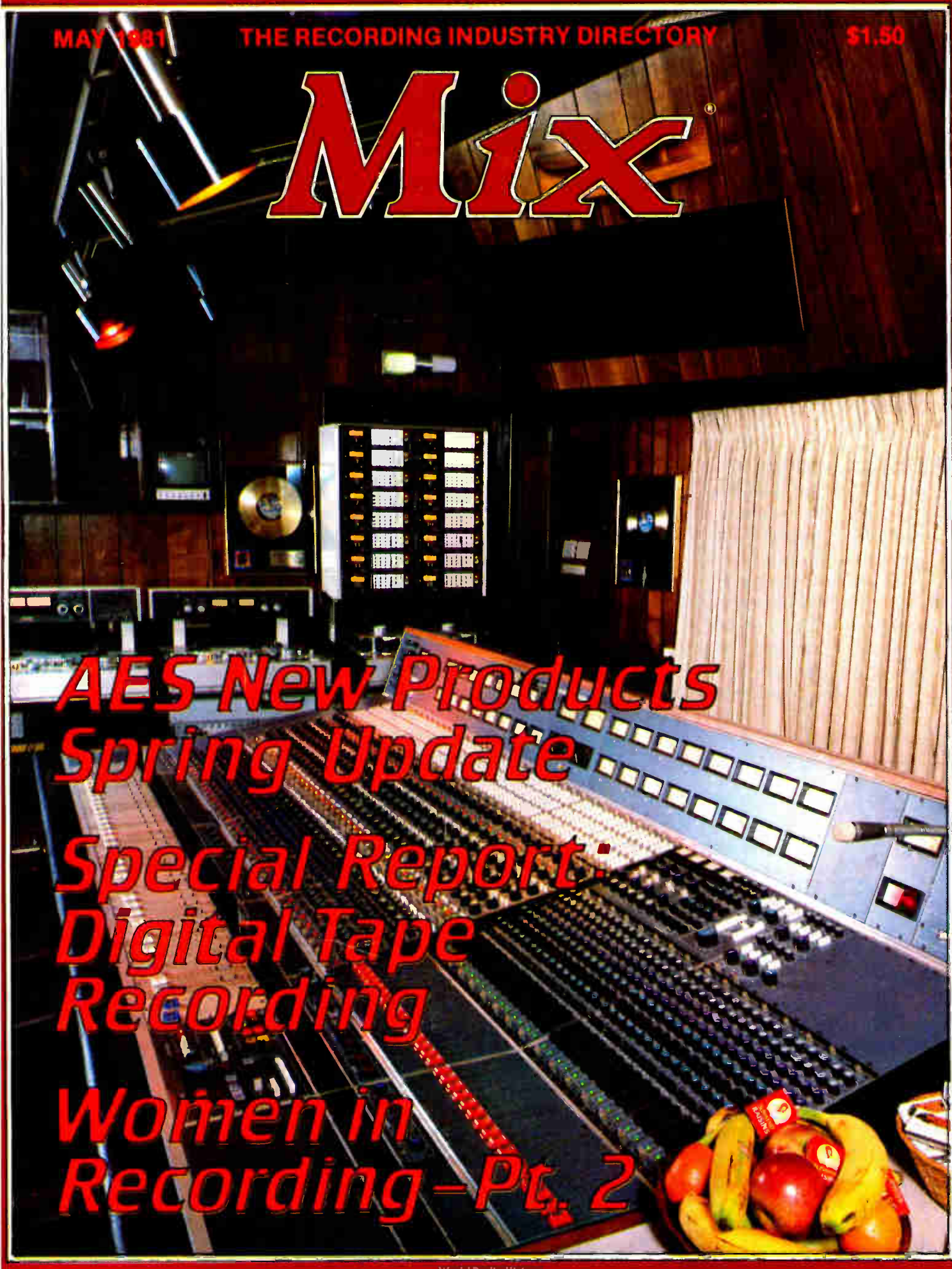
MAY 1981 THE RECORDING INDUSTRY DIRECTORY $1.50

Mix



AES New Products Spring Update

Special Report: Digital Tape Recording

Women in Recording—Pt. 2

Free yourself from the confines of "semi-pro."

Semi-pro gear limits your possibilities. While it is useful and fun in the beginning, you soon outgrow it. Then it begins to hold you back.

The TAC 16/8/2 is not "semi" anything. It's a professional standard low impedance board offering important features previously found only on all-out 24 track consoles.

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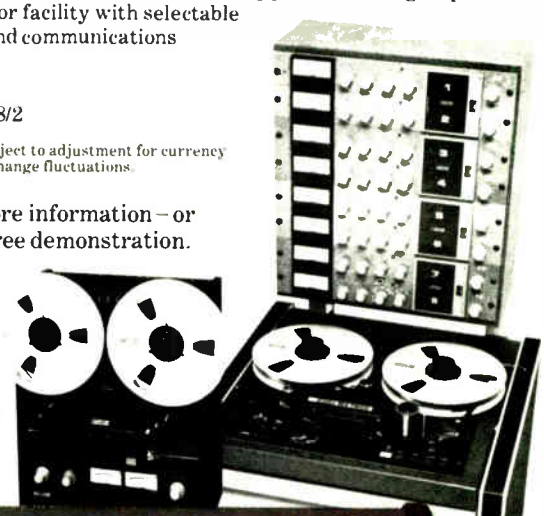
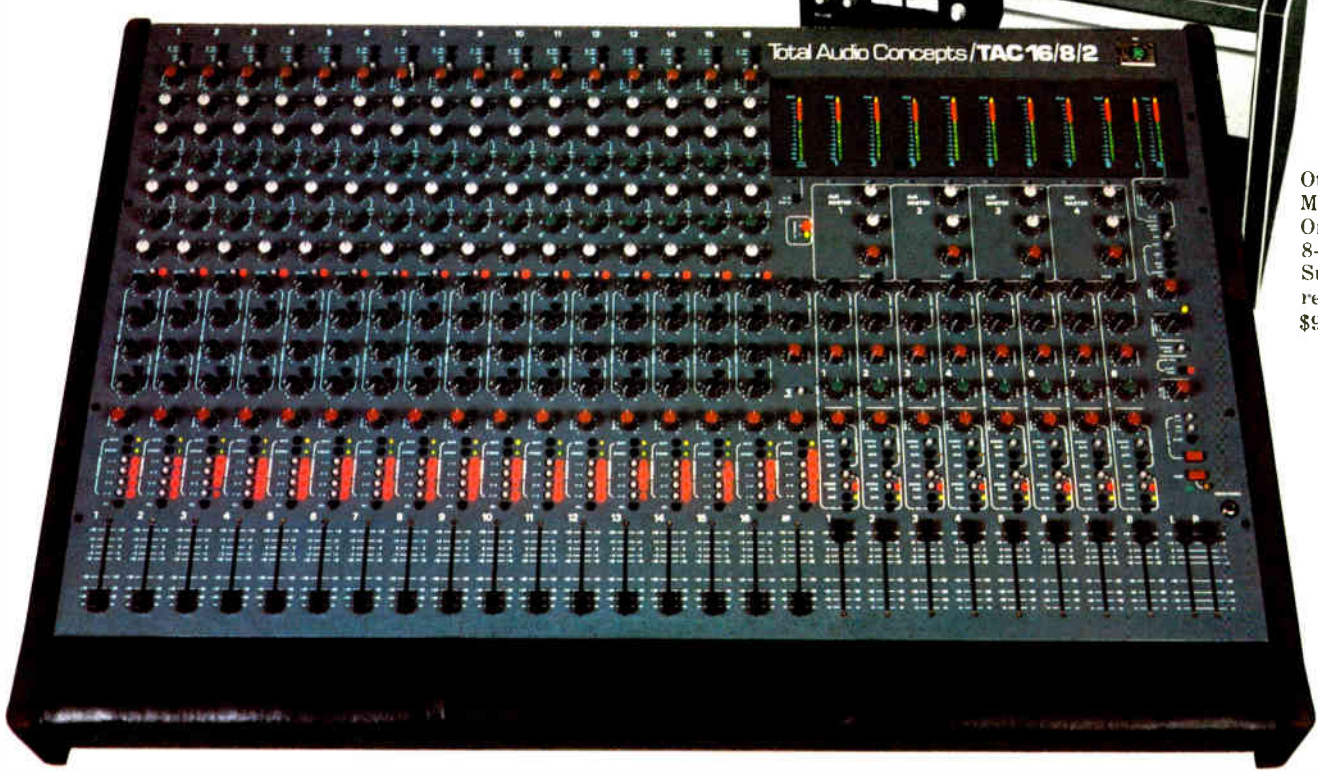
16 in/8 out TAC 16/8/2

$8,000. Subject to adjustment for currency exchange fluctuations.

Call today for more information – or to arrange for a free demonstration.



Otari MX-5050 B
Professional 2-track
Suggested retail:
$2,150.



Otari
MX-7800
One inch
8-track
Suggested
retail:
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New, expandable TAC 16/8/2 Console

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Mix

Cover: Nashville's Woodland Studios, with two 24 track studios and two mastering rooms celebrates its 14th year in business this month. During 1980 they recorded No. 1 records for Barbara Mandrell, The Oak Ridge Boys, Ronnie Milsap, Conway Twitty, John Conley and Eddie Rabbitt.

VOL. 5, NO. 5 MAY 1981

DEPARTMENTS

FEATURES

NEW PRODUCT LISTINGS

The Mix is published at 2608 Ninth St., Berkeley, CA 94710 and is © 1981, by Mix Publications, Inc. This is Volume 5, No. 5, May, 1981.

The Mix (ISSN 0164-9957) is published monthly. Subscriptions are available for $18 per year. Single or back issue price is $2.50. Subscriptions outside U.S.A. are $22.50.

Please address all correspondence and changes of address to the Mix, P.O. Box 6395, Albany Station, Berkeley, CA 94706. (415) 843-7901.

Controlled circulation postage paid at San Francisco, CA (USPS 473-870), and at Berkeley, CA (USPS 445-070)

The Mix is distributed in recording studios, pro-audio stores, music stores and other related businesses. If you have a recording or music related business and would like to distribute the Mix, please give us a call.

Display advertising rates, specs and closing dates are available upon request.

INSIDE

We devote quite a bit of space in this issue to two stories, each one representing a major change in the structure of our industry. Each of these changes also represents a strong source of optimism after a long period of doubt and insecurity in this business of making records.

Digital recording has been around for quite a while now, but all of a sudden it is no longer a novelty. More and more people are listening, evaluating and imagining how it would be for that most valuable area of tape to head contact to be reading and writing 50,000 or so bits of information every second, rather than responding to continuous changes in a magnetic field. The sceptics and tire kickers have taken their best shots and the manufacturers have listened and taken note.

We felt it was appropriate to devote the Progressions column of this timely AES New Products oriented issue to a broad scale update of current, or soon to be available, digital tape recorders. We also felt it appropriate to go directly to the source and have the manufacturers describe their systems and design philosophies in their own words. What has emerged is what we hope will be an informative and up to the minute display of what digital tape recording has to offer.

• • •

The second great change we discuss in this issue deals with the emergence of the woman's role in the art and science of recording. No longer is a woman out of place taking an active and creative part in the control room or in the shop. Obviously creativity and skill in our industry observe no sexual barriers, and it is inspiring to see the enthusiasm in the new wave of talented professionals.

To get a report from the field, we sent Shelly Higgens to interview several women who are quickly making their mark on the recording industry. We feel strongly that their comments and opinions will be of value to us all. ■

TRACKS

CURRENT

NASHVILLE DIGITAL WORKSHOP

It started when Jim Williamson, President of Nashville's Sound Emporium Studios, decided he wanted to know more about digital; and ended as perhaps the most fascinating event thus far in the history of digital recording: five manufacturers' digital systems and 3 analog machines all crammed into the Sound Emporium's Studio A control room for a 5 day (April 20-24) "digital workshop."

The idea for the project sprouted during Williamson's visit to 3M's Minnesota headquarters last winter. "My own lack of knowledge about digital inspired me to ask 3M what the chances would be to have a machine to experiment with. They agreed right away. Then in thinking about it, I thought it would be better to have some other manufacturers' machines represented as well. As the word got around and interest grew, more and more companies got involved."

Masterfonics, a Nashville disc mastering facility, co-sponsored the event and helped enlist support from the various manufacturers. Sony and JVC brought in their two channel machines and editing systems; Soundstream demonstrated an 8 channel unit; 3M contributed a 32 channel, a 4 channel and an edit system; and Mitsubishi brought a 2 channel with razor edit capability. The analog references were Studer 2" 24-track, ½" 2-track, and ¼" 2-track.

Live demonstration sessions ranged from western swing to jazz to a French horn quartet. Country star Don Williams came in to cut a quick digital version of his hit, "Good Ole Boys Like Me."

A custom-built distribution amp and cable setup fed the exact same signal simultaneously to all machines, and a switchbox allowed participants to make direct A-B comparisons. (Units remained anonymous, identified by number only.)

A sampling of comments indicated that differences between the digital systems do exist, though they are subtle.

Connie Potter-Hoge, independent engineer: "I heard a shading of difference with the French horns. Some sounded more real, some less real."

John Abbott, Sound Emporium staff: "They (the digitals) were closer than I had ever expected, but I could hear a difference in some instances. It all sounds great, though!"

Although the ½" analog came close to the digital sound on first pass at 30 ips, the overall enthusiasm for the new technology was summed up by top independent engineer (Crystal Gayle, Don Williams) Garth Fundis: "They have it all over the analog. I'm not losing anything. It's a mirror image of what's coming off the floor."

AES Expands Convention Site

For the first time in its history the Los Angeles Convention of the Audio Engineering Society, May 12 to 15, will employ two major facilities, the Los Angeles Hilton and the Hyatt Regency. The two sites are a four minute walk apart in downtown L.A.

A series of workshops has been added to this year's agenda, with topics that include "High Level Sound in the Body," "Console Technology," "Microphone Techniques," "Digital Editing," "Stereo for Television," "Sound Reinforcement" and "Audio/Video Futures."

The technical papers will be presented at the Hilton, as will the trade exhibits, representing 186 international manufacturers. The workshops will be held at the Hyatt Regency.

3M Video, Digital Audio Products Merge

3M's video and digital audio product lines have been merged into the firm's Magnetic Audio/Video Products Division, the St. Paul-based company has announced.

The newly expanded project is headed by Frank J. D'Ascenzo, manager, who reports to John E. Povolny, vice president, Magnetic Audio/Video Products Division. The new business unit markets products formerly available from 3M's Mincom Division, which has been dissolved.

Products offered by the video/digital audio merger include the TT-7000 "C" format video tape recorder, graphics generators, routing and machine control systems, digital audio recorders, electronic editors and accessories.

According to D'Ascenzo, "Our customers will be better served by the joining of video and audio technologies under the same corporate umbrella."

Other personnel appointments within the video/digital audio merger: Bob J. Landingham, sales manager; Clark Duffey, marketing development manager, digital audio products; James N. Mazzoni, marketing development manager, television display systems; Jerry S. Kerr, marketing development supervisor, switching systems; and David A. Bixler, marketing development supervisor, video tape recorders.

Sony Develops High Definition Video System

Sony Corporation has announced that it has developed a new, high-standard video recording and playback system, called "Sony High Definition Video System," to expand the uses of video and television toward the new image requirements of the 21st century.

The prototype HDVS features 1,125 scanning lines and 60 fields per second with a frequency band width of about 30 MHz, which can contain five to six times more information than the present NTSC standard color TV system. The NTSC system used in Japan, the United States and some other countries uses 525 scanning lines and 60 fields per second with a maximum band width of 4.2 MHz.

Japan Broadcasting Corporation (NHK) conducted research and development in this field for the first time in the world back in 1968. The NHK system, which also uses 1,125 lines, was demonstrated at the SMPTE conference in San Francisco in February of this year.

Based on Japan Broadcasting Corporation's (NHK's) HDTV technology, Sony has developed their high-definition video system by adding video recording, time base correction and other capabilities. Sony expects to play a significant role in promoting and enhancing the high-definition technology as proposed by NHK and providing a direction for the new image industry of the coming era.

The new system is expected to improve the economical efficiency and expand the production techniques of motion-picture production with its electronic shooting and editing capabilities.

The 1,125-line Sony High Definition Video System mainly consists of the following equipment:

1. High-definition 3-tube TV camera, which incorporates a newly developed 1-inch Saticon® high-resolution pickup tube.

2. 1-inch wide-band RGB VTR, which employs a new high-density recording format.

3. Wide-band digital time base corrector, which features a new wide-band AD converter.

4. 20-inch and 32-inch high-definition Trinitron monitors with a fine-pitch Trinitron picture tube.

5. 100-inch high-definition TB projector with a wide-band picture tube for projection use.

Greenberg Named JBL Vice President

Stewart Greenberg has been elected Vice President of Marketing and Sales at James B. Lansing Sound, Inc., effective March 30. Making the announcement was Jerry Kalov, JBL President.

"I am very pleased that Stewart Greenberg will be joining JBL at a time when we're making significant positive changes in the company organization," commented Kalov. "With his impressive industry track record and fine personal talents, he will provide the appropriate leadership and direction for JBL's future marketing program on a worldwide basis."

Greenberg will direct domestic and international sales and marketing efforts for JBL's high fidelity and professional product lines.

Omega Hosts "Supersession"

Omega Recording Studios of Washington, D.C. has announced the second annual "Supersession", a 10 day intensive workshop/seminar in the fine art of professional recording. Larry Boden, Joe Tarsia, Jay Chattaway, Bob Yesbek, and John Woram are a few of the lecturers and instructors this year. "Supersession" makes use of Omega's new 24-track facility including a 32 input API console, Lexicon digital reverb, and all Studer and MCI tape machines. Omega is offering inexpensive accommodations for out-of-town students.

Distribution for Rebis

Klark-Teknik Electronics Inc. has been appointed exclusive U.S. distribution for Rebis Audio, located in Stourbridge, England. Rebis Audio manufactures a complete range of signal processing modules including the RA201 Noise Gate, RA202 De-Esser, RA203 Comp-Limiter, RA204 Parametric EQ, RA212 Mic-Line Preamp, and the RA210 RIAA Disc Preamp. The modules are for use with the RA200R 16 module rackframe and either a free standing or 19" rackmount power supply.

Communication Production Center

The International Picture Show Company (O-T-C) announced today that it has completed a major marketing and economic feasibility study on a proposed $30 million multi-use communication production facility and named Robert Koors president of the project.

Lloyd N. Adams, Jr., chairman and president of TIPS, described the appointment of Koors as a "significant step in the development of this project" which Adams said would be located in Atlanta with the Omni International office-hotel-retail complex being the most desired location. The all-inclusive production center is designed to service the current and future needs of industrial/commercial, television, feature film and record producers.

Findings of the marketing and economic feasibility studies were drawn from interviews across the country with approximately 300 producers in the film, television, video and recording industries. Believed to be one of the most comprehensive studies of its kind, the market research was done by Marketing Evaluation of New York with Atlanta office of Laventhol & Horwath completing the economic feasibility study.

VCA Appoints Blumenthal

In a move designed to produce major original software for the home video market, Al Markim, President of Video Corporation of America (VCA), announced the appointment of Howard Blumenthal to the newly created post of Director of New Program Development.

Talking about his plans for the new department, Blumenthal has high praise for the company's VidAmerica label of "Collectible" home video programs, but points out that "There are many other areas for programming including pay TV, cable and international TV, as supplements to the home videocassette market." He adds, "It is our intention to develop programs with varied formats."

COMMITTEE REPORT

BMA Sets Conference

The Third Annual Black Music Association Conference has been scheduled for Saturday, May 23, through Wednesday, May 27, at the Century Plaza Hotel, Los Angeles.

"The Sound To Count On" will be the 1981 theme and will encompass in-depth analyses of the music industry including marketing and merchandising strategies; communication ownership, technologies and methods; harnessing of creative profitability; developmental processes for the artist; a perspective of today's record company; and other topics specifically geared to herald The Sound To Count On—Black Music.

Further information may be obtained by writing or calling BMA, 1500 Locust St., Suite 1905, Philadelphia, PA 19102; (215) 545-8600.

UK's Studio Exhibition Expands

The Association of Professional Recording Studios (APRS) will expand its 1981 exhibition to occupy more than 27,000 sq. ft. in the Connaught Rooms at the Kensington Exhibition Centre in London, June 10-12.

The event will feature more than 100 exhibitors showing equipment ranging from small tape recorders to recording consoles valued at more than $300.000. Both capital and consumer goods will be displayed.

For further information contact: Edward Masek, Association of Professional Recording Studios, 23 Chestnut Avenue, Chorleywood, Hertfordshire WD3 4HA England. Telephone: (09237) 72907.

NARM Speaks on Copyright Increase

On March 17, the U.S. Court of Appeals for the District of Columbia granted NARM's motion to intervene in the pending appeals of the recent decision of the U.S. Copyright Tribunal which increased the royalty rate on copyrighted music used in sounding recordings. That decision would increase the current rate of 2¾¢ per song to 4¢, effective July 1, 1981.

Joseph Cohen, NARM's Executive Vice President stated, "NARM joins with RIAA in the belief that the increase awarded by the Copyright Tribunal is excessive. We feel it is incumbent upon NARM particualarly, in the best interests of its members, to point out the adverse impact on the consumer which will result if the increase is allowed to stand."

S.F. NARAS Sponsors Seminar

As a followup to their highly successful Studio Musicians Workshop, held in February, the San Francisco chapter of the National Academy of Recording Arts and Sciences will be staging a unique and ambitious seminar on Saturday, July 18. The event will present five simultaneous studio recording demonstrations at five different San Francisco recording studios, each dealing with a special focus: Guitar, Bass, Keyboards, Drums and Vocals. At the conclusion of the day, all five groups will come together for a rhythm section recording date.

Further details and registration information can be obtained by calling the San Francisco NARAS office at 415/777-4633. ■

SESSIONS

NORTHWEST

At **Caribou Ranch** in Nederland, Colorado, **Dan Fogelberg** is over-dubbing his new double album, produced album, produced by Dan Fogelberg and **Marty Lewis** with Marty Lewis engineering assisted by **David Giorgini** and **Jerry Mahler**.

At **Fane Productions Studio**, Santa Cruz, California, label mates **Bob Brozman** and **Michael Rugg** recently finished their newest LPs for Kicking Mule Records. **Pete Carlson** engineering with **Bob Force** producing **Michael Rugg**.

Action at the ***Automatt*** in San Francisco, CA, **Maze** workin on a new LP for Capitol Records entitled ***Live in New Orleans*** with **Frankie Beverly** producing, **David Cole** engineering, and **Maureen Droney** assisting.

At **Mountain Ears Recording** in Boulder, Colorado **Next Coast Productions** has **Bad Boys** recording their debut album with **Jim Mason** producing and **John Aldridge** at the board.

Recent activity at **Bodacious Audio** in San Mateo, CA, includes demos for **Martin Mull** live at the Boarding House in San Francisco, **Dave Haynes** engineering.

Recent activity at **Different Fur Recording** in San Francisco includes, **Walter Hawkins** tracking for a new ***Light Records*** album project with: **Melvin Seals** engineering and **Don Mack** assisting.

NORTHEAST

At Unique Recording New York City studio manager, **Joanne Georgio** reports that **Ian McDonald** (formerly King Crimson and Foreigner) is completing tracks engineered by **Bobby Nathan** for a solo debut L.P.

At **Spectrum Recorders**, in Lanesborough, Ma., **Cobble Mountain Band** has just completed a single for Singlebrook Records, engineered by **Les Kahn**.

Currently at **Celebration Recording Studios** in New York City are producers **Richard Perry** and **Trevor Lawrence** working on the new **Pointer Sisters** album for Planet Records with engineer **Piers Plaskitt**.

At **Kingdom Sound Studios** in Syosset, New York, Long Island, **Blue Oyster Cult** recording & mixing there latest album. **Martin Birch** producing, engineered by **Martin Birch** and **Clay Hutchinson**.

At RPM Sound Studios in New York City, **Phil Ramone** producing **"Billy Joel"** with mixing by **Phil Ramone & Elliot Schiener**. Assisting are **Larry Franke** and **Dominick Maita**. **Phil Ramone** producing **"Paul Simon"** for HBO.

At **Kajem Sound** in Gladwyne, PA, one of Philadelphia's hottest acts, **The Hooters**, recorded and mixed their forthcoming EP. Features **Rob Hyman** and **Eric Bazillian** formerly of Arista's Baby Grand.

Steve Remote of **"Aura Sonic LTD**, on **'Location Recorders'"** just finished mastering a debut single for N.Y. Mod group **"Disturbed Furniture"** which was mixed at **Quadra Sonic** N.Y.C.

SOUTHEAST

Carl Perkins was at **Woodland Sound** in Nashville working on tracks cut for the Austin City Limits Television Show. **David McKinley** was behind the boards.

At **Ardent Recording, Inc.**, Memphis, TN, **Carla Thomas**, back in the music field after a long absence, is putting the finishing touches on a new project for World Productions. **Homer Banks** and **Chuck Brooks** are producing with engineers **William Brown** and **Robert Jackson**.

Ray Charles made a surprise visit to the Nashville **Columbia Studios** recently to join **Johnny Cash** as he was working on his next album. Producer **Billy Sherrill** took advantage of the situation and recorded a duet with **Cash** and **Ray Charles**.

Island Recorders in Nashville, finished recording songs by **Tammy Wynette** and **George Jones** for the soundtrack of ***"The Night the Lights went out in Georgia."*** **George Rickey** producing, engineered by **Dave Shipley** and **Dave Hieronymus**.

The **Artisan Recorders' Mobile Unit** out of Ft. Lauderdale, Fla. recently completed the first successful remote digital recording in Florida, using the Mitsubishi Digital Audio Systems X-80 PCM recorder to capture the Fort Lauderdale Symphony Orchestra live at the Fort Lauderdale Ware Memorial Auditorium. **Peter Yianilos** and **Richard Hilton** engineered.

At the **Muscle Shoals Sound Studios** in Sheffield, Alabama, **Roger Hawkins** and **Barry Beckett** are producing an album on the **Muscle Shoals Rhythm Section** for Capitol, **Gregg Hamm**, **Steve Melton** and **Mary Beth McLemore** at the board.

The **Crystal Caine Band** has been working at **Triiad Recording Studios** in Fort Lauderdale, Fla, on their first album. Co-producing on the sessions is Steve Gaudet and **Michael Laskow**, with Laskow also engineering, and assistance from **Robert Corti**.

At **dgp Studios** in North Miami, Fla., **Peter Olach's** Love Hunter's album currently near mixing stage, supported by Blood Sweat & Tears drummer **Bobby Economeu**, bassist **John Goodwin**, piano and synthesizer by **Brian Bec Var** of Bobby Caldwell fame. Engineering the project is **Gary Vandy** assisted by **dgp's Jeff Dean** and **Ted Stein** along with **John Alderson**.

SOUTHERN CALIFORNIA

NSP Studios in Hollywood, CA, announces that for the past few weeks **Hal Davis, Smokey Robinson,** and **Arthur G. Wright** have been in working on tunes for Smokey's nephews **Keith** and **Darrell**.

Current activity at **Eldorado Recording Studios** in Hollywood, the **Sue Saad Band** mixing a track which will be included in the Irv Azoff Film ***"Heavy Metal"***. The group also set to mix their upcoming record for Planet Records. **Jim Saad** producing, **Dave Jerden** engineering.

Ameraycan Recorders, Studio City, CA recently completed **Phil Seymour's** album on Boardwalk Records as well as 20/20 on Portrait & presently mixing **Carmen Appice's** album on Riva Records.

Activity at **Gold Star Studios** in Hollywood included CBS/Johnston recording artist **Susan Lynch** mixing her debut album for the label with **Terry Melcher** producing and **Bruce Gold** at the board. **Brian Wilson** back at Gold Star working up some new material.

Currently at **Pasha Music House** in Hollywood, **Spencer Proffer** working on the new **Devin Payne** LP for the new Pasha label, and doing preproduction with **Billy Thorpe** for his new album. **Larry Brown** in co-producing and engineering **Chi Coltrane** for CBS/Germany.

At **Skylight Exchange** in Granada Hills, CA, producer **Jeff McGinnis** of McGinnis productions returned this month to mix tracks with independent engineer **Dave Mertens** at the controls.

At **Soundcastle** in Los Angeles, CA, **Poco** recording basic tracks for a new MCA album: **Mike Flicker** producing and engineering. **Rita Coolidge** is recording over-dubs on her newest A&M album: **Andrew Gold** producing. **Jim Nipar** engineering.

Salty Dog Recording in Van Nuys, CA, **Gabe Veltri** engineering sessions for **Joshua Harris**. P.

Continued on page 8

INTRODUCING THE HOTTEST NEW INTERNATIONAL RECORDING STAR.

X800

32-Channel Digital Recorder

It won't be long before the charts are filled with tracks recorded on the new Mitsubishi X800 32-channel digital audio recorders. And why not. The Mitsubishi X800 doesn't just record an artist's sound—it captures it. Every subtle lick. Every gentle nuance. It records it in a way that makes the listener feel like he's right in the booth with the players.

The X800 digital audio recordings are not subject to the limitations of analog recordings. There's no tape hiss. No print-through. No dropout errors. No degradation through generations. The Mitsubishi X800 is the culmination of years of refinement and perfection. It will give the recordings coming out of your studio the reliable advantage of 32 channels of pure sound...real sound...3-dimensional sound.

WHY DIGITAL YOU ASK.

The cry in the industry is 'Diversify' and digital recording is the inevitable future of recorded sound. It represents as big a sound breakthrough as stereo was to the industry. Digital Audio Disc players for the home are already a reality in Japan and are going to be available here next year. The consumers and recording artists will be demanding digital sound. Will your studio be ready?

WHY INSIST ON MITSUBISHI?

Because we pioneered the digital recording effort back in the early seventies. Since then we have been refining and perfecting our equipment to meet your changing needs. And it's ready now.

The Mitsubishi X800 32-channel digital audio recorder represents just one more element of our entire digital audio line. This spring we will introduce the XE-1 Electronic Editor which will allow for extremely precise and flexible electronic editing, and an attractive enhancement of the razor blade editing capability of our X80 Series recorders.

We have a full line of digital products for you now and we intend to keep exploring this new dimension in sound to meet your changing needs. When you record on the Mitsubishi X800 and master on the X80 Series recorders, your final product will be a whole new experience in sound.

MITSUBISHI DIGITAL AUDIO SYSTEMS.

For more information on the Mitsubishi X800 32-channel and X80 2-channel Digital Audio Recorders and Mitsubishi Digital Audio Systems, call us at 800-323-4216 (outside Ill.) or 312-982-9282 (within Ill.)

