Rd., Hopatcong, NJ 07843

(201) 398-7426

Product Name: 1/2" 2 TRACK HEAD ASSEMBLIES

Contact: John French, President

Date Product Introduced: 1/82

Product Description & Applications: 1/2" 2 track head assemblies for MCI JH10A tape machines. Designed by JRF for retrofit applications, the new heads provide substantial improvement over standard 1/2" 2 track performance specifications. In addition to MCI 1/2" 2 track heads are also available for Ampex and Sully tape machines. JRF Company known for its precision head relapping and assembly alignment services offers premium quality direct replacement heads for most studio, mastering, and tape duplicating equipment.

LARKSONG CASSETTES

10 Scott Pl., Ft. Arena, CA 95468

(707) 882-2833

Product Name: CUSTOM CASSETTE LABELS

Contact: Alan Niven, coordinator

Date Product Introduced: 4/82

Product Description & Applications: Small runs of 25 labels or more can now be printed at low cost. The computerized process is especially suitable for demo tapes and limited run album duplication by studios. Twelve type styles are available to cover headline and line print applications. Special characters for Dolby copyright, recording, right and micro second equalization are supported. Expect a fast turnaround of less than one week.

Basic Specifications & Suggested List Price: The cost is a flat 5c per label. First time typesetting is \$1.00 per line, up to 14 lines per label. Runup setup charge for each pair of labels: A+B is \$2.00. Headline type has 17 characters per line, body type #1 29 char/line, body type #2 35 char/line, and line print 58 char/line.

LINN ELECTRONICS, INC.

18720 Oxnard St., Tarzana, CA 91356

(213) 708-8131

Product Name: LINNDRUM DIGITAL PROGRAMMABLE RHYTHM MACHINE

Date Product Introduced: 6/82

Product Description & Applications: A digital programmable rhythm machine containing studio quality digital recordings of drums and percussion stored in computer memory. LinnDrum stores rhythm patterns and songs, all simply programmed in real time with adjustable error corrections, and complete editing functions. Dynamics, odd time signatures and human rhythm feel are all programmable. All data remains in memory with the power off or tape storage functions enable cassette interface to increase memory capacity.

Basic Specifications & Suggested List Price: Weight 22 lbs. Size 11 1/2" x 22" x 4 1/2". Power requirements 90-135 volts AC, internally switchable to 180-270 volts AC. \$2,995.

MELKUIST LTD.

39A Guildford St., Luton, Beds, U.K.

0582 416028; TWX 825828 (UK)

Product Name: MELKUIST TIMECODE SYSTEM

Contact: S1 Price, Director

Date Product Introduced: 1/83

Product Description & Applications: Complete SMPTE generator/reader system for display and generation of code and user bits information. Applications include tape striping with SMPTE, code recovery/regeneration, control of external events.

Basic Specifications & Suggested List Price: Target price is approx. 1500 Pounds Sterling.

MICMIX AUDIO PRODUCTS, INC.

2995 Ladybird Lane, Dallas, TX 75220

(214) 352-3811

Product Name: DYNAFEX MODEL D-9 NOISE

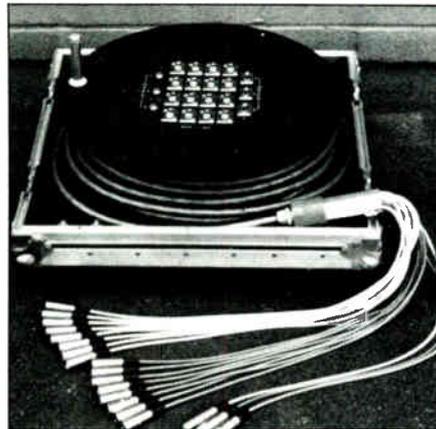
REDUCTION SYSTEM

Contact: Bill Allen, President

Date Product Introduced: 10/82 AES

Product Description & Applications: This new version of the Dynafex is designed to be compatible with the dbx 900 Series card frame. Each module of the Dynafex D-9 provides one channel of single ended non-encode/decode noise reduction. The Dynafex has become popular in broadcast motion picture and recording studio applications. MICMIX will also offer a card frame that contains up to five modules of Dynafex or dbx modules. A full sized card frame is scheduled to be introduced in the near future that contains many unique features for card frames.

Basic Specifications & Suggested List Price: The D-9 provides up to 40dB of noise reduction without having to encode or decode. This single ended module contains a Threshold control that determines the point at which maximum noise reduction occurs along with an IN/OUT switch. Operation is simple and results are dramatic. The system is balanced IN, unbalanced OUT with a 600 ohm transformer option available. Suggested list price: TBA.



ROLL OUT SNAKE MODEL 16-S

Minnich's Audio Products

MINNICH'S AUDIO PRODUCTS

P.O. Box 5372, San Bernardino, CA 92412

(714) 887-8245

Product Name: ROLL OUT SNAKE MODEL 8-S*

Contact: Dan Minnich

Date Product Introduced: Summer 1982

Product Description & Applications: An 8 input, 8 output passive microphone snake. The spool of cable, with XLR connectors arranged in the center, unwinds freely from a rugged ATA approved flight case into which it is permanently mounted. Rugged epoxy filled breakout, 100 feet standard length, consult manufacturer for special orders. A removable hand crank is supplied with each unit for ease of re-winding the cable. Also available in 12-16 (pictured above) and 24 input configurations.

Basic Specifications & Suggested List Price: Size and weight: 18" x 18" x 8", 40 lbs. HS 5535, 21" x 21" x 8", 55 lbs. 16-S \$750.

*Note: Model 16-S is pictured.

MOOG MUSIC

2500 Walden Ave., Buffalo, NY 14225

(716) 681-7200

Product Name: MEMORYMOOG SYNTHESIZER

Contact: Rock Wehrmann, Marketing Manager

Date Product Introduced: 1/82

Product Description & Applications: The Memorymoog is a six voice programmable polyphonic synthesizer, capable of storing up to 100 patches, or programs in memory. Program chains allow strings of programs in any order for use during a song or series of songs. Programmable footpeds let the performer control musical nuances without removing his hands from the key board. The Memorymoog is designed to be the base of any key boardist's set up.

Basic Specifications & Suggested List Price: 6 voice cards, 4 oscillators per voice, 21 note voice assignment keyboard, Polyphonic and mono cluster portamento. Unconditional and return to zero four part contour generators. Keyboard Follow function modifies contour times as a function of keyboard location. \$4,195.

MOOG MUSIC

2500 Walden Ave., Buffalo, NY 14225

(716) 681-7200

Product Name: TAURUS II SYNTHESIZER

Contact: Rock Wehrmann, Marketing Manager

Date Product Introduced: 1/82

Product Description & Applications: The Taurus II is a mono (continued on next page)

ACCURATE TAPE TENSION MAKES BETTER RECORDINGS



The Tentel Tape Tension Gage is designed to diagnose problems in your magnetic tape equipment. Virtually all recorder manu-

facturers use and recommend the TEN-TELOMETER® for use with their equipment. The TENTELOMETER® measures tape tension while your transport is in operation, so you can "see" how your transport is handling your tape; high tension causing premature head and tape wear, low tension causing loss of high frequencies, or oscillations causing wow and flutter. Send for the Tentel "Tape Tips Guide". The T2-20-ML sells for \$279 - complete.

TENTEL

(408) 379-1881

Toll Free

1506 Dell Avenue
Campbell, CA 95008

800-538-6894
(ex. CA)

Circle #061 on Reader Service Card

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ISM 2011 - Mike Preamp/Level Detector

Ultra-low noise preamplifier intended primarily for high quality audio systems. Features include:

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- 100kHz full power bandwidth @ 60dB gain
- 100dB common mode rejection
- Input clamp immune to RF interference
- On-chip full wave rectifier, peak detector
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- Low cost - minimum external component count
- Pop free turn on

ISM 2012 - Voltage Controlled Amplifier

High quality linear-antilog VCA with full class A performance. Features include:

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**Solid State
Micro
Technology**
for Music, Inc.

2078B Walsh Avenue, Santa Clara, CA 95050, U.S.A.

(408) 727-0917, Telex 171189

Circle #062 on Reader Service Card

phonic pedal synthesizer. The synthesizer controls are mounted in a separate compartment for location anywhere in the performer's setup. The synthesizer contains two syncable audio oscillators with the exclusive Moog Overdrive circuitry. Full interface connections allow the Taurus II to drive other synthesizers, or to be used as an expander module.

Basic Specifications & Suggested List Price: 1 1/2 octave low-note priority monophonic pedalboard. Two audio oscillators ranging from 32 to 4". Contoured surge effects produced by sweeping second oscillator with contour voltage. Unconditional 3 part contour applied to VCF & VCA. \$895

NEJ

934 N.E. 25th Ave., Portland, OR 97232

(503) 232-4445; TWX 364412-INTR

Product Name: MODEL 2709B REAL TIME ANALYZER

Contact: H.C. (Bud) Garrison, President

Date Product Introduced: 6/82

Product Description & Applications: 27 band, 1 1/2 octave real time analyzer fully rack-mountable in 3 1/2" x 19" package. Flexibility and operational performance make the 2709B an ideal tool to aid in properly equalizing sound reinforcement, stage studio monitors and instrument loudspeakers. Whether making acoustic measurements, flattening room response, or eliminating feedback, the sound engineer and musician will appreciate the easy to read LED display (with both switchable range and decay rate) built in pink noise generator, and LED display SPL meter.

Basic Specifications & Suggested List Price: Pink noise output level 1 to 1 VRMS. Sensitivity 1mV and up for full scale. RTA display 27 x 9 LED Matrix with switchable range (1dB or 3dB per step). Decay rate slow (1dB per step 5 sec. to 8dB, 3dB per step 10 sec. to 24dB) fast (1dB per step 1 sec. to 8dB, 3dB per step 2 sec. to 24dB) SPL meter 9 LED display, 20dB to 120dB, C weighted. Filter bandwidth 6dB (at adjacent bands). Input impedance 200 ohms. Balanced line input 600 ohms. Balanced line output 600 ohms D3F type connector. \$1,295

NORTRONICS

8101 - 10th Ave. North, Minneapolis, MN 55427

(612) 545-0401

Product Name: PF 208 PROFESSIONAL HEAD

DEGAUSSER

Contact: Ken Lubitz, Sales Manager

Date Product Introduced: 11/82

Product Description & Applications: Hand held degausser with 1000 gauss magnetic field strength. Completely degausses all professional 2" heads and guides. Auto reset thermal device which maintains a safe operating temperature. Has momentary ON/OFF switch and Krayton rubber covered probe tip to prevent harm to head surfaces. Housing is high impact Lexan.

Basic Specifications & Suggested List Price: \$49

OMNIMOUNT SYSTEMS

P.O. Box 2789, Los Angeles, CA 90068

(213) 876-4355

Product Name: NEW UNIVERSAL MOUNTING

ASSEMBLY SERIES 50 AND SERIES 200

Date Product Introduced: Series 50 October AES Show, Series 200 early 1983

Product Description & Applications: Industrial quality Mounting Assemblies manufactured by Omnimount Systems are designed for use with speakers, television monitors, security cameras, lighting and more. System offers extraordinary flexibility. Ball and socket design not limited to pan & tilt functions. Features include quick installation, through-the-tube wiring capability and a very clean appearance. As with existing Omnimount models, series 50 and 200 will be available in a variety of mounting configurations with a full complement of installation accessories.

Basic Specifications & Suggested List Price: Series 50 available models 50WA Wall Mount, 50CA Ceiling Mount, 50WB Wall Mount, 50SWA "Shorty" Mount, 50RWA Coupler Model which interfaces standard plumbing pipe. Series 200 available models same as 50 Series with additional items planned. Maximum rated load Series 50 35 lbs. Series 200 125 to 150 lbs. Specifications subject to change without notice. Series 50 \$38.95, Series 200 price N/A.

OPTONICA

10 Sharp Plaza, Paramus, NJ 07652

(201) 265-5600

Product Name: LINEAR TRACKING AUTO REVERSE

TURNTABLE

Contact: Kenneth R. Wippler, Marketing Service Manager

Date Product Introduced: 6/82

Product Description & Applications: Vertical Design Linear Tracking Turntable with two tone arms features auto reverse playing (both sides of a record) fully Auto Speed, arm set down position. Auto record size APSS (Auto Program Search System - both sides of a record). One touch soft touch operation 2 magnetic phono cartridges, operation single side, both sides or repeat one or both sides of a record.

Basic Specifications & Suggested List Price: Type vertical type with linear tracking. Mechanism fully automatic player with both sides play, continuous play and repeat play. Motor electronically controlled DC motor. Drive system belt drive. Speed 33 1/3, 45rpm. Wow & flutter 0.06% WRMS. Rumble 65dB. Tonearms/Cartridges—Type 2 linear tracking arms with magnetic cartridges. Output level 2.5mV. Freq. resp. 20Hz to 20 kHz. Channel separation 20dB. Channel balance 3dB. Recommended load impedance 47k ohms. Recommended stylus pressure 2.5g. \$300

Other Equipment

PARAMOUNT SOUND SYSTEMS CORPORATION

1651 Gardena Ave., Glendale, CA 91204

(213) 956-3222, outside California (800) 423-3205

Product Name: GS-3 OMNISPEAKER

Contact: Judd McCully Sales

Date Product Introduced: 1982

Product Description & Applications: Outdoor, weather proof enclosed housing 8" cone type speaker. 90% of enclosure buried in around a hidden sound source for amusement parks, malls, pools/spas or any outdoor application. Over 2000 in use worldwide, a sonically excellent and cost effective answer to your outdoor sound needs.

Basic Specifications & Suggested List Price: 360 degree dispersion horizontal 30 degree vertical. Freq. resp. 50 Hz to 10 kHz. Maximum input 15 watts. Color green. Size 14 x 14 x 13". Weight 8 lbs. \$117.95 + tax & shipping.

PASSPORT DESIGNS, INC.

116 N. Cabrillo Hwy., Hall Moon Bay, CA 94019

(415) 726-0280

Product Name: SOUNDCHASER

Contact: Chris Albano, VP Marketing

Date Product Introduced: 1/82

Product Description & Applications: Soundchaser consists of a four octave keyboard and interface card, the Mountain Computer Music System software and the Apple II Computer. By defining waveforms, amplitudes and frequencies with joysticks, the user can play an unlimited number of sounds such as strings, horns and space sounds. Also available are MusicTutor and Notewriter software support for composition and education.

Basic Specifications & Suggested List Price: Keyboard interface, Mountain Music System and Performance software. Retail is \$795. Complete system with Apple II retails for less than \$4,000.

PENNY & GILES CONDUCTIVE PLASTICS

1640 Fifth St., Suite 224, Santa Monica, CA 90401

(213) 393-0014

Product Name: PENNY & GILES CONDUCTIVE PLASTICS

Contact: Gay Coles Sales

Date Product Introduced: Modified continuously (Series 3000 in 1982).

Product Description & Applications: Penny & Giles faders achieve an infinitely smooth, noiseless taper by using glass smooth conductive plastics tracks and a unique wiper and slider arrangement. The mechanical action is equally smooth yet positive in operation. An extremely long working life plus complete operational reliability without any routine maintenance, compliments the performance specification. Penny & Giles conductive plastic faders are used by leading broadcasting and recording studios throughout the world.

Basic Specifications & Suggested List Price: Unbalanced Linear Fader \$34.50+. Unbalanced Log Fader Balanced Log Fader \$34.50+. Digital Output Fader \$49+. Unbalanced Ladder Fader Balanced Ladder Fader \$65+. Joystick Quadra phonic Pan Potentiometer \$109+. Rotary Fader \$41+. Environmentally Protected Faders \$21+.

RANE CORPORATION

6510-D 216th SW, Mountlake Terrace, WA 98043

Product Name: HC 6 HEADPHONE AMPLIFIER CONSOLE

Contact: Larry Winter, VP Marketing

Date Product Introduced: 8/82

Product Description & Applications: The HC 6 consists of six separate stereo headphone amplifiers, with independent volume controls, which may be driven either directly through individual inputs in tandem from the master stereo inputs, or any combination of the two. Featuring both front and rear mounted outputs and signal present LEDs, the HC 6 is a versatile headphone distribution amplifier with the added capability of headphone monitoring, multiple remote program monitoring, language lab distribution and many other applications.

Basic Specifications & Suggested List Price: Power output 100 to 250mW maximum per channel. 5 watts per headset, all inputs auto balanced/unbalanced. Stereo mono switch. 12 stereo output jacks, individual signal present LEDs, master level control with +28dB gain, steel rack mount chassis 19" x 1.75" x H 2.9" lbs. net weight \$349.

RANSTEELE AUDIO, INC.

1697 Broadway, New York, NY 10019

(212) 265-5563

Product Name: RANSTEELE MM-3 DISC CUTTING

MONITOR SYSTEM

Contact: Tom Steele

Date Product Introduced: 5/82

Product Description & Applications: A complete disc cutting room monitor input system enabling the cutting engineer to simultaneously meter and monitor all facets of the stereo program both in preview and program channels. Contains complete VU metering and monitor systems for left/right lateral (sum and vertical

(difference) at any calibrated level, from -14dBm through +8dBm from any of eight selectable input sources. Balanced differential inputs present, no loading effect. High slew rate electronics used throughout. Rack mounted.

Basic Specifications and Suggested List Price: Ransteele MM-3 Meter Monitor System \$4900. Optional LED PPM Program Meters for Left and Right \$470. Optional oscilloscope monitoring with remote meters \$11,562.5

RANSTEELE AUDIO, INC.

1697 Broadway, New York, NY 10019

(212) 265-5563

Product Name: RANSTEELE RDS-600 STEREO DISC

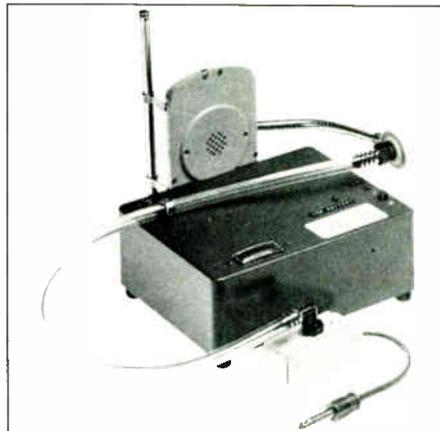
DRIVER SYSTEM

Contact: Tom Steele

Date Product Introduced: Fall 1982

Product Description & Applications: 600 watt per channel custom stereo cutterhead driver electronics package capable and designed to drive any Neumann SX 14 6B or Ortofon DSS 7.5 1/2 Cutterhead, 1 1/2 octave drive equalization for cutter matching, high slew rate electronics (also available transformerless) sophisticated cutterhead protection system, fully adjustable feedback monitor system. Other versions available to drive any Westrex 3D Series or Haeco SC 2 cutterheads. Optional HFAL 3 High Frequency Limiter unit provides complete cutterhead protection.

Basic Specifications & Suggested List Price: Steel rack mount Driver Preamp protection electronics 5 1/4 x 14". Power amp liters 2 1/2 x 19" each. High Frequency Limiter 1 1/4 x 19". Freq. resp. 40 Hz to 20 kHz \pm 1dB (dependent entirely on cutterhead). RDS 600 Driver package \$12,750 for Neumann or Ortofon. Optional HFAL 3 High Frequency Limiter \$2,900.



SYSTEM 50 BASE STATION INTERFACE
R-Columbia Products Co. Inc.

R-COLUMBIA PRODUCTS CO., INC.

2008 St. Johns Ave., Highland Park, IL 60035

(312) 432-7915; TWX 910-692-2160

Product Name: SYSTEM 50 BASE STATION INTERFACE

Contact: I. Rozak, President

Date Product Introduced: 3/82

Product Description & Applications: System 50 Base Stations by R-Columbia will provide full duplex intercommunication between producer-director etc. (wearing an FM wireless intercom headphone) and camera/lighting and/or sound equipment operators who are communicating via existing hard wired systems such as RTS, Clearcom, Telex, etc. Provides crystal clear 2 way voice communication between stage and set management, personnel and equipment operators up to 150 yards.

Basic Specifications & Suggested List Price: FCC certified and license free. Each R-Columbia System includes 1 each transmitting and receiving base station plus one model TR50 AF FM wireless intercom headphone. Total package price is \$995.

R-COLUMBIA PRODUCTS CO., INC.

2008 St. Johns Ave., Highland Park, IL 60035

(312) 432-7915; TWX 910-692-2160

Product Name: MODEL TR50/V WIRELESS INTERCOM

HEADPHONE

Contact: I. Rozak, President

Date Product Introduced: 1/82

Product Description & Applications: Provides hands free wireless 2 way intercom between directors and producers of theatrical and recording events and their equipment operators such as lighting and sound operators, etc. Within its range, 150 yards, the TR50 V will provide crystal clear 2 way voice communication to any number of similar headphones.

Basic Specifications & Suggested List Price: 5 channels are available for operation. FCC certified and license free. Each TR50 V has a built in FM transmitter/receiver and standard 9V battery supply. A sensitive stretch circuit drives the receiver into queuing during times of no transmission. Price of TR50 V FM Wireless Intercom Headphone \$297. Vox attachment \$69.15 additional.

Other Equipment



MODEL TR50-V WIRELESS INTERCOM HEADPHONE
R-Columbia Products Co. Inc.

RENKUS-HEINZ, INC.

17851 AB Sky Park Circle, Irvine, CA 92714
(714) 540-3154

Product Name: HIGH FREQUENCY COMPRESSION DRIVERS, HORNS & PASSIVE NETWORKS

Contact: Alvin Renkus, Vice President

Date Product Introduced: '98

Product Description & Applications: Monitors and stage monitors in sound systems for movie theatres using the RH SSD 1801 or the RH SSD 4301 and drivers.

Basic Specifications & Suggested List Price: List prices range from \$800 to \$1,100.

RKB INDUSTRIAL, INC.

2058 Harrison Blvd., Ogden, UT 84401
(801) 621-5530

Product Name: KIMBER KABLE

Contact: Ray L. Kimmer, President

Date Product Introduced: '82

Product Description & Applications: Kimber Kable is a high performance speaker wire having numerous desirable features. It has special conductors material with unique stranding and insulation. This cable features RF and other outside noise pickup rejection and likewise will not cause crosstalk with nearby low level wiring. Perceived audio quality is also greatly improved by lowered distortion, increased damping factor, and preservation of transient signal.

Basic Specifications & Suggested List Price: Several sizes and configurations are available and in a variety of colors. Prices on standard products range from \$0.60 to \$1.48 per foot. Dealer pricing is available to indirect companies.

R.T.S. SYSTEMS

1100 W. Chestnut St., Burbank, CA 91506
(213) 743-7022

Product Name: SERIES 17 USER STATIONS

Contact: Douglas Leighton, President

Date Product Introduced: '82

Product Description & Applications: This new product group is defined as a low cost conference line intercom system. The easy to use design allows for instant on-line connection of a Series 17 station to an intercom party line. Initially featured is a telephone type handset and a single earphone headset, each unit is completely self-contained — all the necessary electronics are built in. The stations operate in a single channel three-wire mode and can power off a conventional D.C. power supply or a TW Intercom System power supply.

SAKI MAGNETICS

865 Hayden Place, Culver City, CA 90230
(213) 559-6704

Product Name: REPLACEMENT HEADS

Contact: Trevor Boyer

Date Product Introduced: '98

Product Description & Applications: Saki has introduced its new generation of replacement recording heads with metal units designed for 3M M 79 two track twenty-four track recorders, Stevens 16 and 24 track and TEAC 80 B eight track. Now ferrite two track heads are also available for Otari 5050 MC1H 110 3M M 79 and Ampex ATR 100 (the last two available in 1/2" and 1/4" formats).