THE PORTABLE X80

X800
X80 X80A

Experience the 3rd dimension in sound.

THE CONSOLE TYPE X80A

MITSUBISHI
DIGITAL AUDIO SYSTEMS

Continued from page 6

& G. Productions (Pershing/Gaydos) finished up mixing **Trish Cory** project **David Coe** engineering.

NORTH CENTRAL

At **Chicago Recording Company** in Chicago, Ill. **Ramsey Lewis** recently completed his forthcoming Columbia LP, *3-Piece Suite*, at CRC's Studio D. **Tom-Tom 84** produced the album, and **Hank Neuberger** engineered. **The Marshall Tucker Band**, Warner Bros. artists, conducted overdubs and mixdown for their King Biscuit Flower Hour program with **Kevin Herron** engineering.

Recording activity at **Studio A**, Dearborn Heights, MI includes **Johnny Mae Mathews** and **ADC Band** finishing tracks on Detroit duo, **M & M**; **Eric Morgeson** engineering. **Flight**, recently signed to Stan and Sid Bernstein, laying down tracks for their forthcoming album; **Eric Morgeson** at the board.

Studio News

Roxy Recorders in New York City announces the installation of its new Tangent Series 16 console with custom modifications by Paul Blank of Omnisound Ltd.

The new **Music Designer's Recording Studio**, 30 minutes from downtown Boston, on the Marlborough-Hudson line, is a 24 track facility(with 2, 4, and 16 track recording available, and Video Interface), and features a Harrison 3232 Computer-Automated console (the first in New England) along with spacious Recording, Isolation, and Control Rooms. The Music Designer's staff will be Jeff Gilman, Fred Mueller, and Jeanne French.

ACA Recording, Houston, Texas has added a number of electronic keyboards to those available for their clients use: Mellotron, Minimoog, Fender Rhodes, and a Prophet 5 Polyphonic Synthesizer.

Thunder Road Studios LTD. of Calgary, Alberta, Canada, has announced the opening of their music/film complex, designed by **Tom Hidley of Eastlake/Sierra Audio, and built by Lakeside Associates**. The operation contains a Neve/Studer equipped audio studio, a complete film mixing room and a full service 16/35mm motion picture film laboratory.

Tres Virgos Studio, formerly an 8-track facility in Mill Valley, CA announces the scheduled completion of it's new 24-track complex in San Rafael, CA for late summer of 1981. Designed by Chips Davis and Ed Bannon, Tres Virgos will be the state of LEDE™ control room and studio design. The control room will be 450 sq. ft. and the studio will have over 850 sq. ft. of floor area and a ceiling height of 14 ft. For more information call **Robin Yeager**, studio Mgr. at (415) 456-7666.

PPL Records in Hollywood, CA announces the opening of its studio "**R.E.D. Funkin' Rockin' Cabin**". This 4 track studio includes equipment such a a C-12 Mixing console with Dolby noise reduction. Guitar, drums, and keyboard rentals are also available. Engineers are on staff at all times.

Strawberry Jamm Studios, West Columbia, South Carolina has just taken delivery of a Lexicon 93 "Prime Time" digital delay processor, and a Lexicon 224 digital reverberation system from **Trackside Engineering** of Smyrna, Georgia.

Custom Recording/Studio C in Stockton, Ca is proud to announce the acquisition of its new Synclavier II 32-Voice Digital Synthesizer. Studio C will also be updating to an Automated 24-Track facility in May.

Nadya Bell has now taken over **Unicorn Studios** (formerly Star Track) located in Los Angeles, CA. After extensive re-modeling of the entire 24-track studio, with excellent results, Unicorn is now available for bookings. (213) 652-2070

Gopher Baroque Productions in Garden Grove, CA has upgraded it's facility with the purchase of a Tascam 85-16 sixteen track recorder. In addition to the new machine, the studio has acquired a beautiful C-7 Yamaha grand piano.

Antech Labs Inc. of St. Louis, Missouri recently sold and installed a Tascam Model 15 Recording Console (20 x 8) to **Soundvue Studios** of St. Louis, Missouri.

Ultrasonic Studios in New Orleans, LA would like to announce its upgrading to a 24-track facility. In addition to a new MCI JH 24, the studio has increased the signal processing gear and studio instrument selection during the past four years of operation in the New Orleans metropolitan area. **Jay Gallapher** and **George Hollowell**, owners/ engineers, report the expansion as a continuous effort to meet the needs of a city with a rich musical heritage.

Tiki Sound Studio in San Jose, CA. welcomes **Jeannine Osborn** as an in house musician and engineer.

Michael Fusaro was recently named Chief Engineer at **The Automatt** in San Francisco, CA, by studio owner/producer David Rubinson. Fusaro was assistant supervisor at CBS' San Francisco studios from 1971-78 and has worked in engineering and maintenance with both Fantasy studios and Coast Recording.

Heavenly Recording in Sacramento, CA, has added a new MCI JH-110-B transformerless 2 track machine to it's equipment list. dbx noise reduction is available for the 2 track machine in addition to 24 channels of dbx with the MCI 24 track machine.

Round Sound Studios Inc. in Weston, Ontario, Canada expanded to 16 tracks with a new SoundWorkshop series 30, 20 x 16 console, the first to be installed in a Canadian studio, thanks to Gerr Electro Acoustics LTD. Also an MCI 2" recorder with auto locate and new JBL 4343 monitors bi-amplified by Bryston amps.

Sorcerer Sound (N.Y., N.Y.) is proud to announce the opening of its newly upgraded recording facility. A list of equipment includes: An Acoustilog GB-1 30 input console with VCA Grouping, (Automation ready), 4 band sweep EQ, and Multilyzer plasma metering, Studer A80 24 track and 2 track machines, Dolby 24 track noise reduction, and EMT plate & Lexicon Digital Reverbs.

Gary Gunton has assumed the position of general manager at **Eldorado Recording Studio** in Hollywood.

In the Swiss tradition of meticulous precision and matchless craftsmanship, the STUDER A800 represents the ultimate achievement in multichannel tape recording. It is a system designed and engineered to complement the competent professional.

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The A800 embodies all the technical sophistication and total durability you expect from STUDER; a company whose name is synonymous with reliability and functional innovation. For example, the A800 was the first machine to utilize micro-processor control of all critical transport and electronic functions, and employs STUDER developed servo-controls over both tape tension and capstan speeds.

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STUDER has established a *multi*track record, having pioneered most of the functional innovative features found in multitrack recorders today. STUDER remains the standard-setter for the entire industry, producing a steady succession of technological breakthroughs.

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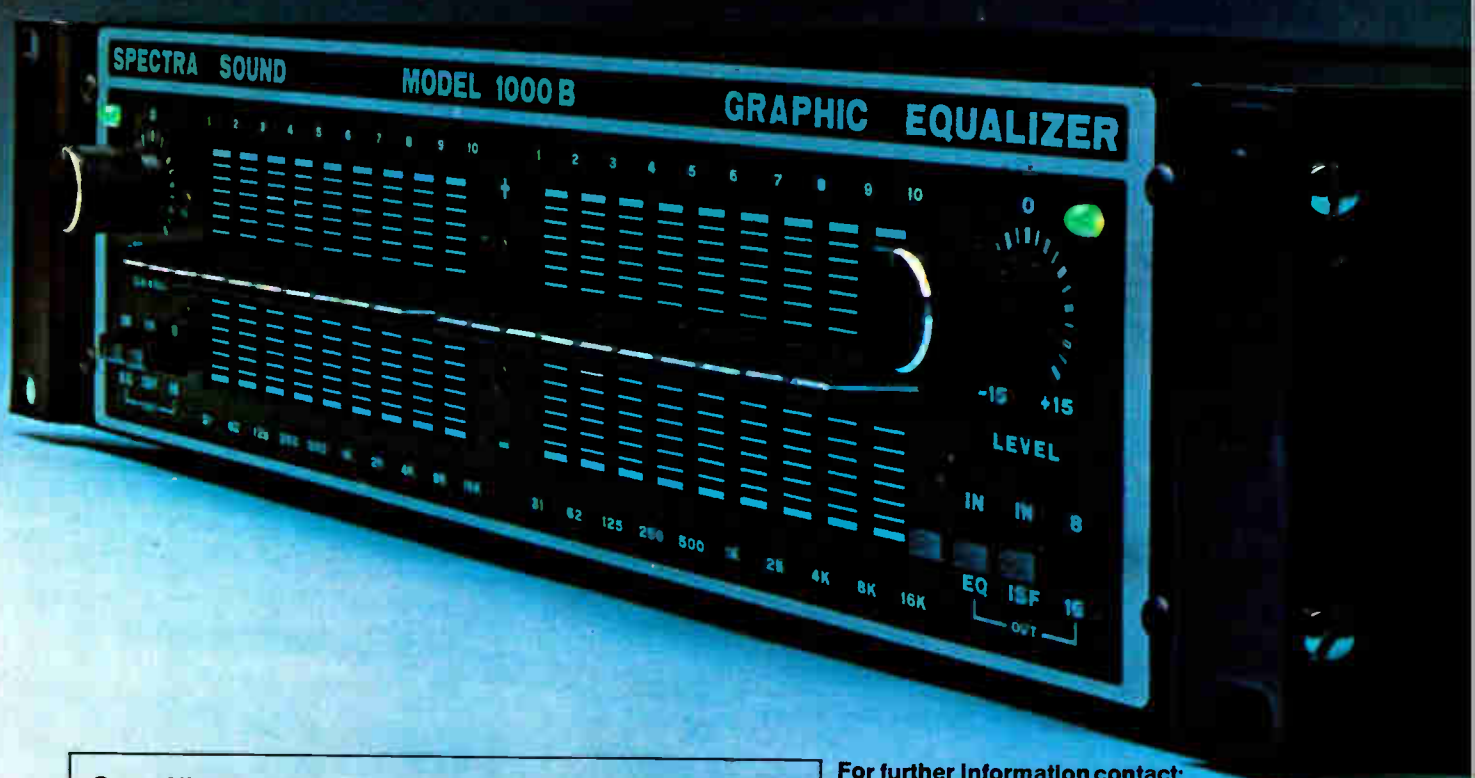

Specifications

T.H.D.	.0018% (Test Equipment Residual)
I.M.	.0018% (Test Equipment Residual)
*Signal/Noise Ratio	104 dB below +4dBv
Frequency Response	20 Hz to 20kHz, ± .5dB, +18dBv
Input Impedance	Balanced, 10k ohms, Unbalanced, 100k ohms
Output Impedance	Less than 1 ohm, typically .3 ohm

*Specification unweighted, 20 Hz to 20kHz.

For further information contact:

Spectra Sound

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Ogden, Utah 84403
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SOUND ADVICE

SIGNAL TO NOISE & MULTITRACK

by Ben W. Harris

In this age of sophisticated electronics it would seem a small thing to ask for one set of common guidelines for measuring equipment noise and distortion. The complaints have been voiced time and time again, and still it seems no one cares. Each manufacturer seems to be fixed to their way of measuring and not readily accepting change. Now, this is not meant to be any kind of indictment against the manufacturers, but rather an attempt at making the consumer and user aware of the various forms of measurement. This month we will deal primarily with noise measurements and dive deeper into the subject in months to come.

The most common of noise specifications is probably signal to noise ratio, or S/N. The S/N ratio is the level difference expressed in dB's between the nominal signal level and the noise floor. If you were given a S/N figure of 74 dB for a 2 track master recorder, you would probably assume this recorder to be very quiet, and in fact it could be, but the fly in the oatmeal is yet to appear.

In the case of tape recorders, the printed "nominal" level could well be an unrealistic figure such as 1040 nWb/m, which for many machines and tape formulations represents the 3% distortion point. Good engineering practice will not allow such high levels. A more reasonable elevated level would be +6 dB, i.e. 380 nWb/m. If this lower "nominal" level were used for the noise performance tests, it would yield a lower S/N ratio on paper and thus make the recorder look noisy when compared to other decks rated with the 1040 nWb/m level; and manufacturers are reluctant to shed any bad light on their own product.

For discussion purposes, let us assume we are trying to make a purchasing choice between two master recorders of equal cost and similar function. Machine "A" is said to have a S/N ratio of 70 dB at 380 nWb/m, while machine "B" is specified at −68 dBv referenced to .775 volts at the same 380 mWb/m. The question is, which one is the quietest. If you chose "A", mark an X for yourself in the novice column. Tape machine "B" is the correct choice with the information given.

You see, S/N ratio and noise level referred to .775 volts are horses of different colors. The −68 dBv noise level of "B" would have a S/N ratio of 72 dB, assuming both machines are operating at a standard level of +4 dBv. The reference to .775 volts is actually zero level or 4 dB below nominal operating level. Therefore, add the 4 dB difference in measurement conditions to tape machine "B's" −68 dBv and you have a S/N of 72 dB, a full 2 dB better noise spec than the other deck.

Now then, as if matters are not confusing enough, you may be comparing apples to to oranges if the noise specification is written with a disclaimer such as "A Weighted" and not full bandwidth 20 Hz - 20 KHz. A noise measurement specified as "A Weighted" simply means that a gentle roll-off above 1 KHz has been used on the output of the device in question before the noise measuring unit "read" the noise signal. This in fact will make the final specification ***at least*** 3 dB better than a 20 Hz - 20 KHz measurement on the same machine. It gets involved, doesn't it?

One of my pet complaints has been in console noise specs. To the onlooker it must appear as if each manufacturer specified whatever figure at the time made his console look better than his competition. This ***is*** and ***is not*** true. The problem lies in no meaningful measurement techniques. The rampant confusion can manifest itself quickly when word spreads that a perspective customer is shopping for a new console. Console salesmen at the first hint will bombard your door, each trying to convince you that his product is by far the best. They have memorized the spec sheets and can quote noise specifications like a recorder playing back all that has been stored. However, it is rare to find a salesman that is really able to answer those questions for you that are not illustrated in the beautiful four-color brochure.

For instance, at the 1978 AES in New York City, I was admiring a prototype 32 x 8 console on exhibit. The salesman was very friendly, rattling off specifications right and left. "From +4 dBv line in to +4 dBv line out, one channel assigned, this board has a S/N ratio of 84 dB," he beamed proudly. "Oh," I said, "then with all 32 channels assigned, you would have a 69 dB S/N ratio, is that not right?" "Oh no," he said, "the noise specification would remain the same, 84 dB. In our console the noise does not add."

Well! Needless to say, I was impressed. A circuit that defies all laws of physics, I would have given my first born male child for a print of it. In the real world, the noise increases 3 dB every time the number of identical channels are doubled into a common buss. (Properly spelled BUS, but for traditions sake, buss.) Therefore, our friends' 84 dB S/N ratio becomes 81 dB S/N with two channels assigned, 78 dB with four and so forth until a S/N ratio of 69 dB would be obtained with all 32 channels assigned. This is assuming the summing amp to be noise free, which it ain't!

Most summing amplifiers are virtual ground current ports, with their positive input tied to console common. All the channels' summing resistors, say 10 K ohm each, are in parallel for a combined input impedance of 312.5 ohms on a 32 channel console. Usually, the summing amp has a feedback resistor equal to one channels' summing resistor, in order to give unity gain.

However, the noise on the ground buss is being amplified through the positive input of the summing amplifier and just how much is calculated below:

$$\frac{\text{Summing amp feedback}}{\text{Summing resistor} \div \text{number of channels}}$$

or

$$\frac{10{,}000 \text{ ohms}}{312.5 \text{ ohms}}$$

+ 1 = Voltage gain
+ 1 = Vgain of 33

Now, a Vgain of 33 is approximately 35 dB! Consider the ground buss to be −105 dBv which is usually considered very good by most designers. Subtract the 35 dB of gain from this figure and you have ground noise in your summing amplifier of −70 dBv. Sum this −70 dBv noise with the −69 dBv obtained with all 32 channels assigned and you will arrive at a figure close to −66 dBv. Those big mega-buck consoles used improperly can be real neat white noise generators.

The next topic is not a noise measurement at all, but rather one that may imply, to the unsuspecting, a noise specification. It is called "dynamic range" expressed in dB. "This here digital dee-lay line had uh hundred dee-bee dynamic range." (That's Tennessee sales pitch for 100 dB of dynamic range.) It sounds good if you say it real fast, but do not confuse this specification with any form of noise specifications. The dynamic range is the level difference between the noise floor and the point at which the unit will begin to clip or distort. "Headroom man, what about headroom?"

Again, good engineering practice dictates that one must maintain an average or nominal operating level at least 20 dB below the clip point for safe operation. Subtracting the necessary 20 dB of headroom from the dynamic range figure of 100 dB gives us a S/N ratio of 80 dB.

And last, but not least of misunderstood noise specifications, is power amplifier specs. Some of the "arc welders" used in today's studios are on the order of 500 watts per channel and the noise spec is sometimes referred to as 105 dB below rated output of 500 watts. "So," you ask, "how come my monitors have audible hum in them?" Well, the answer is again a question of headroom. There is just no way you are going to use an amplifier at 500 watts all of the time. In fact, a more realistic figure would be 50 watts nominal of 20 dB below rated output and 20 dB closer to the hum and noise floor of the amp. This puts the S/N at about 85 dB. Now, include the room equalizer hum and noise, the console itself, and the length of cable connecting all of this together, plus the inefficiency of the speakers, and the loss of level through the speaker cables themselves. Mount the amplifier, as usual procedure, in a rack with other power amps and equalizers, where the stray magnetic fields can induce hum into the high input impedances of the amplifiers. With all of this combined, you will be lucky to end up with a S/N ratio of 60-70 dB.

All said and done, it is no small miracle that our "state of the art" control rooms do not sound like a Concorde SST at forty paces. Alas, even with all of this contributing noise and hum, we still seem quite capable of producing records that do indeed sound good. And we haven't even discussed the noise contribution of 20 to 30 microphones at roughly the same amount of gain per channel, opened to a room with air-conditioning and forced air heat and heaven knows what else.

We probably should have discussed microphone and preamplifier noise, but maybe some other time. ■

Correction: In March's Sound Advice column, page 15, column 1, 11th line, should read ... ±18 VDC power rails."

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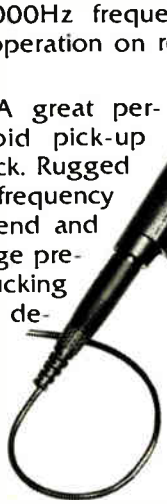

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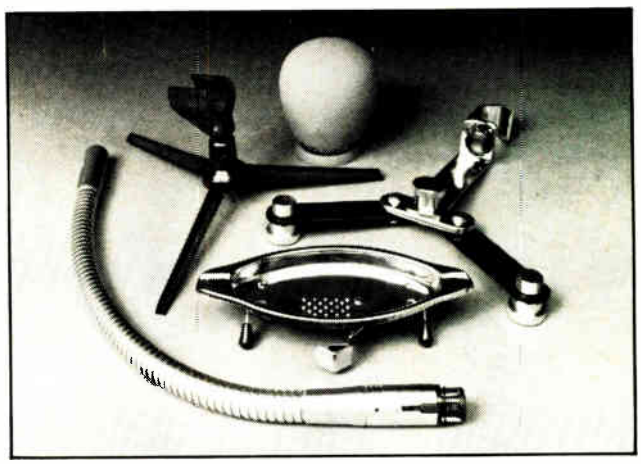

seven M 713. One of our unsurpassed studio condenser mics. Modular system; accepts different transducer capsules and power supplies. Gold-vapored mylar diaphragm for high transient response. Mu-metal shield. Temperature and humidity stable.

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STUDIOSCOPE

Small... Business... Computers

by Dennis Buss and Chris Haseleu

Does your studio have need for a small computer? Very likely you have or will soon consider this possibility. Although many of us sense the usefulness of a computer in our everyday situations; as with all major purchases, we must justify the expenditure.

Of those we have spoken to, who have not yet made this acquisition, frequent comments have included, "I can't afford it", "My receptionist handles all of the bookkeeping, so I don't need one", "Most programs really don't apply to studio situations" and "My accountant takes care of my paperwork."

Computers may or may not be appropriate for your operation but we would like to share some basic information about small computers, and the difference in various systems.

USES

Depending on the system, programs are available that can do anything from write letters, bill credit customers, or analyze studio expenses—to being able to let your employees or clients play sophisticated video games. In deciding on the uses that are appropriate for your studio, two things should be considered: specific needs (payroll, accounts receivables, etc.) and the extent of application (a basic system might be fine for now, but what about growth in the future?).

BOOKEEPING.

This use is one of the most common applications. Some of the specific studio needs that can be accomplished are: a general ledger, payroll records, accounts receivable and payable forms, cash receipts and disbursement journals, and inventory records. When deciding on the computer system to accomplish the above activities, be sure to allow for the inevitable changes. A five-person payroll program might be fine for this year. But, what do you do if in three years you have ten people on staff and your system cannot be upgraded to handle the other five individuals?

STUDIO OPERATIONS

The above uses are primarily record-keeping oriented. There are programs available that involve analysis by the computer: time scheduling (booking studio time, etc.), expense analysis, sales analysis, budgeting by client or by time (i.e. week, month), tax records, and master file information handling.

CLIENT INFORMATION

Studios should have up-to-date information on their past/current clients in order to keep track of credit payments, to market the studio's services better, or to be able to help analyze the studio's past performance by customer group: demo sessions, agency clients, video customers, remote recording, etc. Certain programs in this area include the ability to automatically bill credit customers, keep track of delinquent accounts, develop mailing lists for the studio's services, and list background information on the client such as address, last studio activity, credit rating, money spent on session, etc.

Obviously, the above is not a complete list of programs available to the studio owner. However, they will cover the needs of most small to medium-size studios.

The next question is "which computer system is best for me?" Once the studio owner has analyzed his/her needs for a computer, and thought about the system's extent of application, then decisions can be made as to which specific computer company and model is appropriate. Below is a random list of small business computer manufacturers—ones that we feel could be appropriate for recording studios.

SYSTEMS

Apple Computer, Inc., 10260 Bandley Drive, Cupertino, CA 95014. Model: Apple 11 Business System. Suggested retail price: under $5,000. Software available: general ledger, accounts receivable and payable, account aging, "the Cashier."

Commodore Business Machines, Inc., 901 California Ave., Palo Alto, CA 94304. Model: PET Business System (CBM). Price: $3,585. Software available: mail list, data base management, payroll, general ledger, small business package, inventory control.

Heath Co., Benton Harbor, MI 49022. Model: H-89 Kit (available assembled from Zenith Data Systems, Inc.). Price: $1,595 (assembled: $2,295). Various programs are available.

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Years of proven performance in the studio is the reason you bought Ampex equipment in the past. Technological leadership is the reason to stay with Ampex audio equipment today. And tomorrow.

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ATR-100: THE PROFESSIONAL.
The ATR-100 sets the standard for excellence in audio recording. Its reputation for low distortion, low wow and flutter, and phase corrected equalization is unsurpassed. Add the available cue amplifier and editing kit, and you'll find edit points as easy as turning the capstan knob.

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Radio Shack (Tandy), 1300 Tandy Center, Fort Worth, TX 76102. Model: TRS-80 II. Price: $3,450. Software available: inventory control system, payroll, general ledger, accounts receivable, mailing list.

Tano Corporation, 4301 Poche Court West, New Orleans, LA 70129. Model: Outpost II. Price: $2,595. Various programs are available.

Alpha Micro Systems, 17875 N. Sky Park North, Irvine, CA 92714 Model: Alpha Micro System. Price: $2,895. Manufacturer does not have software packages available.

Columbia Data Products, 9050 Red Branch Road, Columbia, MD 21045. Model: Commander 900. Price: $4,000. Various programs are available.

Industrial Micro System, 628 N. Eckhoff St., Orange, LA 92668. Model: Series 5000. Price: $2,800. Manufacturer does not have software packages available.

MicroDaSys, POB 36051, Los Angeles, CA 90036. Model: System Z. Price: $2,899. Software available: Business Accounting, Inventory, Mailing List.

North Star Computers, 1440 4th St., Berkeley, CA 94710. Model: Horizon. Price: $2,099. Software packages not available from manufacturer.

Ohio Scientific, 1333 S. Chillicothe Rd., Aurora, OH 44202. Model: C4P MF. Price: $1,695. Software packages not available from manufacturer.

Dynabyte, Inc., 115 Independence Drive, Menlo Park, CA 94025. Model: DB8-1. Price: $2,595. Software packages not available from manufacturer.

Exidy, Inc., 390 Java Dr., Sunnyvale, CA 94096. Model: Sorcerer. Price: $1,295. Various software programs available.

The above list of computer hardware is just a small sample of the available systems appropriate for recording studio operations. We selected the systems that have a suggested retail price in the range that a small to medium-sized studio could afford.

Some of the hardware manufacturers do not have programs available. Others have only limited software packages. To help with this problem, there are companies that produce only software packages for a variety of computer systems.

By contacting individual manufacturer's sales representatives and/or computer sales companies (usually listed in the 'yellow pages'), the studio owner can gain additional information as to what small business computer system, or software package, is best for the individualized needs of his/her recording studio. ■

VIDEO INTERFACE

Electronic Editing Systems

by Ken Fay

Electronic editing systems...let me count the ways. But how does this relate to a music studio? It is what you will be using five years from now. The razor blade will go the way of the straight razor. As you will see in the next issue, Regent sound in New York hasn't used a razor blade in five years, except for loops.

Initially, we understand that to edit we need to be able to find a unique position on the tape. This is done using SMPTE time code, an 80 bit digital word that shows position, accurate to a video frame (33 ms.) But what if we go into a high wind mode and this 80 bit word goes zipping by at 140ips looking, for all intents and purposes, like a megahertz? We know that an audio recorder will only pass 20 KHz. A dilemma arises that can be simply solved by the installation of an optional "wide band amplifier," allowing time code to be read at those speeds.

But how did this all start? Originally engineers approached editing video tape as if it was audio tape. People used to tie knots in wire recorders and anneal them with cigarette lighters. Then came audio tape and Jack Mullin showed us all how easy editing could be using a whisker cutter. When video tape appeared, the sophistication that was necessary to edit video tape was incredible...so they used a blade. Technical heresy, you say. Anything that passes video heads spinning at 14,400 rpms has to be perfect. Still in all, early (1956 style) engineers used the beloved blade.

The audio position was easy to identify, but how did they identify the picture, you ask? They used some dope (not that kind) that was painted onto the tape that identified the recorded picture portion of the tape, and then chose the point to splice. Boy were they archaic! (Something must be remembered though, this was way back in the days when we only had 2 track. Yep, these people were recording 3 mghz on tape when we were having a hard time getting 10 KHz.) Obviously this circumstance didn't last for long, but still in all they made it work.

First came control track editing. This method used the control track that the quad recorder used to tell where it was. Than came time code, but it was not just around the corner. Time code editing came approximately 10 years after the blade. The resulting code was accurate to a frame, an incredible step forward as, even today, frame accuracy is the measure of an editing system. This much bandied expression "a frame" needs some clarifications. A frame is 33ms. long, which translates to ½ inch of tape at 15ips. As any person who edits audio tape knows, you can blow an edit by being 1/16th of an inch off. This problem is presently being addressed by the editing system manufacturers, notably EECO.

Many early time code editing systems were jurry rigged small business computers. They used a lot of memory and were capital intensive to set up and operate. As with all technical developments, the price and size has gotten smaller. The early CMX-600 cost $250,000 and took about 250 sq. ft. of floor space. You also had to consider the added expense of the air conditioning unit that was

dedicated to this computer.

Today, we have **THE EDGE.** This product is CMX's latest bid. designed to sit on your lap and allow feet up editing. (This procedure is not recommended however, as we all have to look like we're working.) Previous to The Edge, video editing systems used either an alpha numeric keyboard, or at least a keyboard where each individual function was dedicated to a particular key. The Edge makes a radical departure from this style. There are twelve unlabeled pushbuttons that initate functions. The labeling is achieved by the use of a video monitor that changes depending on the step in the editing process. Better than that, The Edge decides when the function of the buttons will change. This machine approaches being idiot proof, as you are not allowed to continue the editing process until you have completed all the steps. The operating instructions are printed on the face of the table that can be used as a writing surface. (The ultimate crib sheet.)

This machine is so user oriented that you will not be using these instructions for long. An additional feature that is incorporated into an accessorry for the larger CMX-340 is the Gizmo. On The Edge these are motion control knobs that offer the user the ability to rock the tape as if you had your hands on the reels themselves. (One major problem encountered when you do rock tape like this is that time code cannot be read at speeds this slow. The solution is to read tach pulses, until the tape moves quickly enough to update the time code.)

Now we come to the applications in television sound. One thing that differentiates television sound from music recording is that the television industry, as well as the film industry, manufactures their tracks. We in music have the luxury of recording in a stone quiet environment, and can overdub at will. In television, we are often working on a large stage with extraneous noise, or in a terribly small room with the acoustics of a tile bathroom. Recording dialogue is difficult enough let alone incorporating sound effects or a string section. Since this material is done at different locations and times, the luxury of an overdub is impossible. Enter time code. All elements are recorded with time code and assembled later as a D.M.&E. (dialogue, music, and effects.)

To use a razor blade in a half hour show, that will conservatively have 50 audio edits, would not be cost effective. In the film industry the use of the human computer has served well. It is not uncommon to use 4 people to mix the sound on a 120 channel console. On a $30 million picture this setup is a small percentage of the overall budget. In a half hour television show this rig would be the budget.

Computer editing now becomes cost effective. These $15,000 little wonders will go to some time code position, stop, establish a 5 or 10 frame preroll, play the source machine and roll the record (R) machine while punching in the R machine at the exact time you have programmed it to. If you choose, these systems will also allow you to take the machine out of record and instruct the source machine to go to another designated position and begin this sequuence all over again... without the use of a blade.

So don't sell you stock in Wilkinson. Electric razors didn't hurt them that much either, but the next time you hire a second engineer, you might check their typing skills. ■

CMX's The Edge

PRODUCERS DESK

tom werman

by James Riordan

Tom Werman is vice president/executive producer for CBS Records and has been responsible for signing such acts as Cheap Trick, Boston, REO Speedwagon, Ted Nugent, Gary Myrick & The Figures, and Molly Hatchet. He began his involvement in the music world as a musician.

"I played rhythm guitar in college and used to jam with people like Hendrix, Rob Stoner, and Billy Cross. I still play incidental instruments on every album I make. It's a Hitchcock thing. I do almost all the incidental percussion like shakers, maracas, tamborine, wood blocks, claves, hand claps, and occasionally I sing."

In almost storybook fashion Werman got his job with CBS by writing Clive Davis when he was president of the label. "I wrote him and explained that while I was doing well at an advertising agency, I didn't like the work and had a passion for rock n' roll music. Since Columbia was so marketing oriented I thought there might be a place for me. That started a two month interview process which wound up in a job as assistant to the director of A & R for Epic. I then tried to get CBS to sign four bands (Lynyrd Skynyd, Rush, Kiss, and Manhatten Transfer) which they passed on. When those bands all became huge they decided to let me sign an act and that was when I came up with Ted Nugent. I was pretty much of a co-producer on Ted's first album and later I became more of a line producer. As a staff producer I'm only allowed one outside project a year and I've had offers that range from the Blues Brothers to Bette Midler.

Werman's criteria for signing an act can be boiled down to one of two things. "If they are doing something that is a stock commodity, they have to do it better than anyone else in that kind of music or else they have to offer something completely new. They have to represent some kind of extreme like Ted Nugent or Cheap Trick for example."

Werman believes in relatively little advance preparation for the studio. "I make extensive notes from a cassette of all the tunes. I've never spent more than three days in preproduction with a band and once I was forced to spend only 48 hours with tunes I had never heard before. That was with the Cheap Trick ***Dream Police*** album and when it was done in 30 days they put it on the shelf for eight months. It really disturbed me since I was looking forward to going into the studio with Cheap Trick and taking the time to make a brilliant record."

He is enthusiastic about the new ***Hawks*** album. "The Hawks were great because it was done in a converted chicken coupe in Iowa. I usually go along with the band in deciding where to record, but I want to mix at the Record Plant and I like to use the same rooms because it provides a consistent reference point. I also like to use the same engineer (Gary Ladinsky) who I've done several records with."

If the artist wants to be present during the mix, it's alright with me, expecially if it's a new group. Molly Hatchet can't because they're on the road 200 days a year and Ted never had the patience to sit through a mix."

Werman has done two successful live albums (Nugent's ***Double Live Gonzo*** and ***Beck/Hammer***). "They're easy to do with good performers. I like to tape 6

or 7 dates in a row in small theaters that are under 3,000 seats."

Werman is outspoken and not caught up in the politics of the record business. "I'm kind of a political dummy and that forces me to do good work. On the wall in my office are all the records I've ever done, instead of just the gold and platinum ones. I feel it's more of an honest statement to have both the stiffs and the hits."

His advice to would-be producers is to "Know your limitations. I started because I felt I could make better records for me to listen to than I was hearing. Learning how to edit is very important. You must develop a linear memory so you can best structure the basic tracks. I edited most of the Epic singles from 1970 to 1976 and things like doubling the choruses, or moving/eliminating bridges can make all the difference between a hit and a stiff."

Werman sums up his philosophy about producing. "A producer shouldn't be heard. I don't want a sound, although people have already started identifying my things. I like pretty obvious things like locomotive rhythms and eighth notes. I like dynamics...backing off and then charging forward to take the listener on a little trip, but I don't have a stock drum sound or a stock anything sound. This is probably because I'm not an engineer and most of those identifiable producer sounds come from producers who used to be engineers."

Werman has to feel a passion for the acts he records. "I usually get excited about a band so fast that I can't take a minute to identify what it is that I love. The Producers were the first band I signed in three years and there have only been two or three acts I would've signed. I was beginning to feel it might be time for me to leave the business and then I saw them. I had been mastering a Molly Hatchet record and was real tired, but after I heard a few cuts I was convinced. The Producers were that good. They played beautifully with perfect three part harmonies. They had punch and class. If you have to deliberate over a band for more than twenty minutes you probably shouldn't sign them. Words that I've become wary of are 'Tom this is a great band but they need a good producer.' A band that is great enough to attract my attention should be great enough to do a good album on their own and hopefully make a brilliant album with a good producer.

"I won't do a project just for the bucks. A lot of veteran producers will do that because the thrill is gone. Some of the thrill is gone for me, too, but it comes right back when I find a band and it lasts until I leave or they leave. Making Cheap Trick records is always a thrill."

"Some of the best producers never scout for bands and I think that is what separates me from most producers. I love to find and produce great bands." ■

PROGRESSIONS

Special Report: digital tape recording

by Larry Blakely and David Schwartz

"Digital" has been a major buzzword in our industry for several years. We have been espousing our philosophies on digital tape recording for a few columns now, and at last we will complete this series of Progressions with information straight from the source.

In the next few pages, the manufacturers of digital recording systems currently in production, or soon to be introduced, will describe their systems and design criteria directly to you. Immediately following this series of presentations will be a chart which organizes many of the prime specifications, for your comparisons. Please realize that, as there are no established industry standards for digital audio equipment specifications, it may be difficult to make direct comparisons on certain specifics, and for more detailed information you may want to write to the manufacturers directly. (Mix will be happy to forward your inqueries.)

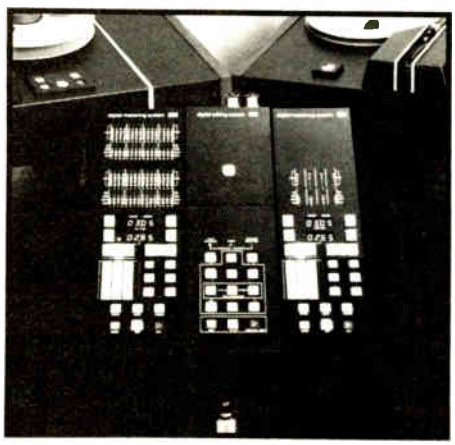
It is important to mention that there are a number of other companies (such as Ampex, Kudelski/Nagra, MCI, Studer and Telefunken) currently working on digital tape recorder designs, however they have chosen not to release any specific information at this time.

As with any new technology, initial production units are expensive and very often confusing. We hope this special report will at least ease some of the confusion, and set the groundwork for further analysis as more equipment develops.

3M'S DIGITAL MASTERING SYSTEM

by Clark Duffy, 3M Marketing Development Manager

Introduced in late-1978, 3M's Digital Mastering System consists of a 30-channel (32-track) recorder and a four-channel or stereo mix-down recorder. It allows for two available tracks to be used in storing editor and SMPTE time codes. The one-track-per-channel design was engineered to obtain an efficient error-detection-error-correction scheme, as contrasted to other systems employing redundant tape tracks.



3M Digital Editing System

In the very rare instances when an error is so great that complete reconstruction is not possible, the system will (by virture of the data word/parity/frame interrelationships) still be able to reconstruct every other data word or sample. During this period, the good word is repeated for the missing word. This form of reconstruction is not audible through short periods of time.

The recording system basically works by sampling the analog waveform, produced by the microphone/preamplifier system, at 50,000 times per second. Each 1/50,000-second point in the waveform is then assigned a numeric amplitude value, using a linear 16-bit binary word. Tape speed is at 45 ips with ±10% vernier. Thus, speed may be varied to alter the pitch by one full tone. The 30-channel uses half-inch tape, both 32 minutes in length, on 12½-inch reels.

Versatile recorder controls permit all standard creative capabilities, such as overdubbing, punch in by remote control and in-sync track-to-track recording (ping ponging). Each track may be controlled separately. With the recently added cross-fade capability, it's also possible to do cross-fade punch ins and punch outs.

Electronic digital editing offers creativity at no risk to the integrity of the initial recording or the new master, whereas physical handling and splicing could destroy the extreme high density information directly or create debris that could later interfere with the signal. With the 3M digital editor, the operator can audition and preview a potential edit point and refine it by as little as a millisecond. The complete edit can also be auditioned and further refined before committing it to the new master. Musical timing between two takes is typically accurate to within one millisecond.

The cross-fade capability, now standard on all 3M digital recorders, guarantees smooth, quiet transitions during editing. It permits complete editing flexibility, inaudible "splices" and considerable time savings.

Edit points can be chosen strictly according to aesthetic musical judgement. The old signal is faded out as the new signal is faded in. Complete error correction data is maintained throughout the ten millisecond cross-fade.

Recorders are similar in size and operation to conventional analog recorders. They may be operated as stand-alone units and controlled at the machine or remotely. Cabinets are 37½ x 22½ x 45". All utilize the unique 3M Isoloop differential capstan drive for precision tape handling.

The 30-channel recorder is priced at $138,000, the four-channel recorder at $40,150. The electronic digital editor, is $9,725 with multi-track cabling or $8,458, wired for the four-channel units. Preview units to digitally delay the signal for cutting lathe optimization are priced at $6,050 for the shorter 1.3 seconds

delay and $8,150 for the 1.96 seconds delay.

Digital Audio Standards

Standards setting is always quite difficult and time-consuming. AES standards discussions began in December 1977 after 3M and Tom Stockham of Soundstream showed equipment at the New York AES. Since that time there has been general agreement and adoption of a 16-bit linear word-musical description and several companies have adopted a 50 KHz sampling rate.

3M chose the 50 KHz sampling frequency early in its planning, and recommends this frequency to others as the best compromise to achieve compatibility with the European Broadcast Union transmission system, and both major television systems—the European PAL and the USA/Japanese NTSC systems.

Other manufacturers have preferred other frequencies for various reasons. And, there are many lesser important, but necessary parameters to be chosen, if there is to be complete tape interchangeability.

Today, a number of professional associations are concerned with digital audio standards and there are more manufacturers with special interests in the outcome.

While 3M has almost 50 digital recorders in studios of five countries, it does not feel that standards are something to be arbitrarily set by one or a group of manufacturers for their own convenience. 3M's position is that standards are most often, and rightfully, established by the users after day-to-day experience and evaluation of the alternatives. And while this is a slower process, it means that the ultimate standard is best suited to the users' needs.

In the interim, what is most needed is a standard signal interface, so that no matter whose equipment is purchased or used, it can "talk" with that of another brand. This is increasingly important as more equipment enters the design phase.

In this belief 3M made available, last August, formerly proprietary information to potential manufacturers of digital audio equipment. This included the technical interfacing data necessary so that these manufacturers, while still finalizing their equipment, could provide signal compatibility.

Even achievement of signal interface compatibility will be far from automatic, but perhaps this is the most realistic goal to work towards. ■

MITSUBISHI ELECTRIC'S DIGITAL RECORDING SYSTEM

by Lou Dollenger, National Sales Manager, PCM/Digital Audio Division of Mitsubishi Electric Sales America, Inc.

In designing the Mitsubishi Electric format Digital Audio Recording System, the challenge to the design team was much more than just the assembly of a digital recorder. To become popular and provide a stable base for digital playback in the home, an entire recording system that could offer the cost, reliability, and flexibility of typical analog methods had to be constructed. It was apparent that if this system worked no better than the first wave of PCM recorders this future would be very dim indeed. The design team recognized that the early hardware had not fully utilized the recent advances in semi-conducor technology. They were largely complicated to operate and maintain, very expensive and worst of all, unreliable. They decided to address the problems that plagued this early equipment and a massive R&D effort ensued. This effort culminated in the 1979 introduction of the X-80 2 channel PCM recorder—the only one of its kind that could edit by the traditional razor-blade method, and a machine that earned the designer Kunimaro Tanaka the prestigious "Ohm Award" for design excellence.

In digital theory, any system that could hope to accurately describe from 20Hz to 20KHz would require at least a 40KHz sampling rate. Also in order to attain the highest possible dynamic range, a 16 bit linear quantization would be necessary, making a 96.5dB range possible. The Mitsubishi Electric PCM format recorders use this 16bit method with a sampling rate of 50.4KHz. What this means is the 50,400 times per second, our format recorders "sample" the audio source and converts this analog sample into a digital binary "number" having an ability of 65,535 distinct gradations, or descriptions of that sound. After processing, this "number" is stored on magnetic tape.

The Mitsubishi Electric X-80 portable and X-80Z console recorders utilize ¼" high-density magnetic tape at a speed of 15 ips. In order to reduce tape costs to a minimum, the 15 ips speed was ideal, but presented a packing density of more than 23KBITS per inch of tape. To enable the high speed processing and storage of this massive amount of data, the information is spread over six tracks, with two associative parity tracks being assigned to a powerful error-correction method. This error-correction scheme was necessary because even with high-precision manufacture of magnetic tape, surface and remanance inhomogenities occur that make reliable data storage and retrieval difficult. In analog recording these inhomogenities tend to be evident in the form of "dropout." In digital recording this dropout of data is much more of a problem because of the high density. Dropout induced errors would normally tend to reduce a recorder's ability to guarantee that data input and output would be identical, so various "error-detection and correction" methods had to be employed. Early recorders performed this error correction in a longitudinal way, usually with an associative track to contain correction and redundancy abilities. The X-80 and X-80A recorders error-correction in both a longitudinal and latitudinal direction, virtually removing dropout as a problem in digital recording. Theoretically, an audible miss-operation should arise only once every 60 years of continuous use and the need to "conceal" any errors about every 4 hours with the Mitsubishi Electric method.

Another problem in making PCM recording accessible was the cost. Typical early hardware cost was very high and usually because sophisticated outboard editing equipment was needed and a large number of circuits were required to process the signals. In response to the lowering cost of semi-conductor technology and our own efforts in creating LSI circuitry for Mitsubishi Electric satellite products, not only is an outboard editor not necessary, but the basic recorder is very affordable. The reason that tape can be "blade-edited" on Mitsubishi Electric format recorders is again

Mitsubishi X-80

Mitsubishi X-800

because of the powerful error-correction ability. When care is taken to insure data integrity (proper storage methods and cotton gloves during tape handling) this procedure is simple and very reliable. The massive amount of error generated by cutting the tape is handled in this fashion: when the detection circuitry sees an edit, a crossfade is automatically performed over that edit. Other dropout induced error-correction is also performed reliably. As mentioned earlier, there are eight digital data tracks; six for data and two for parity. In addition there are two more tracks: one for SMPTE code data and the final one for analog cueing information. When an error is noted on one or two tracks (rare with virgin tape) that error is located and corrected completely—possible because the information is interleaved and then spread over six tracks horizontally and vertically. Therefore small errors of this kind are completely correctable. The next tier of errors are detected from three to five tracks. If these errors occur simultaneously, interpolation results which draw error-free data from before and after that error and inserts an average value over the error. When large numbers of errors are perceived (from five to eight tracks) a mute is performed to eliminate the possibility of the arising of error "click noise." With this configuration of error-detection and the two-dimensional error-correction method, a very powerful format is used that can not only deal with the error problem well, but also allow for blade editing (other recorders of this type cannot be edited this way, even in non-signal portions.)

There are those times however, when more sophisicated edits are necessary—those times when differing crossfade times are indicated. To make reliable editing of virtually any kind of musical passage we also have an electronic editor that can be used with X-80 Series recorders. Priced at under $30,000, the XE-1 Electronic Editor offers extremely precise control of editing by means of a cue-display dial. Other features are: key-operated freely selectable crossfade times, a digital fader to reset levels, an optical CRT display to unmistakeably identify edit points, and a built-in mini-printer. This printer provides a hard copy of all editing chores and is an invaluable aid when complex mixdown and mastering procedures extend over several days. The XE-1 can also lock two X-80 recorders in sync and control three X-80s for editing procedures.

Of perhaps the greatest concern to readers of **MIX** is our multichannel recorder, The X-800 32 Channel PCM recorder. The X-800, first introduced to the audio community at last fall's AES Convention, drew rave responses. The X-800 utilizes 1" tape at a speed of 30 ips. There are 44 tracks across the tape: 32 for digital data, two for analog information, one for SMPTE code data, eight for parity and error-correction (two for every subgroup of eight channels) and one final track for future developments in the area of computer control and processing of automated mixdown and other areas. Interleaving CRC (Cyclic Redundancy Code) with the digital data and writing a powerful Reed-Soloman Code across the tape again allows a two-dimensional error-correction capability. This combination makes the X-800 almost impervious to the effects of even serious dropout induced error. The fact that all errors can be detected, the greatest majority can be completely corrected, and the few exceptions can still be effectively concealed (again by automatic crossfading and signal interpolation) means that the X-800 operates completely free of click noise. This powerful addressing of the error problem in a multichannel recorder indicates our feeling that a reliable PCM recorder should have the ability to record, playback, punch-in, and punch-out, even after years of operation, when using tape that was poorly stored or handled or that was recorded on a slightly mis-aligned deck.

The X-800 has variable speed

14 GRAMMY NOMINEES USED IT.

SONY®

PCM

SHOULDN'T YOU GIVE US A LISTEN?

A whole family of new, exciting digital products will be shown at AES, Los Angeles, May 12th-15th. Hear for yourself why Sony is the digital audio leader or call Roger Pryor at (415) 467-4900 to give Sony a try in your studio.

operation (±10%), internal SMPTE code generation, and a remoteable autolocater unit. The locator features the latest membrane switch technology for fingertip control, a microprocessor to store and control up to 100 take-time points, auto punch-in and punch-out, and a number of sophisticated search functions. Mitsubishi offers the X-800 for less than $200,000.

The entire line of Mitsubishi Electric PCM components was designed with the user in mind. We recognized that PCM technology had many good engineers and musicians baffled, so we paid careful attention to the human engineering of our design. Our digital recorders appear and behave remarkably similar to their analog counterparts—but they offer all the specifications of a modern digital recording system. They behave logically and reliably, yet they provide the freedom from tape hiss, wow and flutter, and a full dynamic range at a low cost. They are fully warrantied by Mitsubishi Electric for one full year with a quick-response line to answer any questions about maintenance. Mitsubishi feels that the lack of a professional standard, which can be traced to a U.S. Justice Department Anti-Trust Division ruling prohibiting standards discussions, was a good idea, allowing for the past three years since that ruling for updates and improvements in hardware. Had a standard been developed a few years ago when it was legally possible, the industry would have been forced to accept what now seems to be an unworkable concept. Our feeling is that the only way that a standard will now develop is for one system to "win" approval over another system. This technique has allowed for the current improvements in the Mitsubishi Electric format recorders and to be locked into an "archaic" standard would have tended to suppress this type of development. Mitsubishi echoes a recent **dB** Editorial, "As with Charles Darwin it's survival of the fittest. If you need to be convinced, just recall the days when both wire and tape recorders were available. Where would we be today if some standards organization had settled for wire? It seemed pretty good at the time, but just imagine the fun of editing a 24 wire system!"

SONY DIGITAL

By Roger Pryor, General Manager, Sony Digital Audio Division

Sony has been in the professional audio market for two and a half years, since introducing the PCM-1600 2-channel processor, the first Sony digital audio equipment in the U.S. Since that time, response and sales have been excellent, with over 200 jazz, classical, and pop projects employing the PCM-1600. Recent albums include Barbra Streisand's "Guilty," Kenny Loggins' "Alive," Stevie Wonder's "Hotter Than July," and Bruce Springsteen's "The River."

Sony's intention is to be the leader in the digital audio field. In this long term approach, Sony has offered much of the benefits of their technical research and digital experience to other manufacturers. At the 66th AES Convention in Los Angeles, Studer announced that they had adopted the Sony format for stationary head digital audio recording, and other manufacturers are currently in conversation with Sony.

The jointly supported format covers the full range of multi-channel recording equipment, with up to a maximum of 48 channels. The format has three nominal sampling rates, corresponding to different applications: 50.4 KHz for highest quality studio recording; 44.056/44.1 KHz for other studio mixdown applications and Digital Audio Disks; and 32 KHz for broadcasting and other applications, in accordance with the EBU standard.

Sony has designed and developed digital recording equipment to fit the needs that exist, and built them to accomodate a variety of applications. According to Sony, digital audio means not only the high technology required by a limited number of professionals, but also the most desired recording method for various situations.

The present equipment Sony has on

MANUFACTURER& MODEL #	NUMBER OF TRACKS	TAPE WIDTH	TAPE SPEED	TAPE FORMAT	MAX REEL SIZE	MAX REC TIME ON A TAPE	SAMPLE RATE	NUMBER OF BITS	DYNA RAN
JVC									
*BP-90	¾" Video	¾" Video	Helical Scan Video Forward Speed	¾" Umatic Cartridge	Cartridge	60 Minutes	44.1KHz	16	90 -
3M									
DMS-32	32	1"	45 IPS	R to R	12½"	32 Minutes	50KHz	16	90 -
DMS-4	4	½"	45 IPS	R to R	12½"	32 Minutes	50KHZ	16	90 -
MITSUBISHI									
X-80 (Portable Recorder)									
X-80A (Console Model)	2	¼"	15 IPS	R to R	10½"	60 Minutes	50.4KHZ	16	90 -
X-800	32	1"	30 IPS	R to R	14"	60 Minutes	50.4KHZ	16	90 -
SONY									
*PCM-1610	2	¾" Video	Helical Scan 3¾ IPS Forward Speed	¾" Umatic Video Cartridge	cartridge	60 Minutes	44.1KHZ and 44.056KHz	16	.94
PCM-3324	24	½"	30 IPS	R to R	14"	60 Minutes	50.4 KHZ	16	.94 ±
DCR/Soundstream									
DTR-I/2	2	1"	35 IPS	R to R	10½"	00 Minutes	50 KKz	16	92
DTR-I/4	4	1"	35 IPS	R to R	10½"	50 Minutes	50 KHz	16	92
DTR-I/8	8	1"	35 IPS	R to R	10½"	25 Minutes	50 KHZ	16	92
TECHNICS									
Digital Audio Rec.	4	¼"	15 IPS	R to R	10½"	60 Minutes	50.4KHz	16	90
**SV-P100	2	¾" Video		VHS Stand. Video Cass.	cartridge	120 Minutes (using NV-) (T 120E)	44.056KHz	14	
Cassette Rec.									

*The BP-90 and the PCM-1610 are digital processors only, and each must be used with a ¾" Umatic Video tape recorder.

the market is as follows:

The PCM-10 processor, a 14-bit non-linear system designed for music situations where editing and overdubbing are not required, and for radio syndication applications. Suggested retail price: $3,000.

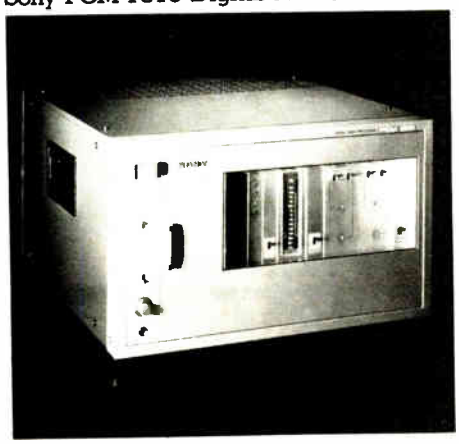
The PCM-100, a 14-bit linear system with full editing and overdubbing capability, designed for radio and television applications. Both the PCM-10 and the PCM-100 have a dynamic range of 85 dB and a flat frequency response from 20-20KHz, which is more than acceptable for broadcasting. Suggested retail price: $11,500.

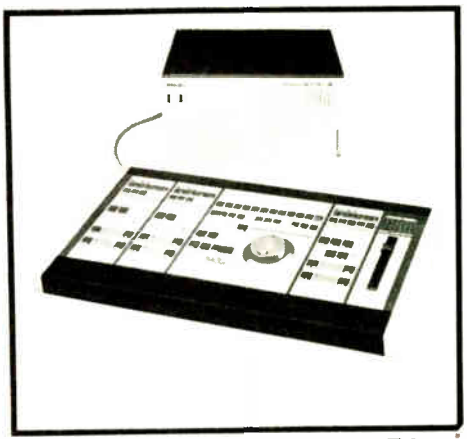
The PCM-1600/PCM-1610 is a 16-bit linear system, with full editing and overdubbing capability, and a dynamic range of 97 dB. We have been marketing the PCM-1600 for two and a half years, and have just recently replaced it with the PCM-1610. Suggested retail price: $28,000.

All Sony processors use the 44.056 KHz (Corresponding to the NTSC bandwidth characteristics of U.S. videotape recorders) sampling frequency and are used in conjunction with standard videotape recorders. The PCM 1610 offers both the 44.056 KHz sampling frequency as well as the 44.1 KHz sampling frequency used in the digital audio disk. The choice of videotape recorder is dependent on the different applications which the user has intended for the equipment. The PCM-1610 has been sold in conjunction with the BVU-200B U-matic recorder, which has a proven track record in video electronic news gathering and has full editing capability. It has a tape speed of 3¾ i.p.s., and uses a standard ¾" U-matic videocassette. The videocassettes are inexpensive, and require less storage space than analog tapes. The recorders have proven reliability, are portable, and with the high bandwidth that a rotating head permits, the user is able to get the audio information from the mixing console to the tape with great accuracy. Suggested retail price of the BVU-200B: $9,500.

Editing of tapes recorded with the PCM-100, PCM-1600, and PCM-1610

Sony PCM-1610 Digital Audio Processor





Sony DAE-1100 Digital Audio Editor

is accomplished with the DAE-1100 digital audio editor, in conjunction with either two or three BVU-200B's, for completely electronic editing. We have been delivering the editor since the beginning of this year, with very favorable response. The editor has an accuracy of 362 microseconds, which is finer than a razor blade edit, and allows a variable crossfade time for combining program material at the edit point, which is not possible with analog. The DAE-1100 has a digital level control that allows matching between different tape level sources, also a preview function, sequential lighting of control buttons that guide the user through the editing process, and a built-in SMPTE time code gen-

FREQUENCY RESPONSE	EDITING		PRICE	AVAILABILITY DATE	ELECTRONIC EDITOR		
	ELECTRONIC	RAZOR BLADE			MODEL NUMBER	AVAILABILITY DATE	PRICE
DC-20KHz ±.5dB	YES	NO	$39,000	CURRENTLY AVAILABLE	AE-90	CURRENTLY AVAILABLE	$36,900
20 Hz-18KHz	YES	NO	$138,000	CURRENTLY	DMS-32	CURRENTLY	$9,725
20Hz-18KHz	YES	NO	$40,150	AVAILABLE	DMS-32	AVAILABLE	$9,725
20HZ-20KHz	YES	YES	$25,000	AVAILABLE	XF-1	N/A	$30,000
20HZ-20KHz	N/A	N/A	$200,000	SEPT. 1981	N/A	N/A	N/A
20Hz-20KHz	YES	NO	$28,000	CURRENTLY	DAE-1100	CURRENTLY	$35,000
20Hz-20KHz	YES	YES	N/A	AVAILABLE LATE 1981	N/A	AVAILABLE	N/A
0Hz-22KHz	YES	NO	$65,000	CURRENTLY	NOTE: DRC/Soundstream has digital editing facilities (for rent) in Salt Lake City, Germany and Soon in Los Angeles and New York City.		
0Hz-22KHz	YES	NO	$65,000	AVAILABLE			
0Hz-22KHz	YES	NO	$65,000	AVAILABLE			
20Hz-20KHz	YES	YES	N/A	LATE 1981			
2Hz-20KHz (+0, -2.5db)	Jump, search and locate functions		N/A	LATE 1981	EDITOR	N/A	N/A

**Specifications subject to change without notice.

erator/reader for referencing of edit points. Suggested retail price: $35,000.

The DRE-2000 is an all digital reverberation unit, which interfaces with either digital or analog systems, making it immediately useful, and avoiding future obsolescence. It is rack-mounted, with a hand-held control unit about the size of a pocket calculator. It has four modes for reverb, two for delay, two for decay, and a non-volatile 10-program memory. Introduced in January of this year, response to the DRE-2000 has been very enthusiastic. Suggested retail price: $15,000.

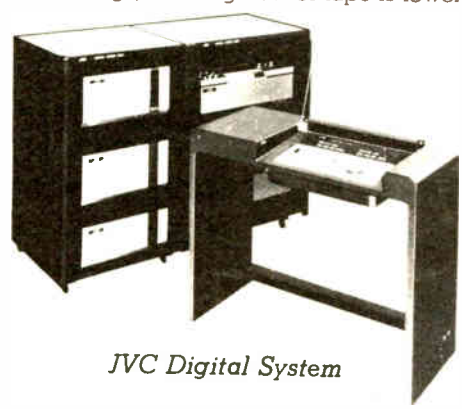
Our multi-track digital recorder, the PCM-3324, will make its debut at the AES show in May, and will be available for purchase by the end of the year. It is a stationary head, 24-track machine, with two additional analog tracks, and one SMPTE track. The unit has a tape speed of 30 I.P.S., using standard ½" videotape and 14" reels. The size is comparable to a standard 2-track studio recorder, thus allowing for great portability and diversity in application. The PCM-3324 features razor blade editing, punch-ins and punch-outs, as well as electronic editing. It is digitally compatible with the PCM-1610.

JVC'S DAS-9 DIGITAL RECORDING SYSTEM

by Tom Nishida, Vice President, JVC

The JVC DAS-90 Digital Recording System consists of three different pieces. The BP-90 processor is a two channel record/playback unit interfacing with any U-matic video cassette deck. It is a sixteen bit system with a 44.1KHz sampling rate. Dropout compensation is achieved with a unique 38 bit triple check error correction system. Frequency response is DC to 20 KHz +.5dB. Usable dynamic range is more than 90dB with less than .02% harmonic distortion.

Special features include ease of transportation and portability for remote recordings; running cost of tape is lower than even present day analog due to its ¾" U-Matic format; master identification codes can be recorded on tape; and two or more systems can be operated in synchronization. The price for the BP-90 Processor is $39,900.



JVC Digital System

The AE-90 Digital Audio Editor is a 16bit, two channel unit for use with the BP-90 Processor. Two six second memories are available and rehearsal mode is eight seconds with editing accuracy to 180 microseconds. Cross-fade duration can be varied between 0,10,20 or 40 milliseconds. Actual editing point shifting is in two millisecond steps in either direction. In addition, a level adjusting fader allows the adjustment of music signal level, or fade-in/fade-out operations.

Special features include that cut-in and cut-out points can be audibly confirmed independently by recalling the signal stored in memory. Locating the exact editing point is possible either by automatic scanning of recorded material near the editing point at the desired speed in either direction, or manual scanning by audibly monitoring the playback (just like editing a conventional analog tape;) and editing is accomplished without risking valuable original recordings. The AE-90 Digital Audio Editor sell for $36,900.

The CD-90 Digital Audio Preview

Unit is a two channel delay unit used to produce the preview signal for variable pitch and depth units in disk cutting. It is a 16 bit serial/parallel system with a sampling frequency of 44.1KHz. The delay is variable up to 1.49 seconds. The output signal (composite video) from the VTR is fed to the CD-90 preview unit after conversion to digital data by the BP-90 processor, and is delayed by the delay memory. The delayed signal is then fed back to the processor for decoding through it's 16 bit D/A converter producing the analog output signal for the cutter drive amplifiers. The analog signal decoded by the D/A converter in the CD-90 unit is fed to the cutting lathe as the pitch/depth controlling signal.

The unit is controlled by an external clock signal and is operative at sampling frequencies ranging from 30 KHz to 60 KHz.

The equipment required for setup of the systems is as follows. Recording employs one BP-90 Processor and one (or two) ¾" VTR U-Matic video cassette machines (any brand).