SESCOM, INC.

1111 Las Vegas Blvd. North, Las Vegas, NV 89101-1197
(702) 384-0993; (800) 634-3457

Product Name: PATCH SYSTEM

Contact: Franklin J. Miller, President

Date Product Introduced: 10/82

Product Description & Applications: The Patch System designed expressly for 2 x 8 track studios is comprised of two patch bays. The Model PR 1 is sixteen double row 1/4" phone jacks normally with designation strips. Phone jacks are mounted front and rear, no soldering required, just plug in appropriate cables for connection. PB 2 same as PB 1 but jacks are not normaled. Units measure 3 1/2" H x 17" W x 4 1/2" D and can be rack mounted.

Basic Specifications and Suggested List Price: \$150 each.

SOLID STATE MICRO TECHNOLOGY FOR MUSIC, INC.
2076B Walsh Ave., Santa Clara, CA 95050

(408) 727-0917

Product Name: SSM 2011 MICROPHONE PREAMPLIFIER/LEVEL DETECTOR

Contact: Dan Parks, Sales Manager

Date Product Introduced: 8/82

Product Description & Applications: The SSM 2011 is an ultra low noise preamplifier primarily intended for high quality audio systems. The input stage uses optimized biasing and geometries to yield a 24nV per root Hertz voltage noise and a 110dB common mode rejection ratio over a $\pm 5V$ input range. A single compensation capacitor provides a 200MHz gain bandwidth product ($G=1000$) and a 200 kHz full power bandwidth at $G=10$. The level detector section consists of a precision re-tunable two internal biased comparators and two LED drivers. One LED output lights at 4dB below a 5V peak output while the other lights only when the signal is within ± 10 dB of nominal output level.

Basic Specifications and Suggested List Price: \$3.30 at the 1000 piece level.

SYNTAURI CORPORATION

3506 Waverley St., Palo Alto, CA 94306

(415) 494-1017

Product Name: ALPHASYNTAURI DIGITAL SYNTHESIZER

Contact: Lenore Wolgaster

Date Product Introduced: 6/82

Product Description & Applications: Composer's Assistant™ a software product for the computer based alphaSyntraur™ key board synthesizer is designed for quick, accurate production of printed scores and lead sheets. A professional 8 voice polyphonic scoring tool, Composer's Assistant digitally converts music played on the Syntraur instrument into a computer-generated score. Key features: 1/8 notes and rest resolution, accidentals, variable time and key signatures, measure tie marking, and text editing for expressions, lyrics and chords.

Basic Specifications & Suggested List Price: Requires 4 or 5 octave alphaSyntraur™ synthesizer system (includes an Apple II computer), and alphaPlus™ or Syntraur's Metatrak™ 16 channel re-recording software. Supports the IDS 440 and other popular printers. Available from selected retailers or Syntauri Corporation \$299.

SYNTAURI CORPORATION

3506 Waverley St., Palo Alto, CA 94306

(415) 494-1017

Product Name: ALPHASYNTAURI DIGITAL SYNTHESIZER

— METATRAK™

Contact: Lenore Wolgaster

Date Product Introduced: 6/82

Product Description & Applications: Metatrak™ a powerful easy to use, inexpensive 16 track digital recording system for the alphaSyntraur™ computer-based digital synthesizer. Designed for composing, arranging and live keyboard playing with back ground accompaniment. Metatrak has standard recording functions (record, playback, erase) plus unique per-track control over instrumentation, vibrato, volume and special effects. Pieces played on the Syntraur keyboard are recorded, saved and re-orchestrated using the Track Master. Variable speed (1-800%) playback, bass line sequencer, and metronome click track are built in.

Basic Specifications & Suggested List Price: Notes storage 4000 notes standard (expandable to 20,000 with optional Meta Expander™). Metatrak is available for the alphaSyntraur Studio Pro synthesizer (5 octave, 8 voice polyphonic, velocity keyboard. Retail under \$4,300 including the Apple II computer.) Metatrak includes software and a comprehensive manual, suggested retail is \$250. Manual available for \$10.

TELEX COMMUNICATIONS, INC.

Audio Visual Department

9600 Aldrich Avenue South, Minneapolis, MN 55420

(612) 884-4051, 884-7367

Product Name: TELEX MODEL 6120

Contact: Tom Johnson

Date Product Introduced: 10/82

Product Description & Applications: An audio tape duplicator capable of making reel or cassette copies from reel or cassette masters at a 16:1 speed ratio. System is modular in design and can be expanded from a cassette master with three slaves to a full eleven cassette slaves with a reel master and two reel slaves.

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TENTELOMETER*
Tentel Corporation

TENTEL CORPORATION
1506 Dell Ave., Campbell, CA 95008
(408) 379-1881

Product Name: TENTELOMETER* TAPE TENSION GAUGE
Contact: Wayne Graham, Sales Manager
Date Product Introduced: 1984

Product Description & Applications: New in-line dynamic tape tension gauge with all electronic meters and manual input for non-ferrous tapes. Fits into small spaces. The L1 H2O CB and the T2 H2O CB offer very low tape resistance to enable the servo circuit new to the tension meter more efficient than ordinary tape tension meters.

Basic Specifications & Suggested List Price: The L1 H2O CB resistance to 200 ohms (100 grams) and has two rotating and one non-rotating probe. The L2 H2O CB also has resistance to 200 ohms (100 grams) and has all three probes mounted. It provides full bearing rollers. Either of these gauges can be used on tape widths of 1/2, 3/4, and 5/8 inch. \$400.

Other Equipment



VIDEO DOORPHONE
Uni-Vid

UNI-VID
P.O. Box 18658, Irvine, CA 92713
(714) 754-5482

Product Name: VIDEO DOORPHONE
Contact: Brian Wilson, President

Date Product Introduced: 1987

Product Description & Applications: The Uni-Vid Video Doorphone is a completely self-contained closed circuit video system that lets you see as well as hear your visitor while your door remains securely locked. The system includes a video camera, light microphone, inter-speaker output, and a video monitor and telephone handset inside. The system can be interfaced with a home video recorder to make a permanent record of any no-balling on you.

Basic Specifications & Suggested List Price: \$1,245

VALLEY PEOPLE, INC.
2820 Erica Pl., P.O. Box 40306, Nashville, TN 37204
(615) 383-4737

Product Name: QLZ (MODEL 813) MIC PRE-AMP

Contact: Liz Clark, Sales & Mkt. Coordinator

Date Product Introduced: 8/82

Product Description & Applications: QLZ Model 813 is a low impedance transformerless quad mic preamp exhibiting transparent low noise and distortion free operation. QLZ is designed to optimize recording on the air and live performance capabilities. Connection is possible at the front panel XLR connectors or at the barrier strip on the back of the TP804 TP805 enclosures. Phase reverse is provided at each of the four input sections. Phantom powering is also incorporated for use with condenser microphones.

Basic Specifications & Suggested List Price: Input impedance: 1.5 k ohms (balanced). Noise: hum output: 200 ohms input impedance at 60dB gain. -67dB typical. Distortion: THIM: less than .005% typical. Freq. resp. ± 25 dB 20 Hz to 20 kHz. ± 4 dB at 10 Hz - 180 kHz. Maximum output: +20dBm into 600 ohms. Gain range: 20dB to 60dB. Power requirement: ± 15 V at 100mA nominal. \$550.

WIREWORKS CORPORATION

380 Hillside Ave., Hillside, NJ 07205
(201) 686-7400

Product Name: HVT SERIES AUDIO/VIDEO MULTICABLE

Date Product Introduced: 1987

Product Description & Applications: Combines video lines and individual shielded audio pairs in the same cable. A great deal of convenience not having to run multiple cables. Typical application would include remote recording on location production (TV, video, film) as well as ENG or wherever audio video lines are required.

WIREWORKS CORPORATION

380 Hillside Ave., Hillside, NJ 07205

(201) 686-7400 TWX: 710-985-4675

Product Name: MULTICABLE COMPONENTS GROUP —

MSBT; MSBD MICROPHONE SPLITTER

Date Product Introduced: 1987

Product Description & Applications: Box or rack mount components that accept individual microphone inputs and split the microphone into 2 or 4 different outputs. Typical application for a monitor console setup as well as remote and broadcast facilities.

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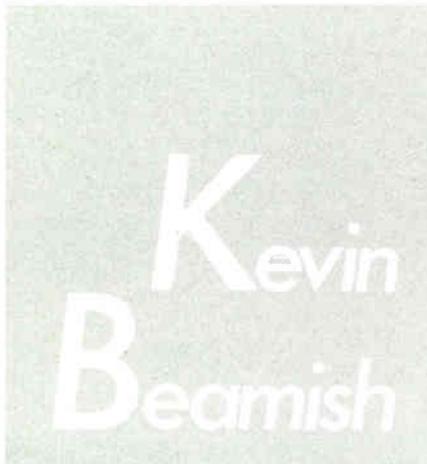
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PRODUCERS - DESK



by David Gans

Although neither party was entirely unknown prior to the release of *Hi Infidelity*, REO Speedwagon and co-producer Kevin Beamish found their profiles raised considerably by the overwhelming success of that record. Four hit singles helped boost sales to nearly seven million units in the United States, plus a couple million more overseas. REO's previous peak had been 1½ million with their live album, *You Can Tune a Piano But You Can't Tuna Fish*. Obviously, something special happened between REO and Beamish when they teamed up for the third time to make *Hi Infidelity*.

I caught up with the 32-year-old engineer/producer at San Francisco's Automatt as he finished up the recording of the Jefferson Starship's next LP, *Winds of Change*, and prepared to return to Los Angeles to mix it.

WHAT MADE *HI INFIDELITY* SUCH A MAGICAL RECORD?

A lot of things. There's a solid base of REO fans—probably close to a million—who will buy an REO album just because they love the band. Then there was the fact of the right song at the right time: "Keep on Lovin' You" was a Number One single, almost a two-million seller. And the band had never really had a hit single before.

So there's a million people who will buy any REO album regardless, and then you get a hit single which appeals to a much broader base of people—maybe an older crowd that would like easier, more pop-oriented sounds as opposed to real hard rock and roll. "Keep On Lovin' You" is a power ballad—it's a sweet song with meaningful lyrics, and yet there are

big heavy guitars in it and a screaming solo.

THE WHOLE ALBUM HAS THAT QUALITY: THE POWER IS THERE, BUT IT'S NOT RIGHT IN YOUR FACE.

There's a huge base of listeners out there that just can't take stuff that's too hard-edged. If you can retain the flavor of a band like REO Speedwagon, put a song out that has the power of REO but isn't, as you said, so much in your face, then you have a big hit single.

WAS THIS A PRETTY DRASTIC CHANGE IN APPROACH FOR THE BAND?

Not necessarily. They were known as one of the original [chuckle] "heavy metal" bands, but there's been a gradual change. On the *Tuna Fish* album, there was "Roll with the Changes," which is really a rock anthem, but there was also "Time for Me to Fly," which is a ballad. It's got acoustic guitars *and* big guitars in it. The band is still REO Speedwagon, but their records appeal to a wider group of people now.

HOW DID THEY HAPPEN TO COME UP WITH FOUR HIT SINGLES ALL AT ONCE?

REO has always been a touring band, hundreds of dates a year, so they really didn't have an opportunity to write as much as they wanted to. After *Nine Lives*, which was a good rock and roll album and sold gold—but didn't have a hit single—there was a conscious effort made to write. They decided to put out *A Decade of Rock 'n' Roll*, which was sort of a compilation album—not really a "greatest hits" set, but a double album with some new live performances and some new mixes from ten years' worth of tapes. We discovered all kinds of

things, such as a song that had a full 30- or 40-piece orchestra on the 16 track tape that wasn't used in the final mixes.

That gave the two songwriters, Kevin Cronin and Gary Richrath, an extra six months to write songs, and "by God, we're finally gonna have that hit single"—the one thing that was keeping them from being a multi-platinum act.

HOW DID YOU RECORD *HI INFIDELITY*?

It's fairly common knowledge now, but at the time we didn't want to tell anybody: as it turned out, seven of the ten songs on *Hi Infidelity* are demos we cut in a couple of days.

We had been rehearsing the songs for a couple of months, and we decided to cut some demos and see what they sounded like on tape. We did five songs one day, five songs the next. After we cut a song, Kevin would put a vocal down and Gary would do guitar solo—or sometimes he'd do the solo as they were cutting the track. The demos sounded great.

We said, "Boy, what a great set of demos! Now let's go in and start cutting the album. We'll do the same thing, but we'll just do it better—we'll spend more time on the sound."

Well, \$20,000 later we had cut one song, and the feel just wasn't there. We had great sounds, but the demos just felt better. So seven of the ten songs are the original demos, recorded the first or second time through, *live*. The Bo Diddley beat on "Don't Let Him Go" is so great—it could never be done again.

We re-cut "Keep on Lovin' You," "Wish You Were There," and "Take It on the Run," because their tempos were really critical and more inconsistencies showed up. So two of the four

singles were demos and two were recut.

You're so conditioned to grinding away in the studio, beating things to death. There's a stigma about using demos, but it's *good music*. I don't think people necessarily say, "Boy, it sounds like they spent a lot of time doing that record—it's so perfect." They react to the feel. But having been brought up in 24 track Disneyland, we couldn't believe that we could actually cut demos and put them out. I really learned a lesson. **WHAT DID YOU FIND ATTRACTIVE ABOUT WORKING WITH THE JEFFERSON STARSHIP?**

I remember coming to San Francisco in 1967 and seeing the Jefferson Airplane, and those personalities—Grace Slick, Paul Kantner... It's a prestige group, not only for the record company but for me, too.

But if they didn't have any good songs, I wouldn't have taken the project. I first believe in the songs, but the fact is they're a good band to work with, legendary musicians. It seemed like the right thing to do. **I SUSPECT THAT IT COULD BE REALLY CHALLENGING, WITH ALL THE STRONG PERSONALITIES AND MATURE TALENTS INVOLVED.**

It *is* a challenge, because this band has very different songwriters and very different ways of doing things. They didn't all start in this band together, and they've come together from different points of view. They're all consummate pros, and yet that's a problem in the sense that they're all so professional that nobody really takes charge.

None of them wanted to help arrange each other's songs, because they didn't want to step on toes, so I could be a decisive factor and say, "Yes this, yes that, and let's try this." **DO YOU EXPECT *WINDS OF CHANGE* TO ENLARGE THE STARSHIP'S AUDIENCE THE WAY *HI INFIDELITY* ENLARGED REO'S?**

Absolutely. That's probably one reason why they hired me, and it's one of the reasons I did it: I do see that there is a wider base that this group can appeal to.

Peter Sears and his wife, Jeanette, have written very pop-oriented, beautiful and wide-ranging lyrics that are going to appeal to a lot of people. It's still the Jefferson Starship, but the Starship is getting older—as are all the fans—and when you're in your late 20s and 30s, you want to hear music that relates to you. The fans should

grow with the band, just as the band should grow with the fans.

ARE YOU GOING TO TRY AND CREATE THE SAME KIND OF AMBIENCE IN THE STARSHIP'S SOUND THAT YOU DID FOR REO?

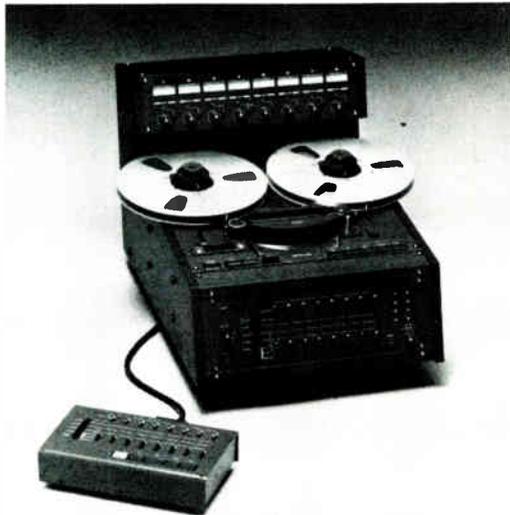
I'm sure the mix will be very deep and three-dimensional, as was *Hi Infidelity's* mix—but it's a different band, with different songs and a different approach. One thing I pride myself on is *not* being consistent. Every project has its own right to be, and each one should be approached differently.

What works with one band doesn't necessarily work with another. If you plug in your limiters before you start mixing just because that's the way it worked on the last album, then you're not only missing half the fun, but you're also cheating the client. You really have to approach it individually.

My job is to develop the sound of the group so it's better than before, and yet to let it be the same group. It's their record, not mine, and I don't want all the records that I do to sound the same. I want them to sound individual and to stand on their own. The artist's name goes on the front of the record; my name goes on the *back*. ■

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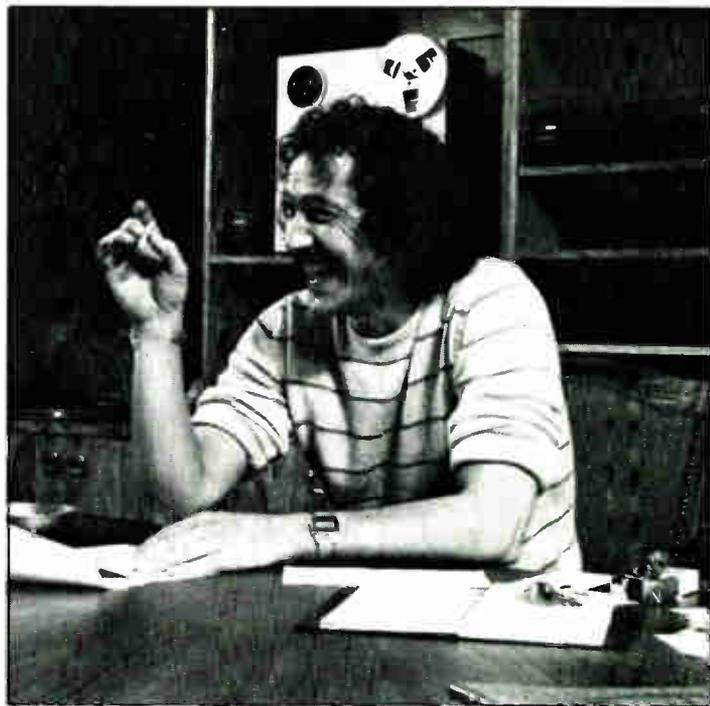
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J.D. Blackfoot

The Platinum Planner



by Douglas F. Ordon

J.D. Blackfoot, owner of Bison Recording studio in Columbus, Ohio, is a man with a grin and a personality that could charm the paper off of a wall. He's also a performer who recently held a St. Louis audience of several thousand at near-frenzy level for more than two hours, nonstop. And, he's a businessman with a very big dream... to "hang platinum" on his office wall.

J.D. (by the way, that stands for J.D.) has been a performing musician for 15 years. His first experience with recording came in 1969 when he convinced a friend to put up several hundred dollars so he could do three songs in a Cleveland studio. He sent the tapes to several record companies and was signed with Mercury, two weeks later! His first album was titled *The Ultimate Prophecy*. Not satisfied with what was happening, he left the label after a couple of years and moved to New Zealand, the country where his wife was born and raised. While in New Zealand, he worked as promotion manager for two record companies. He also wrote and recorded his *Song of Crazy Horse* album. It was named New Zealand album-of-the-year in 1974. (You don't have to spend an extended period of time with J.D. to sense his deep love and

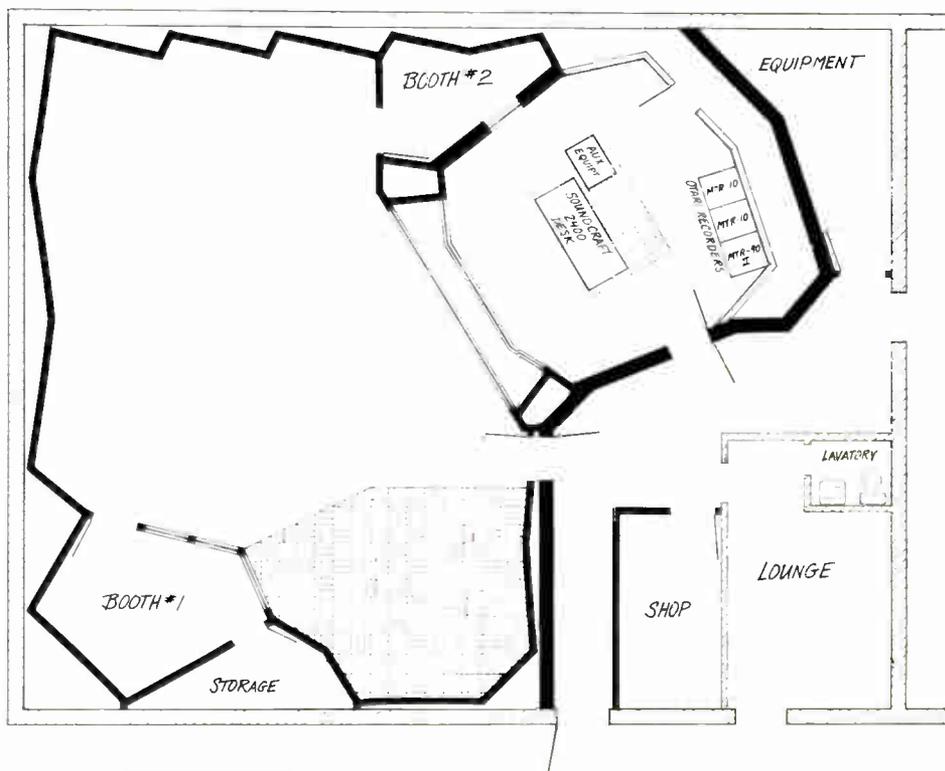
concern for the American Indians.)

He returned to the United States, signed with Fantasy Records and added two more albums to his vinyl collection. He also performed with his band all over the country for the next several years.

Then his career took a major shift. On September 12, 1977, J.D. Blackfoot became an agent for the Prudential Life Insurance Company. It was a matter of survival. He had a wife and children to support, and the music business wasn't making it. But J.D. brought his special kind of enthusiasm to his new job. When the books were closed on

1977 (three-and-a-half months later), J.D. had moved up to number five in sales accomplishments in a district of 36 seasoned agents. In his first quarter he sold over \$1 million in life premium, earning the "Remarkable Rookie" silver trophy. On a challenge from the Marketing Vice President, J.D. sold an additional \$1 million-plus, capturing the gold "Super Remarkable Rookie" award. By the end of his third quarter, and another \$1.3 million, he had moved up to a companywide standing of 97 out of 26,000! Not a bad accomplishment for a guitar picker.

(continued on page 102)

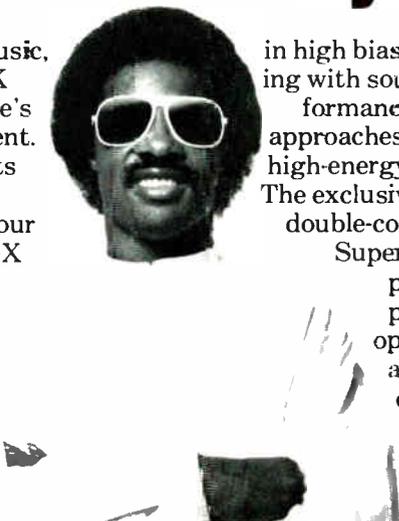


Bison Recording Studio Floor Plan

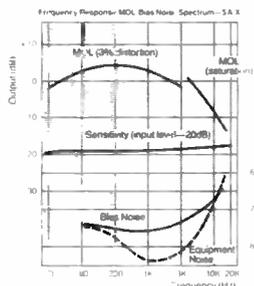


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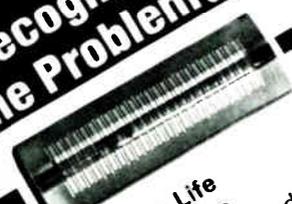
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(continued from page 100)

And then it came—a moment of personal crisis. J.D. had just returned home from a successful sales interview. It was 1:30 in the morning and he was bone-weary. As he sat in his living room, his eyes fell upon the various trophies and awards. All he could think was, "You can hang silver and gold selling life insurance, but you can't do it in the business you love most... music." Sadness filled his mind and tears filled his eyes. Anger took over and he smashed every life insurance memento in sight. The next day he quit the Pru-

ly, that room says to J.D., "I'm out here waiting for you to record every day you can, as you go after your dream... your hit song... your platinum record." As J.D. puts it, "It's just a matter of time. If it takes until I'm 85, the room is here, waiting for me." And as a huge, joyful laugh fills the room, you just have to know he believes it's true.

At this point it might be a good idea for me to set the record straight and assure you that J.D. Blackfoot is not a Walter Mitty or a Don Quixote. There is no question that he is a dreamer. But



J.D. Blackfoot in the control room of Bison Recording.

dential and went back into music. Shortly after his reentry he began toying with the idea of building a studio of his own. Today a chunk of his demolished gold "Super Remarkable Rookie" award rests in a place of honor in his beautiful new studio.

Many of you reading this article probably feel that owning a recording studio would be a dream-come-true. In J.D.'s case, it is more the means-to-an-end. After his return to Ohio, he spent about a year writing songs and playing with various groups of friends. During this time he set about trying to figure out how to accomplish his lifelong goal of "hanging platinum." About the same time he started giving really serious thought to building a studio—not just a studio, but a "world-class room"... a studio that is artist-owned. To J.D. the recording studio meant a lot of things. It was badly needed. At that time and at this writing, no other 24 track facilities exist in Columbus. It was also viewed by J.D. as a means of survival on his way to "hanging platinum." He reasoned that he'd rather support his family on the income generated by a fine recording studio than he would with insurance commissions. And final-

ly, when he identifies an objective, the fantasy ceases and the action begins. He is an astute, hard working businessman with a keen sense of timing and an instinct for doing things right.

When J.D. made the decision to build his recording studio, he thoughtfully identified three priorities—funding for the project, the best people to design and build it, and the finest equipment available for a cost-effective return on his money.

Realizing that he needed financial commitment before he could proceed with anything else, J.D. set money as his first priority. As he recalls, "With money being so tight, I figured it would be impossible to put together a limited partnership that could raise the kind of money we would need for a project like this one." He continued with a grin, "When I mentioned I was thinking about going to the SBA (Small Business Administration) for the money, the reaction was always the same—'Don't waste your time. They'll kill you with paperwork, red tape, and wasted time. It will take at least a year to get an answer, and then it'll be a NO!'"

"I guess I was a little hardheaded, because I went to the SBA and got

their package of applications and forms and more forms. Much to everyone's amazement, 90 days later I was approved for a direct loan from the SBA. My attorneys couldn't believe it and commented that they knew people who would pay good money just to learn how I put the package together. I'll give you that information for nothing. All I did was give them everything they asked for . . . and more. They asked for X amount of paperwork. I gave them all of that, plus about 300 pounds more than they asked for. I included letters of reference from presidents of major labels, promoters, booking agents, radio station owners, and managers who committed their groups to record in the studio once it was completed. I must have been thorough; the SBA didn't ask for one additional piece of paper!

"But the real key factor in my favor, and the SBA loan officer told me this, was my incredibly strong show of force in sales results at the Prudential. I guess that sort of proved to the SBA that I was a strong sales person, and that I could, if necessary, get rid of the long hair, put on a suit and tie, and make it in the business world outside of music. Generally speaking, they find musicians a little risky. And I don't want to take all of the credit in securing the SBA loan. I give a lot of praise to my partners—my sister, who owns her own seminar/consulting business called Management Alternatives, and my brother-in-law, who holds the Carl Vincent chair of political science at Georgia College. Their resumes and backgrounds were very impressive and valuable. Our only other partners are their son and daughter, my niece and nephew. So the five of us are Ohio Dream Inc., doing business as Bison Recording. I guess you could say we're a closely-held family corporation."

The next priority for J.D. was putting together the team that would put together the studio. I'm not suggesting that these steps were done in strict sequence; the events certainly dovetailed. It's simply easier to follow in this manner.

In selecting a person to conceptualize and design the studio and all of the equipment that would make it work, the choice was an easy one . . . Gary Hedden, premier audio engineer. J.D. and Gary had known of each other for years, both being from central Ohio. Gary remembers J.D. as a top local rock and roll star, and J.D. remembers Gary for his reputation as a recording engineer. They both remember hoping to work together some day in the recording studio. They met very briefly about three or four years ago at a session in a Chicago suburb. As Gary recalls, "It was only for a couple of minutes, but there was that special spark."



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Then about a year and a half ago J.D. called Gary to tell him about his idea to build his own studio. He asked Gary if he would be interested in designing the facility. Gary replied faster than you could say, 'YES!'

"I'm convinced," states J.D., "that Gary Hedden is the biggest genius I have ever known in my 15 years in the business. When I learned that Gary was available for this project, I was thrilled. On his first visit from Chicago, the whole time Gary kept asking me about budget requirements. I finally said, 'I want to develop a studio where you would be proud to be the engineer. I need you to tell me how much of a studio that's going to be, and then it'll be up to me to make sure we have

enough money to do it.' I didn't want to say, 'We have X amount of money... what can we build for it?' I philosophically wanted the emphasis reversed.

"I also made it clear that I didn't automatically want the most expensive, because that was clearly out of my realm of thinking. I knew that Gary had been in most of the major rooms in this country, and I knew his magic, sitting behind the console. All I wanted to do was to develop a studio that would produce results that would make Gary happy if he were producing and engineering. No small task! I told Gary that I wanted to get the best equipment possible for the dollars spent, and not from the 'filthy rich' viewpoint. There are lots of products available today that are

purely toys for the rich, products that have gone way beyond what is needed. Sure, after a few hit records, you might treat yourself to some toys. But at first, it's best to keep your priorities in order.

"Another person who deserves a large salute is John Kanuth. John was the builder... the craftsman. He spent about 12 years of his career at Columbus Custom Coach building, of all things, custom coaches for many of the top Country and Western stars. There isn't a person better qualified to know or understand what special touches make an artist or a music business person feel comfortable, relaxed and ready to get the job done.

"There were many more people involved in the creation of this studio, and I wish I could name them all. But one thing I must mention, the greatest thing about all of this is that all of the people involved really wanted it to happen. There was so much love that went into this project, that I can't begin to describe it."

In reflecting on the equipment selection process, Gary Hedden commented, "If you do it right, you improve your chances for survival... as long as you don't go overboard. J.D. and I took advantage of every opportunity to spend a little more to get something a whole lot better." In the interest of space, we will concentrate our attention on only the major components.

Bison employs a split-line design Soundcraft 2400 console. According to Gary Hedden, "The Soundcraft gives a great deal of flexibility in mixdown. I like to assemble lots of toys on the side and have special effects running all over. It's the same console whether you're cutting tracks or mixing... you can add a track with ease. I actually did a lead vocal just before the final mix. Every one of the faders—the twenty-eight on the input side, 24 group masters and the 24 monitor faders—can actually have a line signal present on it and be applied to the stereo mix. You end up with the potential of accommodating two 24 tracks, or a whole bunch of special effects."

The whole control room recording system is Otari," adds Gary. "The transport is a different design approach than many others on the market and uses a deck that has no pinch roller. It's part of a new breed of machines that have electronic brains within them—a computer controls things. It has an RS-232 interface that will allow it to communicate with other computers as systems develop."

The monitor system in J.D.'s studio was manufactured by "the new kid on the block," as J.D. refers to Fostex Electroacoustic. The main monitors are the Fostex LS-3's, and both J.D. and Hedden are enthusiastic about their performance. Hedden says, "After some

THE CAT

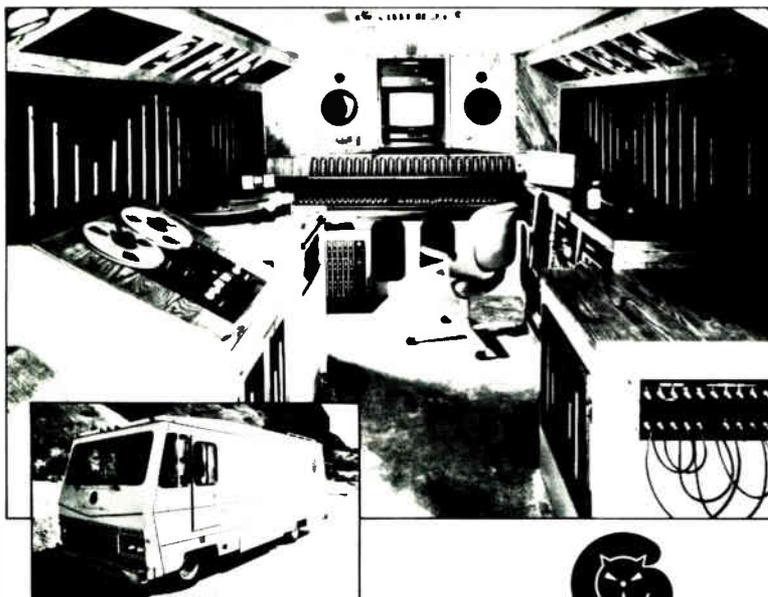
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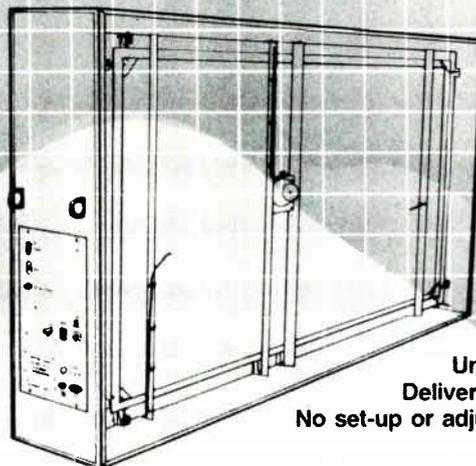
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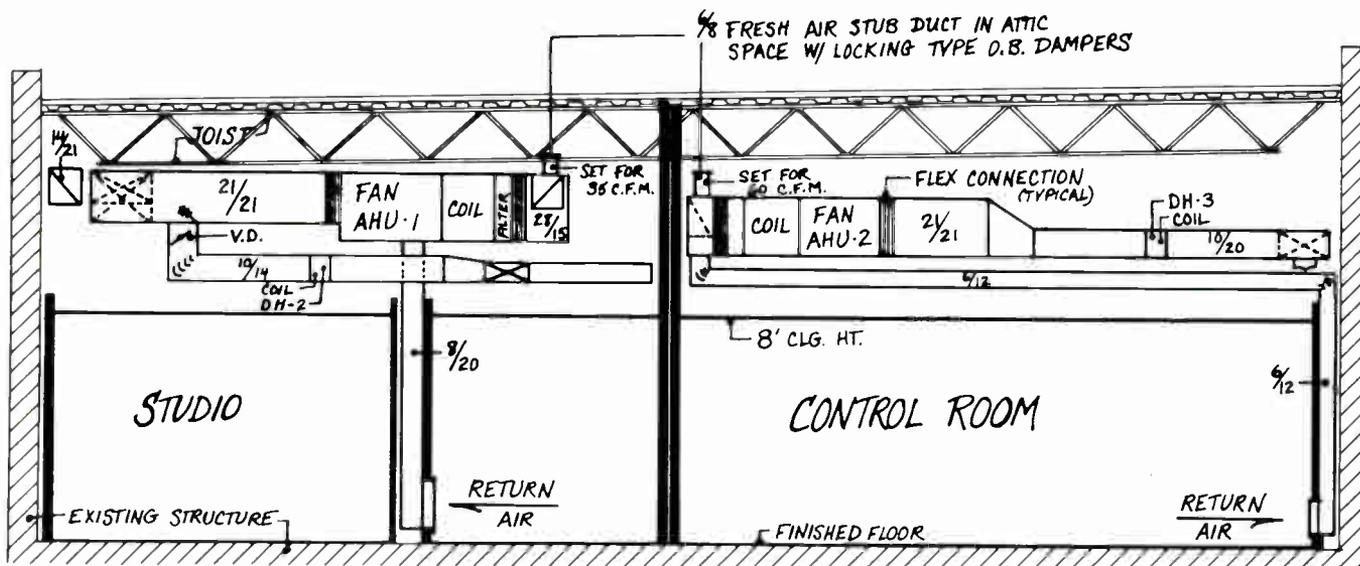
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Partial detail of H.V.A.C. Systems designed by Gary Hedden

careful thinking and evaluation, we elected to try a relatively new system in the Fostex. I'm real impressed with their ability to optimize a number of performance parameters. In the past, something had to suffer—you had to take away from this to add to that. It seems almost impossible that so many features have been optimized in one system."

And in his final thoughts, J.D.

added, "What I've seen happen in this studio is like a race car team without major sponsors. They have to do it all themselves. They don't have a big company shipping them engines, so they must make the one they have work. That engine is good enough to win the race. They don't have a backup because they don't have the bucks. So their choice of parts is impeccable.

They take the care and they play the game to its fullest. And that's what we've done in this room. We don't have big sponsor bucks, so we selected our parts very carefully—the very best equipment we could buy with those dollars. With this kind of heart it's difficult not to be a winner. I'll figure we've won our first race when we hang platinum on the wall."

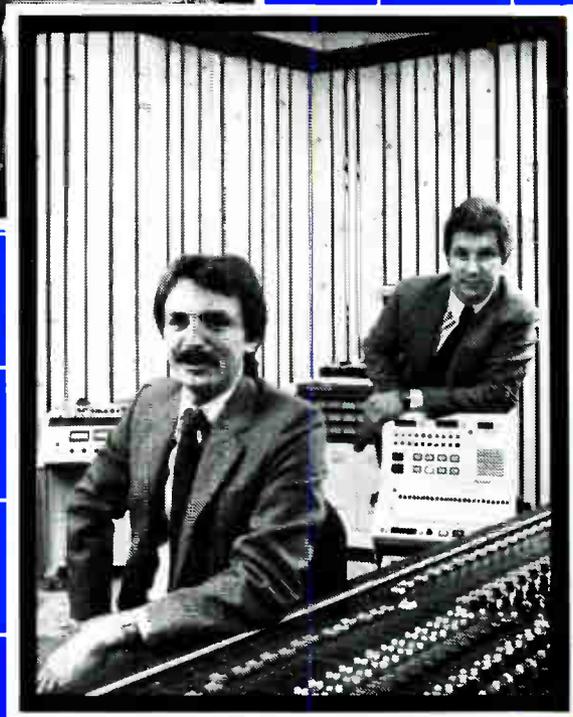
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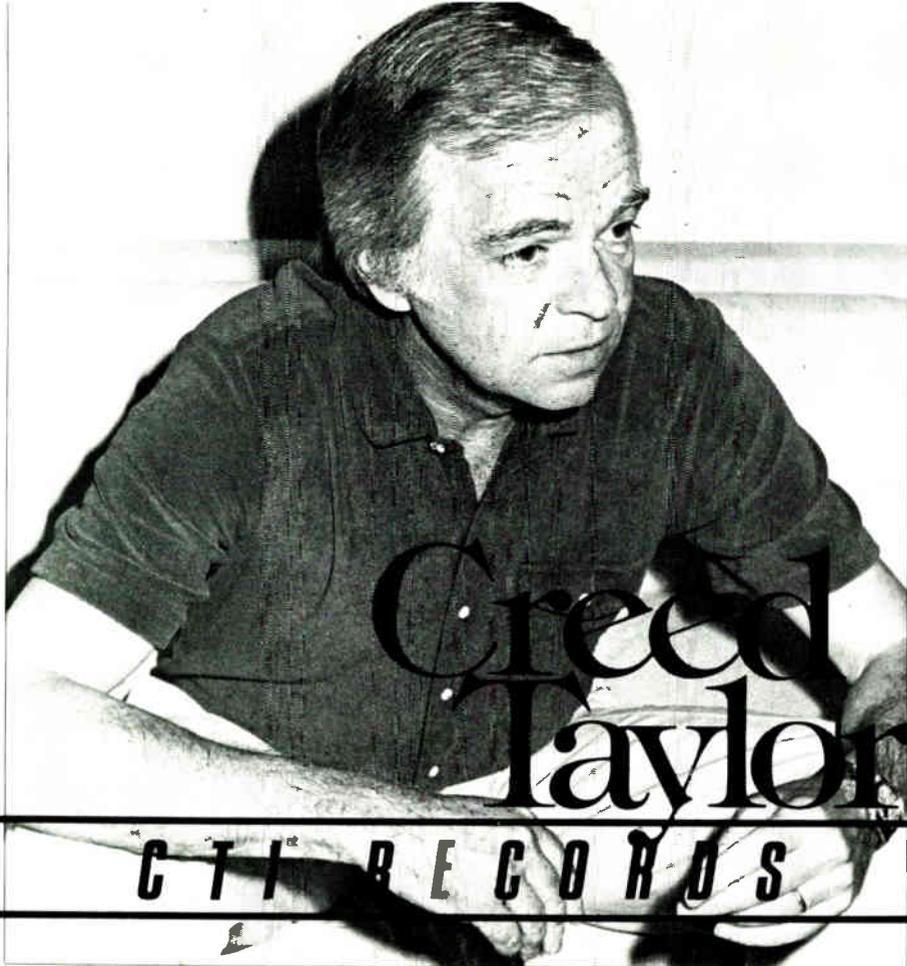
It's reasons like these that led J.D. Blackfoot to call AVC when he decided to construct his new studio, Bison Recording in Columbus, Ohio. A close working relationship between studio designer Gary Hedden, AVC, and J.D. ensured that he received the most for his money.

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by Bruce C. Pilato

Inside the three story offices of CTI Records in New York City, one cannot help but be amazed by the huge and colorful photographic prints that are framed on nearly every wall in the complex. Larger than life, these pictures scream for your attention and they get it. Most are beautiful, some just odd, but all of them have the distinction of being a CTI album cover.

On the top floor of the building, inside his modest but elegant office, sits Creed Taylor. He is friendly, yet not what you would call personable. His publicist, a Frenchman named Didier, has warned me: it may not be an easy interview. It wasn't.

For someone who has never met Taylor before and is not familiar with his jazz legacy, he might appear to be an arrogant man. He is, rather, a man who is simply convinced of what he wants and likes, and is not afraid to say what he thinks.

The name Creed Taylor is synonymous with jazz. He played a major role in transporting jazz from an elitist art form to a more greatly appreciated and universally accepted style of music. And he did it without selling out.

Taylor, unlike many record company presidents, is first concerned with quality and taste. He has the utmost respect for the artists he produces and makes sure their music is recorded the way the artists hear it, rather than the way accountants and marketing people of major companies would.

After heading the leading jazz label in the world during the 1970s, Taylor saw his dream crumble a few years ago due to financial difficulties. Now, in 1982, after thirty years in the business, Creed Taylor is starting over again.

After receiving a degree in psychology from Duke University, Taylor joined the Marines to fight in Korea. After the war he returned to Duke to do master's work in Psychometrics, but his interest in the trumpet, and jazz in general, overtook him.

He became the head of A&R at Bethlehem Records in 1954 and two years later he was appointed to the same position at ABC Paramount Records, where soon after he created their Impulse label. During his time with Impulse he worked with Quincy Jones, Ray Charles, Gil Evans, Kai Winding and John Coltrane.

By 1962, Taylor had moved to MGM to head their Verve label. The label flourished under his guidance, and among his Verve productions was the million-selling "Getz-Gilberto"

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album. That record received the "Album of the Year" Grammy and its hit song "The Girl from Ipanema" was awarded a Grammy as well, for "Single of the Year."

In 1967, Taylor finally started his own label, CTI, in conjunction with A&M Records. Among the artists who had successes on the early label were Wes Montgomery, Paul Desmond and Herbie Mann. The label went independent in 1970 and Taylor also formed two sub-labels, Kudo and Salvation Records.

It was during the 1970s that Taylor's career zenithed. CTI became *the* jazz label in this country and around the world, with a roster of artists that included Ron Carter, Milt Jackson, George Benson, Hubert Laws, Freddie Hubbard, Stanley Turrentine, Deodato, Esther Phillips and Grover Washington, Jr.

There seemed to be a particular magic behind the CTI releases that other jazz labels lacked. His records, according to Taylor "were more of a jazz-produced recording." "The recordings were planned out," he says, unlike most other jazz recordings up to that point. "There was a conceptual organization behind them." An artist who previously used to just go into the studio and simply cut a few tracks, could now go in and play his usual thing behind the context of Taylor's logically planned commercial recording. "And out of that," Taylor summarizes, "came what is known as a CTI type of jazz recording."

Before CTI got rolling in early 1971, a successful jazz album was a record that sold 10 to 15,000 copies. After Taylor organized his roster and started to go after that large untapped market, it was not unusual for a CTI record to be a million seller. In fact, several did and are still brisk items in record stores today.

But Taylor's success didn't last very long. By the end of the decade, straddled by financial burdens, his label ceased operations. At first Taylor was reluctant to discuss what went wrong in 1979, but eventually and gradually he opened up.

"Look," he said with a cocked hand extended outward, "very simply, CBS and Warners ate us alive. It's no different from any other really big company, really. They had a turn around and decided they were going to get into the business that got CTI moving forward with pretty impressive force."

So, basically the majors looked at what CTI was doing and saw the potential of it crossing over big into the pop market and they simply went after it? "Sure," said Taylor almost nonchalantly. "CBS was pursuing our

records. They knew what we were selling and it was all very much a major league kind of sand lot situation."

One by one, Taylor lost most of his roster to the major labels. According to Taylor, however, those artists of his who went with the major labels didn't find the grass greener on the other side. "CBS had a very planned marketing program with all of these people. I remember in particular what they were doing with Freddie (Hubbard). Backing him with a Supremes-type vocal group, 3 girls, putting out the album, putting on a concert. Trying it with Freddie and these "in-girls" backing him up for 15 minutes, swaying back and forth in their long gowns . . . and there's Freddie Hubbard, playing jazz in front of this very embarrassing stuff in the back-

ground."

That was CBS's formula. They were gonna fake all the pop elements, put a jazz player into the pop element, and plaster the marketplace. They were gonna make a pop artist. That's the formula. And they tried to do that with Hubert Laws with the disco kind of cross-over stuff, and it just obviously didn't work.

"George Benson was the exception to the rule. When he went to Warner Brothers, they didn't anticipate the huge surge of sales which they got. The production of the album was an accident, from a pop production standpoint. It was a real accident. "This Masquerade" happened to be a very nice song and hit, but it wasn't a deliberate pop production. Then after

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that happened they just continued with their financial muscle to get him into the marketplace."

Many of the artists who left CTI offended their jazz following with their commercial pop releases, and now are working with Taylor on individual projects to reinstate their standing in the jazz market. Taylor, on the other hand, is now in a financial position to get his operation rolling again. "It takes time to heal financial wounds," said Taylor with a quiet tone. "That's really what it is and these wounds have been pretty well healed by now. We intend to get back in."

Taylor actually started back in the business in early 1981. He signed a distribution deal with CBS and released an album by jazz vocalist Patti Austin. Soon after, the deal soured and Taylor looked at independent distribution once again.