Editing requires one BP-90 Processor, one AE-90 Editor, and two JVC CR-8200 U-Matic Cassette Machines.

The Disk Mastering process would use one BP-90 Processor, one CD-90 Delay Line and one ¾" U-Matic video cassette Machine (any brand).

The cost of the R-8200 U Video Cassette Deck is $5300.

TECHNICS DIGITAL RECORDING

by Jim Parks, Marketing Director Technics Digital Division

Technics is preparing to release its Digital Audio Recorder, Digital Audio Mixer, Editor and Digital Preview Unit.

The Technics four channel Digital Audio Recorder has been made possible by the adoption of thin-film type magnetic heads. As a result, the error-correction capability has been increased, and excellent operation at a low tape speed (15 ips) has been achieved. By establishing an IBG (Inter-Block Gap) in the signal format, the accuracy of electronic editing has been increased. (Manual editing is also possible.)

Because it is possible to overwrite, punching in and out can be easily performed. And with the addition of an analog signal track, cueing is possible during fast forward and rewind operations. Indexing can also be easily accomplished for editing. All operations can be performed by remote control, and a 10-memory Auto Locate system can be utilized. A pitch control of ±9.9% is also available on the recorder. Technics editing unit is designed to operate with two digital audio recorders. Because editing points can be determined by using the search dial, indexing can be performed in the same manner as with conventional analog tape recorders. By means of a memory consisting of semiconductors, the final editing results can be monitored in advance.

"Cross-fade processing" is employed in the connection of editing points and there is no drop in the original or lack of continuity. This eliminates the undesired noise in editing signal often found when listening to edited tapes.

Using Technic's Digital Preview Unit, direct connection to a cutting machine is made possible by the D/A convertor which is built into the output circuitry. The delay time range of 0.1—1.6 seconds can be freely set by using the keyboard.

Technics will also soon be introducing their Digital Audio Cassette Recorder. The SV-P100 combines a PCM processor and a complete tape recording system in a single unit. The unit is simpler to operate than a standard open-reel tape deck, and more economical in tape consumption than a 2-track 15 i.p.s. recorder.

Designed as a compact table-top unit, the SV-P100 has its most often used controls conveniently arranged on its slanted console panel. The cassette is held vertically, permitting easy verification of the amount of tape remaining. The P100 is a digital PCM audio cassette recorder which incorporates a VHS tape transport mechanism and PCM processor in a single, integrated unit. This allows digital PCM audio recording and playback on VHS video cassettes, with the same convenience as a conventional audio cassette deck. ■

Artist Studios

BEACH BOY MIKE LOVE MAKES WAVES

Mike Love, studio owner.

The musician who owns a studio can work when the inspiration appears, can continue to work until the product is complete, and has the sensible convenience of a studio tailored to specific needs. That artist is free from the burden of fitting into studio timeslots, deadlines and other "meter running" drawbacks.

Why don't more musicians have their own studios? Cost is the first obstacle. It costs a lot of money to put together a professional studio, and it is an even bigger risk if the artistdoesn't know what design and equipment are most appropriate for his work. Certainly cost can be the same justification for building one's own studio if the use and output warrents it. Owning and operating a professional recording studio is very often an enjoyable side business as well as a good investment for the successful recording artist.

Over the next few issues we will highlight several artists who have created their own top quality recording facilities.

"My experience has given me a good idea of what an artist needs and wants in a recording studio," says Mike Love, twenty year veteran lead singer for The Beach Boys. "I am pleased that we have created an atmosphere of total convenience coupled with uncompromised quality that offers a creative freedom unattainable in the conventional studio environment."

The environment he describes is a mobile recording studio owned by his company, Western Audio Video Entertainment Services, or WAVES. Home based at Love's ocean front estate in Santa Barbara, WAVES has the flexibility to provide accomodations to visiting clients in Santa Barbara as well as to follow their geographic desires and recording demands.

In addition to various Beach Boys' projects, WAVES has played host to artists such as Terry Melcher and Jim Messina since its opening in late summer of 1980, and has become involved in the production of recording local concerts for sale to video distribution companies.

The $250,000 control room, built into a 28 foot, air conditioned and soundproofed semi-truck, has been luxuriously appointed and carefully assembled. With acoustical input from George Augsberger, a leading studio designer, the bulk of the design is the brain child of WAVES' recording engineer, Jeff Peters.

Major equipment consists of a Neve 8068, 32 by 32 mixing consoles, Studer A80 24 and 2 track transformerless tape machines, Super Red monitors with Altec 604 E's and Mastering Lab crossovers, Dolby noise reduction, AKG BX-20 reverb, and a wide variety of microphones and signal processing equipment. The truck also employs a closed circuit television system with color cameras and a sony Trinitron 25" monitor.

The operation is renting out for $100/hr with an engineer and $75/hr if you bring your own. WAVES' daily rate of $2500 includes an engineer, technician and a set-up person. The price for accomodations at Love's beautiful cliff top retreat is $10 per person per night.

By all indications, the goal of WAVES has been achieved: to satisfy the needs of both Mike and The Beach Boys, who require a state-of-the-art facility with ultimate flexibility, and those special clients who demand top quality on location. ■

Ask Eventide:

Q: There are lots of digital delays around. Why is the Eventide H949 Harmonizer different?

A: Look closely at the H949's digital readout. You'll notice that it's calibrated not in "delay" but in "PITCH RATIO." This symbolizes the unique features that set Eventide Harmonizers apart from ordinary "special effects" digital delay lines. Here's why:

Although "pitch ratio" is a mathematical concept, it has a very real meaning to the recording engineer. In effect, changing pitch is equivalent to retuning a musical instrument. This true pitch change, as produced by the H949 is far different from common ring modulator effects because Eventide Harmonizers preserve all harmonic ratios. As a result, even at wide pitch-change ratios, the modified signal still sounds musical. Pitch-changed signals can be mixed with the original to create chorus and harmony effects. You can change the perceived speed of a tape without changing the running time, or vice versa, and you can create continuous "doppler shift" effects (will that train whistle ever go by?)

True pitch change is also a far cry from the pseudo-pitch change which other digital delays obtain by changing the clock frequency. Any DDL can do this for a very short time (milliseconds at most.) But it does this at the expense of continued operation. For instance, raising pitch implies reading data out faster than they are read in. That's easy; just speed up the clock. Except that to maintain pitch, you have to keep doing it. The DDL quickly runs out of data and then where's your signal? Eventide Harmonizers contain circuitry to allow audio to be "read in" and "read out" at different rates. This provides the ability to set your output pitch up to an octave up or two octaves down with precision on the H949.

Q: What are glitches? How can I get rid of them?

A: If you followed the above answer, you'll realize that something must be done when reading data in and out at different rates, or there will be too much or too little data! What we do, in effect, is to "splice" literally removing or adding very short segments of program to make up for the missing or extra data. And, just as you would when splicing a tape, the Harmonizer makes a "diagonal cut."

While the diagonal cut eliminates sharp transients, it's still possible to get minor imperfections, known as "glitches" in the output. Depending upon the pitch ratio, the program material, and the prominence of the signal in the final mix (i.e. lead vocal or buried horn) this "glitching" can range from objectionable to unnoticeable. Eventide's research has developed ways to substantially eliminate the pitch-change glitch. We do this by carefully selecting each "splice" point, much as a human tape editor tries to match the signal or silence before and after his cut. This important development (the "De-glitch card option") is now available on new H949 Harmonizers, and can be retrofitted to all H949's.

Got a question about digital effects? Write to "Ask Eventide" 265 West 54th Street New York, N.Y. 10019. Questions of general interest will be answered in this column. If we use your question, we'll send you an Eventide T-shirt, so include your size.

ENVELOPE CONTROLLED FILTERS

by Mike Beigel and Elliot Randall

Over the last decade we have seen innumerable new pieces of sound altering equipment hit the market, the studio, the stage,... the pocketbook. In the article that follows, we will discuss one of the most important of these tools—the envelope controlled filter. As the technically oriented musician is well aware, increasing your musical/sound options is both necessary and great fun.

Envelope controlled filters have been used by musicians since 1972. We are accustomed to thinking of them—and using them—as "automatic wah-wah pedals," but this usage has been dictated by the forms of products available rather than the musical possibilities inherent in the Envelope Controlled Filter as a signal processing system. In the same way that a simple bandpass filter can be turned into a complex—and very versatile—parametric equalizer, so the system elements of an Envelope Controlled Filter can be expanded in form and function to provide a very sophisticated musical effects processor.

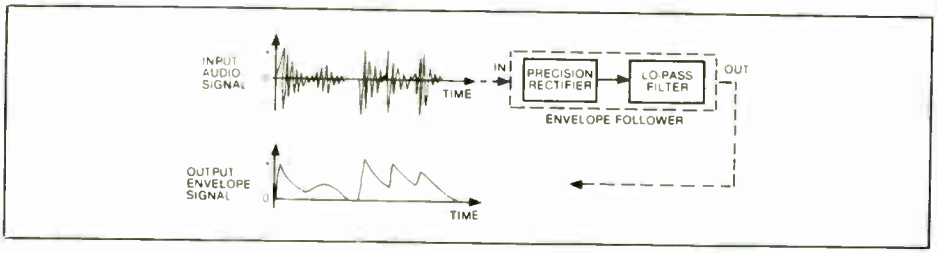


Figure 1. Envelope Follower with input and output waveforms.

Musicians and recording engineers are constantly searching for sounds that are not just new, but useful in expanding their musical expression and palette of sound colors. Basic inventions in the field of sound modification, as in any other technological area, are infrequent; but technological improvements of existing devices and systems are much more accesible. As we gain more insight into the nature of musical sound processes, we are able to develop systems which allow more effective use of the basic building blocks of sound processing. Thus we can breathe new life into systems that were previously quite limited, and produce genuinely new sounds that are qualitatively superior and different from those we now work with.

THE PARAMETRIC ENVELOPE FOLLOWER

An envelope follower provides a control voltage signal in response to the instantaneous "loudness" of an audio signal input. You can compare it to a standard "VU" meter, which indicates the "average" volume of an audio signal in a visual display. The envelope follower's internal electronics actually resemble a V.U. meter circuit in many ways. Figure 1 shows a simple system diagram of an envelope follower, along with the audio input waveforms and output control signals associated with it.

Continued on page 34

ELLIOT RANDALL (LEFT) AND MIKE BIEGEL AT NEW YORK'S MEDIA SOUND.

PHOTO: RICHARD E. AARON

Chet Atkins
Nashville, TN

Lindsey Buckingham
Fleetwood Mac. Hollywood, CA

Bob Siebenberg
Supertramp. Los Angeles, CA

Quad Tech Studios
Hank Waring, Los Angeles. CA

Russian Hill Recording
Jack Leahy, Bob Shotland. San Francisco CA

Soundtrek
Ron Ubel. Kansas City. MO

Lincoln Center for the Performing Arts
New York. NY

New York Metropolitan Opera
New York, NY

WFMT Chicago syndicator for
CHICAGO SYMPHONY ORCHESTRA

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We would like to express special thanks to these people and the many others who in the past few months have made NEOTEK consoles their choice for personal and public recording studios. sound reinforcement. broadcast. theater. and film sound.

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Comparing the input AC signal and the output DC control signal, we see that the output signal closely conforms to the "shape" of the input signal, but without the complexity of all the audio frequency components.

A simple envelope follower, like the one just shown, provides a signal which very closely "tracks" the average instantaneous amplitude of the input. This corresponds very closely to the rhythmic and loudness properties of the input, and therefore any audio modification process controlled by a simple envelope would also display this characteristic. In fact, most available envelope-controlled filters are limited by the fact that the envelope follower "tracks" the input so closely. Hence, the characteristic "automatic wah" sound so typical of envelope controlled filters.

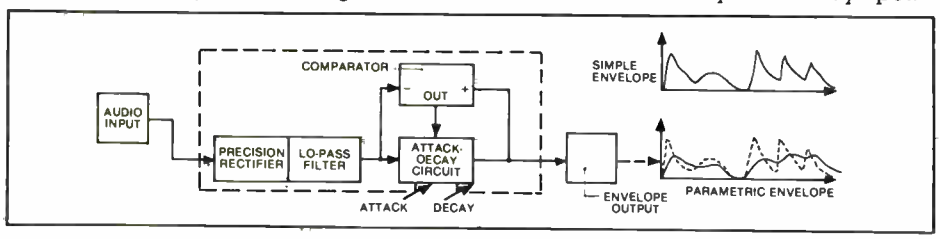

Figure 2. Parametric envelope follower

We can augment the design of the envelope follower by giving it independent "attack" and "decay" times. The idea is almost identical to the "attack" and "decay" controls on an envelope generator found in synthesizers, but with an important difference: The attack (onset) and decay controls of the parametric envelope follower function in relation to the input signal. When the envelope output voltage is ***less*** than the input signal, the "attack" mode approaches the input signal with a time-constant set by the "attack" pot. When the envelope output voltage is ***greater*** than the input signal, it decays toward the input signal level with a time-constant set by the "decay" pot.

The output of the parametric envelope follower thus depends on the settings of the controls ***and*** the input signal, and many complex and subtle control voltages are produced in this way. Figure 3 shows some of the different kinds of envelopes that can result from the same input signal, just by changing the attack and decay controls.

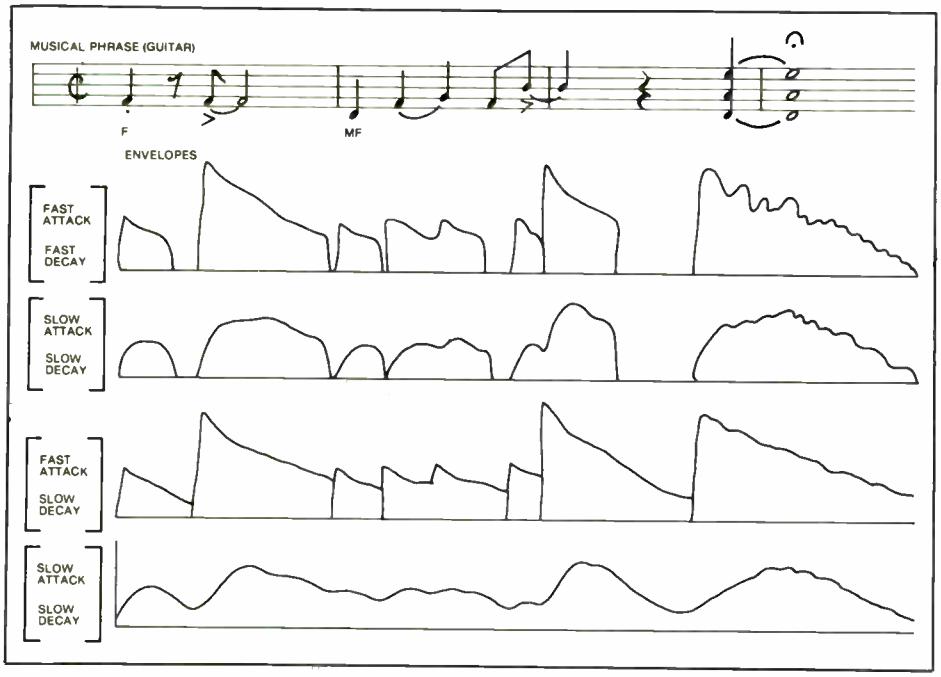

Figure 3. Envelope shapes

One of the most versatile filters for processing musical signals is the "State-variable" or multi-mode filter. This type of filter allows lowpass, bandpass and highpass characteristics (Figure 4). Each has its distinct sound character and musical uses. Most musicians are familiar only with lowpass filter characteristics common on synthesizers, and often miss the interesting musical effects obtainable with the two other modes.

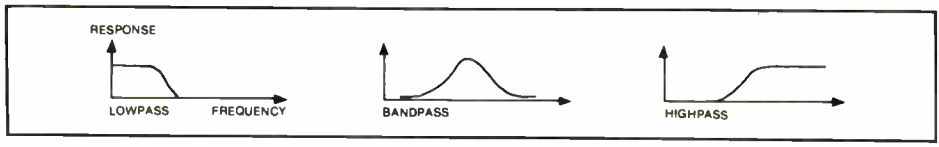

Figure 4A. Filter modes

The amount of resonance (or "Q" or "peak") of the filter is vitally important to the perceived sound quality. With little or no "peak", the sound quality is subtly modified, only in terms of "brightness" or clarity. With very high "peak", the sound quality is grossly modified, becoming vowel-like when swept, or even accentuating individual overtones of the musical signal.

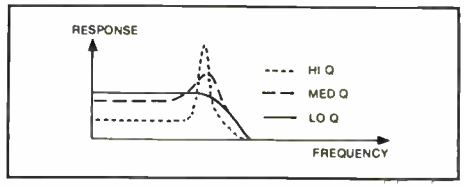

Figure 4B. Filter "Q" (Peak)

Both the cutoff frequency and the "peak" of the filter's response can be voltage-controlled (and thus envelope-controlled). That, of course, is what transforms the filter from a simple "equalizing" device into a musical effect.

DRIVE AND CONTROL FUNCTIONS

The versatility of a musical effect system depends on how the components interact with each other. If we have an envelope follower producing a control voltage, and a voltage controlled filter responding to that control voltage, we still have many choices over how the control voltage affects the filter response. The envelope voltage sweeps the filter: but in which direction, over what range, with what accuracy? We might want the filter cutoff frequency to move hardly at all, or down instead of up, or over its full range. Perhaps we want to vary the filters "Q" or "peak" proportional to the envelope signal instead of simply setting it with a knob.

The filter control system is the interface between the envelope follower and the voltage controlled filter, and it's as im-

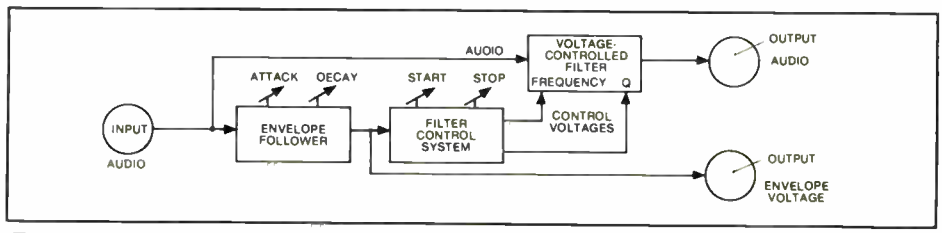

Figure 5. Filter Control System

portant as either of them. In one version, "start" and "stop" controls determine the trajectory of the filter. The filter cutoff frequency varies from the "start" position (with "zero" envelope) to the "stop" position (with "full" envelope). The settings of these two controls thus determine the sweep width, direction, and starting point with complete flexibility.

EFFECTS LOOP

The Effects Loop in an Envelope Controlled Filter system serves a function similar to the hole in a doughnut. It's really not there, but it enhances the product dramatically. The Effects Loop consists of two jacks, stategically located after the audio input, out of the way of the envelope follower, and before the voltage-controlled filter.

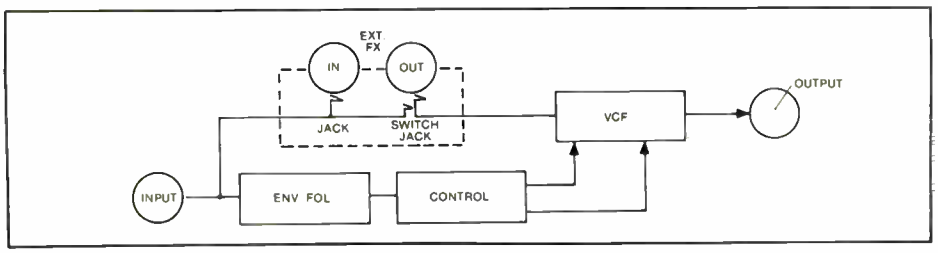

Figure 6. Effects Loop

The real reason the effects loop is there is that many additional audio processes which make the musical signal more interesting (especially if we want to filter it) badly degrade the signal's natural envelope. Fuzz tones, "soft distortion" devices and compressors are prime examples. The filter likes them, but the envelope follower hates them. So we provide a place where they can process the signal before it's filtered, without bothering the envelope follower. Echo and chorus machines, octave dividers or doublers, and many other effects find surprisingly advantageous uses in the "effects loop" position.

More aspects of product design could be covered, but these constitute the major recent advances in envelope-controlled filter technology (apart from specific product designs.)

STUDIO USE AND SETUP

Having been to a few recording sessions in which the Envelope Controlled Filter was used, I realized that the studio setup and use of this device is critical. The way the system is set up in the context of the studio can "make or break" the utility of the effect. The following guidelines will help you use the effect to its fullest advantage in the studio:

1. The effect is best used ***live*** rather than post-mixed. This is because envelope-controlled filtering is an ***interactive*** effect, rather than just an automatic sound process. The musician plays ***through*** the effect as an integral part of his performance.
2. The musician using the effect should be able to hear it on his own headphones or monitor speaker.
3. The ***effects loop*** of the Envelope Controlled Filter should be accessible to many different sound processes: those brought along by the musician as well as those available in the studio.
4. The ***effect*** and the ***direct signal*** from the musician's "unprocessed" instrument should be available on separate faders. A proper mix of processed and unprocessed material often provides the optimum musical sound.
5. The control panel of the device should be available "hands on", either to the musician ***and*** the device.
6. Signal levels to the device should be optimized to provide the best signal-to-noise ratio, while preventing overload distortion. Remember: at high values of the "peak" control, the device can easily exhibit a gain of 30 dB at its resonant frequency.

Figure 7 shows a preferred studio setup for the Envelope Controlled Filter. Using this or a similar setup (and plenty of creativity) you will be able to use this effect along with the rest of your electronic arsenal to produce many beautiful and "unheard-of" new musical sounds. ■

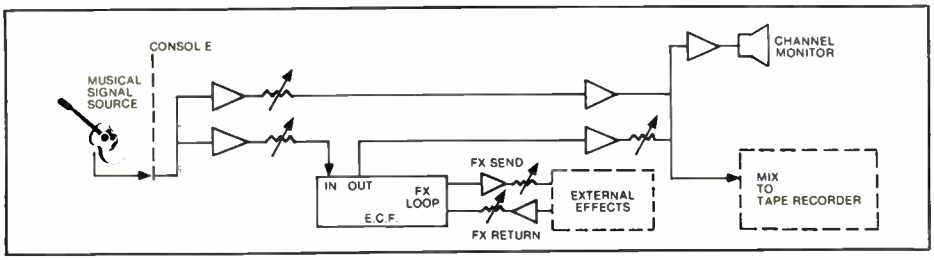

Figure 7. Studio Setup for Envelope Controlled Filter

Michael Beigel presently heads up Beigel Sound Lab, which produces professional sound-modification equipment. He was a principal developer of the MUTRON line of sound modification products. Elliot Randall is one of New York's leading session guitarists.

Opportunities in the 80's

Part Two

WOMEN IN RECORDING

by Shelly Higgens

Becoming successful in the recording industry of the 1980's is no small achievement. It takes talent, chutzpah, luck, and grit. A degree won't get you in, affirmative action hiring is scarce, and there are few women at the top to provide role models. But women are getting more than a foot in the door and they're making it...at every level of the recording industry.

The women who have shared their experience and opinions in this article were chosen somewhat arbitrarily by the author, and are just a sampling of others across the country attempting to carve out a niche for themselves in some facet of the recording industry.

It can be lonely, especially outside the major markets where opportunities are fewer. But it can be done. The women in this article are challenged, excited and optimistic about the future. Each success story adds to the expanding network. Each time a young women with curiosity about the industry goes to a session, buys a record, or attends a concert where women are involved in production, another link in the chain is created. Interest leads to education, education to knowledge, and knowledge to application. The trend should be encouraging because everyone can profit by the new ideas and enthusiasm women are bringing to the audio scene.

The booming growth of the record industry during the 60's and 70's gave rise to a new phenomenon in the studio. The engineer, once regarded as a lowly button-pusher, began to be considered a key factor in the recording of hits. Particular engineers became sought after by producers for their unique sound and personal styles. The image of the engineer as "star" was beginning to evolve.

With this upgrading of the engineer's status came the rapid technological advances that characterize the modern recording process. Control rooms developed from antiseptically functional affairs into the hi-tech "cockpit" style of comfort now in vogue.

At times it seemed that everybody who ever bought a cassette deck wanted to be a professional recording engineer. Schools began to crop up to meet the demand for training. Unfortunately, the graduates of these schools often met with a shock upon confronting the slim pickings of the job market. Yet the field remained full of eager new-comers anxious to learn the trade, more and more of these candidates being women.

Leslie Ann Jones

Leslie Ann Jones is a staff engineer at the ***Automatt*** in San Francisco. She has engineered many albums, most recently ***Randy Hansen*** on Capitol, ***The Waters*** on Arista, and ***Swing of Delight*** (Carlos Santana) on CBS.

"It definitely helps to have a track record. But it's a Catch 22. You don't develop a track record unless you do projects and you can't do projects unless you have a track record. So you have to be in the fortunate position of getting work where people need to use you because maybe you're the only one there or maybe they liked you as a second and decide to use you on their next project.

PHOTO: LUIS MEGID

Leslie Ann Jone of San Francisco's Automatt

"I was the second on a live John Mayall album. It's funny. John said he liked the fact that he had seen me on my knees fiddling around with a tape machine, as he put it. He thought that if I could do that he might as well use me instead of using this guy he had been using who would walk in very well-dressed and groovy in a sports jacket. I think he liked the fact that I just ***did*** it. I wasn't the world's greatest engineer and I didn't try to look like that, but I was capable. So he asked for me, and I was flabbergasted. It was great.

That was the first album I had done. It was called ***A Hard Core Package.***

"As far back as I can remember, I've been involved in the music business. My father was a bandleader and my mother was a singer. I played guitar in several groups. I played in a Top-40 all-girl band and I owned the the PA. When I left the group, I was left with alot of PA stuff. I started renting it out to other groups on weekends and doing their sound. I got very interested in that and gradually less interested in playing.

"I started reading alot of hi-fi magazines. There weren't any engineering magazines back then that I knew of. The Mix certainly wasn't out then. Later on, I decided to take a couple of courses. Sherwood Oaks Experimental College was offering the very first recording engineering program in L.A. I took the course and the advanced course. That was great because I could take everything I had been reading and be able to ask someone questions and have them know the answers.

"I've been very lucky in that most of the projects I've worked on I've really enjoyed. Alot of it has to do with the people. Every producer's capacity is different and so is every artist's requirements. Some producers do everything for the artist. Some just end up going out to get food. Alot of it depends on what the group requires. When I walk in to a session I don't know what the relationship between the group and the producer is. If it's a new producer, I don't know what the relationship is going to be between me and the producer in terms of how much I can say about how it sounds. I usually don't know until about the 3rd day. As the engineer, you don't get on the talkback and say let's try another guitar sound. You just don't do that. When you make an album, you live with those people for a month or 6 weeks. My favorite projects are the ones where we have all become good friends and see each other after the album is done.

"The Joan Baez album I just did was produced by Joan and her manager Nancy Carlen. I got an associate producer credit on that for the first time, which I'm very happy about. Unless you're a female artist on a label and have someone specific that you want to work with, there aren't many women producers who are well-known enough for a record company to take a chance with. It's hard. The economy right now is making record labels go with the sure thing. But the independent women's music labels all use women producers who may not have ever produced anything before.

"I love working. I go crazy when I'm not working. Even if I started producing, I don't think I would give up being an engineer because I really get a kick out of it. It's very magical to be in the same room with somebody when they create something brand new. Maybe you're the only one there and all of a sudden somebody plays a fantastic lick that they've never played before. There's nothing like it in the world."

Kathy Morton

Kathy Morton is the recording engineer at ***Zoetrope Studios*** in San Francisco. The 24-track studio has as its main priority the support of owner Francis Coppola's films. Among her credits are co-engineering on the soundtrack albums for ***Apocalypse Now*** and ***Black Stallion***. Kathy is involved with projects outside of film sound, including albums for synthesist ***David Rosenboom***, and hard rockers ***Youngster***.

"I was a musician for many years and then in college I got involved in electronic music. So I was learning about sound as a signal that flows from one place to another as opposed to my instrument, the piano. I toured Europe and the United States working with electronic music composers and their instruments. Then I went to graduate school in electronic music at Mills College.

"I got a job at Zoetrope Studios one summer, starting out as an assistant. My backgound in electronic music was certainly a factor in my being hired and I did use what I

PHOTO: LUIS MEGID

Kathy Morton of Beggs Zoetrope Studios

knew to help create some of the elaborate sound effects on "Apocalypse Now". Our walls were just covered with every conceivable synthesizer and we worked with electronic sounds for many months.

"Looking back to my college days, I feel I knew virtually nothing about recording because my knowledge then was unorganized and untested. There's a vast difference between graduate school and the kind of pressure you encounter in session. It's a drive to meet the daily demands.

"I do alot of commercials, some jingles, some demos, radio production, and of course, the in-house soundtrack work. Sometimes I encounter surprise on the part of clients who don't expect to find a woman engineer. Some clients feel anxious at first but in most cases they have a second surprise when they see the session going smoothly. Then, some producers come in, find a woman engineer, and are quite delighted to see a woman doing it. I can't be sure but I think there's less of an ego struggle between the producer and the engineer when the engineer is a woman. All attention can then be devoted to the product. I also have many female clients. Women find it enjoyable to work with another woman.

"The job requires a fantastic amount of concentration and attention to detail and co-ordination of all the events happening in a session. There's alot of activity and quick decision-making. It's a terrific responsibility. The classic engineer is this very relaxed, usually male, person who doesn't react to any of the proceedings and maintains a calm authority. Anyone, male or female, has to learn quiet confidence in the face of impending chaos. That's just a requirement of the job. You need a strong dedication, too. The hours can be nearly intolerable and very often, you find that nobody cares whether you've had any sleep in the last couple of days or not.

"I don't think I could do more than I'm doing, like have a hobby. I don't think most engineers have a huge social life.

Whenever I take a vacation, it takes a little time to get my skills up again. It's like playing an instrument. You really have to practice every day or you get rusty.

"If you want to be an engineer, go out and record something, anything, not only record it but edit it, then mix it together with something else. Then play it for somebody. Then do another one.

The quarterback of the recording team is the producer. This is who the studios court. The producer is, of course, more carefully catered to if the budget is a fat one. It is the producer's search for perfection that drives studios to constantly update, refurbish, and remodel. No matter how appealing that new piece of gear sounds to an engineer, if the studio doesn't draw the high-rolling productions, it's hard to make the investment.

Some producers swear by a single engineer, some will take whoever comes with the room. Some producers infuse a project with their own personality. Some prefer to create an atmosphere in which other people's ideas flourish.

Producing is less tangible than engineering, yet it must incorporate technical understanding. For some, it's bringing together people of different backgrounds to create enthusiasm for the common interest. A good producer can coax a top performance from a tired musician or a "spec" deal from a jaded studio owner. In this tremendously diverse role, women are just beginning to make "waves."

June Millington

June Millington is a free-lance producer currently based in L.A. As well as being an excellent musician in her own right, she has produced albums for ***Mary Watkins, Chris Williamson*** and ***Holly Near.***

"I think it would be difficult for someone who didn't play anything to be a producer. You'd have to at least have some terminology. If you don't, the communication with the musicians breaks down. You can know what you want but if you can't communicate it to the players, you're in big trouble.

"I was in an all-women's rock band named "Fanny" and Richard Perry got us signed to Warner Bros. Aside from recording our own albums, I would hang out with Richard when he was recording other people. You have to be discreet and I realized early on that the best thing when you're in someone else's session is to just sit quietly and watch, not offer comments. Being in Hollywood was a great advantage in that I had access to alot of different projects that were going on in terms of sitting in the studio and just watching.

"I think producing is a really hard gig. It's so much responsibility if you're really going to carry a project through. Choosing the material, the studio, the players, the arrangements. If something works, you're given credit, and if it doesn't work, you're the one who's blamed for it. There's alot of pressure all the time.

"I try to make sure that the people I'm bringing together are compatible. Everyone works differently and brings a different flavor in terms of how they play and what they have to offer.

I think planning and pre-production rehearsals are the most important thing. You have to think ahead. You have to have a vision, or you're lost.

"Right now I'm producing my own album after three years of producing other people. I'm very interested in the idea of having my own label. The point is not to get discouraged. Women are getting more visibility and more credibility. I'm still doing quality work even though I refuse to play the game. I'm not stopping for any reason. I'm moving right along. People who want to hear my stuff are going to get it."

Judy Munson

Judy Munson is one-half of ***Bogas & Munson Productions,*** a highly successful music production company in San Francisco. Besides a long list of commercial credits, they have composed and produces the music for the ***Charlie Brown*** television specials and feature films and the music for the Academy Award winning TV documentary Who Are The Debolts.

"I started out being Ed Bogas' copyist. I didn't know anything at all about written music at that time. Ed taught me how to transpose and take a score and write in all the instruments and he encouraged me to write on my own. He would say, Well, this is what I've written. Why don't you try a string part? I would and then it would be played immediately in the session. What a high that was! I was fascinated by the whole process.

"At the time we were doing mostly commercials. Ed was playing piano on the sessions. And we were doing everything very quickly. So I concentrated on the producing and really liked it. Also, Ed didn't like paperwork or keeping records and he was ending up losing alot of money by bidding too low. So I began dealing with clients in terms of estimating fees and making budgets. We started showing more profit soon after, and he invited me to become his partner.

"There are alot of tensions on a project. Wars can start between people in the studio. People are always changing their minds, sometimes for good reasons, sometimes not. Your ego can't get in the way too much. If you really put your identity into a particular piece of music, you'll be crushed. I don't like fighting and I don't like withdrawing. I try to be flexible.

"The people I've worked with in film have put a whole lot of themselves and their creativity into it. They've tried hard not to compromise and want that from whoever they work with. Being a woman or a man doesn't make any difference if they feel you "fit" with their movie.

"I'm totally emotional in my approach to composing. I sit at the piano and try to match the feeling I got the first time I saw the picture. When I get something on the piano that makes me feel the way the picture did, I try to follow that line. Then we go into the studio with the best players we can get and they take what I wrote and ***actualize*** it. To hear these musicians make what I wrote into this beautiful thing...it's really thrilling. I know I'm very lucky to do something I like as much as this for a living."

Genya Raven

Genya Raven first made her mark on the music business as a gutsy rock singer with such groups as ***Goldie and the Gingerbreads*** and ***Ten Wheel Drive.*** She has since gone on to successfully produce herself, and albums for ***Cryer & Ford, Rosie,*** and ***The Dead Boys.*** Her most recent project is Ronnie Spector's ***Siren*** on Polish Records, Genya's own label in New York City.

"I pretty much did everything blindly. I was in a bar in Brooklyn and I got really loaded and jumped up on the stage. I had no idea that I could sing. I was always pretty daring. They asked me 'What key?' and I said 'What's that?'"Total blindness. I was doing cheesecake modeling at the time but I always covered up my face so my mother wouldn't see it. The first record I made won this contest they had in Detroit: "Worst Record of the Week." Then it turned out to be #1 in Detroit and Ohio and parts of Canada. Suddenly I'm sitting in this cab and on the radio I hear my name. Goldie Zelkowitz. To hear ***that*** name on the radio! That was ***pretty*** weird.

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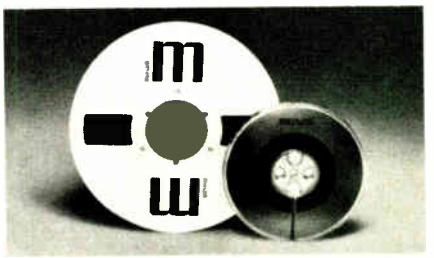

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PROFESSIONAL INDUSTRIAL PRODUCTS

The Professional Advantage

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60 Oxford Drive, Moonachie, NJ 07074

"I don't read music or write music. I just hear it. I hear the charts and I make changes. But I had to go to ***my*** school. Hang out in studios, dabble with alot of demos. Alot of cabaret women came to me to get 'rockified.' After a while I said, "This is crazy. Only women are coming to me. I have to go out and search." I did alot of downtown groups in New York when CBGB's was just started. I did a demo for The Dead Boys. Hilly Crystal played if for Sire Records and they freaked out. They said, 'This is no demo. We want to put this out.' That was their first album.

Producer Genya Raven

"The only way to do it is to go in the studio. If you find a group you really like, you make a spec deal with a studio. You either give them a point or you pay them back after you get a deal. You can't sit around and hope somebody will pick up on you. The main thing is to find the talent you really connect to...when you just ***know*** you could do something with their sound. I got my knowledge by watching and asking alot of stupid questions, which I still do.

"I don't even want to touch the board. I don't want to look at the dials. I listen for sound and tell the engineer what I want. If an engineer is going to produce, he should bring in another engineer while he's listening to the group. Sometimes there are clicks that go by that I don't even hear, but the engineer does. He's listening for that. I'm listening to the performance. Of course, I know about compression, limiting, EQ and all but I don't reach over and start doing it.

"I started my own label because there's so much talent around that record companies just pass on because they don't know. There are more followers than there are leaders. That's why when one group has a hit, nine others are immediately signed who sound just like them. It's ridiculous. I want to give more attention to an unknown act than the major labels do.

"The record companies were putting all their heavy promotion behind the old groups that were already selling. They weren't taking the time to groom future new stars. My label's going to stay small but that doesn't mean we're going to pass on good talent.

"You can't just walk into a record company and say, 'I want to produce.' You've got to get the experience. You've got to go in and do it yourself. I'm not a feminist. I think that's the total opposite of a chauvinist. I've never felt any discrimination as a woman. Maybe I'm blind or stupid but when I go after something, I really go after it.

The studio's administrative staff are the unsung heroes of many a successful recording project. They keep the details out of the minds and ears of the clients so they can be tuned into the work at hand. Without their hours on the telephone and attention to preparation, the engineer could not get a click track on tape.

"A good manager is invaluable to any (hopefully) profit-making operation. In a small studio, the manager usually wears a variety of hats. Beside day-to-day operations, the manager can influence the reputation of a studio. Is the studio known as a hangout or a tightly-run shop? The word on the street can make a difference in clientele.

Anywhere you go, bookings (or 'traffic') are the manager's first priority. While everyone else is concerned with getting a good drum sound, the manager must be thinking about the next project and beyond.

Administration undoubtedly provided the first opportunities for females in the studio, and it remains a mainstay in today's emerging women's network. A fast-thinking, capable manager can save a studio owner many sleepless nights.

Foote Kirkpatrick

Foote Kirkpatrick is vice-president and general manager of ***Universal Recording***. She is the eye of the hurricane at this huge multi-media facility in the congested Rush Street area of Chicago, Illinois. Universal is the largest studio in Chicago and one of the few full-service studios in this country, doing a pretty even mix between radio and television commercials and record work. The Manhattan's ***Shining Star***, nominated for 2 Grammys this year, was done at Universal, as well as the ***Blues Brothers*** film soundtrack and soundtrack L.P. Universal has two film mixing theatres and 7 production studios, and employs about 170 people.

Universal's Foote Kirkpatrick

"I became interested in music as a singer during the big band and be-bop era. I started at Universal 10 years ago as, really, a go-fer. It wasn't until I was in the studio itself that I became fascinated by sound, by ***what is*** good sound. My whole interest in the technical side came after I got into the

Nyya Lark

Nyya Lark is an experienced live sound mixer. She has toured extensively with ***Gil Scott Heron*** and has been working at ***Fantasy Records'*** studio in Berkeley, California for the past three years.

Nyya, along with several like-minded friends from around the country, is getting ready to release the first issue of a newsletter directed to women in all aspects of audio work. The idea came about at the AES Convention of last Spring. Nyya says, "The convention helped us to meet each other. Hopefully, the newsletter will be a way to keep that communication and break down the isolation that can happen when you're working a lot. The project is just getting started and we need all the input we can get in terms of names and addresses, interest and ideas. By the way, we're not keeping men out of it. Everyone's welcome to add their part."

Mailing address:
"Women In Audio"
c/o Nyya Lark
3933 Harrison
Oakland, CA 94611

studio. My interest now is the business side, but they can't be separated. My deepest concern is to be able to offer the highest quality audio service to my clients, to have the most professional approach and a state-of-the-art studio.

"Historically speaking, there haven't been alot of jobs for women in music, unless she was an artist or worked in an office. How many road managers do you know who are women? How many women are producing record albums? You would think that the advertising world, by the very nature of the market they aim for, would be filled with women. But you don't find them in the creative, decision-making positions.

"It's difficult because women aren't encouraged in the things it takes to get there. It's not that they're not talented, they've been excluded. What women have got to learn is how to take the knocks. You're expected to perform at a very high level of competence. You're working long hours. When a woman gets put down in the studio, for whatever, by the engineer or by a frustrated producer, there's a tendency to react from a female stance as opposed to a business stance. I'd be inclined to fire someone who responds by bursting into tears. Women have to develop tougher skins. I wish they would develop more ego and assert themselves more. Being an engineer takes brains and guts. You have to be able to cope with whatever situation comes up.

"Women have to get the strongest possible technical background. Everything helps. If a young woman would rather have for herself the confidence of going to a school, there are many around...some good, some not so good. But no resume in the world is going to convince me that a young woman or man has a chance in this business unless they have tremendous desire. If what you want to do means more to you than anything else, the commitment is easy. The sacrifices are not sacrifices. You find a way to make it work.

"I personally can't think of anything else I'd rather be doing. But it's not for everyone."

Patty Gleeson

Patty Gleeson is the managing co-owner of ***Different Fur*** recording studio in San Francisco. The plush, intimate 24-track studio feels like a comfortable home until you walk into the beautifully appointed control room. In fact, until recently, Patty lived in an apartment above the studio with co-owner Partick Gleeson, a synthesizer player and composer.

"When Pat and I first bought the warehouse that became Different Fur, I was willing to do anything. I had no business

Patty Gleeson at Different Fur

background but we needed someone to run the office and supervise construction. Pat was on the road alot.

"I set about learning everything I could about control rooms, equipment, acoustics, everything. I taught myself the bookkeeping just doing it over and over. I started to learn more about the business in terms of figures, expenses, our gross. Where could I cut down on overhead? How could I benefit tax-wise? "I learned to allocate responsibility, not be responsible for every little detail, but only hear about something if it doesn't work out.

"I know that really good, really talented people are not going to stay working with me forever. So I'm constantly looking for new talent. But if I treat people well, if I respect them, we'll maintain a working relationship and they will bring me business. We'll help each other out. Women have to be aware of this...creating good will and making a network.

"When I hire someone, I'm looking for somebody who's got common sense, good judgment, good intuition and the confidence to follow it. A sense of humor is ***very*** important, too.

"I think, frankly, that women are great for interfacing with the public because they do not threaten the clients, who are 95% male. It's a service industry and a woman can provide that nurturing "we'll-take-care-of-you" atmosphere. Men really enjoy talking to a woman who understands the technical side.

It takes money and energy to maintain the quality in a small studio in a secondary market like San Francisco. You have to continually innovate or you're left behind by the rest of the industry. I'm beginning to realize that I need to find groups, to develop producers. If I can put together a great group and a capable producer, we could become a mini-record label.

"It's very important to make goals for yourself. You have to look around and say 'That's what I want.' You have to let go of one trapeze before you can move to the next. You have to take that risk."

Besides the administrative side, maintenance is the other "backstage" support in any recording session. If all goes well, the "tech" is an invisible contributor.

Technical work is performed behind the scenes and consequently few maintenance engineers are in it for the glory. When everything is working, nobody but the engineer on a date needs to be concerned about the medium which transmits the message. But when a machine fails, it is immediately the number one concern in everybody's mind.

This is where the skills of the tech are tested. They are the doctors of the studio and the good ones cultivate a calm and concerned attitude as well as an accumulation of technical know-how. The right way with the right client at the right time can be vital in a tense situation.

Behind every technically smooth session are hours of tedious preparation, meticulous attention to detail and alot of overtime. This is a demanding role and excellent maintenance can be worth it's weight in gold. Records, that is.

Wendy Bluth

Wendy Bluth is a maintenance engineer at the ***Record Plant*** in LA. She has been in maintenance for several years and has worked at ***Village Recorders*** and ***Westlake Audio*** among others.

"My father is a pretty well-known man in video and I grew up around video trucks and video installations. I had been a musician from the age of 8 or 9 and had always wanted to work in a recording studio so I said to myself,' OK,what have I got to do to get into a studio?' I decided to hit it from the technical side, mainly because that seemed to be the easiest way to get in.

"I worked for a few places before I came to the Record Plant and I've been here now for 2½ years. It's 40 hours a week and that's real nice. I have many other things that I like to do, so I don't let my work become my life. When I first started, I was always in the studio. Now I like to be in my garden, feeding my trees and pruning my plants. I like to read about birds, too.

"In maintenance you have to know how to handle touchy situations. They happen all the time. A guy makes a stupid mistake and I get called in. If it's a wrong button that's pushed in, I just go in, push it out and say, 'OK You're done.' If it's a wrong patch, I'll diplomatically explain why you have to do that another way.

"Sometimes maintenance people have a hard time relating because they're so scientific and not real people-oriented. I can interface with people well. I try not to let them get too serious about the problem, whatever it is. The whole name of the game is to try to leave the room as quickly as possible. If I see something that's very very bad, I'll pull the engineer to the side and explain the options to him.

"The problem for maintenance is that when you walk in, you generally have no idea what's going on in the session. If someone's doing a vocal and they're just on the verge of getting it, and something goes wrong, it's very disrupting to have any stranger, including a maintenance person, walk in.

"More challenges to the technology probably happen at Record Plant than at any other place on earth. We do some of the most insane things you can imagine. But they do take care of us. We work with the state-of-the-art machines, including good test gear.

"I really don't know why there aren't more women in maintenance. There are women in electronics but few go into recording. If you have an EE degree, there's really a wide range open to you. But it seems that nobody wants to do maintenance. I guess that makes me a wierdo. But I like it." ■

Other Side of the Tracks

HATS OFF TO LAYLA

by Mr. Bonzai

"I love the sound of a tube limiter...it's so soft on the attack and so quick on the recovery," remarked Layla, our studio receptionist.

"I've always felt that tubes were here to stay. They give a warm feeling, like the sound is bathed in amber hues," added Smilin' Deaf Eddie, our elderly maintenance man.

Layla cooed, "You know, Eddie, nothing comforts me like a tube amp and a bottle of Lone Star."

This oddly sensual electronic patter continued for a few more moments until Eddie escorted Layla into his tech workshop and shut the door with a quick, "We've got work to do."

Recording studios are such secretive environments. There are few windows, rooms are literally isolated, and the inhabitants are separated from the rest of humanity. Eddie and Layla had been spending a lot of time together lately and I was beginning to wonder what was up. Eddie had explained to me that Layla was becoming quite a good engineer, but that she needed some special instruction in preventative maintenance. Layla had confided that she was curious about some of Eddie's old circuit designs.

It was an odd coupling, but as long as Eddie took care of the equipment and Layla ordered the tape on time, I had nothing to complain about.

As manager, I had plenty to keep me occupied. We had accounts receivable to account for, outboard gear to order, final mixes to finalize, and a new rate card to design. With the annual EAS convention coming to Los Angeles, things at Ryan Recording were getting hectic.

Suddenly, Eddie and Layla burst out of the tech shed and beamed like a couple of proud parents.

"Mr. Bonzai, we've done it! We can tell you all about it now," Layla exclaimed. "We've built a full-frequency, totally pro-audio monitor that's only ***three inches high.***"

"This little lady has challenged George Augsmeister and the entire theory of advanced transducers," testified Eddie.

Now the truth came out of hiding. Eddie and Layla explained what they really had been up to. Layla had suggested to Eddie that perhaps a speaker core could be made using an inexpensive combination of mercury, iron particles, and cubic zirconium, the diamond substitute available at leading department stores. Eddie was astounded with the simplicity of the formula and had merely added a microprocessor circuit to the novel design. By outboard programming, even the tiniest speaker could reproduce all audible frequencies and drive them to the pain threshold. The new invention was smaller than an Auratone and more powerful than a wall of Marshalls.

We began packing up our gear for the trek to the EAS show at the Bilton. We looked forward to the close of the show when amateurs could present their wacky inventions and new audio devices. Layla's new speaker was sure to cause a stir at the "science fair."

When we got to the show we browsed around for awhile drooling over the equipment and listening to technical barking from the sideshow salesmen.

5-X Corporation had a new delay device they called the "Slap Master." It was a component which strapped onto the tape recorder and utilized a small, fleshy pad to actually "slap" the tape between the record and play heads, giving a tunable flutter to tape echo effects.

Eyeball Audio presented their "Technical Specs," a pair of bifocals which allowed engineers to simultaneously view the VU meters on the mixing console and the musicians in the studio. It was a nice idea, but engineers already look weird enough without giving them glasses that look like psychedelic goggles.

The most impressive new item unveiled at the show was the "De-Flatter" from Abba Dabba Labs. The "De-Flatter" was a microprocessor-based pitch controller which analyzed any singer's proclivity to flat vocalizing and continuously adjusted any variations so that the performer always sang in perfect pitch. Abba Dabba boasted of the success of their processor in the recording of the new album from Chugalug Heinz, "I Got Round." It was an awful album, but he *was* in tune.

As we were preparing for Layla's speaker demo in the listening hall a smidgeon of panic broke loose. Layla's technical papers and system diagrams were missing.

I didn't really suspect any foul play, but recording espionage is something to be wary of in these economically crunched days. The recording industry is growing faster than the automotive and the fast-food industries, and as the competition gets fierce and the formats get expensive, the tactics may get nasty.

We assembled in the hall and listened to the finish of a demonstration of a new voice synthesizer invented by some students from Cal Tech. The device could make a small child sound like David Clayton Thomas. As a youngster from the audience belted out "Spinning Wheel," a large person with a strange bulbous hat sat down in front of me. The acoustics abruptly changed. I have had this happen before in clubs and concerts, but never so dramatically. I looked around and noticed that similar hulks were joining the audience, all of them wearing gigantic party hats.

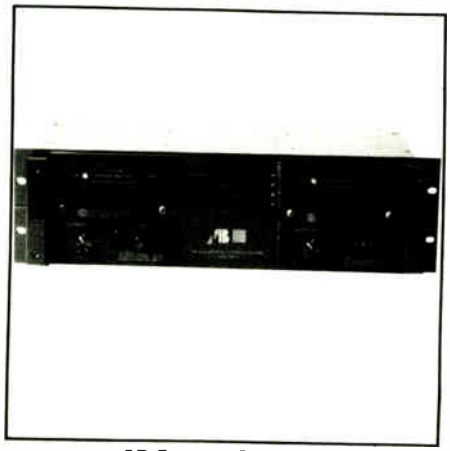
Layla and Eddie went to the podium to announce their demonstration. The crowd waited patiently as she popped a cassette into her recorder and switched on her new speakers. For about thirty seconds the volume slowly rose and just as we began to enjoy the amazing presence of these tiny wonders, all of the guys in the funny hats started twisting their heads in unison. As they nodded and bobbed, the sound from Layla's speakers went totally haywire.

There was phase cancellation, low rumbling distortion, and agonizing buildup of irritating frequencies. The crowd was grumbling and holding their ears and Layla and Eddie frantically searched for the problem. A couple of spikes went through the speakers and people began to hit the deck, wincing in pain.

I knew the guys in funny hats had something to do with the problems. I ran up to the stage and pulled the plug. I yelled for everyone to protect their ears and get ready for the real thing. Everyone obeyed and I put the plug back in. I asked Layla to go for optimum volume.

She cranked up the knob and a tidal wave of sound pressure hit the audience. Toupees flew off, papers blew away, and the men in the bulbous party hats lost their headgear. Then the speakers began to break up and the volume faded as they actually melted down to little puddles of wire and metal. The speakers were destroyed, the plans were missing, and we would have to wait an entire year of another convention. It was depressing, but the echo of success remained. ■

New Products AMPLIFIERS UPDATE



AB Systems Design
1210A Modular Power Amplifier

AB SYSTEMS
1210A MODULAR POWER AMPLIFIER
P.O. Box 754, Folsom, CA 95630
(916) 988-8551
Contact: Bob Bird, Nat. Mkt. Mgr.
Date Product Introduced: March 1981.
Product Description and Applications: Each channel is safequarded against both short-circuit and thermal-overload with independent protection. Clip indicators engage whenever a substantial difference occurs in the wave-form between the input and output signals. An integral bridge-mode switch, located on the right wall of the right output-tunnel, provides bridge-mode operation of two of the same type modules. It's location inside the amp eliminates chances of inadvertent switching between modes while the unit is in operation. Differentially-balanced inputs are available optionally, so there's no need for expensive, outboard, balancing transformers.
Basic Specifications: Power Output: 250 Watts (into 8 ohms), 350 Watts (into 4 ohms), 700 Watts (Bridged into 8 ohms), Minimum continuous power per channel, both channels driven with no more than 0.1% T.H.D. or I.M. distortion from ¼ watt to rated output at any frequency from 20Hz to 20 KHz.
Frequency Response: 20Hz to 20KHz ± 0.25dB.
T.H.D. or I.M. Distortion: No more than 0.1% from ¼ watt fo full rated power 20Hz to 20KHz.
Hum & Noise: Better than −105dB referred to rated output.
Input Sensitivity: 0.75 volts RMS for rated output.
Crosstalk: 80 dB down at 1KHz.
Dimensions: 5¼" H x 19" W x 11"D (13.33cm x 48.26cm x 27.94cm).
Shipping Weight: 48 lbs.
Suggested List Price: Introductory List Price: $1099.00.

ALTEC CORPORATION
1270 TWO-CHANNEL POWER AMPLIFIER
1515 So. Manchester Ave., Anaheim, CA 92803
(714) 774-2900
Contact: Larry Lutz-Product Mgr., Commercial Products.
Date Product Introduced: May 12, 1981.
Product Description and Applications: The low cost 1270 is clearly the choice of the professional. Cosmetically packaged in only a 5¼ inch rack space, it is consistently selected in blind listening tests three to one over amplifiers costing up to three times more. Advanced circuit techniques produce ultra-low distortion, excellent frequency response, and extremely low noise. It is ideal for high power, wide response, high accuracy music reproduction/reinforcement.
Basic Specifications: The 1270 can deliver more than 200 watts per channel into 8 ohms at less than .05 percent THD at any frequency from 20 Hz to 20 KHz, or greater than 800 watts monaural into 16 ohms.
Extras include: LED clipping indicators, LED distortion indicators, and detented volume controls.

ARCAM (USA), INC.
A-60 INTEGRATED STEREO AMP
852 Glenbrook Road, Stamford, CT 06908
(203) 357-8327
Date Product Introduced: 1981.
Product Description and Applications: Operational features and controls have been deliberately kept to a minimum in the A-60 to permit emphasis to be placed on sound quality. Designed with traditional British conservatism, the A-60 has healthy overload margins on all its inputs, 36 dB above 2mV on phono to allow use with high output cartridges without overloading the first audio stage. Available loading modules suit the input to the impedance requirements of all popular cartridges. For use with moving coil cartridges, the external HA-10 pre-amplifier is available.
Basic Specifications: The overall performance of the A60 amplifier provides frequency linearity within ±0.75 dB with both channels simultaneously driven from 20 Hz to 20 KHz at 35 watts continuous into 8 ohms at 0.2% total harmonic distortion.
Damping factor is greater than 45 at mid-frequencies and 8 ohm load.
Delayed V-I limiting with automatic reset protects against short term overloads. Internal fuses protect against long term overloads.

BGW SYSTEMS, INC.
BGW MODEL 750B
13130 S. Yukon Ave., Hawthorne, CA 90250
(213) 973-8090
Contact: Marguerite Sweeden-Sales Administrator.
Date Product Introduced: January 1981.
Product Description and Applications: The new improved 750B delivers total power output of 900 watts and features precision stepped, thick film attenuators, and a new multi-color LED metering system-using the latest IC circuitry and including separate loss of feedback clipping indicators.
Basic Specifications: 900 Watts Total Power Output.
IM Distortion: Less than 0.02%.
Frequency Response: +0, −3dB 1Hz to 90KHz.
Signal to Noise Ratio: 106 dB below rated output.
Input Sensitivity: 2.12 volts for rated output.
Damping Factor: 230.
Suggested List Price: $1299.00.

BGW SYSTEMS, INC.
BGW MODEL 150
13130 S. Yukon Ave., Hawthorne, CA 90250
(213) 973-8090
Contact: Marguerite Sweeden-Natl. Sales Administrator.
Date Product Introduced: January 1981.
Product Description and Applications: Replaces our Model 100B. 75 Watt per channel, all modular design amplifier. Features a low-noise toroidal mains power transformer, front panel mounted magnetic circuit breaker/power switch, improved noise performance, precision stepped, thick film attenuators and 3/16" aluminum front panel and multi-color LED clip lights and new integrated circuitry.
Basic Specifications: 150 Watts total power output.
IM Distortion: less than .02%.
Frequency Response: +0, −3dB, 1Hz to 90KHz.
Signal to Noise Ratio: 109dB below 50 watts.
Input Sensitivity: 1 volt for rated output.
Damping Factor: 400.
Suggested List Price: $549.00.

BGW SYSTEMS, INC.
BGW MODEL 250F
13130 S. Yukon Ave., Hawthorne, CA 90250
(213) 973-8090
Contact: Marguerite Sweeden-Sales Administrator.
Date Product Introduced: April 1981.
Product Description and Applications: The new improved 250E delivers total power output of 400 watts and features precision stepped, thick film attenuators, and a new multi-color LED metering system-using the latest IC circuitry and including separate loss of feedback clipping indictors.
Basic Specifications: 400 Watts Total Power Output.
IM Distortion: Less than 0.02%.
Frequency Response: +0−3dB, 1Hz to 90 KHz.
Signal to Noise Ratio: 110dB below rated output.
Input Sensitivity: 1.5 volts. for rated output.
Damping Factor: 230.
Suggested List Price: $829.00.

CM LABS DIV., AUDIO INTERNATIONAL INC.
CM 914C
Box 477, Monticello Rd., Albany, KY 42802
(606) 387-8856
Contact: Geoffrey Hall, Marketing Mgr.
Date Product Introduced: 1980.
Product Description and Applications: 2 channel power amplifier producing 150 WRMS per channel into 8 ohms. Features include locking level controls, LED meters, low feedback so the signal phase is unaffected by load. Applications: sound reinforcement, studio monitor amplifier.
Basic Specifications: Rated power: 150 WRMS/channel @8 ohms with less than .1% THD from 20Hz to 20 KHz.
IMD: less than 0.1% SMPTE.
Phase Shift: less than 1° LAG @ 20KHz.
Suggested List Price: $679.00.

CM LABS DIV., AUDIO INTERNATIONAL INC.
CM 920
Box 477, Monticello Rd., Albany, KY 42802
(606) 387-6656
Contact: Geoffrey Hall, Marketing Mgr.
Date Product Introduced: 1980.
Product Description and Applications: Stereo Power Amplifier 250 WRMS per channel @ 8 ohms, 400 WRMS per channel @ 4 ohms. Features locking level controls, LED meters, Relay Speaker Protection. The CM920 is a low feedback design, output signal phase is unaffected by load conditions. Applications, sound reinforcement, studio monitor driver.
Basic Specifications: 250 watts RMS per channel @8 ohms @less than 0.15% THD 20 Hz to 20KHz.
400 watts RMS per channel @ 4 ohms, IM distortion less than 0.1% SMPTE.
Phase shift less than 1 degree LAG @ 20 KHz.
Suggested List Price: $1099.00.

CROWN INTERNATIONAL
POWER AMPLIFIER PS-400
1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571
Contact: M. Young, Advertising Manager.
Date Product Introduced: March 1, 1981.
Product Description and Applications: PS-400 is a two-channel, professional monitor amplifier rated at 265 watts/channel into 4 ohms. Back panel included terminal strips in and out; phone jacks in, banana plugs out. Switch convertible to mono operation. Low-cost plug-in options available for balanced active input, transformer input and output, and fan cooling. Multi-Mode™ circuit drives any impedance, and amp is fully protected.
Basic Specifications: 265 watts/channel into 4 ohms, 165 watts/channel into 8 ohms.
Mono: 530 watts into 8 ohms; 330 watts into 16 ohms.
S/N: 112dB.
Frequency response: IO.1dB DC-20KHz, 1 watt into 8

ohms.
IOC™ Indicator, signal presence indicator. 19" rack mount, 7" high.
Suggested List Price: $1,149.00.

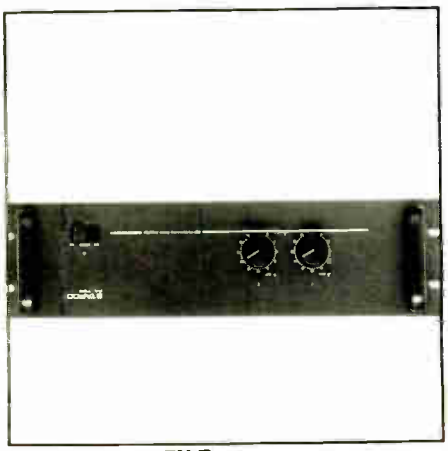
CROWN INTERNATIONAL
POWER AMPLIFIER D150A SERIES II
1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571
Contact: M. Young, Advertising Manager.
Date Product Introduced: March 1, 1981.
Product Description and Applications: Crown D150A Series II is a modification of a two-channel amplifier which has been familiar to audio professionals for over a decade. This latest version offers Crown reliability and high sonic accuracy, with a new professional appearance.
Basic Specifications: Power: 80 watts/channel into 8 ohms; move 150 watts into 16 ohms.
S/N: 110dB.
Frequency response: IO.1dB, DC-20KHz, 1 watt into 8 ohms.
EIA 19" rack mount, 5¼" high.
Suggested List Price: $669.00.