So far this year, he has released five albums by Roland Hanna; Art Farmer & Joe Henderson; Ray Baretto; Studio Trieste, composed of Chet Baker, Jim Hall and Hubert Laws; and one by Fuse One, which is a studio super-jazz group he assembled consisting of Stanley Clarke, Ronnie Foster, Ndugu, Tom Browne, Stanley Turrentine, Eric Gale, George Benson,

Dave Valentin and Wynton Marsalis.

"The way I look at it, any of the artists that I would be interested in recording for CTI if the right project made sense. And as far as exclusive contracts are concerned, we're not at the point where we want to say, 'Well, why don't we try to make arrangements for any particular artist to come back to CTI.'"

Taylor has confirmed, however, that some of the artists who left for the major labels are dissatisfied with the direction their careers are taking and want to get back on the CTI roster.

"We're gonna put out just the promising people. Now, I have no idea just how many albums we're gonna put out, but I know that each one is going to have a real reason and thought put behind the recording, before it's recorded. Unlike some of the other jazz labels."

Taylor is going to be producing each recording himself and he has been reunited with his longtime engineer Rudy Van Gelder and arranger Don Sebesky.

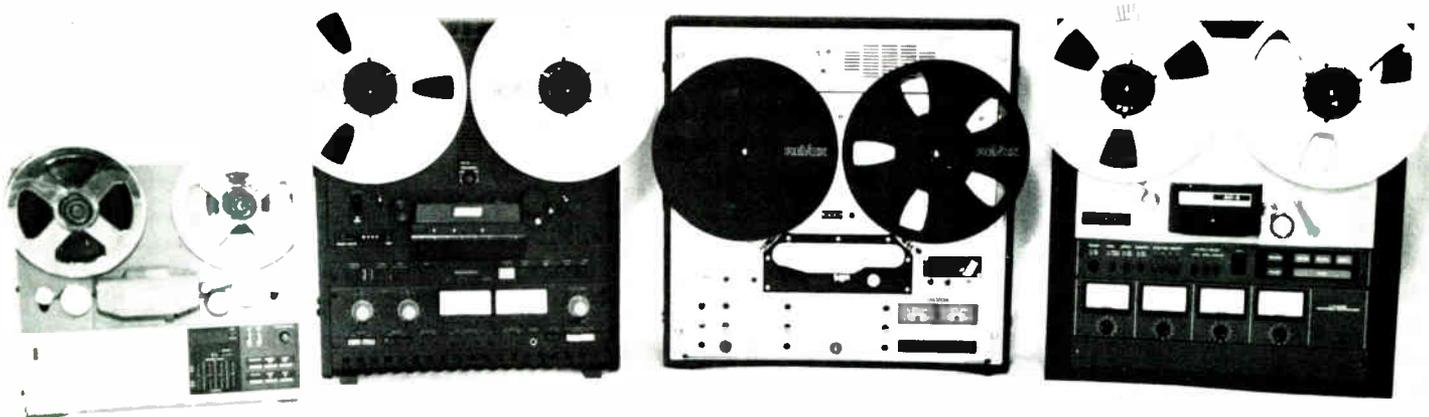
Taylor is well aware of the advances in recording production since the last time he was actively making albums; however, he doubts whether

he'll record any differently than he did in the mid 1970s. For instance, he has no desire to make digital records.

When it comes to producing in the studio, Taylor is less concerned with the technical side of things and more interested in the background of the artist and what that musician is trying to achieve with his or her music. "I think about the types of tunes, or the arranger, or the rhythm section, or whether this guy has been recording with a lot of electronic backing or with stiffer studio pop players. I think about what other recordings he or she may have made before and how I can improve on what we're about to proceed with. I just look at the chronological development of the recordings that this artist has been doing."

With Elektra Records and Island Records both launching new jazz divisions, and putting a major push behind them, Creed Taylor certainly has his work cut out for him. But then again, stiff competition usually motivates the market, so CTI should benefit by the company they'll be getting. He knows what brought him down last time and he's determined to avoid the same pitfalls. Creed Taylor intends to get back on top of the jazz heap... and stay there. ■

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.38 SPECIAL

Calling Their Own Shots

by David Gans

"Nobody can tell the group how to sound or direct them better than somebody who's been in on the molding of it for ten years," says .38 Special's Don Barnes. The band has grown out from under the "Southern Boogie" mantle of their early days, and along the way Barnes' role in the band has grown to include lead vocals and, on the last two albums, production—a responsibility he shares with producer/engineer Rodney Mills and the band's other guitarist, Jeff Carlisi.

"Rodney's title is 'Producer,' and we're called 'Co-producers,' but he doesn't override us," says Barnes. "We bang heads and bounce ideas off

each other, that kind of thing. It's actually a three-man production team."

Mills has produced and engineered the Atlanta Rhythm Section's albums for ten years, and Barnes and Carlisi are big fans of that band.

"They're killer players—we've got all the respect in the world for them," Barnes notes. Mills produced *Rockin' into the Night*, .38 Special's third album, and then brought Barnes and Carlisi along as 'Production Associates' on *Wild-Eyed Southern Boys*, the breakthrough album that included the hit, "Hold on Loosely." This year, the guitarists were credited as 'Co-producers' on *Special Forces*, which cracked the Top Ten and yielded a Top Ten single, "Caught Up in You."



From left to right: Don Barnes, Larry Junstrom, Donnie Van Zant, Jack Grondin, Jeff Carlisi, Steve Brookins

"Rodney knows how to lay down the basic format of a song," says Barnes. "We have that sense, too, and there are areas where he might be a little weak and one of us can pick up the slack.

"Everything is well thought out; not one element has been overlooked or approached a little bit slack because somebody doesn't know enough about it. The final product is tight, and it has a lot of character."

Because Mills is not a singer, Barnes took command of the production with regard to frontman Donnie Van Zant's tracks. "Sometimes a singer needs a producer who can carry out a thought as a singer," Barnes explains. As for his own vocals, "I just try all different kinds of things, and if it sounds right to the others we'll go for it."

Carlisi doesn't sing, but he's been playing music with Barnes since they were kids in their native Jacksonville, Florida. He can listen to Barnes during a take and have a pretty good idea of what's going to sound good on playback. "I know what good singing is, even though I can't speak the language," he explains. "I can say the obvious things, like 'You're flat' or 'You're sharp,' but I also know what Don likes and what he'll be satisfied with.

"When Don's singing, a lot of times he'll get really intense about a part. I might criticize something and he'll be in total emotion—'What's wrong with it?!'—and I'll just say, 'All I can tell you is, you're not going to like it.'"

"And it'll be true," says Barnes. "You have to overdo the vocals in the studio to have them come out on the record with intensity. You have to overemphasize every single word, just like an actor on the stage has to exaggerate every move, so it'll reach the people.

(continued on next page)



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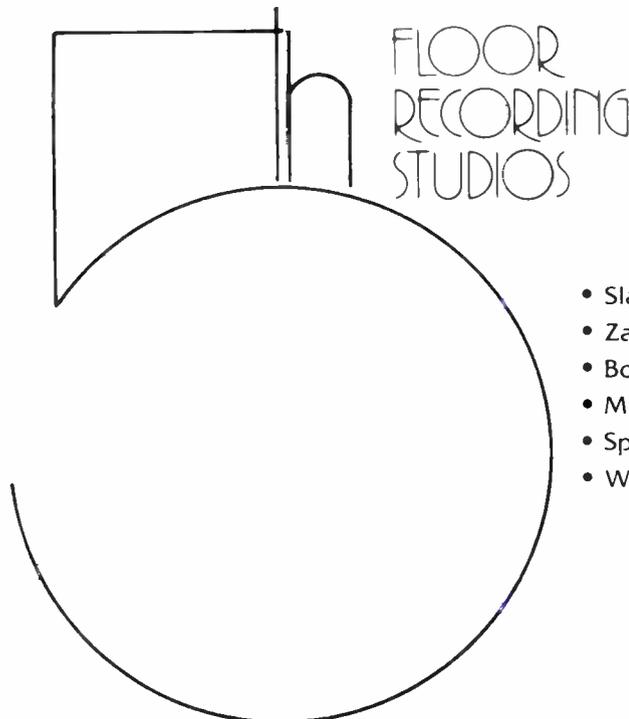
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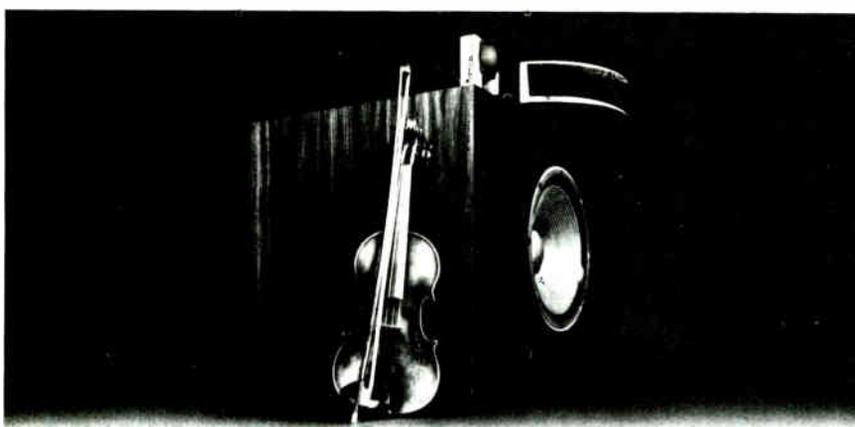
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(continued from page 113)

"Sometimes you go too far and it sounds corny. It felt great at the time you were doing it, but when you hear it back it sounds too dramatic. You go, 'What a joke,' and back up a little and relax. That's what Jeff does for me—he lets me know if it's too corny or if I tried to sing that word with too many riffs in it, or something."

The same goes for the guitar parts. The fact that these two men—and the rest of the band, who've been together for ten years without a change in personnel—trust each other's judgment can't be underestimated. "Your fingers are hurt and bleeding, and you thought you just did something great," says Carlisi. "As frustrated as you might be at the time, when it's all over you're so glad that someone else made you do one more take."

"The bottom line is that whatever that guy is telling me, he *knows* me. He knows what I can do and what I'm going to like. That's why it works."

Neither Barnes nor Carlisi thinks .38 Special had to "sell out" for the commercial success they've worked so long to achieve. They grew up in the shadow of Lynyrd Skynyrd (Donnie Van Zant is the younger brother of Skynyrd's late frontman, Ronnie Van Zant), and learned after two modest albums that they weren't going to get anywhere until they developed a band personality of their own. "You have to put your

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.38 Special Live

own character into your music," says Barnes.

"You can follow a formula and be successful at it, but I don't think you'll last as long as a band that develops its style from real character," Carlisi adds.

"People relate more to character than they do to proficiency in playing," says Barnes. What has emerged from .38 Special's drive to become themselves is a more cosmopolitan, but no less hard-rocking, sound than they've put forth in the past. Their live shows kick ass just as hard as they did before, but a level of sophistication has been added—a natural product of the maturing of the band as individuals and a payoff for years of determined teamwork.

"After the first two albums, we stepped back and took a look at our weak points," says Barnes. "We decided to update everything and try some new ideas. Radio is a strange beast, you know, and you have to understand it. We're not selling out—we're playing good songs that people like to hear." Barnes' vocals balance Van Zant's good-time presence with a more romantic and sensitive persona, and the band's recent singles have succeeded in appealing to a broader range of listeners than the early material.

.38 Special was founded on a commitment to working together and "giving it our full 100%," says Barnes. "No one person is the star in the group. We approach everything as a real team, and it works for us." ■

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COMPUTER TOOLS FOR THE MUSICIAN

by Andy Muson

Andy Muson has been a studio musician, arranger, composer, and producer for the past thirteen years. Originally from New York, he has lived in Los Angeles since 1975. He has recorded with many artists, including James Taylor, Manhattan Transfer, B.J.

Thomas and Leo Sayer. Some of his recent projects have been: Grease II, Entertainment Tonight, Aerobicise, Lily Tomlin TV Special.

Computer technology has been put to great use in the recording studio for quite some time now. In fact, we take many things for granted

that are just now delighting consumers, businessmen, and other children within a wide age span. Digital recording, computerized mix-down, mix merging with instructions flashing on a monitor, synthesizers, emulators and digitizers of all kinds are now commonplace in the studio. But, for use at home, this new tech-
(continued on page 118)

Andy Muson composing on the Soundchaser/Apple II system

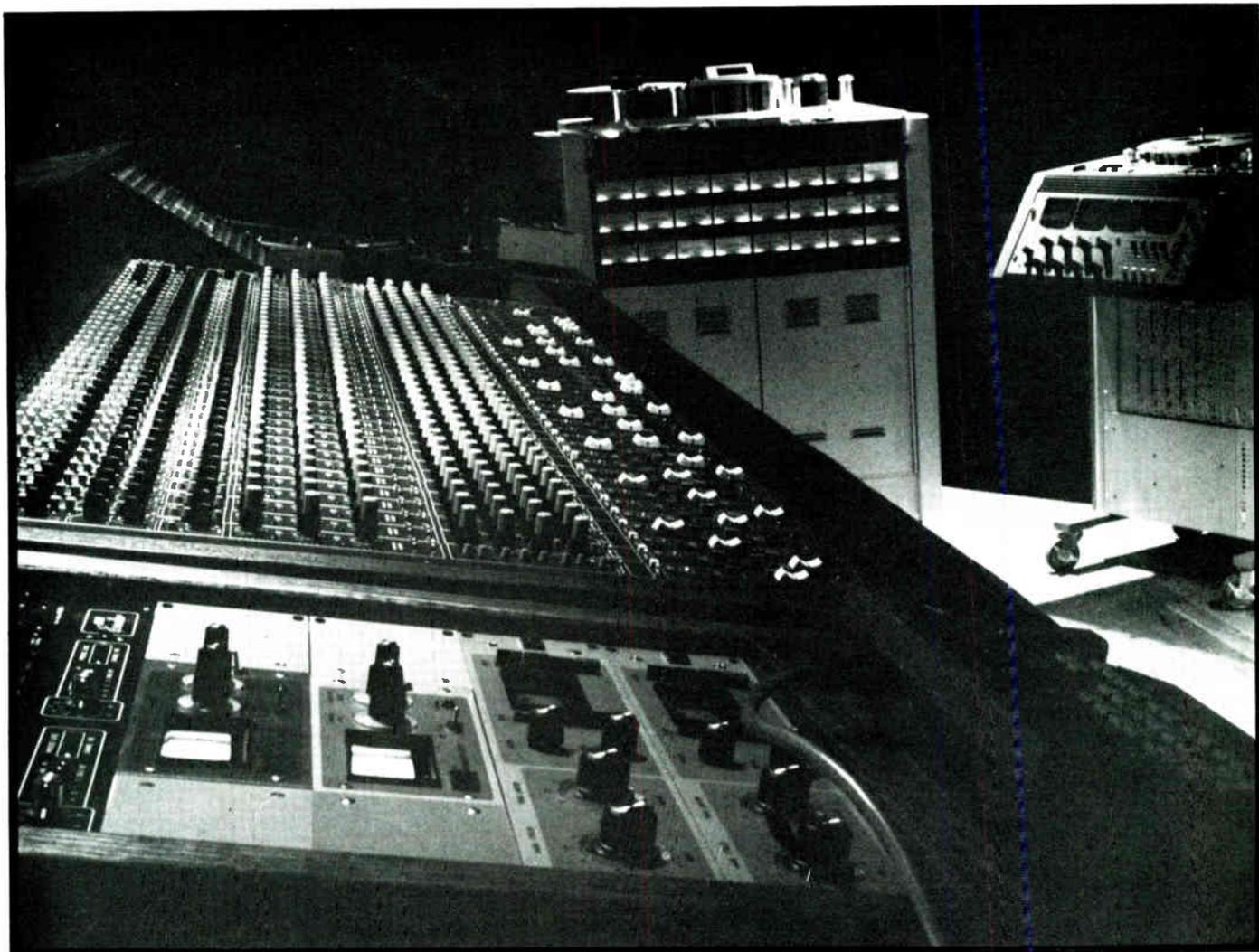


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(continued from page 116)

nology has only recently become accessible as well as affordable.

I had been intending to buy a synthesizer, primarily so that I could learn to write in that medium and communicate to the players, in some intelligible way, the sounds that I hoped to hear. It was at just about this time that I was asked to write many minutes of music for "Aerobicise," a sensual aerobics workout seen on cable TV. The producer requested that the music for these segments be generally "new wave" and very "moderne."

The timing was great. I was about to do the obvious thing. Any one of the well-known synthesizers would have sufficed as a vehicle to get me through the gig, and I would probably own one of them today, had it not been for my eight year old son.

We (I) had recently (reluctantly) bought a home computer, after many months of pleading by son David. Since I wasn't about to let him sit in front of the tube all day and just shoot 'em up, I got a machine that had some programming capabilities. As we drove home from the computer store, loaded with arcade games and other programs that I felt had given this purchase some redeeming educational value, I cautioned him that he had better spend equal time "playing" math, spelling, and history, etc. Two days later I had a numb spot on my thumb, very bloodshot eyes, and an angry eight year old on my hands. I had beaten all of his high scores.

I realize that every computer salesman and many parents have heard that one before, but it was from such mundane beginnings that I entered the computer age and soon found the synthesizer that I was "really" looking for.

You see, I got hooked. I learned some BASIC programming, read all the magazines, and began checking out local stores for the latest in software. It was during one of these little forays that I noticed someone leaving a computer showroom with what looked like a piano keyboard. "Hmmm... what was that?", I mused.

Steve Kessedjian of Micro Business World in Woodland Hills, CA had just sold a Soundchaser to a customer. He told me that he was into keyboards, and that this machine was really something, and would I like a demonstration? BINGO. Deja Vu in the computer store.

It really was something special. I could hardly sleep until I owned one. (I slept even less for the first few

days after it arrived.) The only other thing I had to do to fulfill my quest for the perfect machine was to carefully explain to my wife that I needed an Apple computer to run this fantastic instrument. Within a few short weeks we became a two computer family.

I learned during that short demo that this machine wasn't just another keyboard synthesizer, but rather a complete music recording, transcribing, editing, printing and sound creation system, with lots of extra little tricks thrown in.

Everything in the system is digital. Sound generation is by two banks of eight oscillators. The keyboard itself is eight voice polyphonic. A possible sixteen voices may be recorded over four tracks (digitally) à la sel-sync. A fifth track played live may be added, but won't be saved in memory. When I get to this stage, I usually send the whole thing to my tape deck. This is very simple to do, since the output of the system is fed into the aux. input of a stereo system.

I used the four track mode and the sequencer extensively while working on the "Aerobicise" project. The ability to change the sounds on a track *during playback* was a fantastic tool to have at my disposal. Not only could I mold and change the basic sound by changing the attack, decay, sustain, release, pitch, vibrato, LFO modulation, octave, and volume (as on other synthesizers), but, I could change the actual preset or even change to another "master." (A master contains ten presets that can be used during playing and recording.) Six masters are provided with the original software but the fun begins when you start to search for and create original sounds.

There are several ways to go about creating sounds. Any of the sound waves that comprise a preset may be displayed on the monitor screen (up to three waves for each preset). These waves may be edited or altered by several other procedures. A light pen is provided with the original hardware, but game paddles are the most effective when it comes to editing waves. For creating from scratch, a graph of the harmonic system appears on the screen and the amplitude for each harmonic overtone is entered. When this is completed the wave can then be displayed on the screen, edited and tweaked some more. Move the waves, load them into presets, load the presets into a master of your favorite sounds and so on, ad infinitum. With this kind of versatility, the range of sound is almost limitless, including all sorts of

ethereal sounds and space age effects. All of this is accomplished with amazing speed and a minimum of hassle.

I want to stress that I still don't know very much about computers. All of this "programming" is accomplished by simple menu prompting on the screen, and by using the clear and concise manual provided by the Soundchaser people. It took a very short time to learn to operate the system, and lucky for me, because I had to use it "Now."

One particular function of this computerized instrument really saved me from a lot of grief. With all of its marvelous features, I still had to play everything I wanted to hear on a piano keyboard.

My instrument is the bass. I play just enough piano to check my voicings, rhythm figures, and play melodies, etc., if they are not too fast. Well, I must admit that I took full advantage of the tempo change function. Play it slow, press the button and hear it back, up to the tempo of your choice, *in the same key!* Now that's what I call progress through computing. I probably would have bought the system for that feature alone. It all works, and there is more.

With the addition of a printer and the Notewriter program, musical notation can be displayed on the monitor screen as it is played on the keyboard in real time. Right now we are limited to a monophonic line, but I am told that the next update of the program will implement four voice capability. Enter key signature, time signature, and the tempo, (a click track is also provided), play the melody, send it to the printer, and you have an instant lead sheet, or trombone part, or whatever. Naturally, many edit options including transposition and proof reading for rhythmic correctness are incorporated into the program.

I realize that this may be an awful lot to swallow at first, but at the same time I feel that these computerized tools that I have been describing are just the tip of the iceberg as far as musical applications are concerned. The techniques of programming, and the large musical computers have been dissected and studied in universities for a long time. I, for one, am really happy that the availability of these tools has become such that we can make use of them on a daily basis. For me, the computer programmable synthesizer has been an invaluable tool, not only as a time saver, but also as a kind of audio (and visual) "drawing board," adding impetus to the creative process. ■

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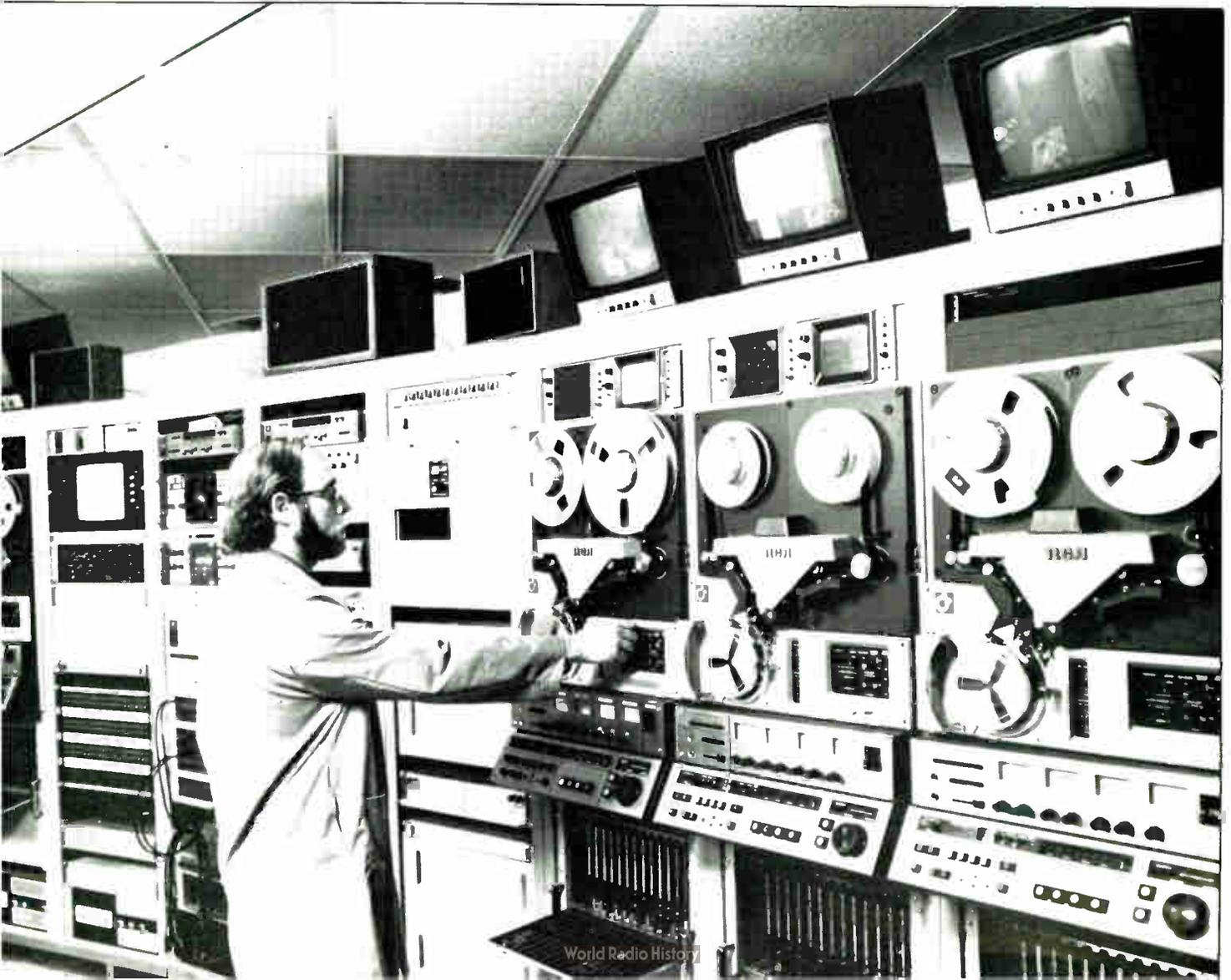
(Below) A view of Video Post's machine room shows the new 1" type C video format, RCA TH200 video recorders. Video Post currently has two fully computerized CMX340X 1" stereo editing bays with full NEC two channel digital video effects.