CROWN INTERNATIONAL
POWER AMPLIFIER PS-200
1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571
Contact: M. Young, Advertising Manager.
Date Product Introduced: March 1, 1981.
Product Description and Applications: PS-200 is a two-channel, professional monitor amplifier rated at 140 watts/channel into 4 ohms. Back panel connections include terminal strips in and out; phone jack in, and banana plug out. Low cost plug-in options are available for balanced active input; transformer input and output and fan cooling. Multi-Mode™ circuit design will drive any impedance load, and amp is fully protected. It is switch connectible to move operation.
Basic Specifications: 140 watts/channel into 4 ohms; 90 watts/channel into 8 ohms.
Mono power is 180 watts into 16 ohms, 280 watts into 8 ohms.
S/N: 112 db.
Frequency response: IO.1dB DC – 20KHz at 1 watt into 8 ohms.
IOC™ indicator for all distortion reporting, signal pressure indicator.
19" EIA rack mount, 5¼" high.
Suggested List Price: $749.00.

CROWN INTERNATIONAL
POWER AMPLIFIER DC-300A SERIES II
1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571
Contact: M. Young, Advertising Manager.
Date Product Introduced: March 1, 1981.
Product Description and Applications: Crown DC-300A Series II amplifier is the latest modification of the two-channel monitor amplifier which has for over a decade supplied audio power in recording/reinforcement application all over the world. This version provides all the power and reliability for which the DC-300 is famous, together with a new professional appearance.
Basic Specifications: Power: 155 watts/channel into 8 ohms; Mono power 310 watts into 16 ohms.
S/N: 110db.
Frequency Response: IO.1dB, DC – 20KHz, 1 watt into 8 ohms.
EIA 19" rack mount, 7" high.
Suggested List Price: $1,049.00.

EV-TAPCO
PA-700 HIGH PERFORMANCE POWER AMPLIFIER
3810 - 148th Ave., N.E., Redmond, WA 98052
(206) 883-3510
Contact: Jim Loppnow/Market Development Manager.
Date Product Introduced: February 1981.
Product Description and Applications: A rugged, high performance amplifier built for reliability. Advanced circuitry reduces distortion and noise, while the high damping factor assures clean, solid bass response. The welded steel chassis means solid roadability, while the modular construction provides ease of service. The exceptional thermal capacity does not allow the amplifier to overheat, while the two-speed fan lets the unit run much quieter under most operating conditions. High input sensitivity allows the amplifier to handle almost any pre-amplified audio signal, and sophisticated Loss of Feedback clipping indicators (LED's) warn of clipping on either channel.
Basic Specifications: 355 watts/channel into 4 ohms, 210 watts/channel into 8 ohms, and 710 watts mono bridged into 8 ohms.
Noise and Hum: 95dB below rated output.
Distortion: (T.H.D. and I.M.) less than .02%.
Damping factor: Approx. 200 at 8 ohms.
Power Turn on/off Relay. D.C. Protection relay.

New Products AMPLIFIERS UPDATE



EV-Tapco
PA-700 Power Amplifier

Circuit Breaker on/off switch.
Detented channel level controls.
Suggested List Price: $1,095.00.

FAX AUDIO, INC.
MODEL FA-130 VOLTAGE CONTROLLED AMPLIFIER
29 Anita Place, Amityville, NY 11701
(516) 261-6085
Contact: Michael Kahn, Marketing Director.
Date Product Introduced: January 1981.
Product Description and Applications: The FAX model FA-130 Voltage Controlled Amplifier card directly replaces the API model 350 VCA, while upgrading circuit performance. The FA-130 utilizes the FAX FA-100 op-amp and FA-101 VCA module (which replaces the API 2551B VCA) as its active elements. The FA-130 plug-in card features two bridging inputs, two transformer coupled outputs, and its gain is adjustable by any of three external control inputs. Applications include: compressors, expanders, limiters, noise gates, and line or booster amplifiers.
Basic Specifications: Frequency Response: ±0.25dB, 30Hz to 20 KHz.
Distortion: less than 0.05% THD @ +4dBm.
Noise: −110 dBm @ full attenuation, 20Hz to 20KHz.
Output Clipping Level (3% THD): +25dBm.
Power Requirements: ±15VDC ±20% @55mA max.
Gain Control Range: −100dB to +30 dB.

FAX AUDIO, INC.
MODEL FA-108 METER AMPLIFIER
29 Anita Place, Amityville, NY 11701
(516) 261-6085
Contact: Michael Kahn. Marketing Director.
Date Product Introduced: February 1981.
Product Description and Applications: The FAX FA-108 Meter Amplifier isolates a conventional VU meter from a sending circuit, preventing distortion from being reflected back to the source. The FA-108 can be used to precisely meter a wide range of audio levels and operates off of a large variety of meter lamp voltages. The differential, high impedance input will not unbalance or load 150 ohms or 600 ohms lines. A multi-turn trimmer is provided for making "zero" adjustments. Brackets are supplied to accommodate various mounting options.
Basic Specifications: Gain Range (for 0 VU): +30dB to −6dB (from −20dBm to +16dBm @150 ohms. or −26dBm to +10dBm @600 ohms).
Frequency Response: within 0.1dB 20 Hz to 20KHz.
Output Impedance: 3.6 ohms.
Input Impedance: less than 100Kohms (differential).
Power Requirement: 6.3 – 23VAC or 12 – 32VDC @10 mA max.

PHASE LINEAR CORP. PROFESSIONAL SERIES
A60 PROFESSIONAL SERIES POWER AMPLIFIER
20121 48th Ave., West, Lynnwood, WA 98036
(206) 774-3571
Contact: Larry Winter, National Sales Mgr.
Date Product Introduced: May 1981.
Product Description and Applications: The A60 is a rugged, compact professional high power amplifier designed for sound reinforcement, studio/broadcast and commericial applications.
Basic Specifications: Power: 225 WRMS per channel @ 8 ohms, 325 WRMS per channel @ 4 ohms.
Automatic mono input for 650 WRMS into 8 ohms.
THD less than .05%, IM less than .005%.
Slew rate better than 100Vusec. 5¼" high rack mount modular package, 42 lbs.

SPECTRE AUDIO SYSTEMS
ACCESSIT
8033 Sunset Blvd., Suite 177, Hollywood, CA 90048
(213) 650-0060
Contact: Richard Crispo, Mkt. Director.
Date Product Introduced: January 1981.
Product Description and Applications: Amplifier—Spectre Audio Systems is pleased to announce the addition of a stereo, two mic mixer and a 6-watt amplifier to supplement its line of 6 ACCESSIT signal processors.
Suggested List Price: Mixer preamp: $93.00 plus external power supply. Power amplifier: $93.00.

New Products MICROPHONES UPDATE

ARIA MUSIC (U.S.A.) INC.
A&F MICROPHONE SERIES
1201 John Reed Court, City of Industry, CA 91745
Date Product Introduced: 1981.
Product Description and Applications: Aria has introduced a full line of "A&F" series microphones. "A&F" is a new brand name in the music field. These products are manufactured by Foster Electric Co. who are very well known for their engineering expertise in making microphones to the highest professional standards. "A&F" offers quality equipment at reasonable prices.

COUNTRYMAN ASSOCIATES, INC.
MODEL EM 202 PRECISION PRESSURE MICROPHONE
417 Stanford Ave., Redwood City, CA 94062
(415) 364-9988
Contact: Carl Countryman.
Date Product Introduced: April 2, 1981.
Product Description and Applications: Certain audio engineers have long recognized that pressure microphones provide a more natural sound because they respond to direct and reverberant sound fields equally. The new EM-102 Precision Pressure Microphone gives you all the advantages of a ture pressure microphone at an easily affordable price. Its extremely small size provides flexability of placement and superior performance on drums, symbols, strings, horns, acoustic guitar, vocals, pianos as well as podiums, lecterns, conference tables and theatrical stage applications.
Basic Specifications: Frequency Response: 10Hz to 20KHz.
Noise Level: 25dB A weighted.
Clipping Level: 140dB SPL.
Output: High impedance unbalanced.
Power: 9 volt battery.
Size: 5/8" x 5/16" x 5/32" (16mm x 8mm x 4mm).
Suggested List Price: $149.95.

COUNTRYMAN ASSOCIATES, INC.
MODEL EM-102 PRECISION PRESSURE MICROPHONE
417 Stanford Ave., Redwood City, CA 94063
(415) 364-9988
Contact: Carl Countryman.
Date Product Introduced: April 2, 1981.
Product Description and Applications: The EM-102 Calibrated Precision Pressure Microphone delivers laboratory microphone performance at a conventional microphone price. Each EM-102 is individually adjusted by a computer to within 1.5dB of perfection from 20Hz to 15 KHz and shipped with a signed and serialized calibration curve that fully documents it's laboratory quality performance.
Basic Specifications: Frequency Response: 20Hz to 20KHz (20Hz to 15KHz ± 1.5dB).
Noise Level: 25dB A weighted.
Clipping Level: 140 dB SPL.
Output: High Impedance unbalanced.
Power: 9 volt battery.
Size: 5/8" x 5/16" x 5/32" (16mm x 8mm x 4mm).
Suggested List Price: $199.50.

COUNTRYMAN ASSOCIATES INC.
MODEL EM 302 PRECISION DIFFERENTIAL MICROPHONE
417 Stanford Ave., Redwood City, CA 94063
(415) 364-9966
Contact: Carl Countryman.
Date Product Introduced: April 2, 1981.
Product Description and Applications: Differential microphones pick up sounds well that originate very close to them and reject sound sources that are farther away. Now Countryman Associates offers the EM-302 Precision Differential Microphone with true high fidelity response. This new concept in microphone design offers astonishing reduction of leakage and feedback with drums, vocals horns, strings or in any application where it can be placed in close proximity to the desired source of sound.
Basic Specifications: Frequency Response: 20Hz to 20KHz.
Clipping Level: 140dB SPL.
Output: High impedance unbalanced.
Power: 9 volt battery.
Size: 5/8" x 5/16" x 5/32" (16mm x 8mm x 4mm).
Suggested List Price: $169.95.

ELECTRO-VOICE INC.
DO56L DYNAMIC OMNIDIRECTIONAL MICROPHONE
600 Cecil Street, Buchanan, MI 49107
(616) 695-6631
Contact: Greg Silsby, Professional Products Marketing Manager.
Date Product Introduced: March 15, 1981.
Product Description and Applications: The DO56L is an omnidirectional microphone that has been specifically designed for interview applications such as electronic news gathering (ENG), television game shows, and television talk shows. The DO56L incorporates all of the acoustical advantages of the already popular DO56, which also remains in the E-V line, including a shaped frequency response that has been tailored to provide high quality voice reproduction while at the same time attenuating low frequency ambient noise. Also, like the DO56, the DO56L is constructed with an internal shock-isolated microphone element which is virtually free from the mechanical transfer of handling noise. An obvious advantage of the DO56L over ordinary microphones is its physical length. Without the cable connector added, the DO56L has an overall length of 11.5 inches. The length of the DO56L makes its possible to move in close for an interview without thrusting the interviewer's hand rudely into the face of the subject. The DO56L is a very lightweight (5.5 oz.) microphone exhibiting excellent balance in the hand.
Suggested List Price: Resale Net = $132.00.

ELECTRO-VOICE, INC.
CO94 MINIATURE CONDENSER LAVALIER MICROPHONE
600 Cecil Street, Buchanan, MI 49107
(616) 695-6631
Contact: Greg Silsby, Professional Products Marketing Manager.
Date Product Introduced: March 15, 1981.
Product Description and Applications: The CO94 mounts on a tie clasp and is specifically designed to be very unobtrusive on camera. The new CO94 can be powered by an internal 9-volt "transistor-radio type" battery or any external phantom power supply that produces a DC voltage from 8 to 50 volts. The CO94's powering system has been designed to allow either supply voltage to act as a redundant system to the other in case of power supply failure. Switching from one supply to the other, in such an event, is totally automatic and silent. The CO94 offers a wide dynamic range that has previously not been available in the typical electret lavaliers powered by low-voltage batteries. The 10 dB greater sensitivity of the CO94, versus conventional electret lavaliers, coupled with the ability to handle 20 dB greater input SPL translates into an outstanding signal-to-noise ratio and headroom. Another unique feature of the CO94 is an active high-pass filter that provides a 12 dB-per-octave bass roll-off starting at 80Hz. This filter serves to cut off low frequency energy such as traffic and machinery rumble, wind noise, etc.
Suggested List Price: Resale Net = $225.00.
At the same time, Electro-Voice also introduced the Model 390 dual microphone tie clasp. The 390 is a single tie clasp outfitted with two adjacent microphone support clips. The 390 can accommodate a pair of CO90, CO90P or CO94 microphones in those critical applications where 100% redundancy is desired.
Suggested List Price: Resale Net = $5.50.

NADY SYSTEMS, INC.
NADY VHF 610 RECEIVER
1145 65th St., Oakland, CA 94606
(415) 652-2411
Contact: Pete Kalmen, Marketing Director.
Date Product Introduced: January 1981.
Product Description and Applications: The VHF 610 Receiver is the smallest full performance wireless mic receiver on the market. Designed primarily for film and video production, it can be used with both the Nady VHF 900 bodypak lavalier transmitter and the handheld mic. Only 4.5" x 1.2" x 5.0", it can be attached to cameras or portable mixing boards, or carried on the body.
Basic Specifications: Signal-to-Noise 102 dB using Nady Systems' patented companion (patent no.: 4,215,431).
25-15,000 Frequency response: less than .6% distortion 200-1500 foot range.
Suggested List Price: $1200.00.

SHURE BROTHERS INCORPORATED
SM85 UNIDIRECTIONAL HANDHELD CONDENSER MICROPHONE
222 Hartrey Avenue, Evanston, IL 60204
(312) 866-2200
Contact: M. Solomon, Manager, Microphone Products.
Date Product Introduced: April 1981.
Product Description and Applications: The SM85 is designed for the most demanding applications in sound reinforcement, broadcasting and recording. The microphone features a triple - stage "pop" screen, a "space frame" shock mount, thorough shielding from magnetic & RF interference, wide range simplex powering capability, high output, crisp, clean & sharply defined sound and a light weight. The SM85 is sensitive enough for the studio and rugged encugh for the road.
Basic Specifications: Frequency response: 50-15,000 Hz.
Impedance rating: 150 ohms.
Open circuit voltage: −74dB (Odb = 1 V/ubar).
Maximum SPL: 142 dB.
Power Supply Voltage: 11-52 Vdc.
Finish: black, aluminum case & black, teflon-coated all-steel grille.
Suggested List Price: SM85 without cable: $231.00.
SM85 with cable: $252.00.

SOUND INVESTMENT ENTERPRISES
PS-46A CONDENSER MICROPHONE POWER SUPPLY
31121 Via Colinas, Suite 1003, Westlake Village, CA 91362
(213) 991-3400
Contact: Jim McCandliss, Audio Consultant.
Date Product Introduced: November 1980.
Product Description and Applications: The PS-48A is a 48 volt DC phantom supply capable of powering up to 4 condenser microphones. It's 100 mA supply is more than adequate for most any condenser microphone requirements. The output of the PS-48A will not pass DC therefore the user may connect it directly to any transformer, transformerless, or unbalanced mixer input. Input connections (to the microphone) are female XLR 3 pin and output connections (to the mixer) are male XLR 3 pin following EIA industry standard wiring conventions.
Basic Specifications: Supply output: regulated 48 volt DC, 100mA.
Power requirements: 110 volt AC 20 watts.
Size: 7½ L x 5¼ W x 2½ H, net weight 3 lbs.
Suggested List Price: Retail: $179.95. Special Dealer Pricing is available.

Pick a number from 9 to 52!

You've just chosen the ideal DC voltage to phantom-power these new ATM electret microphones.

Introducing four "universal" phantom-powered electret microphones. Designed to work from external power, internal regulation automatically handles any voltage from 9 to 52 VDC without adapters, switches, or rewiring. Just plug in and enjoy. With current drain a mere 0.3 mA at 9 volts (4 mA at 12-52V) a 9V battery lasts thousands of hours, not just the 60 or 70 hours typical of other mikes.

When your power supply isn't available, or isn't enough, use ours. The new AT8501 Dual Battery Supply holds two 9V batteries. One to use, and one in reserve. Instant switchover and test LED eliminates guesswork. And spares are as near as the closest shopping center. Neat!

But convenience and versatility are just two of the advantages of the new ATM models. All-new electronics provide plenty of headroom inside the microphone with no more than 1% THD even when used in acoustic fields of 141 dB SPL. Which sets new standards for clean sound even close-up to big brass or inside a powerful drum kit.

And the sound you hear is wide-range and *musical*. Presence without peaks. Highs to 20,000 Hz but without a raspy "edge." Yet despite their responsiveness, these new ATM microphones have the "Road Tough" reliability proved so often on stage and in the studio.

Before you add another microphone, compare our sound, our convenience, our reliability, and our cost. Write for literature and list of nearby ATM microphone specialists. Get great sound...right from the start! AUDIO-TECHNICA U.S., INC., 1221 Commerce Drive, Stow, Ohio 44224. (216) 686-2600.

audio-technica®

New Products
MIXING CONSOLES UPDATE

AUDY INSTRUMENTS
SERIES 2000 MIXING CONSOLE
35 Congress St., P.O. Box 2054, Salem, MA 01970
(617) 744-5320
Date Product Introduced: 1980.
Product Description and Applications: An audio mixing console with independent mono and stereo outputs for live performance and recording applications.
Basic Specifications: The Audy Series 2000 Mixing Console produces simultaneous mono and stereo outputs that allow mono and stereo formats to operate independently. It also provides separate monitor and effects sends. Available in 12, 16, or 20 channel (stackable to 40), the console utilizes high speed, low noise IC technology to reduce TIM distortion to 0.03% and enhance sound quality.
Providing input preamps with a dual LED system, the Audy Series 2000 Mixing Console maintains headroom of 25 dB throughout. Other standard features include: individual channel and output patch points; transformerless balanced inputs and outputs; 3 band EQ with switchable mid-range; switchable pre and post monitor and effects sends; soloing for any input or output; phantom power; and work lamp socket.

Audy Instruments
Series 2000M

AUDY INSTRUMENTS
SERIES 2000M MONITOR MIXING CONSOLE
35 Congress St., P.O. Box 2054, Salem, MA 01970
(617) 744-5320
Date Product Introduced: 1980.
Product Description and Applications: A new monitor mixing console with six separate output mixes for on-stage monitor mixing, sound reinforcement, and recording applications is being introduced by Audy Instruments, Inc. of Salem, Massachusetts.
The Audy Series 2000M Monitor Mixing Console provides 16 inputs (stackable to 32) with separate output mixes that permit control of up to six independent monitor sends. Using high speed, low noice IC op-amp technology, it minimizes transient and slewing-induced intermodulation distortion. A dual LED system assures proper adjustment of input attenuation switches and maintains 25 dB of headroom throughout for clean sound.
Basic Specifications: Standard with Penny and Giles faders and sealed conductive plastic rotaries, the Audy Series 2000M Monitor Mixing Console provides smooth, quiet control.
Other standard features include: input and output channel patching; EQ in/out switch for each input mix control; individual channel muting; talkback; 6 auxilliary inputs; headphone monitoring with solo priority system, high resolution; 20-segment LED bargraph meters; phantom power; work lamp socket; and Anvil ATA approved flight case.

CM LABS DIV., AUDIO INTERNATIONAL, INC.
MODEL CM 610
Box 477, Monticello Rd., Albany, KY 42602
(606) 387-6656
Contact: Geoffrey Hall, Marketing Mgr.
Date Product Introduced: November 1980.
Product Description and Applications: The CM610 is a music mixer with stereo inputs for 2 turnables and 2 high level sources. Each input has an input level control and cue send. The CM610 also features a microphone input with a talk-over switch, active EQ, LED meter 3, headphone amplifier for cue sends, master gain and stereo balance. Applications: Disco System, Format Tape Mixer, Remote Broadcast Mixer.
Basic Specifications: Phono Input Sensitivity: 2.2 mV.
Signal to Noise ratio: 85dB "A" weighted.
Overload: 190 mV.
High Level: Input sensitivity = 200 mV.
Signal to Noise ratio: 85dB "A" weighted.
Output: Rated 2 VIHF.
Max.: 10V.
Distortion: = 0.05%.
Frequency Response: 10Hz to 50 KHz ± 1dB.
Suggested List Price: $399.00.

EV-Tapco
Intersound 1KP-6

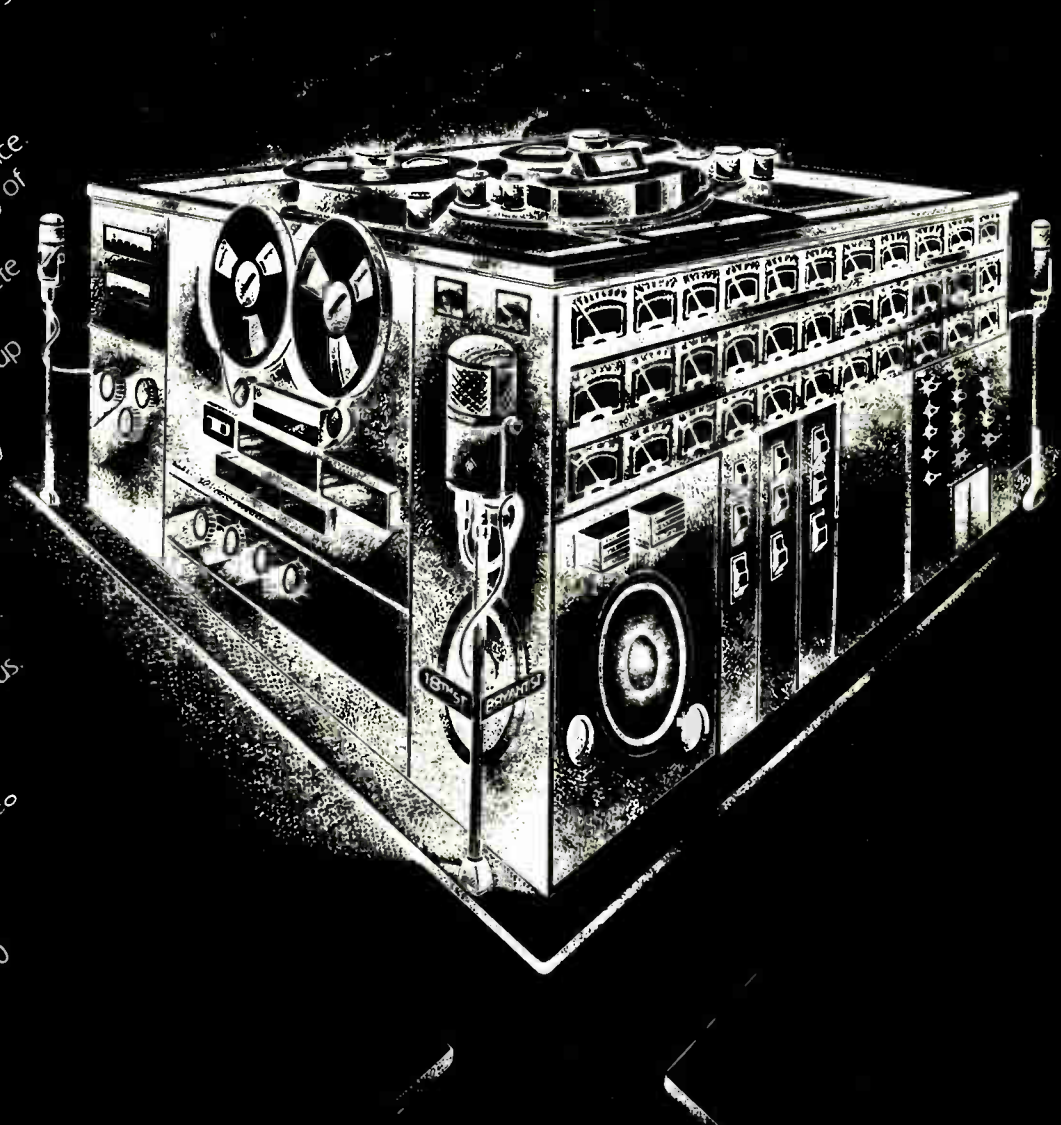
EV-TAPCO
INTERSOUND IKP-6-INSTRUMENT-KEYBOARD PREAMPLIFIER-MIXER
3610 - 148th Ave., N.E., Redmond, WA 98052
(206) 883-3510
Contact: Jim Loppnow-Market Development Mgr.
Date Product Introduced: February 1981.
Product Description and Applications: A basic six input system providing clean, quiet mixing capability at a very low cost. Two inputs per channel accept almost any type of input signal, from keyboards, high or low impedance mics, acoustic pickups, preamps, etc. Separate Bass and treble controls are on each channel with frequency centers selected especially to enhance keyboards. AutoPad® volume controls are used to provide distortion-free sound at any input level. Master volume control sets overall output level, while a separte adjustable level output is available to drive stage monitor amps, guitar amps, etc.
Basic Specifications: 6 High level inputs and 6 Low level inputs (both ¼" Phone Jacks).
Frequency Response: ± 1dB 20-20 KHz.
Distortion: Typically .05% (THD) and .089. (IM).
Signal to Noise: Better than 80 dB.
Output level: +17dBm.
Suggest List Price: $295.00.

HARRISON SYSTEMS, INC.
MODEL MR-3
P.O. Box 22964, Nashville, TN 37202
(615) 834-1184
Contact: David Purple, V.P. Sales.
Date Product Introduced: March 1981.
Product Description and Applications: 28 and 36 in mainframes, 24 output busses; transformerless mic and line inputs; 3 band sweep EQ with hi&lo peaking/shelving switch, fully parametric mid-standard, 3 band fully parametric-optional; balanced +4 or +6dBm patch point-insertable at various points of signal chain; stereo cue and 4 echo sends; 12 segment LED meters-standard, 36 segment VU/PPM meters-option; automation ready. Application: Multi-track recording and re-mix, video sweetening.
Basic Specifications: Specifications available upon request.
Suggested List Price: Prices start at $49,900.00.

MCI, INC.
JH-852 SERIES
1400 West Commercial Blvd., Ft. Lauderdale, FL 33309
(305) 491-0825
Contact: Larry Lamoray; Marketing Manager.
Date Product Introduced: December 1980.
Product Description and Applications: The JH-652 is the first console specifically designed for true split operation. It includes 52 inputs, physically installed 26 on either side of the master control section. The revolutionary feature is that the mix outputs, effects/foldback outputs, and automation of each side can be operated independently or joined, allowing use as a twin console with separate monitoring, or with dual synchronized multitrack recorders.
Standard features include: PPM lightmeters, 3 band EQ on each input, full level and mute automation, 6 wild faders for pan or sends automation, and totally transformerless circuitry throughout.
Basic Specifications: Frequency Response: 15H-20KHz +0/½dB.
S/N Ratio: Better than 84dB.
Max output level: +27dBv.
Suggested List Price: JH-652-52-AF/LM (24) $104,790.00.

N.E.I.
XM SERIES CONSOLES
934 N.E. 25th Avenue, Portland, OR 97232
(503) 232-4445
Contact: Bud Garrison, Vice President, Marketing.
Date Product Introduced: February 1981.
Product Description and Applications: The XM Series offers 4 submaster/stereo/mono output formats, availability in 8, 12, 16, and 24 input channel version.
Basic Specifications: Models 84XM, 124XM, 164XM, and 244XM include a host of features:
Transformer balanced microphone input with switchable line level input. Input preamp input/output jacks. Pre-EQ/fader Monitor bus Post EQ/fader effects bus; Switchable pre or post Aux bus; extensive input preamp equalization with switchable bass shelving (80 or 200 Hz) and sweepable midrange; Submaster Assignment Switches; Channel mute (post fader, except Solo); Solo; (60mm slide channel fader, Submaster controls 1-4 with Solo (60mm slide),Independant Left and Right, Mono output level controls (60mm slide), Monitor master with Solo (60mm slide),); Selectable LED output metering; Submasters 1-4 Left, Right, Monitor and Mono; Effects and Aux send masters (with Solo) and returns with Effects and Aux return pan controls; Solo bus level control with Solo status LED; Powerful headphone amplifier with level control;

We have it all under one roof.



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he industry. (System design,
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f technicians.)
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nest, no-hype sales staff.
Guaranteed competitive prices.

ore you make a sound, listen to us.

Sound Genesis®
SAN FRANCISCO

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dio Equipment Center.
01 Bryant St., San Francisco 94110
285-8900. TWX 910 372-7393

981, Sound Genesis

Submaster output and Input jacks; Balanced and unbalanced Left, Right, Monitor, and Mono outputs with function Input jacks; HI and Lo Effects/Aux send and return jacks for use with mic or line level effects devices; External power supply jack and Internal-external power supply selector switch.

New Products MIXING CONSOLES UPDATE

NEOTEK CORPORATION
SERIES II
1215 W. Belmont Ave., Chicago IL 60657
(312) 929-6699
Contact: Victor Allen, Sales Manager.
Date Product Introduced: May 1981.
Product Description and Applications: The new Series II consoles are cost-effective multitrack recording mixers with the latest advances in sound quality that have made NEOTEK consoles the choice of critical users. With in-line monitoring, four-band multi-mode parametric equilizers, complete patch bay and monitoring facilities, the new Series II can be ordered with any number of input channels to suit every studio.
Suggested List Price: $12,000 to $24,000.

NEOTEK CORPORATION
SERIES III
1215 W. Belmont Ave., Chicago, IL 60657
(312) 929-6699
Contact: Victor Allen, Sales Manager.
Date Product Introduced: May 1981.
Product Description and Applications: The latest version of the Series III offers all the features demanded of a multitrack master recording console. Solid state switching under logic control for all operating modes, four band multi-mode parametric equalizers, three-way solo system, six auxiliary buses, high resolution metering, group muting, twenty four and thirty two track configuration with up to fifty six input groups. Completely transformerless design is but one reason the Neotek Series III sets the standard for sonic quality.
Suggested List Price: $20,000 to $50,000.