"Music video producers want professionally mixed audio to join professionally edited video," says Paul Christensen, president of Omega Audio & Productions.

Omega recently opened a joint facility with Video Post and

Transfer, Inc., and Clearwater Teleproductions at Love Field Airport in Dallas. The companies offer music video producers a single source for turnkey services.

Production services include (continued on page 132)



VIDEO

New Medium

ED LEVER: Music Avenger

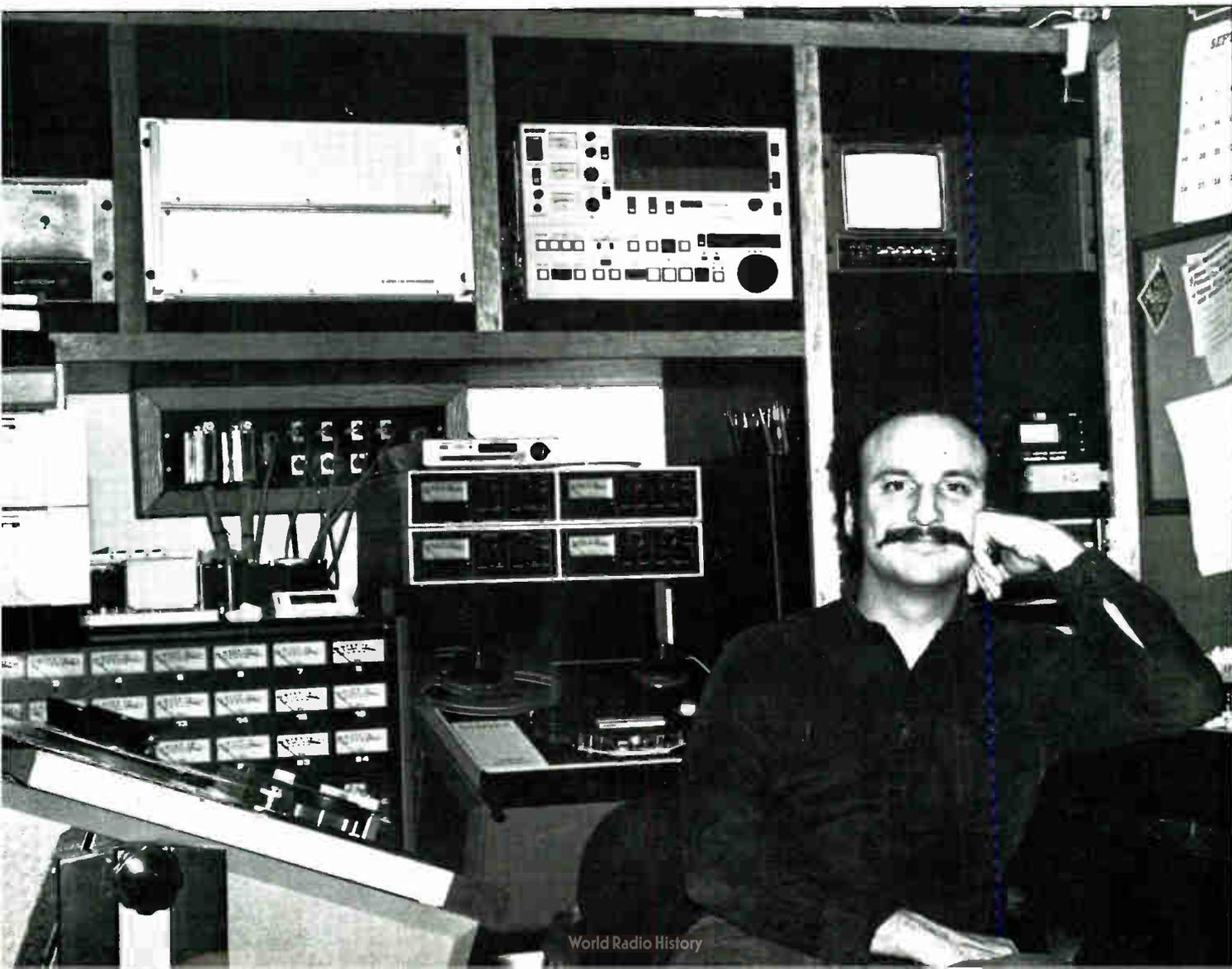
by James Riordan

Ed Lever should have his own television show. Not only is he quite an entertaining fellow by his very nature,

Ed Lever at Canyon Recorders

but he perpetuates what seems to be a caricature of himself... someone who might be aptly described as the Music Avenger. In this guise, Lever continually ventures out on the limb of the unsolvable with an eerie confidence and a zesty sense of humor.

After a childhood identity duel between nuclear physics and rock and roll, Lever put down his guitar and decided to focus his talents as a sound engineer. He worked for L.A.'s Village Recorder, in the mid-seventies, as a
(continued on next page)



(continued from page 121)

gunslinger maintenance engineer eager to draw his tweaking screwdriver for a shootout with the latest console.

One day he was assigned the task of wiring up the Shangrila Ranch in Malibu for The Band's use during the summer. The Village was revamping Studio A, and the ranch made the perfect place to store and rent the equipment at the same time. A sixteen track machine was all that was needed, and guess who happened to have one sitting under a blanket in his living room? That's right, maintenance engineer turned equipment rental impressario, Ed Lever.

The extra money rolling in each month propelled Lever into his own business. Building home studios led somehow to renting accessory equipment to the biggies of recording, and pretty soon Lever's Canyon Records was the first to rent "heavy iron" to the studios.

Lever remained an oddity through all of this, occasionally answering a late night emergency call from a major studio wearing a doctor's smock and carrying his gear in a black doctor's bag, or insisting on only charging ten dollars for a Dolby channel when the standard was twenty, because he thought it was more fair.

Conceived as an equipment rental company that loved a challenge, Canyon quickly evolved into the audio Ann Landers of the L.A. studio community. Free information became the company's number one product. Lever believed that such an approach would stimulate the industry and eventually stimulate the Canyon coffers as well. It wasn't long before artists such as The Who, The Rolling Stones, Diana Ross,

Willie Nelson, Barbra Streisand, Frank Zappa, The Doobie Brothers, Supertramp, Fleetwood Mac, and many, many more took advantage of Canyon equipment and know-how.

At the point that Lever entered into what he calls his "trial by timecode fire" period, Martin Scorsese and The Band had been looking for a better way to mix the audio to "The Last Waltz." Ed Lever's job became finding a way to link a 24 track so it could be fine-tuned to the visual image in almost a simultaneous mix. When the camera moved, the sound had to move. When you were visually three feet from the drummer, it had to sound that way. The soundtrack of "The Last Waltz" is now legendary in the world of film sound, and Ed Lever has become a super specialist in mixing music for video, a master of the timecode.

Lever's skills were first applied to television on "The Captain & Tennille Show." While working with Darryl Dragon, it was decided there must be a better way to link audio and video than prerecording the audio and miming the numerous retakes for a compatible and technically satisfying visual image. Lever thus devised the following method for maximum sound quality and authentic visual representation within the arena of a high-pressure network variety series: the basic tracks for the songs on that week's show were prerecorded in a sound studio and mixed to four tracks. This was played back during the video taping on four tracks of an eight-track machine, along with a scratch vocal and a scratch keyboard track through the monitors. Two additional tracks of vocals and keyboards were recorded along with the video. These tracks (which of course contained the per-

formance of the show's stars) could then be mixed to the final visual image. If the camera focused tight on the Captain's trickling fingers, the sound could correspondingly focus or increase in volume. And since the keyboard and vocal track was recorded each time the visual was recorded, the sound and the picture always matched perfectly. Even the most scrutinizing musician watching on television at home could not detect a mismatch.

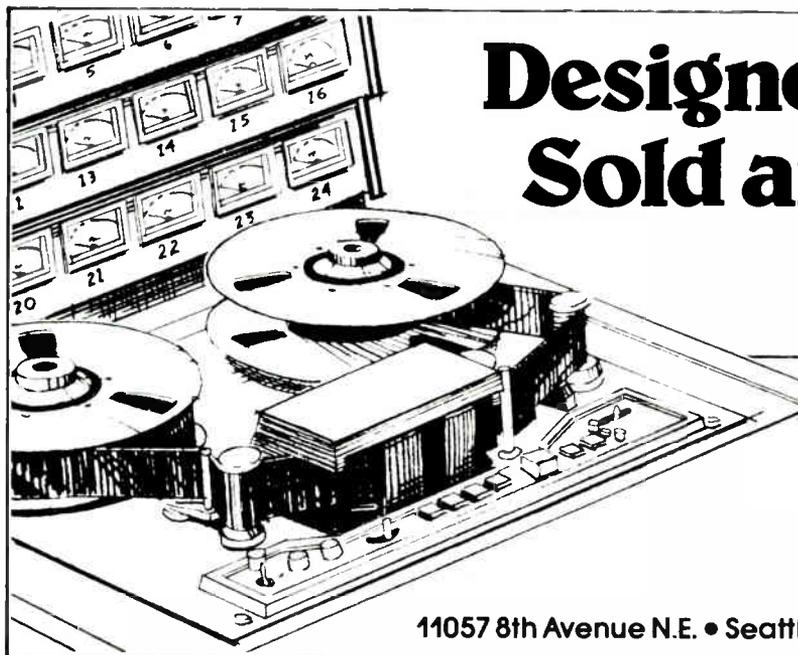
Lever has high hopes for the future of music and video. He is music's avenger in the world of video, one of the first real music people to fully become a video person. He sees both world's independently and is skillfully able to integrate them.

• • •

Ed Lever felt so strongly about the need for a video editing facility which was really concerned about the audio that he poured nearly a million dollars into his new edit bay in West Los Angeles. He built the Canyon video facility not merely as a collection of just the right equipment, but rather as a completely integrated system. Here we have a totally committed audio person making a total commitment to video.

For those of us already condemning music/video by what we have seen these past few years (I've liked two of them), perhaps we are being unfair. According to Ed Lever, we are voting much too early. "The visual-music art form has not been defined yet," says Lever. "There will have to be a lot of experimentation to find out what really gets under people's skin. Music is a language. It's a way for an artist to share an otherwise incommunicable feeling or

(continued from page 122)



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thought or vision. Sometimes it's just a texture, an interesting synthesizer sound treat which is sort of like an hors d'oeuvre. Videc has similar treats, like special effects, animation, and more subtle techniques . . . but we have only begun to explore the ways to use them. When the motion picture was first developed as a technical medium, they

didn't really know what to do with it; so they concentrated on filming what was already happening. The first things they did were stage plays which were all shot from eleventh row center. It took a while before they learned they could move the camera all over the place. It was later still when they began cutting the film in interesting ways, doing
(continued on page 126)

*Canyon's audio/video editing suite.
Equipment layout diagram on page 126.*



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MILAM AUDIO

Mr. G. C. "Jeep" Harned
MCI Inc.
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1982 has been another very successful year, with increased MCI sales and installations of 14% over 1981, with indications for even higher growth before year end. The upgrading of present facilities accounts for most of the major sales, but new rooms are also on the increase.

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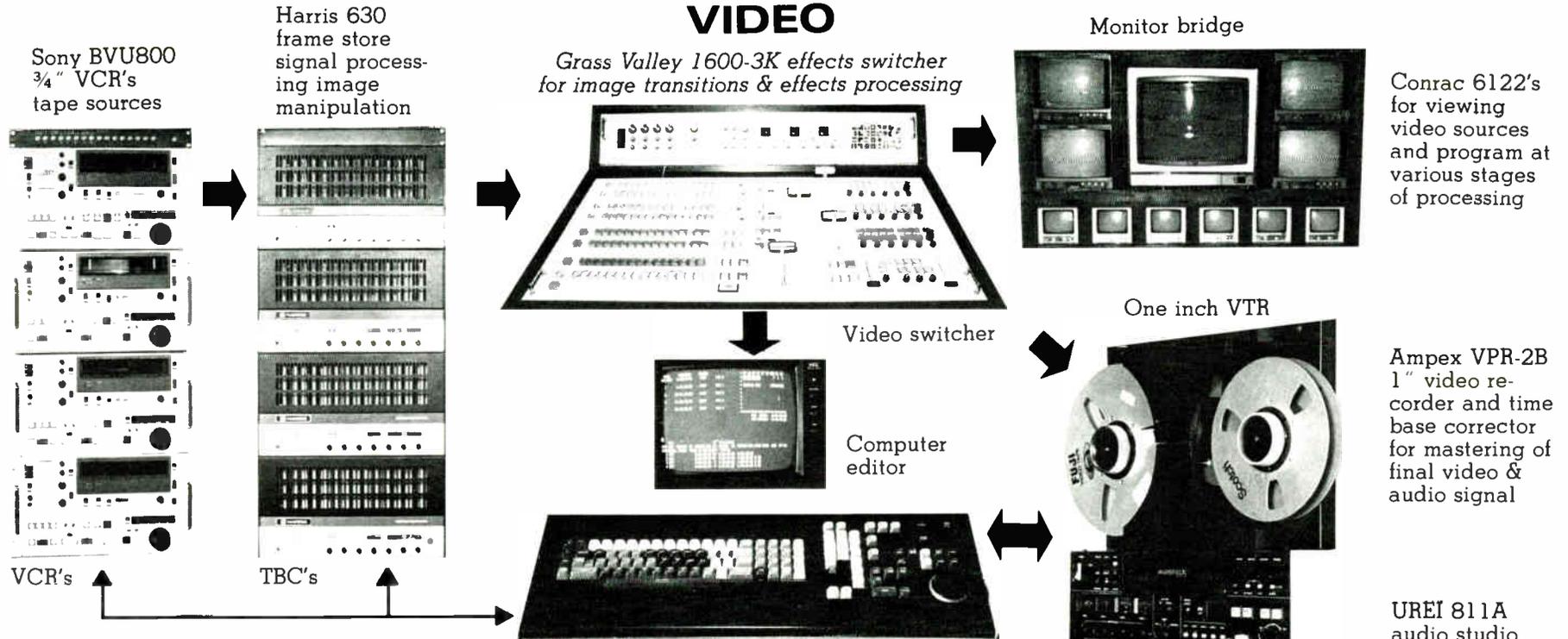
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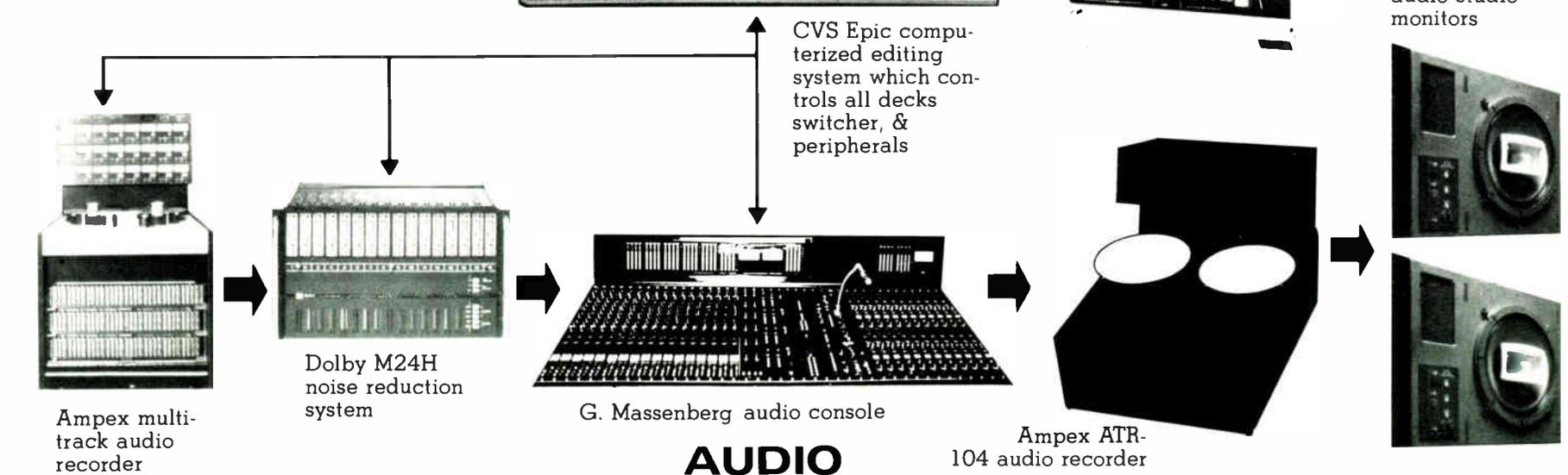
Jerry Milam

The Canyon Audio/Video Post-production Layout

VIDEO



AUDIO



(continued from page 124)

things like double exposures and dissolves, and making something that was different from real life. It took some time after the medium was created before the art form was born. In the same sense, a medium like the video disc was promoted by the creators of the medium before the art form to accompany the medium was created. It was premature, and that's why it didn't catch on."

Lever has formulated his theories on the future of video by comparing the medium and the art form with those of audio recording. "In the early days of recording, up to rock and roll's beginnings, the artists had very little to do with how their sound was captured on tape. Production and engineering were considered something that was no part of an artist's territory. In fact, engineers would scream "grievance" if an artist so much as touched the board. And no matter how interested he was in the mix, the artist was not allowed to participate in it. A lot of garage studios came about because the artists wanted to record it their way. In fact, it was not uncommon for an artist to record and mix another tape in a garage studio and then sneak into the label's tape vault and actually switch the masters. Once the artists started getting involved in the areas of engineering, production and the mix, a different kind of artist emerged who was much more self-motivated and disciplined. A few wrote their tunes, arranged them and worked the entire thing out in the studio. This was about the time when mass-appealing artists came into being and record sales began to surge. Once writers and musicians started playing with the studio, a new breed of mixers and recording engineers came along who were really in love with the art form. They understood the music *and* the machines. These people were excited about the equipment and sought improvements like multitrack. They utilized the gear for what it could do and began to create sound rather than just capture it. They began to use it as an axe."

In the same sense, Lever designed Canyon's video edit bay for use by creative minds by making the technical processes simpler. In this way, more people could be exposed to what the equipment can do, allowing them to begin to use video as an axe. "I built the place to provide an environment that is conducive in video to the type of instantaneous creativity that goes on in audio studios, rock and roll creativity. It's a method of trial and error, with more coming out of the spontaneous rush of artistic stimulation than careful preplanning would produce. The art of video is usually practiced with more preplanning and less experimentation, for the

(continued on page 129)

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Ed Lever

A Brief Description of the Editing Process

Amid all the discussions by recording studio people about "Getting Into Video," it should be pointed out that there are basically two ways of attempting the feat:

METHOD 1:

- Call your local studio builder.
- Have him cut a hole in between the studio monitors.
- Put a TV set in the hole.
- You are now "Into Video."

METHOD 2:

- Learn about the video process and business.
- Decide where you can and want to fit in.
- Do it (right).

Basically, a video (or film) production is divided into three processes: pre-production, production, and post-production. The pre-production is the planning stage (script, budget, creative design), the production is the development of the material (shoot), and post-

production is the final assembly and marriage of the materials (video editing and music mixing).

With the exception of pre-recorded music for television shows, what To perform an edit, you need a certain amount of data: the start of the section of source material, where on the record reel you want that material to begin, the length of the edit (scene), and what kind of TRANSITION you want to make between scenes.

There are four basic kinds of transitions between images: Cuts, Dissolves, Wipes, and Keys. A Cut is just like cutting the film, the instant replacement of one image for another. A Dissolve is the gradual fading-out of one image and fading-in of another. A Wipe is the revealing of one image behind another in the shape of a selectable geometric pattern (like a growing circle). A Key is like a wipe except that the shape of the pattern "cutout" is determined by the character of the video image. Ex-

cept in the case of a cut, when you choose one of these transitions you must also specify the duration of the transition.

It must be clear that by now we deal with here at Canyon is primarily considered post-production, mainly: editing, special effects, and sound sweetening.

EDITING

Editing is the means by which pre-recorded images are combined and assembled into a finished product. Generally this means taking the raw "footage" and deciding which scenes and camera angles to use, what order you want them in, and then putting them together. It's similar to deciding which verses and choruses to cut together from a bunch of takes of a song.

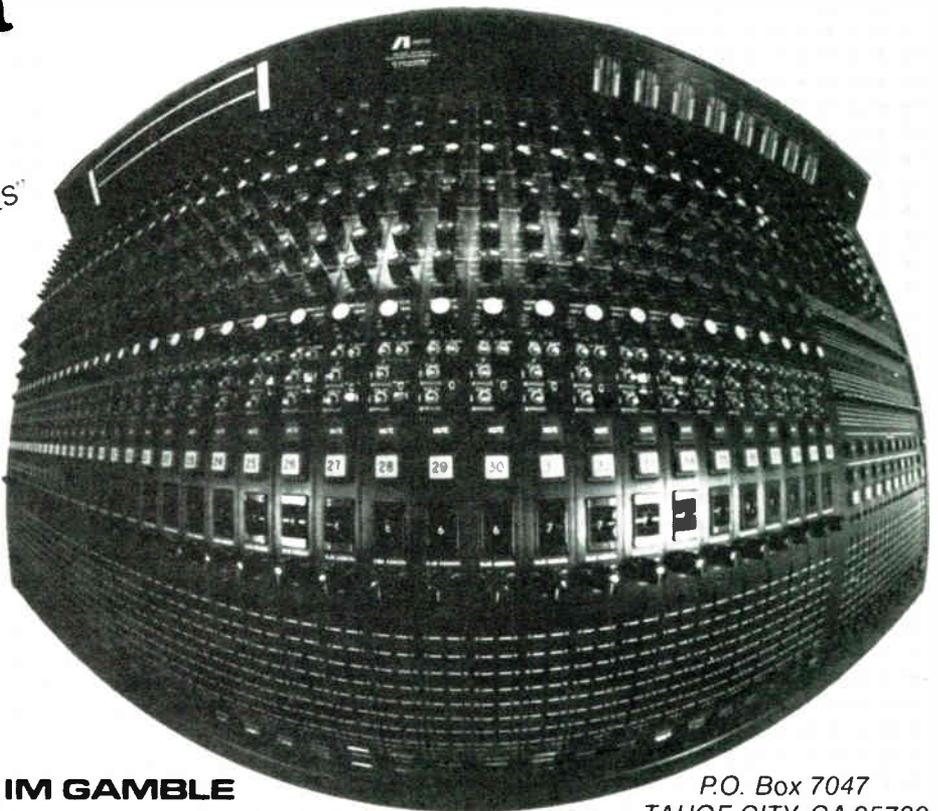
However, unlike audio or even film, videotape cannot be physically cut and spliced. Instead, the method of cutting from scene to scene is a transfer process whereby you playback from your camera (SOURCE) reels and transfer to your master (RECORD) reel. Each scene is treated as an individual edit, and must be laid onto the master reel exactly to length and in the proper location. Time code is used to accomplish this accurately.

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you have a lot on your mind. That's where the computer editing system comes to the rescue. All tasks in video-tape editing are accomplished through dialogue with the editing system, which assumes command of the various functions, controlling the tape machines and the video switcher.

When doing a video shoot, you can use one camera and perform multiple takes of the same tune, or use many cameras and select between shots as you go (live switch), recording the resulting image on a single machine. In music productions, however, we are almost always using a third alternative called "ISO." This is where each camera has a VTR (ISO) of its own, whereby all images are recorded discretely so they can be combined in post with complete freedom. This is similar to multitrack recording techniques, where you don't want to commit to the final stereo mix while you're laying the tracks down.

The post side of this method is called "SYNC-ROLL" and literally means rolling all reels of tape in sync. It looks like the show is going on right there in the edit bay and you can see all the shots at once on various monitors (and perhaps even put multiple images on the final image simultaneously.)

(continued from page 126)

simple reason that the studios are not set up to make quick changes. If Mick Fleetwood wants to see the four members of Fleetwood Mac arranged in a quad-split (an arrangement of four simultaneous images) video setup with each one in a different corner, it takes a half hour to do, just for him to see it. If he wants to switch them around, that takes another half hour. People who are used to working in rock and roll recording are used to a much faster mode of experimentation, and their creative capacities are in tune to that pace. I want to provide a video environment more suited to that type of creativity."

What causes a lot of delay in most video studios is the time required to deal with the speed of the signal. You can't just insert a compressor or freeze frame, for example, into the circuit between the playback machines and the switcher like you can in audio, because the additional wires will cause the signal to take more time and fail to sync up with everything else. To help give the artist more freedom of spontaneous creativity, Canyon installed a signal processor on every single playback machine in the edit bay. "We did a lot of things to put effects and modifications at the fingertips of the operators. The idea was to provide something really comprehensive without it getting too complicated for most people to use...to

make it easy to experiment with not just video toys, but the real stuff set up like ABC Broadcast and tweaked to the max with every ounce of performance squeezed out of the gear. The idea is, once the artist plays around with the equipment enough to get a feel for what it can do, he will begin to incorporate that into his art. Then when he writes a song, he is writing it picture and sound together. He is conceiving it as a whole thing. By giving these people a chance to play with the gear, they will begin to use it as an axe, which is the only sincere way to approach the eventual marriage of visual and audio."

Canyon is designed to edit in the 3/4" format. Lever calls it the "neglected" format because until recently it

was only used for working dubs and the like. The difference is partially due to the new Sony BVU 800 TVRs, of which Canyon received the first five machines shipped. This is not a beefed up 3/4" machine, but a bonafied (and expensive) professional model. The image quality is virtually indistinguishable from one inch. The advantage of shooting and editing in 3/4" are many. The tape costs are one quarter as much as one inch and you can use cassette which saves tremendous amounts of time on the shoot. The 3/4" format is now being used by television shows like "You Asked for It," "Real People," "That's Incredible," and many others by copying the edited master onto the standard television 1" format. The 3/4"

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format, because of its convenience, is more comfortable for the artists, and comfortable artists can devote more energy to creating, according to Lever.

Achieving a high believability level through technical excellence is extremely costly, and currently the problem is the only markets making that kind of thing cost-efficient are commercials for Network television, because of their short duration, and feature films, because of their high-income potential. At the same time, video creators are confronted with the reality that viewers judge everything they see on a television screen by the Network quality they are used to; and when it comes to effects, their standards are Lucas and Spielberg. Pretty tough competition.

"To make a video on that level of technical quality rules out selling it to cable and possibly even Network, for the money they would need to justify it. That's why you only see the best quality in feature films. When you get down to video discs or video cassettes, there isn't enough money to make it on that level because there isn't enough of a market. But there never will be enough of a market, or any real market at all for that matter, unless somebody has the balls to go out there and make a great one . . . one that is so good people will want the thing that plays it. It can't be just a great feature film that you want to see at home. It's got to be something more. It has to be something special that is best seen on the video screen."

Having extensive experience in audio recording, Lever's venture into video has triggered some new ideas on how audio recording studios can beef up their incomes in these troubled times. "One area that I really encourage recording studios to consider is ADR (Automatic Dialogue Replacement), or 'looping' in film terms. Recording studios could pick up anywhere from \$125 to \$200 an hour by converting one of their spare rooms. We converted an old office that we were using as a catch-all room into an ADR room. We put up an inexpensive wall, without floating anything, and a piece of glass. I put in an Ampex 16 track, an ATR 104 4 track, a Sony BVU 800 VCR, a couple of Auratones, a cue lock synchronizer, a Crown, a limiter, a 1176LN, a de-esser, and a couple of TV monitors. That room is now cranking out \$50,000 a month; and the total cost, if you really did it up right, wouldn't be more than \$100,000. What really helped us get the business were the techniques we learned in rock and roll. The people we are working with were using a room where they didn't know how to overdub and punch-in. If they screwed up any of the dialogue, they would go back to where there was a commercial break and punch-in there. The place they were using had the gear but didn't

know the procedure to just fix a word or two. We literally cut their time by two-thirds right away. Now we're doing a hundred and fifty shows for "You Asked For It." That's 750 segments we're sweetening. A lot of them are MOS (literally 'mitout') without sound. We record all the dialogue, lay in the music, create the sound effects and mix, and it's all being done in what was basically an empty room with some equipment we just shoved in there and wired up. The point I'm trying to make is that most of the recording studios out there can do the same thing. With the chops they have from making records they can take a studio that they may be desperately trying to sell for \$30 or \$40 an hour and start getting a hundred or a hundred and fifty an hour. The going rate for that kind of sweetening and ADR is two hundred bucks an hour. They can undercut everybody else and start cranking the work out. This is a perfect way to get into video, because it allows you to make the step in a small way and start making contacts and building relationships in television and film.

"One of the things I feel is important is that we're not video people who bought a TEAC 3340, and we're not audio people who got hold of some video toys. We're music recording people who want to share what we can with our friends in the recording industry. Getting into ADR should really be the first step, if you want to eventually get to the editing bay stage. Video can be a high-yield business, but you have to put out a lot.

An editing bay makes you a hundred thousand a month, but it costs one to two million dollars. An ADR room makes you fifty thousand a month and costs you a hundred grand, so it's actually a better investment. Even if all you want to do is music, it can help pay the bills until there's a resurgence in the recording industry."

"The music and pictures of tomorrow's videos will probably have to stand alone and still match perfectly into something that will mesh and draw you in and then take you away. It will probably be concepts more than stories. It will be filled with excitement and wonder. Unfortunately the tools and the instruments that we need to practice the craft of creating imagery electronically in video are very expensive, and the only people who are not fools who have them are keeping them busy a lot to pay for them. This fool here, however, has decided that he can be very happy with so many hours a week sold in the edit bay, and I intend to leave a lot of time open for the purpose of getting in there and playing. I want to do something else with this thing besides making a damn business. You can't take it with you." ■

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(continued from page 120)

1-inch multi-camera remote videotaping and remote 24 track audio recording with SMPTE time code interlock. Post production services include 32 track computerized audio posting with mix-to-picture capability, computerized on-line 1-inch video editing, digital video effects, computerized film-to-tape transfer through Rank Cintel Flying Spot Scanners, and computer animation.

According to Neil Feldman, Video Post president, a major advantage to the present arrangement is the mutual freedom of the

Omega Audio's new control room, as shown here, includes a custom designed BTX interlock computer system that controls three audio machines and a JVC CR6600 3/4" video cassette recorder on a frame accurate basis for 32 track video/audio mix-to-picture projects.

ways on particular projects. Music video projects, however, enable them to join forces for high quality.

"Audio people need to know video, and video people need to know audio. With a facility like this, we're trying to make the transition as easy as possible for both," says Christensen.

Following is a description of the 'typical' video music production procedure for the Dallas based team.

In a live music production, the performance comes first. Precise technical arrangements are made in advance with the band manager, musicians, road crew, hall manager and audio/video team. In rehearsal, the video director is familiarized with the music and various lead breaks.

We do most major music shows with at least two 1-inch videotape recorders (VTR's) going simultaneously, with one or more being switched live and the others isolated. This pro-

vides greater visual choice in the final edit.

Audio personnel mike the music as they might for an album-style live concert. All the microphones on stage are fed to separate tracks of the 24 track tape machine along with the video time code (SMPTE). The same microphones (inputs) are mixed in real time and routed in stereo to all videotape recorders. This real time recording becomes a scratch track as well as a safety copy.

After the concert, the master tapes fall into three categories:

Primary video master: A 1-inch video tape that has been switched from various camera inputs according to the director's commands. This tape contains switched video, scratch audio and SMPTE timecode.

Isoed video masters: A 1-inch videotape isoed versions of the same concert that has not been switched, to serve as a "safety net" for unique shots that might otherwise have gotten away. Each tape contains unswitched video, scratch audio and SMPTE time code.

24 track audio master: 2-inch audiotape, containing all microphones on separate tracks, plus the SMPTE time code.

The primary and isoed video masters are immediately dubbed over to two 3/4-inch sets of video workprints. While one set is being off-line video edited, the other set can be in audio post production for mix-to-picture purposes. Before discussing the details of each process, let's examine a critical factor for both: the SMPTE time code.

Each 3/4" video workprint has two kinds of information—picture and sound. The picture, or video portion, also includes a time code (a sequential number for each frame of video, which appears "burned in" on a corner of the screen). The audio portion of the workprint has time code in digital form on one track and scratch audio, in mono, on the other track.

Suppose, for a moment, that you are the music video producer on a project that has come to this point. Your next step is to make a decision: should you edit the videotape first and then mix audio to it, or should you mix audio first, using the unedited video primary reel?

Technically, it can be done either way. But because on-line video editing can create drastic time code changes (with song #12 now leading the program, for example), some producers prefer to pre-mix, or mix-to-picture, first. On the other hand, editing first can save having to mix every song, thereby saving time and money. In addition, the audio mixer

(continued on page 134)



POLY-SEQUENCER



The POLY-SEQUENCER (Model 1005) for the PROPHET-5 is self-contained with a built-in digital cassette deck and connection cable which interfaces with the PROPHET-5 via the 4-prong Digital Jack on the synthesizer's back panel. This unit is remarkable for its ease of operation and outstanding features:

- Over 10,000-note storage
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- Sequence grouping
- Instant transposition
- Real-time or single-step recording
- Variable playback speed
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- External clock input for synchronized playback with other instruments (electric drummer, etc.)

This sequencer is very easy to use. To record a sequence, simply press the Record Switch then the desired Sequence Switch. The recording will automatically begin when you play your first note. When you've finished playing, hit the Stop/Continue Switch (or the Stop Footswitch) to end the recording and the sequence will start playing back. That's all there is to it!

As your sequence is playing back, pressing Record then Edit will allow you to overdub additional notes or set program changes. In this way, a sequence can be constructed one layer at a time (like a multi-track tape recorder that automatically assigns tape tracks). Program changes can be set within the sequence to vary timbre, volume, or other parameters. Sequences, chords, or single notes can then be edited, clock pulses added or deleted, and all sequences and one file of 40 programs saved on digital tape.

Sequences can also be "single-step" recorded: assigning each note a particular number of computer clock pulses. This method allows you to synchronize the sequence with other instruments, such as an electric drummer. A footswitch can be used to advance the internal clock, leaving both hands free to play the keyboard.

The sequence grouping (or copying) function simplifies the amount of input required for a complex musical arrangement. Each section of music can be input as a separate sequence, then linked together in any order as another sequence. The original sections can either be erased, to make room for more music, or kept on file for changes or regrouping; the grouped sequence is complete and independent of other sequences.

REMOTE PROPHET



The REMOTE PROPHET Keyboard (Model 1001) combines all the mobility of the guitar with the sound of the PROPHET-5 synthesizer. This compact four-octave keyboard weighs less than ten pounds and comes with its own shoulder strap and twenty-foot connection cable.

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The REMOTE PROPHET Keyboard interfaces with the PROPHET-5 by connecting the reinforced cable to the Digital/Analog Interface Jacks on the back panel of the synthesizer. The 1/4" phone plug can be connected to either the Amplifier CV In (for volume control) or the Filter CV In (Filter Cutoff control).

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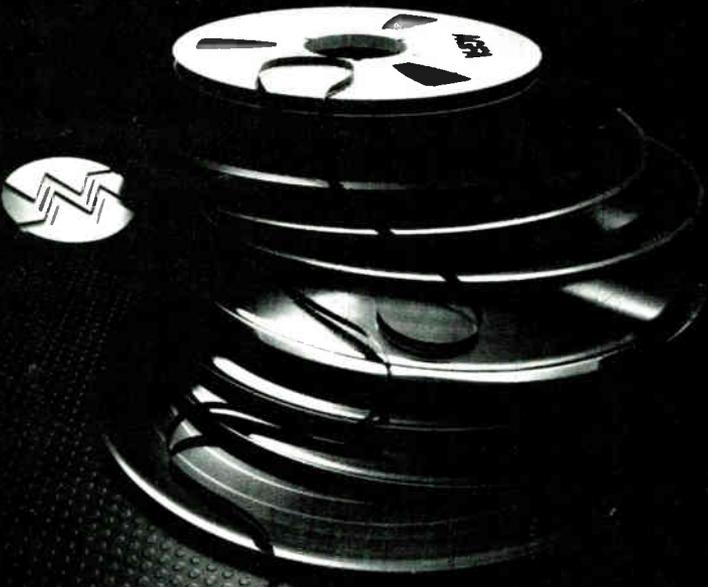
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(continued from page 132)

has final knowledge of which camera angle or scene the director will feature in each song, so that instruments can be featured in the mix. But it should be noted that mixing after the final edit may involve more time if the show is cut up or its order changed quite a bit. This decision of when to mix-to-picture should be thoroughly planned prior to execution.

So you have booked audio time, and are ready to mix-to-picture. Now comes the miracle of modern technology—computerized synchronization. Every point on the audio track is automatically sync-ed with the video track to an accuracy of $\frac{1}{3000}$ of a second.

Sitting at the controls you simply twist a dial to advance or reverse the picture on a color television monitor before you—and the 24 track audio machine follows and locks to that point.

Let's take a moment to review what a television picture actually is. Like motion picture film, in which 24 frames per second create the illusion of motion, video employs a similar process electronically. The video picture's basic frame rate in the U.S. is 30 frames per second and causes a picture to be electronically painted on a phosphorescent surface.

Each frame is made up of 525 horizontal lines in a system known as NTSC. Actually, every frame of information is scanned twice, utilizing a trick referred to as "interlacing." This simply means that every other line is scanned per field. In other words, it takes two fields to create one frame.

You may have heard of the term, "freeze frame." If you were to play back a single frame repeatedly, you would create the illusion of freezing motion.

Through the use of computers, video editing is now frame accurate. A similar application of computer technology now enables audio to mirror that accuracy. As you recall, the audio and video tapes were synchronized at the time of that original concert. Sophisticated digital technology preserves that precision.

When you're comfortably seated at the console, it's "ready set, mix-to-picture"—from 24 tracks to stereo, either onto two spare tracks of the 24 track machine, or on a separate $\frac{1}{2}$ " 4 track audio recorder. As you work from song to song it is vital that the mix-down machine also be sync-ed to the video program, so that speed variations will not cause difficulty.

The last audio step is a "lay-back," or an audio transfer to the original 1-inch master videotape. While interlocked with the 1-inch



The Rank Cintel Flying Spot Scanner, shown here, enables Video Post & Transfer to take music projects shot on film footage and to transfer them to video tape for editing purposes. In addition, The Rank unit can perform computerized scene-to-scene color correction. Once the film stock is transferred to tape, much time can be saved through advanced computer editing techniques.

machine, you erase the original audio and replace it with the new mix.

Audio sweetening will not occur until after video editing. This is because, for example, when you juxtapose song #12 with song #8, you will want to bridge over the edit point with applause. So that is the appropriate time to add voice-over narration, laughter and other effects as needed. When the time comes, of course, you can pinpoint the location of each effect with perfect frame accuracy.

Another byproduct of computerized audio sweetening is Automatic Dialogue Replacement (ADR). This involves word-for-word audio retaping for lip sync video. If, in the process of taping a TV commercial your on-camera narrator's voice cracks, he can re-do it in the studio. Let him watch the monitor several times. Then, with headphones on, he can lip sync it phrase by phrase if necessary. Your smart computer allows you to assemble as you go.



Now for the video side of the fence. Video post production has changed recently due to several technological breakthroughs. Electronic editing is now economically feasible for independent producers. A brief glance at video history will provide some perspective.

In the "golden days," fine television audio was technically impossible. The limited bandwidth monoaural sound accompanying the carrier wave trudged its way through a low-quality speaker or the receiver end.

Several years ago, the networks discovered they could "simulcast" televised music specials in stereo. Sud-

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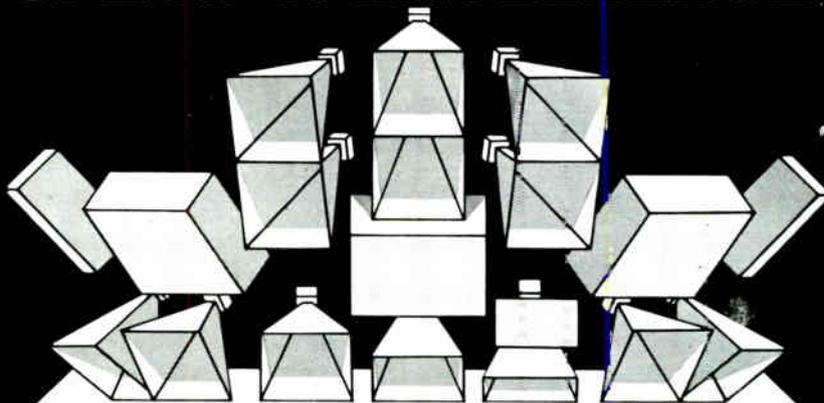
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denly, a national audience experienced good quality audio with television. Movie theaters no longer had a monopoly on good sound with picture.

Meanwhile, technological refinements enabled satellites, cable, video-discs and video cassettes to offer stereo audio. Virtually overnight, several means of distribution had emerged. Due to the sudden growth of these new markets, video producers discovered the need for high quality audio.

The medium of videotape itself also underwent some astonishing improvements. Along with advances in digital processing of the video signal, the new 1-inch Type "C" tape format brought many advantages. Compared to its bulky 2" quad predecessor, the 1-inch VTR offers stereo audio, lower cost, easy and infrequent maintenance, faster lock-up for frame accurate edits, and special features such as slow-motion, freeze frame and fast motion.

Also, as you may have observed, most television is "pre-recorded" these days. Live television, like live radio, brought the joy and terror of spontaneity to its productions. Mistakes did happen.

With the introduction of magnetic videotape recording, post production editing became feasible. Due to the high cost of equipment and labor, however, it remained in the domain of the networks until recently.

Today, the costs of both production and post production have declined. Independent video production companies in many cities are



doing very well. In addition, a number of corporations have their own video departments. And the newest entrant to the growing industry is the music video producer.



Back to video editing. Today, the editing process is made up of two distinct phases, referred to as off-line and on-line editing, a major difference between the two being cost.

The goal of the significantly less expensive off-line editing process is to make as many editing decisions as possible in advance of the final on-line editing session. When off-line editing has been completed, you will have a list of numbers representing the exact sequence of shots from the 3/4-inch dubbed workprints.

In the process of off-line editing, most producers create a 3/4-inch tape called a "roughcut" to help them visualize the final product. Some simply keep it in their heads and make note of the frame numbers. In either case, the numbers or edit points are essential.

As you recall, your primary and isoed master videotapes now contain mixed stereo audio. You will bring those master tapes, along with your list of edit points, to the on-line session.

The editor will feed those

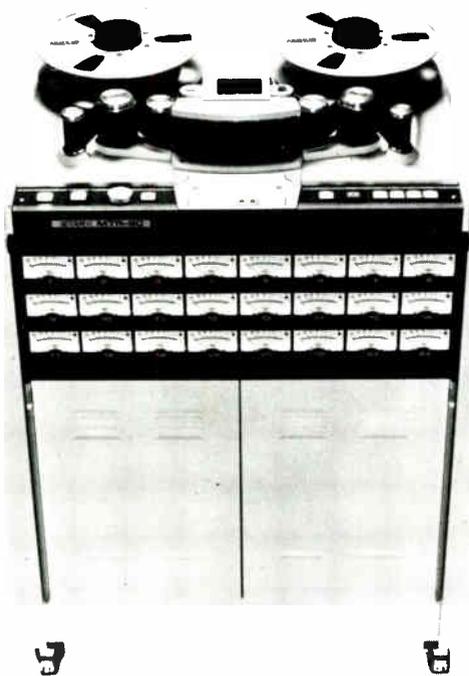
numbers into the computer. Cross-fade and special effects transitions can be programmed in advance. The machine will automatically make a transition according to the edit points, and each edit decision can be previewed for approval. Off-line editing techniques make it possible to edit a program in far less time than ever before.

So now we have come full cycle. The concert, shot on video, is converted to a 1-inch master and probably two 3/4-inch workprints. Audio mix-to-picture work takes place while the video version is being off-line

edited. On-line editing incorporates the mixed stereo audio track with the newly selected and switched picture sequence. Finally, audio sweetening covers the gaps.

Space-age computer technology has helped to bring about a period of quantum changes in the communications industry. It's all happening at once. Video and audio are merging toward a single industry unit as markets diversify, production needs soar and production costs decline. In this brain-baffling era, the expert is only five minutes ahead of everyone else. ■

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Omega's 24 track remote truck pictured here is specially designed for audio support of video music specials shot on location.



VIDEO NEWS

by **Mia Amato**

Public TV: Changing Channels

As the future of public broadcasting becomes more uncertain, at least one public TV station—WTTW in Chicago—is attempting to bolster its finances and keep jobs intact by sliding gracefully into production for cable TV. *MusicAmerica Live*, a series of live-

by-satellite concerts, is the first venture of **WTTW Enterprises**, the station's new profit making arm.

The first three performances featured **Johnny Mathis**, **Frankie Valli and the Four Seasons**, and **Manhattan Transfer**. The series is being sold to STV and cable outlets including ON-TV, Star TV, and Home Theatre Network; some of the outlets are presenting the shows on a pay-per-view basis in order to gauge their popularity with subscribers. Executive director **Keven Wilder** has been masterminding the sales to systems and exploring cassette and disk possibilities as well.

The programs are commercial-free and simulcast by local FM radio stations. In format, they are similar to *Soundstage*, WTTW's successful weekly music show running on PBS. "This is the kind of programming we know we can do well, and it makes no difference if it's run on cable or public TV," says a station spokesman. "We're also developing a cable version of *Sneak Previews*, our film review show." TPC of Pittsburgh is handling the location video at various small halls around the Chicago area; portable uplink and transmission is provided by **Netcom**. WTTW is using its own gear and staff for the 24 track stereo audio feeds.