RUPERT NEVE INCORPORATED
NECAM II
Berkshire Industrial Park, Bethel, CT 06801
(203) 744-6230
Contact: Anthony H. Langley, Marketing Manager.
Date Product Introduced: January 1981.
Product Description and Applications: NECAM II post Production Automation System for audio using SMPTE based control and floppy disc/minicomputer storage. Comparable to NECAM I with additional features. 8108 microprocessor controlled multitrack audio console.
Basic Specifications: NECAM provides automation for up to 48 control circuits with virtually unlimited storage and recall. Compatible throughout world on all NECAM systems. 8108 is Neve's top of the line 24/32 or 48 track console with up to 56 inputs, 4 band EQ and transformerless mixdown.

SOUNDCRAFT INC.
SERIES 800
20610 Manhattan Place, Suite 120, Torrance, CA 90501
(213) 328-2595
Contact: Wayne Freeman.
Date Product Introduced: 1981.
Product Description and Applications: 18 or 32 input, 8 group output mixer. Available in recording, P.A., or monitor versions. Modular. 4 band EQ.
Electronically balanced inputs and output. Flight case available.

SOUNDCRAFT INC.
SERIES 1624A
(213) 328-2595
20610 Manhattan Place, Suite 120, Torrance, CA 90501
Contact: Wayne Freeman.
Date Product Introduced: 1981.
Product Description and Applications: 24 input, 16 group output, 24 track monitoring, recording console. Automation ready. Transformerless electronics. Comprehensive patch-bay. 4 band EQ.
Detented controls. Penny & Giles faders.

SOUNDCRAFT INC.
SERIES 2400
20610 Manhattan Place, Suite 120, Torrance, CA 90501
(213) 328-2595
Contact: Wayne Freeman.
Date Product Introduced: 1981.
Product Description and Applications: 28 input, 24 output recording console. Automation ready. Transformerless electronics, Patch-bay, 4 band EQ.
detented controls, Penny & Giles faders.

SPECTRE AUDIO SYSTEMS
ACCESSIT
8033 Sunset Blvd., Suite 177, Hollywood, CA 90046
(213) 650-0060
Contact: Richard Crispo, Marketing Director.
Date Product Introduced: January 1981.
Product Description and Applications: Mixing Consoles: Spectre Audio systems is please to announce the addition of the British made SECK audio console line to its product family. SECK features a 10 x 4 console and a 6 x 2 console.
Suggested List Price: Model 104: $699.00 plus external power supply; Model 62: $498.00 plus external power supply.

STUDER REVOX AMERICA, INC.
STUDER 369 MIXING CONSOLE
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Contact: B. Hochstrasser, Pres., or D. Beard, Mgr. Techn. Svc. Studer.
Date Product Introduced: NAB Las Vegas, April 1981.
Product Description and Applications: Highly flexible compact console for OB van use or on location recording. Ideally suited for PA applications in theaters as well. Up to 32 microphone/line inputs, up to 8 submasters with line outputs, 2 sums and mono sum. Sophisticated monitoring and talkback system. Up to 8 auxiliary outputs (cue, reverb etc.) Many features optional available. Modular construction.
Suggested List Price: Prices from $35,000.

STUDER REVOX AMERICA, INC.
STUDER 900 SERIES MIXING CONSOLES
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Contact: B. Hochstrasser, Pres. or D. Beard, Mgr. Techn. Svc. Studer.
Date Product Introduced: NAB Las Vegas, April 1981.
Product Description and Applications: High performance automated mixing console for broadcast and recording studio use. Up to 40 inputs, up to 24 outputs. Transformerless inputs and outputs with actively balanced and floating inputs and outputs. Excellent specifications. VCA grouping etc.
Suggested List Price: Prices from $40,000.

STUDIOMASTER INC.
8/4 MIXER
1365-C Dynamics St., Anaheim, CA 92806
Date Product Introduced: 1980-1981.
Product Description and Applications: Because of its features and flexibility, the 8/4 serves as a perfect recording board and/or live performance board. Because of its 4 discrete outs, it also works as a monitor mixer or keyboard mixer. The first 4 channels are set up to accept RIAA equalization which means the 8/4 will serve as a disco or nightclub mixer also. All new electronics (IC's) and edge connectors are included plus electronically balanced inputs and phantom powering.
Suggested List Price: The retail price is $1495.00.

TAPCO
C-12/SERIES TWO MIXING CONSOLE
3810 148th Avenue, N.E., Redmond, WA 98052
(206) 883-3510
Contact: Jim Loppnow, Mkt. Development Mgr.
Date Product Introduced: February 1981.
Product Description and Applications: The C-12/Series Two mixing console is deceptively simple and well thought out. The 12 x 4 x 2 x 1 format, the double-duty solo system, the stereo compatible sub-grouping, multi-grouping, multi-function metering, and the extensive patching facilities contribute to an extremely versatile unit. The C-12/ Series Two B denotes the balanced output format of the C-12/Series Two console. A new addition to the C-12/SEries Two console is the independent sub-group channel assignment switching facilities. The C-12/ Series Two and C-12/Series Two B mixing consoles provide optimum performance and versatility for both on-the-road and in-the-studio use.
Suggested List Price: C-12/Series Two = $2,695.00, C-12/Series Two B = $3,095.00.

New Products SIGNAL PROCESSING UPDATE

ACOUSTILOG, INC.
DTC-1 DUAL TRACKING CROSSOVER
19 Mercer Street, New York, NY 10013
(212) 925-1365
Contact: Gregory Guarino, Marketing Mgr.
Date Product Introduced: January 1, 1981.
Product Description and Applications: The Acoustilog DTC-1 is a stereo, 2-way, electronic crossover that has the unique feature of one-knob frequency control for the low pass and high pass sections. The benefit of this is exact summing of the split outputs to re-form the original signal, with no holes or bumps in the combined acoustic response. No longer is a spectrum analyzer needed to set the crossover frequencies. Also, one knob tuning for each channel allows rapid sweeping of the crossover frequency with perfect tracking between woofer and tweeter, allowing quick determination of the best crossover point.
Basic Specifications: The DTC-1 can be used for 3-way mono systems by using the second channel to split the high-pass from the first channel.
Slope: High Pass-12 dB/Octave, Low Pass-6 dB/Octave.
Output Impedance: 100 ohms. Input Impedance-10 K ohms.
Maximum input or output level +20 dBv.
Suggested List Price: $395.00.

ACOUSTILOG, INC.
PHASER 5A
19 Mercer Street, New York, NY 10013
(212) 925-1365
Contact: Gregory Guarino, Marketing Mgr.
Date Product Introduced: January 1, 1981.
Product Description and Applications: A Five-stage phaser of unsurpassed flexibility which uses electro-optical elements for minimum noise and distortion. Features both variable-automatic and manual phase sweep controls. Voltage control input allows control of phase sweep from an external device. Mixing for combining dry and phase-shifted signals. Regenerative feedback control. Transformerless balanced input. Envelope follower-variable control, provides separate envelope output; allows triggering of external devices (filters, oscillators, etc).
Suggested List Price: $395.00

ACOUSTILOG, INC.
IE-100 IMAGE EXPANDER
19 Mercer Street, New York, NY 10013
(212) 925-1365
Contact: Gregory Guarino, Marketing Mgr.
Date Product Introduced: January 1, 1981.
Product Description and Applications: Improves the clarity and definition of either stereo or mono signals. Can be used either as an external effects processor or in the final output of a stereo mix. Mixing controls adjust the intensity of the effect. Stereo Programs will reveal enhanced spatial information. Corrects high-frequency loss from multiple generations of tape or processing. Uses no distortion products.
Suggested List Price: List Price: $395.00; Electronically balanced in/out IE-102 $445.00.

ALTEC CORPORATION
1653 ACTIVE EQUALIZER
1515 So. Manchester Ave., Anaheim, CA 92803
(714) 774-2900
Contact: Larry Lutz-Product Manager, Commercial Products.
Date Product Introduced: May 12, 1981.
Product Description and Applications: An exciting addition to Altec's line of electronic products is the 1653 Active Equalizer, designed to compensate for acoustic imperfections in the sound environments. The 1653 will provide accurate equalization of the entire audio spectrum for professional & industrial use. The possibilities of applications are limitless; conference & meeting rooms, churches, industrial facilities, on-stage, and with the microphone mixer in recording and playback.
Basic Specifications: The 1653 contains 29 active band rejection filters at ISO preferred ⅓ octave center frequencies from 25 to 16,000 Hz.
Each filter section provides + or − 12 dB of boost or cut at its center frequency and is skirted to crossover with adjacent sections at − 7 dB, binding to give ripple free simulation over 85 percent of the range. A gain control restores equalization losses, the high and low pass filters roll off at 18 dB per octave with continuously variable 3 dB down points.
The AC power switch acts as a by-pass switch, and allows the filter set to be conveniently switched in and out of the circuit. Features include: input and output impedances of 600 or 15,000 ohms unbalanced (direct), or 150, 600, or 15,000 ohms balanced (with accessory transformers).

ASHLY AUDIO
SC-68 PARAMETRIC NOTCH FILTER
100 Fernwood Ave., Rochester, NY 14621
(800) 828-6308 in N.Y. State (718) 544-5191
Contact: Gregory A. Green/National Sales Manager.
Date Product Introduced: December 1, 1980.
Product Description and Application: The SC-68 Parametric Notch Filter is a cut-only equalizer which is used to insert relatively sharp dips in the frequency spectrum. As such, it is useful for removing spot frequencies which cause problems such as feedback, cabinet resonances, hum or TV sync signals, and single "hot" notes on musical instruments. The SC-68 includes a limiter in the setup system for control of feedback levels during setup.
Basic Specifications: Amplitude: 0 to − 30 dB.
Frequency: (low) 16 Hz-800Hz, (3/low-mid) 48Hz-2.4 KHz (3/hi-mid) 160 Hz-8KHz, (high) 480KHz-24KHz.
Bandwidth: .1 octave − .01 octave.
Input impedance: 10K ohm active balanced bridging.
Max. in-out level: + 20 dBm (+ 5 dBm at max, cut, full sharp).
Frequency response: ± .5 dB 20Hz-20KHz.
Hum and noise: − 87 dBV (eq in), − 95 dBV (eq out).
Distortion: .05% THD, + 10dBV, 20 Hz-20KHz.
Suggested List Price: $625.00.

ASHLY AUDIO
SC—88 STEREO 4-WAY ELECTRONIC CROSSOVER
100 Fernwood Ave., Rochester, NY 14621
(800) 828-6308; in N.Y. State (716) 544-5191 TWX 5102533901
Contact: Gregory A. Green/Sales Manager.
Date Product Introduced: December, 1, 1981.
Product Description and Applications: The Ashly SC-88 Stereo 4-Way Electronic Crossover is an extention of the Ashly Electronic Crossover Series. 12 dB per octave slopes, Peak overload lights, inputs and outputs that can be used as balanced or unbalanced, and our exclusive roll-off control for crossover point depth adjustment is provided. The SC-88 can be easily patched for monaural 7-way operation for highly sophisticated systems.
Basic Specifications: Input gain: − 00 − + 10dB.
Crossover frequencies: 16HZ-800KHz, 160Hz-8KHz, 480Hz-24KHz.
Rolloff: 1.5dB − 12dB (crossover point depth).
Input impedance: 10K ohm balanced bridging.
Frequency response: ± .5dB 20Hz-20KHz (within passband).
Distortion: .05% THD, + 10dBV 20Hz-20KHz.
Hum and Noise: − 90dBV.
Suggested List Price: $604.00.

AUDIO & DESIGN RECORDING, INC.
SCAMP S25 DE-ESSER MODULE
P.O. Box 786, Bremerton, WA 96310
Toll Free: 1-800-426-6170 in WA: 206-275-5009
Contact: Nigel Branwell, V-P (Sales).
Date Product Introduced: November 1980.
Product Description and Applications: The Scamp S25 De-Esser is the fourteenth module in the Scamp range. Working on a band-splitting principal, the unit takes the incoming signal and splits it into two components: the "main" and the "ess" band. The Side Chain has a sharply tuned variable 5K to 15KHz filter and senses the presence of "esses" in a signal. Unlike de-essers that use limiters and pre-emphasis networks (and consequently lower the gain overall to minimize the effect of de-essing), the S25 De-esser module actually attenuates only the "ess" frequencies which have been selected by the user. The two channels of de-essing may be used separately, in stereo, or in series, offering the advantage of sensing at two frequencies.
Basic Specifications: Differential Inputs/Outputs.
CMR: Better than 40 dB 20Hz to 20KHz.
Max Input Level: + 18dBm 600 ohm load.
Threshold Max Sensitivity: − 30dBm.
Side Chain Freq. Response: 5 to 15KHz continuously variable.
Attack: 100uS Normal: 100mS Auto.
Release: 60mS Normal: 1S Auto.
Depth Notch: Variable.
Crosstalk: Better than 0dB 20Hz to 20KHz.
Output Noise: Better than − 82dBm 20KHz Band.
Distortion: Less than 0.5% 3KHz, 600 ohm load.
Freq. Response: + 0dB, − 1dB 20 Hz to 20 KHz @ 1KHz.
Format: 1 inch Scamp Module.
Suggested List Price: $580.00.

AUDIO & DESIGN RECORDING
TRANSDYNAMIC TRI-BAND PROCESSOR
P.O. Box 786, Bremerton, WA 98310
Toll Free: 1-800-426-6170; in WA (206) 275-5009
Contact: Nigel Branwell.
Date Product Introduced: March 1981.
Product Description and Applications: Designed primarily for the Broadcast industry (AM/FM & TV), the Transdynamic Processor does have specific applications in disk-cutting and tape duplication. The unit provides all the necessary facilities for sophisticated tri-band processing in conjunction with any professional level control amplifiers. Normally sold as a package with Audio & Design's Compex, Express, or Easy-Rider Compressor-Limiters, it is available seperately for use with other units. The Transdynamic facilitates seperate processing of high, mid, and low frequency bands, avoiding modulation effects and enabling the set up of dynamic equalization curves (eg. HF and LF selective limiting to avoid overload on RIAA disk curves). Both 12 dB/octave and 6 dB/octave phase compensated splitting is available; the former allowing twice the dynamic reduction before band-spread reduces effective operation. The recombined signal may be further processed thru a wide-band VCA Peak limiter/clipper for absolute peak control. These sections can be switched to provide 25, 50, 75uS shaping prior to pre-emphasis in the transmitter of disk cutting amplifier.
Basic Specifications: Frequency response: 20 Hz to 20 KHz − .05 dB (without conditioning filters).
Distortion: less than 0.06% at all bandpass frequencies.
Signal to noise: better than − 82 dB Ref to Max operating level (+ 15 dBm).
Tri-band filters: 6 dB and 12 dB/octave.
Phase compensated: lo-pass to Mid: 75 Hz to 1 KHz variable; Mid to hi-pass: 1.1 KHz to 15KHz variable.
Peak limiter: attack and release: program controlled attack dependant on input level and frequency changes.
Metering: LED bargraphs on tri-band returns and on gain reduction of peak limiter (both channels).
Analog peak program meter on overall output switchable between input, output, channel 1 & 2.
Max input: + 20 dBm; Max output: + 15 dBm.

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DBX ASHLY TEAC
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FURMAN SOUND ANVIL
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BGW BEYER AKG ROLAND
RENKUS-HEINZ LEXICON
ALLEN&HEATH SESCOM
BIAMP SYSTEMS, INC.

Sound Unlimited Systems, Inc., is nationally recognized for offering only the finest professional audio equipment at the price. There are many fine components on the market for professional sound systems. We have the experience to know which components work well together. And, we'll ship anywhere, C.O.D. or prepaid. Contact us for the answers you need, today!

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New Products SIGNAL PROCESSING UPDATE

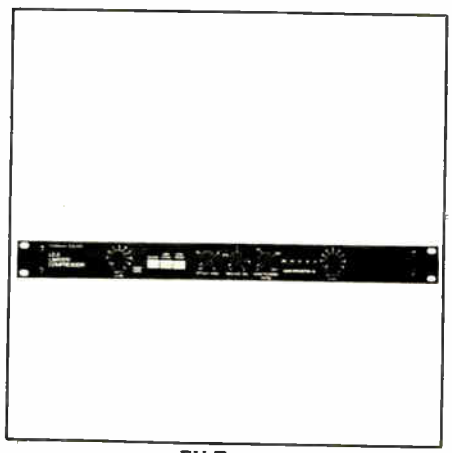
CROWN INTERNATIONAL
MX-4 MONO THREE-WAY CROSSOVER
1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571
Contact: M. Young, Advertising Mgr.
Date Product Introduced: March 1981.
Product Description and Applications: The Crown MX-4 is a single-channel electronic, active crossover, continuing adjustable filters to select high, mid-range, low and subwoofer outputs for three-way speaker systems, with or without sub-woofers. Each filter offers eleven frequency roll-off points for maximum flexibility in tailoring a reinforcement system for the intended purpose. The MX-4 includes polarity reversing switches for balanced outputs.
Basic Specifications: MX-4 includes balanced and unbalanced input and output. Output 10V max before overload, 2.5V rated. Gain is 9.09 dB from balanced input through any output, 10 dB from unbalanced input. Output and inputs connections are XLR or ¼" phone jacks. All filters are 3 pole Butterworth with 18 dB/octave. EIA 19" rack mount, 3½" high.
Suggested List Price: $549.00.

DATATRONIX, INC.
GRAPHIC EQUALIZER, MODEL 560A
2100 Reston Ave., Reston, VA 22091
(703) 820-5300
Contact: Saul Walker, Product Mgr.
Date Product Introduced: March 1981.
Product Description and Applications: Designed for both in-console and outboard mounting. The Model 560A ten band graphic equalizer is available in both transformerless and transformer coupled versions. Grouding problems are eliminated by an exclusive ground loop correction circuit in the transformerless unit. The Model 560A is a newly redesigned version of the popular API Model 560 featuring improved resolution in the critical range of ± 4 dB without sacrificing overall curve shaping capability. The transformer coupled Model 560AT provides balanced output to +30 dBm.
Basic Specifications: Controls: 10 octave band continuously variable symmetrical ± 12 dB with zero center click stop; silent in/out switch with LED indicator.
Output noise below −95 dBu unequalized.
Distortion under .05% THD at +20 dBm to 20 KHz.
Size: 1½" x 5¼" x 5¾" behind panel.
Suggested List Price: Model 560A price: $450.00.

DELTALAB RESEARCH, INC.
DELTALAB HARMONICOMPUTER™
27 Industrial Avenue, Chelmsford, MA 01824
(617) 256-9034
Contact: James L. Camacho, V.P. Sales & Mkt.
Date Product Introduced: May 1981.
Product Description and Applications: A special effects pitch shifting device featuring keyboard-type controls for precise musical intervals. Application: for performing musicians and for any size studio use. Two full octave operation.
Basic Specifications: Full two octave operation—one octave higher and one octave lower. Glitch-free operation—advanced digital technique eliminates splice glitches. Selectable pitch shift control allows full range (2 octaves) sweep or fine tune (with keyboard). VCO, feedback +90 dB Min, 95 dB typical dynamic range.

ELECTRO-VOICE, INC.
XEQ 804/808 PASSIVE CROSSOVER/EQUALIZER
600 Cecil Street, Buchanan, MI 49107
(818) 895-6831
Contact: Travis Ludwig, Mkt. Development Mgr., Commercial Markets.
Date Product Introduced: March 1981.
Product Description and Applications: The XEQ 804 is a passive unit which is intended to be inserted between a single power amplifier channel and the low and high-frequency speaker system. The XEQ 804 matches any single or dual horn/driver combination to a 4 ohm, dual woofer system such as the E-V LF215 low-frequency system. When used with E-V's unique Constant Directivity Horn systems, proper equalization for each horn/driver combination can easily be achieved by using the front panel patching terminals. Input and output terminals include convenient ¼-inch phone jacks. The XEQ 804 can be used with amplifiers rated up to 400 watts continuous power. The XEQ 804 can be used as a stand alone component, may be fastened to a flat surface such as the side of the bass enclosures, or can even be flush mounted in a rectangular recess made in an enclosure wall.
Suggested List Price: Pro user net price: XEQ 804 = $225.00. XEQ 808 = $186.00.

ELECTRO-VOICE, INC.
XEQ-2 ACTIVE CROSSOVER/EQUALIZER
600 Cecil Street, Buchanan, MI 49107
(616) 695-6831
Contact: Travis Ludwig, Mkt. Development Mgr., Commercial Markets.
Date Product Introduced: March 1981.
Product Description and Applications: The XEQ-2 combines an active, 2-way frequency dividing network; a 5-position "Thiele" low-frequency equalizing network; and a variable high-frequency horn-driver equalizer which is compatible with the Electro-Voice TL bass speaker systems and high-frequency drivers. Two crossover modules (500 & 800 Hz, third-order Butterworth) are supplied with the XEQ-2. Selectable "Thiele" low-frequency equalization is provided via switchable +6 dB peak boost frequencies of 29, 32, 35, 45 and 60 Hz, plus "flat" with a high-pass F3 of 30 Hz for use with low-frequency enclosures other than E-V bass reflex systems.
Basic Specifications: The XEQ-2 utilizes a series of plug-in modules for high-frequency equalization. Each one is optimized for a particular E-V model HR constant directivity horn. This equalization accurately compensates for the falling high frequency response (above 2500 Hz) inherent in any and all high performance compression drivers when used with any Constant Directivity Horn. Additional features include time delay control, high-frequency level control and phase reversal switch. The XEQ-2 will accommodate any balanced or unbalanced, high or low impedance, active or passive source which is capable of providing a line level signal. Both unbalanced and balanced output configurations are provided.
Suggested List Price: Pro user net price is $350.00.

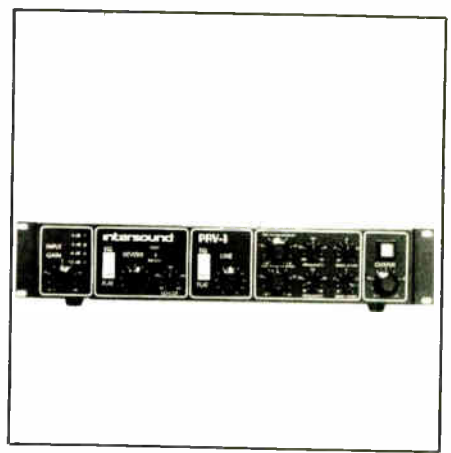


EV-Tapco
Intersound PRV-1

EV-TAPCO
INTERSOUND PRV-1-PARAMETRIC EQUALIZER/REVERB
3810-148th Ave. N.E., Redmond, WA 98052
(206) 883-3510
Contact: Jim Loppnow, Market Development Mgr.
Date Product Introduced: Winter 1980.
Product Description and Applications: An advanced design mono reverb system designed especially to complement instrument systems. The special tunable lo-cut filter eliminates low frequencies associated with acoustic feedback, which plagues many other units used on stage. The two bands of parametric equalization can be selected for the reverb signal, line signal, or both, allowing the user to select the function of the PRV-1 as a reverb device with full equalization, or as a separate, highly versatile equalizer. The footswitch provision combines with these other features to make it the most versatile reverb unit for live stage systems, as well as sound reinforcement and recording applications.
Basic Specifications: LED ladder displaying reverb drive signal. Independent reverb level and line level controls. Balanced (XLR) and unbalanced inputs and outputs.
Signal to noise: −95 dB (dry)/ −70 dB (reverb).
Distortion: less than .05% T.H.D. and I.M.
Decay time: 3.0 sec.
Lo-cut filter: 12 dB/octave, tuneable from 150 Hz to 1.2 KHz. Two independent bands of parametric equalization: 80 Hz - 1.8 KHz and 500 Hz - 12.0 KHz (± 14 dB ea. band).
Bandwidth: .25 - 3.0 octaves/band.
Suggested List Price: $425.00.

EVENTIDE CLOCKWORKS, INC.
EVENTIDE TIMESQUEEZE SYSTEM
265 West 54th Street, New York, N.Y. 10019
(212) 581-9290
Contact: Richard Factor, Vice Pres.
Date Product Introduced: April 1981.
Product Description and Applications: Eventide Clockworks, Inc. has introduced the Timesqueeze System capable of altering the running time of audio/video recordings or film material. The system allows broadcasters, commercial producers and film makers to shorten or lengthen recorded programs and commercials with no editing, no deleted material and no abnormal audio pitch effects. The Timesqueeze System consists of three parts: the well-known Eventide H949 Harmonizer the newly introduced PTC945 Precision Tape Controller and a micro-computer (programmed with Eventide software). The system interfaces with the user's 1" video recorder or audio tape machine.
Basic Specifications: 15 KHz bandwidth; 96 dB dynamic range; variable delay up to 400 ms.
Suggested List Price: Eventide H949 Harmonizer lists for $3,500 (de-glitch card installed). Eventide PTC945 Precision Tape Controller lists for $1,000. Hewlett Packard 85 computer lists for around $3,970 w/recommended options.

EVENTIDE CLOCKWORKS, INC.
EVENTIDE H949 HARMONIZER DE-GLITCH CARD
285 West 54th Street, New York, N.Y. 10019
(212) 581-9290
Contact: Richard Factor, Vice Pres.
Date Product Introduced: Winter 1980.
Product Description and Applications: The LU618 is a signal processor/analyzer board which eliminates almost completely the "glitching" common to pitch change devices which operate by eliminating or adding signal segments. This computerized addition to the H949 Harmonizer determines the optimum splicing point, thus reducing the potential "glitch" almost to inaudibility.
Suggested List Price: The LU618 when factory-installed in a new H949 Harmonizer adds $740.00 to the base price of $2,760.00. On all already purchased H949s the LU618 can be field-installed.



Furman Sound
LC-2 Limiter/Compressor

FURMAN SOUND, INC.
LC-2 LIMITER/COMPRESSOR
616 Canal St., San Rafael, CA 94901
(415) 456-6766
Contact: Diane Poole, Marketing Assistant.
Date Product Introduced: January 1981.
Product Description and Applications: The LC-2 Limiter/Compressor is Furman Sound's newest addition, offering a versatile, professional quality unit with a wide variety of features including—"de-essing" mode; a side chain mode to allow frequency selective gain reduction (may also be used to allow a completely independent signal to control gain reduction); and Program Adjusted Release Time which causes the gain reduction circuitry to release twice as fast for transients as compared to continuous program material to control "pumping" and "breathing."
Basic Specifications: Input: 10 K ohms unbalanced (balanced available).
Output: 270 ohms unbalanced (balanced available).
Attack: 400 microseconds—25 milliseconds.
Release: 200 milliseconds—5 seconds.
Compression ratio: 2:1 - 50:1.
Frequency response: ± or −0.5 dB, 20Hz - 20KHz.
S/N Ratio: 92 dB with 5 dB gain reduction.
Suggested List Price: $315.00

The Unlimited Limiter.

In keeping with MXR's expanding commitment to the professional recording industry, our engineers have designed and built the Dual Limiter. A world class mono-stereo limiter offering total flexibility and ease of operation, the Dual Limiter produces a musically natural response in any compression-limiting application. All of this versatility is built into a compact, rack-mountable package.

The totally unique VCA's at the heart of the Dual Limiter provide an exceptionally wide dynamic range with low levels of distortion. Continuous bass distortion is much lower in level than typical compressor-limiters, allowing more freedom in setting release characteristics.

The Dual Limiter is also a forgiving limiter. Attack and release characteristics dictated by the front panel controls are modified by program dynamics and compression requirements. The slope increases smoothly past the threshold point, allowing a *gradual* transition into compression. Varying the Dual Limiter's threshold region produces a variety of intermediate slopes with the primary slope being that chosen by the slope switch. These features permit apparent dynamics to be maintained even though the dynamic range is being controllably limited.

The Dual Limiter's remarkable versatility is based on the fact that it can be viewed as two independent mono limiters that can be patched together via front panel switches for stereo limiting applications. Each channel has an In/Out switch, Slope switch, Input, Output, Attack and Release controls and an LED display, showing the amount of gain reduction. On the rear are both XLR and ¼" phone jack (ring-tipped sleeve) input and output connectors. Each channel's detector is accessible via rear panel phone jacks to permit external tailoring of the detectors' frequency response. This feature allows for de-essing (reduction of vocal sibilance) and a wide variety of frequency dependent limiting needs.

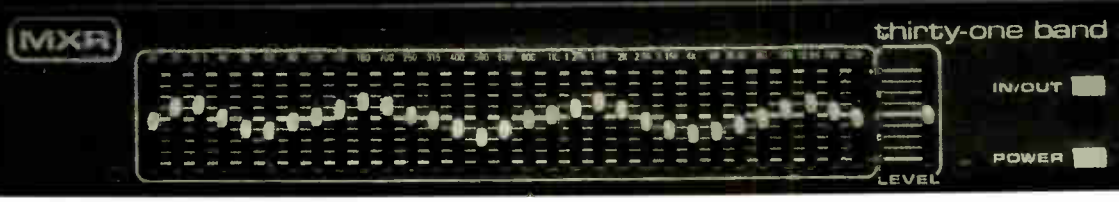
Because virtually every form of musical signal was used to evaluate the Dual Limiter's response during the initial stages of development, its sophisticated internal circuitry enables it to sound musically *natural*— even at extreme compression settings.

Balanced inputs, the ability to drive 600 ohm loads, +19 dBm input and output and standard rack dimensions (1¾" high) allow the Dual Limiter to be easily integrated into any professional system. With an extremely rugged case, metal knobs and reliable internal construction, the new MXR Dual Limiter reflects the highest professional standards and has been fully designed and built in the U.S.A.

The Unlimited Limiter— MXR's natural response to the question of performance and versatility in a space-efficient and cost-effective package. See the MXR Dual Limiter at your nearest MXR dealer.

MXR Professional Products Group

MXR Innovations Inc.
740 Driving Park Avenue
Rochester, New York 14613
(716) 254-2910



GOTHAM AUDIO CORPORATION
EMT 251
741 Washington St., New York, N.Y. 10014
(212) 741-7411
Contact: Russ Hamm, National Sales Mgr.
Date Product Introduced: Winter 1980.
Product Description and Applications: The EMT 251 provides high quality reverberation with extraordinary versatility in the control of its characteristics. The unit provides, simultaneously, reverberation and four digital delays, each individually controlled to prevent detailed placement of first, second and third reflections as well as a reverbant cluster prior to the onset of actual reverb. Previous to the EMT 251 this manipulation would have required a control room full of digital delay lines. In addition, it provides three special reverberation modes plus delay, echo and chorusing.
Suggested List Price: Two-channel version - $20,100.00. Four-channel version - $21,450.00.