Video Sessions: On the Road

Odyssey I, **Unitel's** famous folding "studio on wheels," has been making tracks up and down the coast on video music projects...down to Hampton Coliseum, for example, for a **Hall & Oates** concert, directed by **Jay Dubin** for **Champion Entertainment**. Then to New Jersey's Capitol Theatre for a **John Mayall** performance destined for RCA Vidisk release. **Jonathan Stathakis** produced and **Len Dell'Amico** directed for **Monarch Entertainment**. For the Entertainment Channel, **RKO/Niederlander** booked Odyssey I to document **Lena Horne's** Broadway show; there was also a short trip to Phil-

adelphia to tape **Eugene Ormandy** in a program on Liszt for ABC's ARTS cable channel.

E.J. Stewart successfully completed its first co-production with MTV, an **Outlaws** concert directed by **Don Roy King**. Promo sessions: **Ann Woodward** at **National Video** posted three promos for **Dave Edmunds**... **Varitel Video**, of San Francisco, created the promos for 415/CBS Records' new band **Red Rockers**... two clips for **Translator**, also commissioned by 415/CBS were produced by **Alcon**, also based in San Francisco.

Showdates: New York, Anaheim

Billboard's Video Entertainment Music Conference will be held in New York November 18-21 at the Vista International Hotel in the World Trade Center. Besides the change of site, this year's program has been beefed up with panels on home taping, piracy, and retailing strategy; a response, perhaps, to criticism of last year's seminars as too lightweight for the \$375 registration fee. For more information, call 213/859-5319.

The California Cable Television Association convenes those same days at the Anaheim Convention Center for the annual "Western Show." In past years, this event has been the major arena in which satellite programming services pitched (and wooed) cable systems. This year, the anticipated 10,000 attendees can expect to find evidence of an industry swing away from entertainment to information services. For registration and information, call 415/881-0211.

Software: Upcoming Releases

Pacific Arts is aiming for a Christmas release of **Mike Nesmith's** second video album, to be titled *Video Ranch*. The Carmel-based firm is also expanding as a distributor of offbeat feature films, having secured home

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video rights to *My Dinner with Andre* and the surfing classic *Endless Summer*. As one staffer commented, "We're starting to think of ourselves as a 'boutique' label."

The Compleat Beatles, a two-hour film compilation, is expected soon from MGM/UA Home Video in stereo tape and disk, according to programming VP **Ronna Wallace**. A **Barry Manilow** performance tape on MGM/UA should be in the racks as you read this. **RCA Selectavision** promises a rare **Elvis** concert, a program based on the **Allman Brothers'** last tour, and a solo video album by **Mick Fleetwood**.

Pilot Productions: Navigating a Market for Jazz

"Repeatable imagery of a collectible nature" is how **Barbara Gronbeck** likes to describe the image processing work of **Mark Allen**, her partner and resident video artist at **Pilot Productions** in San Francisco. That's also how Gronbeck describes the company's latest project — a performance documentary on the career of jazz sax ace **Pharaoh Sanders**. Called *Highlights*, the program is scheduled to run in November on "Night Flight," USA Network's late-night, predominantly rock satellite cable feed.

The project began as a promo clip commissioned by Sander's label, **Theresa Records**. Promo videos for jazz artists are rare. After the clip circulated to a very positive response, the recording company and **Pilot Productions** are now releasing a half-hour program on Sanders as a co-production.

"Much of the program is 1981 concert footage," says Allen. "We've added a short interview by jazz d.j. **Herb Wong**."

The most visually arresting part of the show is a performance taped in an abandoned tunnel in Marin County, California. Sanders walks in and out of the frame, sometimes silhouetted by the tunnel arch, or walking up and down the tunnel as the sound changes with his movements. "People often think that a lot of Pharaoh's sounds are created electronically," adds Allen. "Most of this song was shot in one long take, to highlight his technique of 'circular breathing,' which enables him to play continuously for several minutes without stopping."

The program has little of the brilliantly-hued image processing that is Allen's trademark. Like **Ron Hayes**, Allen began using the abstract, swirling patterning of video synthesizers at **WGBH** in Boston in the early seventies. Allen recently inked a deal with **Thorn-EMI** to serve as executive producer on a videodisk program which will bring together the video music works of **Hayes**, **Ed Emshwiller**, **Steve Beck**, and others working in the genre. ■

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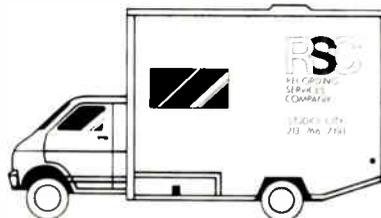
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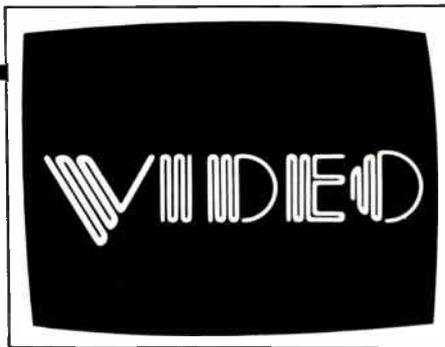
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INTERFACE

by N.I. Weinstock

For many typical sound studios, the last couple of years have continually begged the questions of whether and when to get into both video and digital audio. Because of the usual limitations in wallet capacity ("It's just as well, my pockets are so stuffed with business cards from guys selling

eons ago by the powers that presided over the beginnings of TV. As it has stood ever since, the interval is unused space in the broadcast signal, and on videotape as well. Unused, that is, till the idea of teletext was born; now digi-

meant to match with the SL-2000 Beta VCR (together they sell for a mere \$3,000), will encode either 14 or 16-bit PCM onto standard L-250 or L-500 tape. It will also work with any other U-matic, Beta, or even VHS VCR. Since it's the digital processor that determines audio quality, not tape format, the format really doesn't matter

DIGITAL AUDIO AND VIDEO

new studio equipment," one studio proprietor told me at the recent AES convention, "I don't have any money there to buy anyway,") it may seem a tough decision, an either/or. Which technology to get into? Which will customers demand most now, to help pay for the other later? Which can our engineers adapt to best and quickest? Which do they want most, or first?

Probably the answer to all this is both. And several recent developments are making it possible to enter video and digital together, cheaply.

Sony is really on top of the news in this area, with following developments from arch-rival Technics and many of the slightly less huge electronics mega-corps. The coming of the Sony-Philips digital audio disc next year is a well-publicized certainty, with hard to predict effects for the music, recording, and consumer audio industries. Recently, Sony gave us all another unexpected *zetz* by letting it slip, at the Consumer Electronics Show in Chicago, that they are on their way to perfecting a way to insert a digital audio signal into the vertical blanking interval of standard Beta and Beta II video.

To explain: Vertical blanking is the space between video frames, seen as the black bar when "vertical hold" needs adjusting. The dimensions of vertical blanking were arbitrarily decreed

tal audio is a competitor of teletext for the use of the space. Sony is not explaining the details of how they put the signal on there, but given their engineer's brainstorm of doing so, the how does not seem terribly complex. Of course, the standard audio track of Beta—or of any other format of videotape—is too narrow and moves too slowly for the scads of information digital requires. But the blanking interval moves diagonally across the tape, as do the frames in-between, and so there would seem to be enough tape there for the digital code. Probably there is not enough room there for 16-bit encoding, which requires over 65,000 possible values, and so Sony's vertical blanking encoded digital is most likely a 14-bit system (requiring about 16,000 values). This translates into about 80 dB signal-to-noise and dynamic range, which is about equal to the best vinyl pressings.

It seems likely that Sony will be bringing this system to market A.S.A.P., in an attempt to improve the format's relatively unpopular stance in the home VCR business. 'Twould seem to be some opportunities therein, for video producers with the right soundtrack. Beyond this, Sony is also the first company to be on the market with a digital audio processing adapter for VCR. Their PCM-F1, a dapper little unit

very much. Only a little: if you've ever heard the intense distortion resulting from a drop-out within a digital recording, it will be obvious that the quality of the tape itself, and the sheer volume of it that passes by the recording heads, is critical to keeping the drop-out rate low.

Recording digital onto videotape in this manner makes interfacing audio with visuals as easy as pie. With SMPTE time code tracked directly on the master audio, editing audio with video entails just a two (or at most, three) VCR set-up. No need to cannibalize the audio mixing board, and you can get away with using the most basic of editing controllers in your video editing room.

By the way, we don't mean to be such exclusive partisans of the Sony Corporation, but the PCM-F1 is the very first 16-bit digital recorder with both pro and consumer applications that this writer has managed to play around with. There are other PCM devices coming soon which are equally aimed at the consumer, such as the Technics SV-P100 stand-alone deck, but this, and all others to our knowledge, are 14-bit systems. The ramifications of a 16-bit digital system equally available to the public at large as to the pros seem about as gigantic as those first 4 track, sound-with- and sound-on-

sound decks of a few years ago.

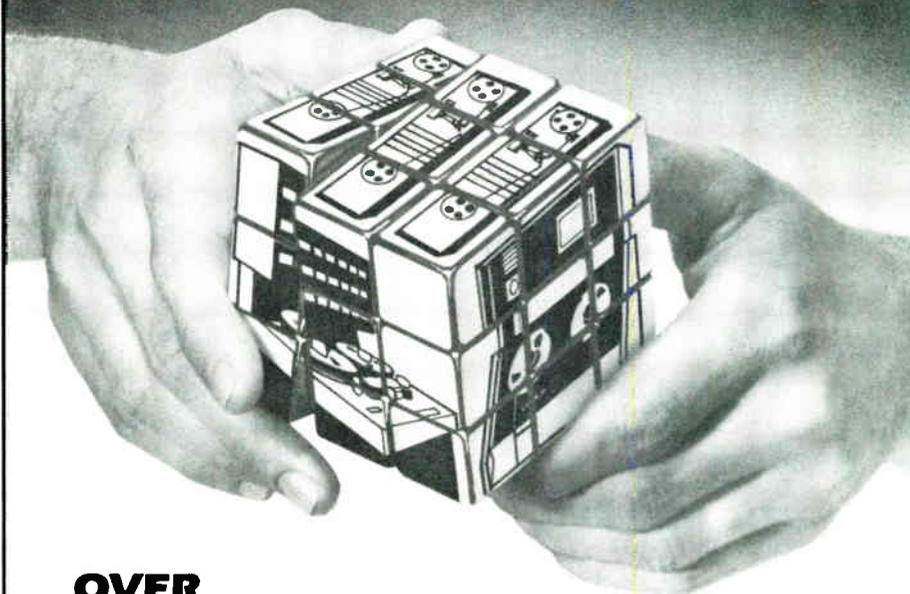
Aside from the general effects of better quality audio recording available with video to the masses, what effect will digital theory have on the video track alongside? As much as video editing inspired digital audio editing, and feels like digital audio editing, video recording is certainly an analog process. What would digital video feel like?

Lest we forget, video is so far away from being digital that it is generally still in the era of the tube. The very first cameras not to use some variant of the plumbicon, saticon or vidicon tubes as the essential conversion device are only now becoming available. An MOS chip is being used by Hitachi in a \$2,000, 3 lb. camera which NBC has already used for broadcast; several manufacturers have been working on CCD cameras as well. This correspondent actually got his hands on the Hitachi camera and found it very impressive in color rendition, sensitive to relatively low light, but without very much light latitude within the frame. Of course, improvements have already been made that I haven't yet seen, and it shouldn't be more than five years till we're in the transistor age of video sensing devices.

The next step then would be conversion to digital. But why? For the same reason one converts audio to digital, the generation problem, the noise problem—but then the video signal is so much more complex than audio that it's going to be a long time till we have the computer capacity to store a digital record of life-detail video, and make it popularly available. Optically read disc storage is the means, but you'd need a Pentagon budget to use it.

On the other hand, computer generated graphics are gradually working their way up to life size realism, and are by definition "digital." Yet the end image is spewed out in analog fashion onto tape. Digital thinking in video is more a mindset of computer generation, computer programmed cuts, computer correction, and now digital soundtracks, than a necessarily digitally encoded image. In any case, the major improvements needed in the video image, in the areas of resolution and lighting latitude, will not be achieved by encoding the present signal, but by expanding the signal to wave lengths much more difficult to encode. That will also be a long time coming, due more to politics than technological limitations. ■

Puzzled...



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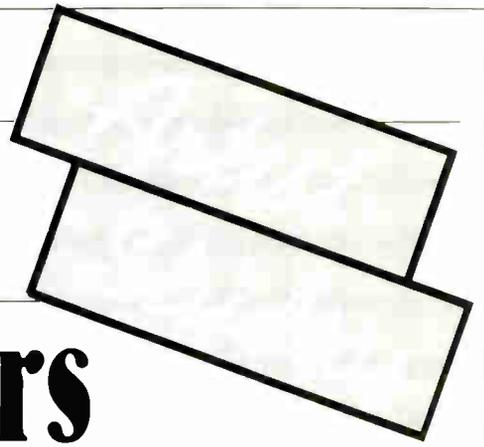
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Neil Young's Modern Recorders



by David Gans

When I interviewed Neil Young recently, I was taken to the studio on his Northern California ranch to hear a rough two track of his nearly-completed album, tentatively titled *Trans*. Nothing connected with Young's creative output is ever definite—"If every-

thing goes right, this record will come out in time for the tour," he told me. "If everything doesn't go right, it won't. That's just the way it goes"—so the release date, title, sequence, artwork, etc. are still up in the air at the time of this writing, and Young left for a European tour before the produc-

tion could be completed.

The studio is in a house, certainly not a space designed with acoustics or convenience in mind. The "lobby"—once the entry hall of the house—and the control room were all I saw, but I gathered that the studio is
(continued on page 146)



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The Mark IV™ Monitor Mixer is available in 16 x 8 or 24 x 8 configurations and features transformer balanced inputs and outputs, 8 unbalanced outputs, PFL/Solo headphone system, 10-segment LED ladder displays for each of the 8 outputs, auxiliary inputs and low-cut controls for each mix and a unique PFL/Solo patch. The PFL/Solo patch is a highly desirable feature that enables the monitor engineer to patch any of the mixes back into the switched inputs so that externally equalized or processed signals can be monitored. This is a feature which is not usually found on custom-made monitor mixing systems costing \$15,000 or more.

Each channel of the Mark IV™ Monitor Mixer features LED status indication of -10 dBV and +10 dBV, an input gain control, 4-band equalization, built-in mic splitter, phase reversal switch, PFL and mute switches, and 8 color-coded rotary level controls which correspond to color-coded slider level controls in the output section.

To make the most out of the Mark IV™ Monitor Mixer's capabilities, we have equipped the mixer with two separate built-in communication systems. By utilizing our optional headset or "goose-neck microphone," the monitor mix engineer can communicate with the musicians through any of the 8 separate monitor mixers. This

talkback system will help alleviate the problems musicians sometimes have in establishing the proper on-stage mix, especially if a previous sound check was not possible.



A second communication link can also be established by the monitor mix engineer between the stage crew and lighting personnel by utilizing the optional Talk/Comm "slave" units. The Mark IV™ Monitor Mixer's front panel utilizes an LED indicator to alert the engineer as a call function and also shows when intercom is active.

MARK IV™ MIXING CONSOLE

Next, the house (main) system must be able to deliver crystal clear, noise-free sound reproduction to the associated equalizers, power amps and horn/loudspeaker enclosures. For the main PA, our new Mark IV™ Professional Mixing Consoles offer the sound engineer the necessary performance, flexibility and functions to do almost any sound job.

The Mark IV™ Professional Mixing Consoles are available in 16 or 24 channel versions (16/24 x 4 x 1) and feature transformer balanced inputs and outputs, PFL headphone system, 10-segment LED ladder display for all outputs, channel and sub output LED indication (-10 dBV and +10 dBV), internal reverb and effects/reverb return to the monitors. The console also utilizes a 24 volt phantom

power supply, variable low-cut controls on each sub (20 Hz to 500 Hz), and in-line patching facilities between the sub outputs and the sum.

Each channel of the Mark IV™ mixing console features an input gain control, two pre-monitor sends, 4-band equalization, effects/reverb send control, pan control, "push/push" channel assignment switches, pre and post EQ, send/reverb patching and PFL (pre-fade listen) switch.

The Mark IV™ Professional Mixing Console has two complimentary communication systems for use with our Mark IV™ Monitor Mixers, headsets, gooseneck microphone and Talk/Comm "slave" units. The Mark IV™ Series intercom system allows communication between the "house" and monitor mix engineers as well as stage, lighting and other associated concert personnel.

Both the Mark IV™ Monitor Mixer and the Mark IV™ Professional Mixing Console feature gooseneck lamp connectors (BNC) with dimmer controls for use with our optional gooseneck lamps. This option allows superb visibility of the mixers in poor lighting situations.

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For complete information on the Mark IV™ Series write to: Peavey Electronics Corp., P.O. Box 2898, Meridian, MS 39301.



PEAVEY ELECTRONICS CORP.
711 A Street Meridian, MS 39301

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(continued from page 142)

in an adjacent room connected by a door. There is no window between the two rooms.

The control room is jam-packed with stuff. Handsome wooden cabinets house outboard gear, including several older items. There were Pultecs, United Audio EQs, 1176LN's, an old Ampex two track, two Nagras, two 3M two tracks, a Q-Lock SMPTE unit which had been rechristened "Q-Fuck" with a black marker, the giant microphone from the stage set of the "Rust Never Sleeps" tour, and several items I couldn't identify. It's a cramped but comfortable workplace.

Co-producers David Briggs and Tim Mulligan were hard at work on

the tracks, even as Mulligan prepared to leave for Europe. "Most of the equipment left yesterday on the truck," Mulligan explained. If all this is the second-rank gear, I wondered, where the hell do they put all the front-line stuff?

After hearing the roughs of *Trans*—which features vocoders and Synclavier's prominently on several tracks—I talked with Briggs and Mulligan about the nature of their work with Young. I got the impression that these men are philosophically united behind the erratic genius of the singer-songwriter, and that while conditions in the studio are anything but conventional, they enjoy their work immensely and get more satisfaction

out of it than they do anywhere else they work.

Mix: I understand you recently did some of this new album in Hawaii.

Briggs: All the stuff that doesn't sound like vocoders is from Hawaii.

Mulligan: Neil will write a bunch of songs, and wherever he is he'll call up and say, "Let's record," and we go into whatever studio happens to be there—even if it's not a great technical studio. You make the most of a situation and create something there.

Briggs: There may be only one other guy in the world—Bob Dylan—who's capable of writing ten or 12 songs full-blown in a sitting. He might be in Florida, he might be in Hawaii, he might be in L.A., but when the songs are done, "play ball!" Drop what you're doing and go.

Mulligan: You walk in the door, press RECORD on the multitrack, and—

Briggs: —and then start shoving the faders up.

Mulligan: You don't hear, "Let's hear that first one we did"—"Oh, I'm sorry, we didn't record that one."

Briggs: You never hear that, I guarantee you.

Mix: Neil doesn't do a lot of takes, does he?

Briggs: It depends on the song. The way he prefers to do it—and in my opinion, the right way—is "Here I am. I'm going to be great, and I'm going to be great *right now*. And everybody else had better be great, because that's why you're all here."

Mix: Does that put a lot of pressure on you guys?

Mulligan: No. It's not pressure at all.

Briggs: That's what we do for a living. We're all pros; we've been doing this a long time. It's just like any other big-league enterprise: when they call you, you're supposed to go up and be great right then and there—not a week later, not five hours later. Your game is to catch it—now. Be great or be gone.

Mix: A lot of Neil Young albums have a rough quality—

Briggs: He's also done a lot of beautiful, clean recordings—letter-perfect, no mistakes. The counterpoint is more of a live feel. What you pay for in one thing, you get back in another.

If you're lucky, you can get perfection and spontaneity at the same time. But that's something to aspire to, not something that you're going to get every time. The way Neil generally feels is, unless he's got a lot of time and it's a really complex song, he'd much rather have the spontaneity and the life and heart come out than to piss it all away trying to get perfection.

That's the curse of multitrack when it gets down to rock and roll

(continued on page 148)

The Last Generation of Analog Audio

The last generation of analog audio recorders shall be analog in the audio signal path only. All else shall be under digital control. A sophisticated "nervous system" of microprocessors, RAM's, EPROM's, and digitally controlled pad networks shall direct all transport functions, all audio and bias switching, and all setting of audio parameters: bias, erase, level, and EQ. A variety of user functions shall be field programmable to allow unprecedented operational flexibility. A SMPTE time code system (optional) shall place the code track between two audio channels on 1/4" tape and still achieve a crosstalk spec better than 90 dB. And, because they interface directly with computers, these recorders shall open the way to automated recording/playback systems limited only by the imagination.

They shall also be built with meticulous Swiss precision.

The last generation is here. The new Studer A810 Series shall be revealed in the Balboa Room of the Disneyland Hotel in Anaheim during the 72nd meeting of the Audio Engineering Society.

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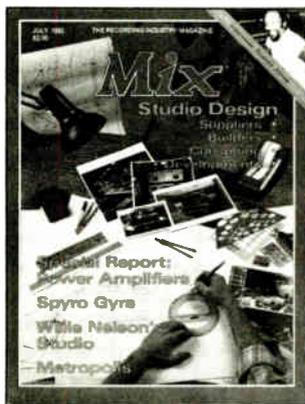
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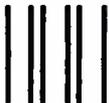
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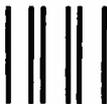
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SOUND ON STAGE

... bits and pieces ...

by Patrick Maloney

Are you tired of keeping meticulous records of every hall you ever worked in only to discover on your return two years later that a new sound system has been installed and everything you know is wrong? Well, P.E.P.S., the Professional Entertainment Production Society, has a solution for you in the form of a computerized fact gathering and updating service based on the technical specs of halls throughout the United States. At the present time information from about 600 venues has been computerized and another 500 have been contacted to supply data on such things as personnel contacts, power handling capabilities, lighting and sound equipment lists, rigging facilities, etc. The fact sheets are reasonably priced and are available on a hall by hall basis. Technical spec sheets for an average 30 city tour can be had for as little as \$34.50.

For more information and a sample computer-generated fact sheet, you can contact Sugar Bear Productions, 21907 Gresham St., Canoga Park, CA 91324. Although you don't have to be a member of P.E.P.S. to order the Facility Fact Sheets, you'll receive a 25% discount if you are. So you might as well join this worthwhile organization and take advantage of the savings.

Meyer Sound Labs speaker

systems have been getting a lot of notice lately and for good reason – they work. Having used several of John Meyer's PA systems over the years as well as his ACD/Meyer Studio Monitors, I can honestly say I prefer to use nothing else at this point. If you don't recall hearing them in a concert situation, you might have listened to them nonetheless if you live in the Bay Area and attend outdoor sporting events. Designed and installed in cooperation with McCune Sound in San Francisco, John's systems can be heard at the Oakland Coliseum, the Oakland Arena, Golden Gate Fields, and, starting this season, at Candlestick Park – home of the Superbowl Champion 49ers.

Actually, there is a rather interesting history to the system that's now out at Candlestick. After last year's winning football season the park's management decided that their old distributed horn system needed replacing with something a little more state-of-the-art. The 49ers themselves wanted something similar to what the Oakland Raid – oops, I mean the *Los Angeles Raiders* – had in their stadium. The Oakland system caused quite a sensation when it was installed a couple of years ago – the announcer sounded like the voice of God, rock music was played through during all the time outs, and perhaps most important, the players could

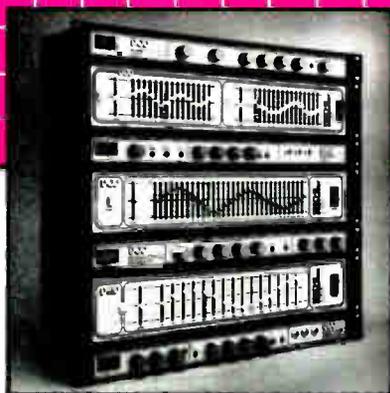
hear their names announced whenever they made an outstanding play – and they kinda liked that! Since the system is a single point array mounted on the rim of the stadium, it hits on the field just as loud as it does in the stands. The older system pointed into the stands away from the field and the players were pretty well isolated from the sound. Now that the 49ers have joined the ranks of Superbowl Champions they want the same quality sound in *their* stadium – and on the field! – as the Raiders have, or had.

Earlier this year McCune Sound had designed and installed a new sound system for Golden Gate Fields in Albany, CA. The heart of this system was a large single point source cluster of Meyer components similar to the one at the Oakland Coliseum – the MSL-10. Well, as luck would have it, the racing season at Golden Gate Fields was over just before the start of the football season, so McCune's did a little wheeling and dealing with the two organizations. In order to test out the feasibility of a permanent MSL-10 type system at Candlestick, as well as generate a little rental income for Golden Gate Fields, the system was moved from the race track to the ball park and installed high up in one of the light towers in time for the 49er-Raider exhibition game.

I attended this "Clash of the Titans" and must admit that I was more impressed with the quality of the PA than by the performance of the players! In truth, I found it to be a little too loud at times – an easy thing to correct – and there wasn't much sound in the stands under the press-box overhang which partially blocked the speaker's pattern. The latter problem is being solved, according to McCune, with the addition of a few smaller full range cabinets suspended from the roof of the overhang. No

(continued on page 162)

Dual Delay R-880



Description

The DOD Dual Delay R-880 is intended for echo and reverb effects. The R-880 is ideal for mono or stereo P.A.

Special noise reduction techniques make the R-880 quiet enough for even the highest gain preamps, and it incorporates some features only available in digital systems.

All this, combined with the DOD reputation for quality and service makes the R-880 an excellent choice for medium to long audio delay applications.

The Dual Delay uses both companding and emphasis to achieve its remarkably quiet operation.

Delay times of 12 ms through 500 ms are easily obtained by adjustment of the simple, straight forward controls. The front panel is divided into three sections: the delay controls; the signal controls; and the signal jacks.

The DELAY 1 and DELAY 2 switches engage each of the delay lines; therefore, at least one must be "in" to produce a delayed signal. The INPUT jack goes directly to the input level pot, so there is no input stage to overload. The CLIP indicator begins to light at about one-half of the actual clip point to allow for more headroom in the program material. The A MIX and B MIX controls are two identical mix circuits that go to separate output jacks. When using two amplifiers, the mix controls may be set differently for greater presence.

Specifications

Frequency Response:
 Dry 20Hz to 20KHz \pm 1db.
 Delay 40Hz to 6KHz \pm 1db.
 X2: 40Hz to 3KHz \pm 1db.
 Signal to Noise Ratio:
 Dry 95 db un-weighted.
 Delay 90 db un-weighted.

Input:
 100K ohm unbalanced.
 Outputs:
 Channels A and B are separate and identical. Output impedance is 600 ohms each channel unbalanced.
 Indicators:
 All switches have LED lamps to indicate when they are in. The power switch is illuminated when on and the clip lamp lights when a signal over 5 volts PP is present.
 Delay Range:
 Delay 1: 12 ms to 125 ms.
 Delay 2: 25 ms to 250 ms.
 Delay 1 x 2: 25 ms to 250 ms.
 Delay 2 x 2: 50 ms to 500 ms.
 Size:
 Standard 1 3/4" x 6" x 19" rack.
 Weight
 6 lb. 7 oz. (3 kg.)



Electronics Corporation
 2953 South 300 West
 Salt Lake City, Utah 84115
 (801) 485-8534



Aerial shot of Us Festival site — beer garden and semicircle of portapotties in fortunate proximity; stage flanked by white Eidophor screens and topped by DiamondVision screen; tech fair behind stage area

by David Gans

By now you've heard that the Us Festival, a three-day rock and technology extravaganza bankrolled by Apple Computer wizard Steve Wozniak, was a surprise success despite the heat and dust that plagued the San Bernardino County, California, site. Though ticket sales looked disastrous right up until the start of the Festival, the turnout was excellent and the event was smooth-running, great-sounding and musically satisfying. The Police, Tom Petty, Fleetwood Mac, Pat Benatar, Jackson Browne, the Grateful Dead and 13 other acts performed between Friday afternoon and Sunday night, September 2-4.

"Showco and Clair Bros. are bringing everything they've got," Bill Graham Presents' Bob Barsotti told me a week before the Festival. A press release from JBL boasted that more than 2400 of their drivers went into the sound system, which was driven by more than 300,000 watts of power.

Clair Bros. provided the monitors and the main speaker system; Showco put up the four two-level delay towers which helped carry the music up the hill to patrons at the rear of the 57-acre amphitheatre, a few hundred yards from the stage. I tested the system with my own ears from several locations at various times over the weekend and found it to be excellent from nearly every angle—including right in front of the stage, where small speaker cabinets provided sound to the overheated sardine-types.

Bass tones went straight to the chest and, particularly noticeable during the percussion-heavy Talking

Heads set, highs were sharp and well-defined. I've never heard such good sound at an outdoor concert before, and several people later reported that the sound was clear and loud even at the rear of the bowl.

The 67' x 300' stage had a 50-foot nighttime projection video screen on either side, and above the center was a 20' x 30' DiamondVision screen that operated day and night—that is, once it was finally put into operation during the fourth set of the first day.

Bill Graham explained that the DiamondVision system was brought to New York by boat from Europe, where it had been used for the Rolling Stones tour. A dishonest trucking company put it on a train rather than driving it nonstop to southern California, thereby saving themselves some money but also getting them into very hot water with Graham.

The producers discovered the trucker's deception and promised to file a lawsuit, but that didn't get the show on the road any faster. They still had to wait for the train to arrive in Los Angeles—which it did, the day before the Festival started and two days after it was to have been set up. "We schlepped it out here and got it up late today," said Graham, and Wozniak later explained that the DiamondVision system had to be cooled before it could be started up, so it didn't get going until Oingo Boingo's set.

DiamondVision doesn't have the resolution of the Eidophor projection system, but its colors are much more intense. Between the three screens, everybody in the bowl could see what was happening on stage more or less clearly. Only we old geezers who

remember what concerts used to be like—before technology made a joke out of the notion of music as an experience to be shared intimately between the performer and the audience—felt the loss of human contact inherent in a concert of this magnitude. Aw, shit, it's not so bad. There's always the laser light show.

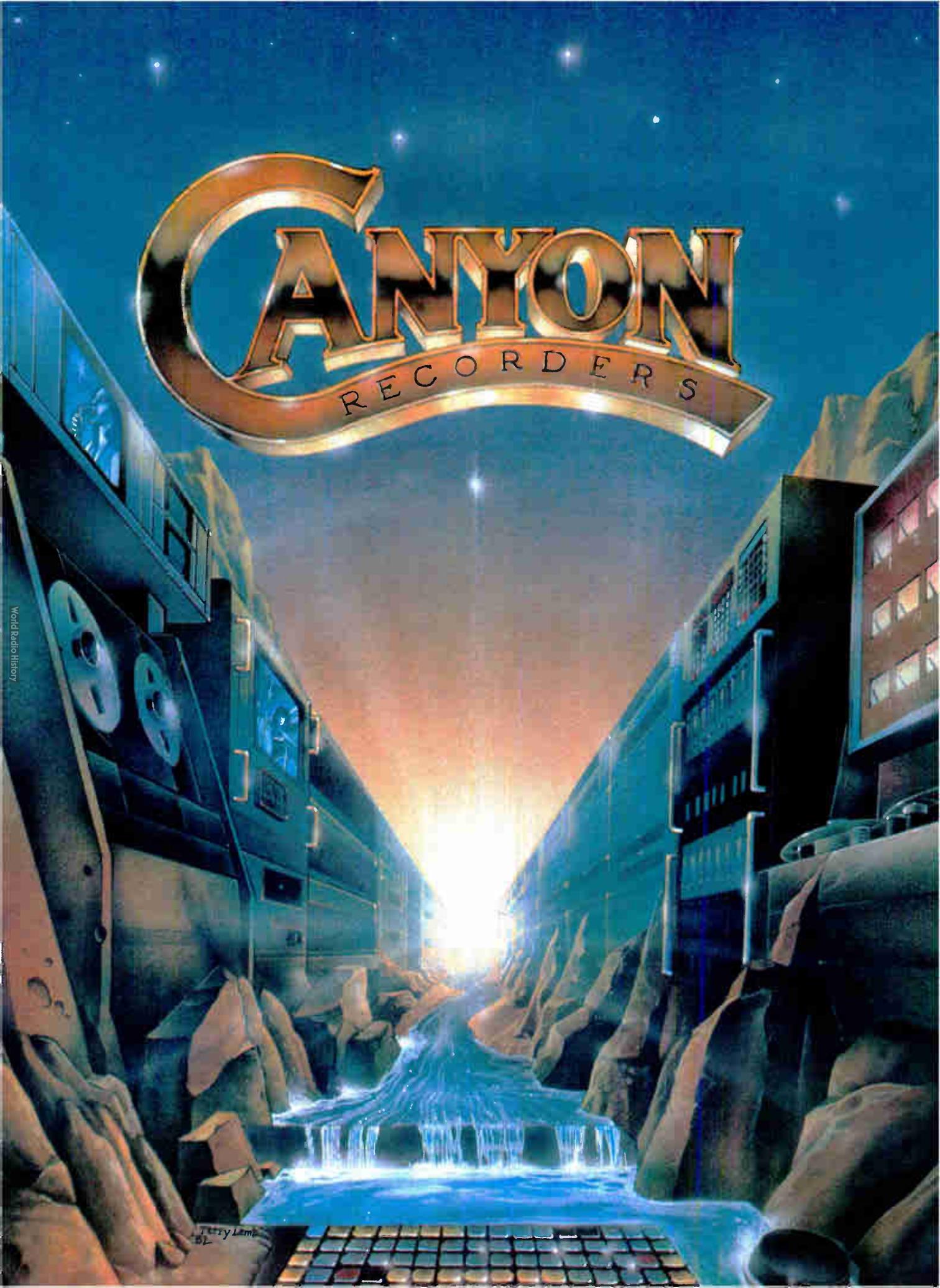
The only musical snafu of the Labor Day weekend was a 40-minute delay that occurred when the Kinks apparently stalled so that they could take the stage after sunset and take advantage of the lights. It was widely reported, with several colorful versions of what happened before and after the Kinks finally did hit the stage. Most accounts seemed to attribute Machiavellian measures to Bill Graham, so I asked him to tell his version of the incident a week or so later at his office in San Francisco.

"It was agreed weeks in advance that for X number of dollars, the Kinks would play for 75 minutes starting within one hour of the completion of the Cars' set," said Graham. "The Cars came off at 5:25, five minutes early, but by 6:00 the Kinks weren't even there yet. [Kinks manager] Elliott Abbott and the road manager were there; they should have been with the band, bringing them there.

"6:15, 6:30, no Kinks," Graham continued. "I said, 'Elliott, you gave your word.'" After a brief exchange, an unmollified Graham ordered Abbott to leave the backstage area, and a forklift was brought over to remove the manager's Mercedes if he didn't comply. The Kinks arrived by limo at 6:40, says Graham, and when they saw Abbott walking up the road away from the stage, leader Ray Davies

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left: Bill Graham
right: Steve Wozniak

said, "Bill, what are you doing with Elliott?"

Graham snapped back that Abbott was leaving and said, "Just get on the stage. There are 180,000 people waiting!"

"Ray said, 'If you don't let Elliott in this limo, we ain't playing.'

"Then you don't play," thundered Graham. "At that point, Ray couldn't answer, because he knew that I would have thrown them off the show." The Kinks continued to dawdle, and finally Graham bounded up the stage steps to order their equipment removed. Davies and company hastened to their instruments and began their set at last, 40 minutes late.

What galled Graham was that Davies later took a swipe at him in front of the audience. "Instead of leaving the stage early and coming back to do his encore, at around the 70th minute Ray said to the public, 'We'd like to play some more, but this is our last number because the promoter won't let us play any more.' Then he did his last song, walked off at the end of 75 minutes, and the crowd went crazy," Graham recalled.

"I walked up to the mike and said, 'Let's hear it for the Kinks. Let's hear some *more* from the Kinks—c'mon, Ray!' Cynically for him, but for *them* I said, 'I don't want you folks to think that we would stop them from playing more.'"

The Kinks did return, said Graham, "and Ray said, 'I can't believe that Bill Graham would allow us this privilege.' Now why did he bring his laundry out there?" Graham's voice rose again, eleven days after the incident, and he directed his anger at the imagined

presence of Ray Davies: "Did you have the guts to say, 'We were fucking with you people for 40 minutes? Did you tell the audience that your manager sat in my office the day before and said, 'We will go on within an hour after the Cars'?"

"Maybe your manager was afraid to tell you that he couldn't deliver what he'd promised!" Calming down, Graham then said, "I never talk business with artists. [Abbott] probably told them, 'Oh, you can go on in the dark—these shows are always late.'"

One writer's account of the incident concluded by saying that "the Kinks won the battle, but they lost the war when Graham refused to allow the group to use the Eidophor system and thus deprived them of the best reason for playing after dark."

"That had nothing to do with me," Graham pointed out. "The Kinks were the only group that didn't want to use the screens. It was their idea."

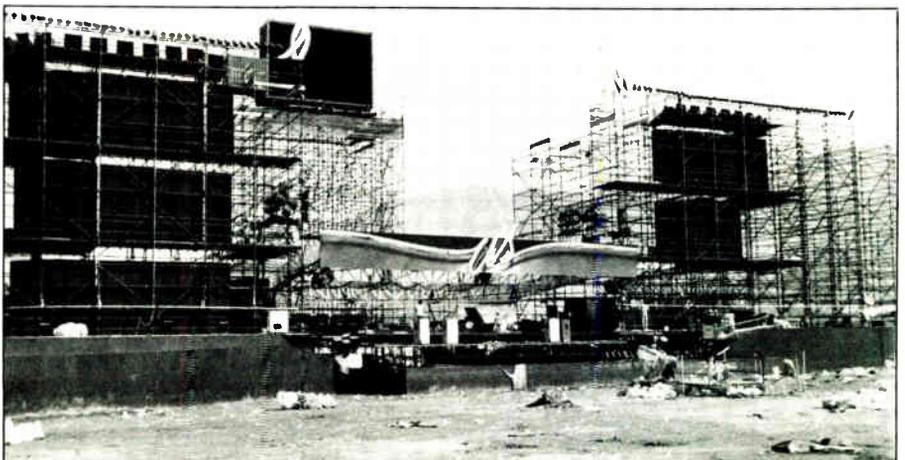
"I called that writer today, and he apologized to me. I assumed that that was the way you were getting back at Ray Davies."

"I said to him, 'Do you think I would deprive the public of seeing them on the screen? Do you honestly believe that that's the same guy who

tried to get them on stage because they were keeping the audience waiting?' " Say what you will about Graham's personal style—the man cares about the people who buy the tickets. And he made a point of noting that the entire staff of Bill Graham Presents holds the audience's enjoyment above all else from the time the doors open until the last straggler leaves.

There's been some controversy about BGP's role in the Us Festival, though to everyone's credit it didn't erupt until after the music ended. Unuson, the corporation Steve Wozniak funded for the purpose of staging the Us Festival, maintains that Graham snatched control away from them at the last minute. Graham counters that his people did double and triple duty to cover tasks that Unuson's inexperienced staff couldn't handle. It'll be a while before the dust settles on this issue, but all parties in the dispute—and the press and the public—agree that despite the backstage backstabbing, the ticket buyers were treated to a beautiful event that ran on schedule (with the exception of the Kinks' set and the two that followed).

It was definitely *not* a West Coast Woodstock, but it wasn't meant to be. Woodstock was a magical event because so many people had a great time in spite of the fact that more showed up than were expected, the site was a mess, the weather was awful, the show ran behind schedule, and myriad other unfortunate circumstances. The Us Festival, on the other hand, was overplanned: there were more than adequate portapotties, water fountains, sandwiches, speakers, access roads, t-shirts, squirt bottles, etc. for the people who came to be with Us. A smiling fan is all the good review Woz needed to see. ■



Dismantling the stage Monday morning. Clair Bros. designed the mains and the monitor system. ("Us" logo was higher during show.) Note DiamondVision screen above stage.

INTERNATIONAL RECORDING UPDATE

The European SIM-HI.FI-IVES '82 exhibition in Milan, Italy, attracted a total of 124,089 visitors, averaging about 25 thousand daily.

From a commercial angle, Italian and foreign trade visitors, including distributors, wholesalers and retailers, numbered 27,271, representing approximately 25 percent of the total number of visitors to the Fair.

Compared with the 1981 figures (Italian trade visitors 22,280, foreign buyers 1,600), SIM-HI.FI-IVES '82 recorded a marked increase in the overall number of buyers, an increase which can partly be attributed to the addition of new commodity groups to the traditional ones this year, but also a consequence of the increasing importance which this Milanese September expo has taken on in Italy and abroad.

While the Milanese exhibition attracts buyers from every country in Europe and from North America, it is also characterized—more than any other European operational center—by the interest of numerous trade visitors from the Mediterranean countries, Africa and Central-South America.

Next year, the international exhibition of music, high fidelity, video and consumer electronics, will be held

from June 9 - 14. The new dates have just been fixed following an agreement with the Milan Fair Authorities.

• • •

Sopran, a subsidiary of Rhone-Poulenc, one of France's leading industrial companies, and InterMagnetics Corp., a worldwide manufacturer of video equipment and a leading specialist in building magnetic tape plants, has announced the establishment of a video tape manufacturing company in Besancon, France.

Terms of the transaction were not disclosed.

The venture was announced simultaneously in Europe by Jacques Durieux, president of Sopran, and in the United States by Terry C.T. Wherlock, president of InterMagnetics Corp.

InterMagnetics will supply equipment, technology and training, as well as operate the video company. Local French people will be recruited by InterMagnetics to staff and manage the factory, according to Georges Abitboul, chairman of the new French-based company.

Sopran specializes in assisting companies wishing to locate in Besancon and other sites in France. "InterMagnetics was aggressively interested

in pursuing a venture in Besancon," Durieux said. "The ideal location and the special help offered by our Rhone-Poulenc subsidiary, Sopran, were significant factors."

In addition to producing videotape for the VHS and Beta home systems, InterMagnetics has opened discussions with N.V. Philips, of Holland, with a view to obtaining a license to provide cassettes and tape for the Philips system, which is becoming increasingly popular in Europe, according to Wherlock.

"We see nothing but growth opportunities with this venture," Abitboul stated. "The video market is exploding and is very exciting; it represents an excellent business opportunity."

"Audio cassettes also represent a major area of growth as most tape companies have 'abdicated' in this field to make way for the Japanese magnetic tape producers.

InterMagnetics supplies technology, know-how and audio and video machinery to international companies. It has audio cassette licensing partners and manufacturing plants in Singapore, Indonesia, Hong Kong, the Republic of China (Taiwan), India, Thailand, Transkei (Africa), Egypt and

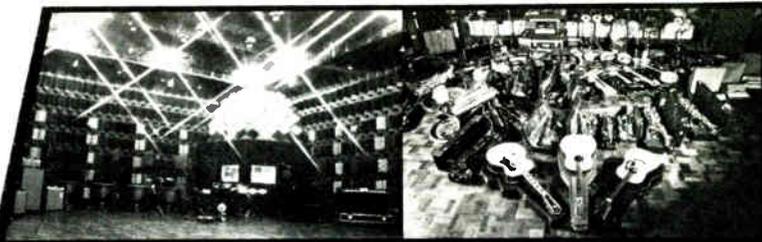
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Turkey, and audio/video technology-marketing centers in the United States, Japan and England.

In video, InterMagnetics is building facilities in the U.S., France, the United Kingdom, Hong Kong, Indonesia and Singapore.

MCI/Sony multitrack equipment is going "on the road" in the Soviet Union. A 32 foot customized recording van, recently purchased by the Soviets, includes MCI JH-24 series recorder and MCI console. According to MCI/Sony's Lutz H. Meyer, the Soviets negotiated the purchase on the spot when the unit recently was demonstrated for Melodiya (the state recording company) in Moscow.

Harrison Systems, Inc., the Nashville-based manufacturer of professional audio products, has announced a change in its international sales and marketing system. As of August, direct factory representation is being provided through its experienced dealers in all export markets outside the United States and Canada.

"This change of marketing structure, which replaces our former method of export marketing through an exclusive export distributor, is consistent with our overall direct-marketing strategy which has already been implemented in North America during the past year," said Claude Hill, vice-president of marketing at Harrison, in making the announcement.

"The changes in the world market and economic situation, our wider range of products and services, and our strong desire to supply the audio console needs for emerging and third world countries, as well as our traditional **European, U.K., and Far Eastern** customers, have made it desirable to change and expand our export marketing organization. We are maintaining and strengthening our dealership arrangements with our existing export dealers, who are the finest group of knowledgeable and competent audio people in the world. In addition, we are actively seeking out new representatives in areas where we are not now represented for our full range of broadcast, film-sound, and music recording consoles."

Michael Hurt, a member of the Harrison engineering staff for over six years, has been appointed as the Harrison factory export marketing representative and will handle all matters related to export dealer relations and special engineering requirements. Harrison Systems may be contacted through the Marketing Department, P.O. Box 22964, Nashville, TN 37202, (615) 834-1184, Telex 555133. ■

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(continued from page 150)

delay will be needed since you really can't hear the main system under there anyway.

One thing that annoyed me was the fact that the line from the official's wireless mike receiver appeared to be left open all the time and a little squelching noise got through now and then - a truly disgusting crackle that was reproduced in all it's hi-fi glory by the excellent PA. The same thing happens over at Oakland and it would seem to be something easily solved by the insertion of a simple noise gate or a more alert soundman.

The McCune/Meyer system wasn't the only PA in the park that day, although it got the most attention. Also on hand was Jerry Pfeffer of Sound-On-Stage (No relation to this column!) from Brisbane, CA. Jerry's speakers were placed at intervals around the edge of the field and were used mainly to amplify the sound from the 49er Band. The band couldn't be amplified through the MSL-10 due to the time delay from the distant cluster. I felt sorry for Jerry since his mix position was right next to the band and he heard more from them acoustically than from his own PA. He was forced to monitor off headphones and walk around a lot; not a real enjoyable situation for a professional sound-mixer.

Candlestick frustrations aside, Jerry says this has been the busiest and best year in the history of his company. He purchased one of the new Jim Gamble mixing consoles recently and has been quite impressed with its performance so far. "There is an obvious sonic difference between it and anything else I have ever used," he told me. "It's not a cheap board but then it uses only the best, most expensive components. I consider it to be an investment in the sound business and it's almost paid for itself in increased business within a year." Gamble boards utilize Texas Instruments TL074 op amps throughout, P&G long throw faders (no short throws here!) and Bourns pots. Although I don't like to comment on equipment I haven't personally used, I will say that I certainly like the feel of the board as well as it's overall design layout when I first saw one at the A.E.S. The one negative comment Jerry had related to doing shows with the board outside during the day. Seems that some crucial LED's are not very high intensity and therefore hard to see in daylight. Evidently it's a little difficult to ascertain some key switch positions without first cupping the LED's with your hand - a rather time consuming exercise and one that brighter lights or shadow switches might eliminate. ■



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