GOTHAM AUDIO CORPORATION
TTM 202B
741 Washington St., New York, N.Y. 10014
(212) 741-7411
Contact: Russell O. Hamm, National Sales Mgr.
Date Product Introduced: Spring 1981.
Product Description and Applications: The TTM 202B is a two-channel noise reduction frame which accepts telcom, Dolby and dbx plug-in noise reduction cards. It is a compact unit requiring the half-width rack space, which allows twice the number of NR cards in the same space occupied by existing frames. Signal inputs and outputs are electronically balanced, eliminating transformers. A specially developed circuit allows either output side to be grounded without the usual distortion or loss of level. A separate optional power supply mounts on the rear of the frame. On-board regulators enable the 202B from any nominal 24 Vdc power source.
Suggested List Price: TTM 202B - $960.00, TTM PSU - $190.00.

KLARK-TEKNIK ELECTRONICS, INC.
DN27A ⅓ OCTAVE GRAPHIC EQUALIZER
262 A Eastern Parkway, Farmingdale, N.Y. 11735
(516) 249-3660
Contact: Jack Kelly, President.
Date Product Introduced: December 1980.
Product Description and Applications: The DN27A includes unique features such as an automatic system bypass in the event of an accidental power shut down, and an earth lift switch to separate signal and chassis grounds. The front panel contains 27 x 60 mm faders (center dented), power on/off, and a normal/bypass switch. The rotary gain control allows infinite attenuation and +6 dB of signal gain. Connectors are professional XLR type. Unit is switchable 110v/240v.
Basic Specifications: Frequency response: ±.5 dB, 20 - 20KHz (flat).
S/N: less than −90 dBm, 20 - 20KHz (unweighted).
Distortion: .01% - 1KHz at +4 dBm (600 ohm).
.05% - 20 - 20KHz at +18 dBm (600 ohm).
Filters: centered 40 - 16 KHz I.S.O.
Options: plug in balancing card, Persper security cover.
Suggested List Price: $850.00.

KLARK-TEKNIK ELECTRONICS, INC.
DN60 ⅓ OCTAVE REAL TIME ANALYZER
262 A Eastern Parkway, Farmingdale, N.Y. 11735
(516) 249-3660
Contact: Jack Kelly, President.
Date Product Introduced: December 1980.
Product Description and Applications: The DN60 is a microprocessor-based R.T.A. The unit has a 30 x 16 LED high intensity display, and separate column for broadband SPL readout. Features include 3 memories, average or peak resolution with choice of 3 time constants, and a peak-hold function that allows simultaneous viewing of the real time signal. Pink noise generator and 'A' weighting facility are included. Provision is made for X-Y outputs.
Basic Specifications: Filters: double pole I.E.C. 225.
Inputs: line/mic.
Attenuator: −50 dBm to +20 dBm, 50 dB SPL to 120 dB SPL.
Noise source: digital psuedo-random white noise generator w/pink noise filtering.
Weighting: 'A' type I.E.C. 651.
Resolution: 1 or 2 dB per L.E.D.
Noise output: +4 dBm RMS.
Options: RT60, printer.
Suggested List Price: (Complete w/microphone) $3,195.00.

LEXICON, INC.
NVS-224 NON-VOLATILE MEMORY STORAGE OPTION FOR MODEL 224 DIGITAL REVERB
60 Turner St., Waltham, MA 02154
(617) 891-6790

New Products SIGNAL PROCESSING UPDATE

Contact: Virginia Casale, Mkt. Administrator.
Date Product Introduced: March 1981.
Product Description and Applications: The NVS-224 is an optional plug-in module for the Model 224 Reverberation System. This module is designed to provide non-volatile memory storage for the 36 storage registers in the 224 provided for storing the user's reverberation programs when they become available. The single multi-bus compatible card plugs into the option card slot of any Model 224.
Suggested List Price: $400.00.

MICMIX AUDIO PRODUCTS, INC.
MASTER-ROOM XL-121
2995 Ladybird Lane, Dallas, TX 75220
(214) 352-3811
Contact: Bill Allen, Sales Mgr.
Date Product Introduced: May 1981.
Product Description and Applications: The Master-Room XL-121 is a new reverberation system in the XL Series. This unit is a 1¾ inch rack-mount system that achieves the superior performance of the Master-Room series of reverberation chambers. The unit is full mono with two bands of equalization and can be used as a reverb and a pre-amp. The unit will accept any input level by adjusting the GAIN control and OUTPUT level control. The XL-121 also contains a MIX control to combine the direct and reverberated signals, and will accept a standard footswitch for easy bypass capabilities. The system is engineered for small studio, sound reinforcement, and broadcast applications.
Basic Specifications: Gain control range: 40 dB.
Max. input level: +18 dBv.
Max. output level: +18 dBm rms.
Input impedance: 47 K ohms.
Output impedance: 47 ohms.
Reverb time: 2.5 sec. at 500 Hz.
Noise level direct only: −76 dBm; reverb only: −66 dBmA; EQ: ±12 dB.
Dual-colored LED overload indicator.
Size: 1¾ inch rack-mount.

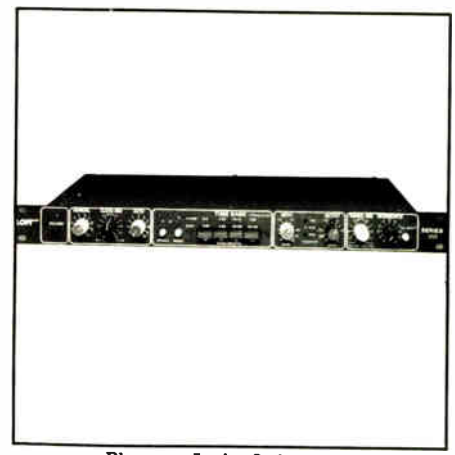
MXR
DUAL LIMITER
740 Driving Park Ave., Rochester, N.Y. 14613
(716) 254-2910
Date Product Introduced: 1981.
Product Description and Applications: At the heart of the Dual Limiter is a totally unique switching V.C.A. which permits wider dynamic range and lower distortion than conventional circuitry. The Dual Limiter derives its name from one of its unique features, namely, its ability to function either as two mono limiters or be joined via a front panel switch for stereo limiting applications. This "convenience" feature provides extreme versatility. Both channels in the Dual Limiter incorporate unique design parameters which offer clean, natural-sounding and versatile compression with no audible "side-effects." The limiting slope is user-selectable between 4:1 and infinity, with a smooth transition through the threshold region. Each channel has an In-Out switch, Slope switch, Input, Output, Attack and Release controls as well as LED meter displaying the amount of gain.

N.E.I.
1022 DUAL CHANNEL GRAPHIC EQUALIZER
934 N.E. 25th Avenue, Portland, OR 97232
(503) 232-4445
Contact: Bud Garrison, Vice President, Marketing.
Date Product Introduced: February 1981.
Product Description and Applications: 1022 Dual Channel Graphic Equalizer, packaged in a 1/8" anodized aluminum front panel. Suits any application requiring professional features and excellent performance in a full octave equalizer. Each fully independent channel has high quality, oil-dampened slide controls with center detents for easy return to "flat".
Basic Specifications: ±12 dB boost or cut on each of 10 bands (on ISO frequency centers), fully rack mountable (EIA) for installation in permanent equipment rack or road/flight case, optional 220 V, 50 Hz line voltage. Unbalanced inputs and outputs.
Suggested List Price: List Price: $349.00.

N.E.I.
2712 ONE THIRD OCTAVE GRAPHIC EQUALIZER
934 N.E. 25th Avenue, Portland, OR 97232
(503) 232-4445
Contact: Bud Garrison, Vice President, Marketing.
Date Product Introduced: February 1981.
Product Description and Applications: 2712 is a sophisticated part of NEI's professional signal processing family. The 2712 combines superb design and high performance electronics for quiet, precise equalization of any sound reinforcement or recording system. Center detented, oil-dampened slide controls boost or cut ±12 dB each 27, ⅓ octave bands on ISO frequency centers. EQ in/out switching and unbalanced input/output.
Basic Specifications: Standard EIA rack mount size, 3½;; x 19" for easy installation in road/flight case or equipment rack.
Optional 220V, 50 Hz line voltage available.
Suggested List Price: Retail Price: $399.00.

N.E.I.
MODEL 351 REVERBERATION SYSTEM
934 N.E. 25th Avenue, Portland, OR 97232
(503) 232-4445
Contact: Bud Garrison, Vice President, Marketing.
Date Product Introduced: February, 1981.
Product Description and Applications: NEI introduces the newest member of its signal processing family: The 351 Reverberation System. The 351, with SAR (Signal Activated Reverb) is designed to provide the optimum in spring reverb performance without many of the problems normally associated with spring reverbs.
Basic Specifications: Features include: Accutronics type 9 tank, 3½" x 19", rack-mount package.
Power on/off with indicator, optional line voltages, steel chassis.
Suggested List Price: Retail Price: $329.00.

ORBAN ASSOCIATES INC.
674A STEREO EQUALIZER
645 Bryant St., San Francisco, CA 94107
(415) 957-1067
Contact: Sid Goldstein, Marketing Mgr.
Date Product Introduced: April, 1981.
Product Description and Applications: The 674A Stereo Equalizer is a quasi-parametric equalizer with the convenience of graphic-type controls. Wide range high and low-pass filters with 12dB/octave Butterworth slopes follow the EQ section for added versatility. The 674A has two outputs per channel, arranged so that these filters can be used as a fully tunable electronic crossover. Continuously variable control over center frequency and bandwidth in the EQ section makes the eight bands/channel extremely flexible. Potential applications include: stereo mixdown in recording, sound reinforcement and monitor tuning, broadcast production, and dance bars.
Basic Specifications: Nominal Input Level: Between −10 and +4dBm.
Absolute Overload Point: +26dBm.
Nominal Output Level: +4 dBm.
Frequency Response: ± 0.25 dB; 20-20,000 Hz.
Available Gain: +12dB.
Total Harmonic Distortion: Less than 0.08%, 20-20,000 Hz (+18 dBm).
Noise at Output: Less than −78dB.
Suggested List Price: Price: $1,095.00 (approx.).



Phoenix Audio Laboratory
Loft 450 Delay Line/Flanger

PHOENIX AUDIO LABORATORY, INC.
LOFT SERIES 450 DELAY LINE/FLANGER
91 Elm Street, Manchester, CT 06040
(203) 649-1199
Contact: John Roberts, Pres., Peter Nimirowski, V. Pres.
Date Product Introduced: December 1980.
Product Description and Applications: The Series 440 Delay Line/Flanger noted for its exceptional flanging, realistic doubling and chorus effects has been redesigned to the Series 450 offering the same great ef-

fects with improved S/N and transient response. New features include a three LED Headroom display, E.Q. Shift on regeneration, input and output level controls and an optional EM450 extender module that doubles the delay time on each range.
Basic Specifications: THD over a range of 20Hz to 20 KHz is .5%.
Output noise is rated at – 78dB.
The units measures 1-¾" x 19" x 9" and weighs 10 lbs.
Suggested List Price: Suggested retail: $750.00. Optional EM450 $125.00.

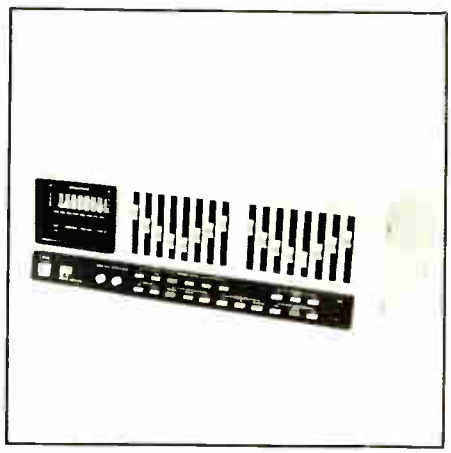
PHOENIX AUDIO LABORATORY, INC.
LOFT MODEL 402 ELECTRONIC CROSSOVER
91 Elm Street, Manchester, CT 06040
(203) 649-1199
Contact: John Roberts Pres., Peter Nimirowski V. Pres.
Date Product Introduced: May 1, 1981.
Product Description and Applications: The Loft model 402 is an 18 dB/Octave stereo two-way electronic crossover. 21 detent controls allow continuous adjustment over a 40 Hz to 800Hz (400Hz to 8KHz in x10) range with accurate repeatability. Recessed frequency controls and range switches prevent accidental misalignment. 3 LED headroom displays and master level controls are provided for each input, peak indicators and calibrated level controls for each output. "turn on delay" and "loss of power" muting protect against speaker damaging transients during power up or A.C. power interruption.
Basic Specifications: Summed Freq. Response: +/– .5dB 20 Hz to 20KHz.
Distortion: less than .01% 20 to 20KHz.
Output Noise: less than – 90dBm "A" wtd.
Slope: – 18dB/Octave.
Freq. Range: 40Hz to 800Hz (400Hz to 8KHz in x10).
Dim.: 19" x 1.75" x 7" 8 lbs. (3.6 kilo).
Power: 115VAC.

PHOENIX AUDIO LABORATORY, INC.
LOFT MODEL 401 PARAMETRIC E.Q.
91 Elm Street, Manchester, CT 06040
(203) 649-1199
Contact: John Roberts, Pres., Peter Nimirowski, V. Pres.
Date Product Introduced: May 1st, 1981.
Product Description and Applications: The Model 401 is a mono four group fully parametric Equalizer designed to meet the demands of the professional recording engineer or musician. A 20dB adjustable pre-amp is provided so the unit can be used as a musical instrument pre-amp or with low level equipment. This unit features 21 detent controls to aid in repeatability of control settings, bi-fet op-amps for state of the art performance and a three LED headroom display.
Basic Specifications: THD: less than .01% 20-20K.
S/N: greater than – 85dBm A weighted.
Freq. response: ± 0.5dB 10-20K E.Q. in controls flat position.
18dB of cut, 18dB of boost.
.15 to 3.0 Octave range.
Freq. range Low band 30 to 600Hz, Freq. range Low mid band 100Hz to 2KHz, Freq. range Mid ban 400Hz to 8KHz, Freq. range High band 1KHz to 20KHz.
Max. output +22dBm.
Unit measures: 1¾" x 19" x 7" and weighs 8 lbs.
Suggested List Price: Suggested retail price: $495.00.

REBIS AUDIO
REBIS MODULAR SYSTEM
(distributed in the US exclusively by Klark-Teknik Electronics Inc.)
262 A Eastern Parkway, Farmingdale, NY 11735
(516) 249-3660
Contact: Jack Kelly, President.
Date Product Introduced: February 1981.
Product Description and Applications: The Rebis System is a modular signal processing system centered around a 16 unit rack frame. The frame is powered by either a free standing (PSU1) or rackmount (PSU2) power supply. Current modules include a Compressor/Limitor, Noise Gate, Parametric EQ, De-Esser, Mic/Line Amp, LED Meter, Disc Preamp (RIAA), Timer, Mono & Stereo Mixer, Oscillator. There is also a delay module (2-80ms) with corresponding mixer and modulator modules. System is complete with blank panels and patch bay modules.
Basic Specifications: Send for individual unit specification.
Suggested List Price: Prices: 200R-Rack Frame: $300.
PSU1-Power Supply: $200.
PSU2-Power Supply: $275.
Modules: $230-$525.

SANSUI ELECTRONICS CORP.
SE-9
1250 Valley Brook Ave., Lyndhurst, NJ 07071
(201) 460-9710
Contact: Gerald LeBow, Senior Vice President.
Date Product Introduced: May 1981.

New Products SIGNAL PROCESSING UPDATE



Sansui Electronics Corp.
SE-9

Product Description and Applications: Microprocessor controlled 8-band stereo graphic equalizer, the SE-9 automatically measures and sets fader for acoustically flat response. Will also reproduce up to four manually set fader positions stored in memory. Built-in signal generator is programmed to feed pink noise to left and right channels. Levels are detected by microphone and microprocessor calculates how high or low the 16 faders should be set.
Basic Specifications: Center Frequencies: 80, 160, 315, 630, 1.25K, 2.5K, 5K and 10KHz.
Frequency Response: 10 - 20KHz ± 0.5dB.
THD: 0.008%.
S/N Ratio: 100dB.
Adjustable Range: ± 12dB.
Rated Input Level: 1 volt.
Rated Output Level: 1 volt.
Input Impedance: 30Khz.
Output impedance: 600KHz.
Other features: built-in eight-band spectrum analyzer, two-way tape dubbing facility, comes with an electret condenser microphone.
Suggested List Price: About $600.00.

SPECTRE AUDIO SYSTEMS
ACCESSIT
8033 Sunset Blvd., Suite 177, Hollywood, CA 90046
(213) 650-0060
Contact: Richard Crispo, Marketing Director.
Date Product Introduced: January 20, 1981.
Product Description and Applications: Signal Processing Devices. Spectre Audio Systems is pleased to announce the addition of a noise gate to its present line of five (5) Accessit signal processors, mixer and power amplifier.
Suggested List Price: Noise Gate: $108.00 plus external power supply.

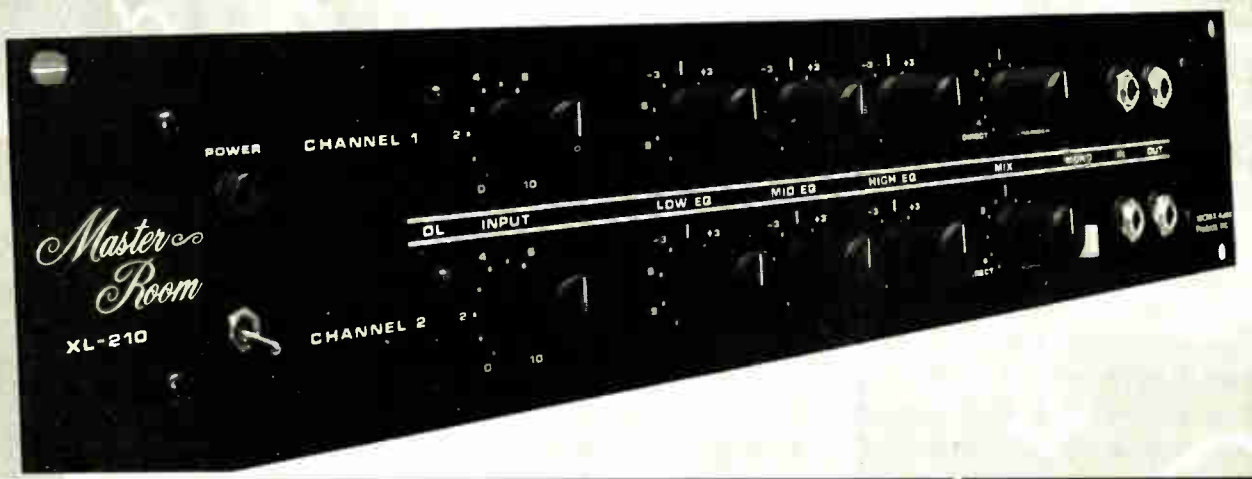
SYMETRIX, INC.
DPL 220 DUAL PEAK LIMITER
109 Bell St., Seattle, WA 98121
(206) 624-5012
Contact: Dane Butcher, Sales Manager.
Date Product Introduced: May 1981.
Product Description and Applications: The DPL 220 contains two limiters in a 1¾" high rack mount chassis. The limiters may be operated independently or in the stereo interconnect mode. Applications include peak level limiting in PA, broadcast, recording, or any situation where absolute control of maximum levels in desired. Controls for each channel include threshold level, release time, auto-release, limit in-out, and peak or RMS detector selection. Controls common to both channels are the stereo interconnect and power on-off switches.
Basic Specifications: The DPL 220 is available in both unbalanced and balanced versions designated DPL 220 and DPL 220B, respectively.
Connections to the DPL 220 are via ¼" phone jacks while the DPL 220B uses XLR type connectors.
DPL 220B inputs are electronically balanced and the outputs are transformer coupled.
Suggested List Price: Suggested pro user prices:
DPL 220: $299.00.
DPL 220B: $379.00.

URSA MAJOR, INC.
8 x 32 DIGITAL REVERB SYSTEM
Box 18, Belmont, MA 02178
(617) 489-0303
Date Product Introduced: 1981.
Product Description and Applications: The new reverb system produces a wide range of natural and artifical reverberation effects suitable for studio, broadcast, live performance, and other applications where clean, high-quality sound is important. The microprocessor-based front panel has separate LED read-out and control for each adjustable reverberation parameter. These displays and controls make the 8x32 an exceptionally "friendly" system to operate, despite its sophistication. The 8x32 also features a bank of 32 non-volatile (they retain their contents even when the power is turned off) storage registers that allow users to store and recall 32 complete reverb set-ups, and to edit them at will. Four basic programs are available with 8x32, ranging from a small, fast-diffusing "Plate" to a large, echoing "Space" simulation.
Suggested List Price: Price: $5995.

VALLEY PEOPLE, INC.
GAIN BRAIN II
P.O. Box 40306, 2820 Erica Place, Nashville, TN 37204
(615) 383-4737
Contact: Bob Todrank-Marketing Director.
Date Product Introduced: December 1, 1980.
Product Description and Applications: Gain Brain II combines the functions of Limiter, compressor, and Ducker (voice-over device) in a small package. The Valley People EGC 101 VCA at the heart of the unit assures very low noise & distortion...unparalleled transparency. A proprietary release strategy discourages pumping, squashing, and modulation distortion.
Basic Specifications: Slew Rate: 13v/usec.
Signal to Noise: 112dB (+21dBv in & out).
Threshold: Variable – 40dBv to + 20dBv.
Ratio: Variable – 1.3:1 to 00:1.
"Duck" Ratio: 1:50.

A NEW DAWN IN REVERBERATION!

XL-210



UNMATCHED PERFORMANCE AT AN AFFORDABLE PRICE!

For years, companies have tried to develop a self-contained, rack-mount reverb of professional quality that would sell for under $1,000. All attempts have been based on the same basic design, some using signal manipulations in an attempt to conceal the inherent inadequacies of the reverberation elements. Not one of these designs successfully eliminates the unwanted side-effects such as boing, twang and flutter.

The new MASTER-ROOM™ XL-210, however, incorporates revolutionary technology (patent pending) which provides smooth, natural sounding reverberation without unwanted side-effects . . . even on the most demanding percussive material.

The XL-210 operates in true stereo as well as full mono. This unit can be used with the echo/effects section of any console or can be connected in the main signal path. The versatile EQ allows the user to effectively simulate the reverberant sounds of a live chamber, plate or concert hall. The XL-210 is ruggedly built for road use and is triple-isolated to prevent acoustic feedback.

The MASTER-ROOM™ name has long been synonymous with the highest in professional quality reverberation and can be found in the most respected studios and on tour throughout the world. The XL-210 provides performance that is far superior to what has previously been considered the best of inexpensive reverbs and establishes the new standard for excellence in systems priced below $1,000.

Available at:

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SAN FRANCISCO

2001 Bryant St.
San Francisco, CA 94110
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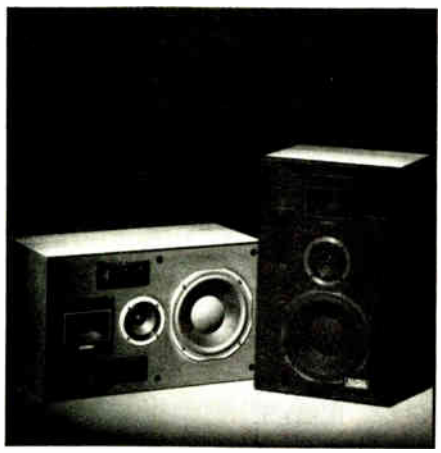


Altec Corporation
9813A Monitor Speaker System

ALTEC CORPORATION
9813A MONITOR SPEAKER SYSTEM
1515 So. Manchester Ave., Anaheim, CA 92803
(714) 774-2900
Contact: Larry Lutz-Product Mgr., Commercial Products.
Date Product Introduced: May 12, 1981.
Product Description and Applications: The 9813A is a unique speaker system well suited to monitoring and recording broadcast studios and control rooms, as well as disk mastering rooms. It may alsc be used for live or recorded sound reproduction in small clubs, theatres, schools, and so forth. Features include the new LZT UHF driver, tangerine radial phase plug, Mantaray constant directivity horn, automatic power control, and anechoic dampening.
Basic Specifications: The 9813A is a three-way system consisting of a 12 inch low-frequency driver, a 5 inch mid-frequency driver, and a radial phase plug compression driver mounted to a Mantaray constant directivity horn.
The dimensions are 25½ inches high by 15½ inches wide by 13½ inches deep.
The weight is 37 lbs.

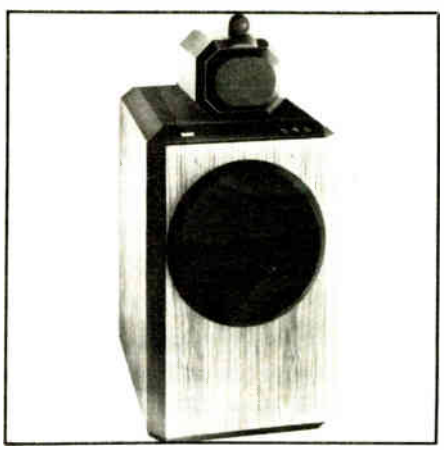
ALTEC CORPORATION
921-8A LOW FREQUENCY LOUDSPEAKER
1515 So. Manchester Ave., Anaheim, CA 92803
(714) 774-2900
Contact: Larry Lutz-Product Mgr., Commercial Products.
Date Product Introduced: May 12, 1981.
Product Description and Applications: The 921-8A is a 15 inch low frequency loudspeaker designed specifically for sound reinforcement in reproduction systems where high power handling capacity must be combined with high sensitivity in linearity. The 921 is built on a rigid 16 inch dye-cast aluminum frame, which is designed for either front or rear mounting. An efficient 4.87 lb. ferrite magnet structure backs up a high power voice coil. The voice coil is wound on an aluminum form for maximum strength and heat dissipation and then attached to a carefully molded paper cone. The entire cone /voice coil assembly is mounted to the frame with a flexible yet linear surround and spider. The magnet is secured mechanically by bolts and adhesive to the loudspeaker frame. Together, these components make up a loudspeaker that is efficient, yet rugged; linear, yet tolerant of large amounts of power..
Basic Specifications: The 921 has a continuous power rating of 150 watts, and a frequency response from 35 to 8000 Hz. It is designed for high efficiency, high linearity, low distortion, and wide range.

AMERICAN ACOUSTICS LABS
ROAD SYSTEMS RS-250
629 W. Cermak Rd., Chicago, Il 60616
(312) 243-1310
Contact: Jim Straus, National Sales Manager.
Date Product Introduced: January, 1981.
Product Description and Applications: 12-inch, two-way stage monitor, with 2-inch voice coil, 40-ounce magnet, wide dispersion titanium dome compression-type high frequency driver, computer-designed L/C crossover network; advanced insta-set thermal protection grips; 10-year limited warranty.
Basic Specifications: 10-100 watts dynamic range; 50-10,000 Hz ± 4dB frequency range; 8 ohms impedance; 16x21½x16-in.; 44 lbs; 10-year warranty.

AMERICAN ACOUSTICS LABS
ROAD SYSTEMS RS-350
629 W. Cermak Rd., Chicago, Il 60616
(312) 243-1310
Contact: Jim Straus, National Sales Manager.
Date Product Introduced: January, 1981.
Product Description and Applications: 15-inch, two-way multi-purpose portable playback system; with 2-inch voice coil; 40-ounce magnet; wide-dispersion, titanium-dome, compression-type, high-frequency driver; computer-designed L/C crossover network; advanced insta-set thermal protection circuit; durable, non-resonant cabinet construction; recessed professional grips; 10-year warranty.
Basic Specifications: 10-150 watts dynamic range; 42-15,000 Hz ± 4dB frequency range; 8 ohms impedance; 25x20x15½-in.; 65 lbs; 10-year limited warranty.

AMERICAN ACOUSTICS LABS
ROAD SYSTEMS RS-450
629 W. Cermak Rd., Chicago, Il 60616
(312) 243-1310
Contact: Jim Straus, National Sales Manager.
Date Product Introduced: January, 1981.
Product Description and Applications: Dual 15-inch, two-way, multi-purpose portable playback system; with 2-inch voice coils; 40-ounce magnets; wide-dispersion, titanium-dome, compression-type, high-frequency driver; computer-designed L/C crossover network; advanced insta-set thermal protection circuit; durable, non-resonant cabinet construction; recessed professional grips; 10-year warranty.
Basic Specifications: 10-250 watts dynamic range; 38-15,000 Hz ± 6dB frequency range; 4 ohms impedance; 40½x20x15½-in.; 125 lbs; 10-year limited warranty.

B&W LOUDSPEAKERS LTD.
MODEL 801
C/O OVERHAUSER MARKETING
P.O. Drawer BZ, Incline Village, NV 69450
(702) 831-3174
Contact: Bill Overhauser.
Date Product Introduced: January 10, 1981.
Product Description and Applications: The Model 801 is the one model that represents the sum total of B&W expertise in loudspeaker development. Every element of its design, from the directable midrange/treble turret to the electronic overload protection system to the isolation-mounted Bextrene bass driver reflects a B&W innovation.
A testament to the 801's success is that if has been chosen by EMI and Decca in England, CBS in America, EMI Pathe in France and EMI Electrola in Germany as well as by numerous other professional recording studios as a primary monitoring loudspeaker.
Truly the flagship of the B&W line, the Model 801 incorporates loudspeaker advancements that other manufacturers are only beginning to discover. The Model 801 offers tomorrow's state-of-the-art performance today.
Basic Specifications: Frequency Response: 45 Hz to 20 KGz ± 2dB at centre of the listening window at 2m.
Drive Units: Vertical in-line and corrected for minimum inter-unit time delay. Computer-matched in pairs insuring accuracy typically better than 0.25dB.
Overload Protection: Overload protection circuit prevents thermal damage to drivers.
Power Handling: Minimum amplifier 50 watts into 8 ohms. No upper limit because of Audio Powered Overload Circuit (APOC).
Dimensions: Height: 948mm (37.3in).
Width: 432mm (17 in).
Depth: 560mm (22 in).
Weight: 44kg (97lb).
Cabinet Finish: Standard: selected veneers of teak, walnut and black ash. Special: selected veneers of rosewood.
Suggested List Price: $3,070 per pair.



B&W Loudspeakers Ltd.
Model 801

B&W LOUDSPEAKERS LTD.
DM-12
C/O OVERHAUSER MARKETING
P.O. Drawer BZ, Incline Village, NV 69450
(702) 831-3174
Contact: Bill Overhauser.
Date Product Introduced: January 10, 1981.
Product Description and Applications: A significant trend in today's audio equipment is toward small loudspeakers capable of significant acoustic performance. However, virtually all of these "mini-monitors" suffer from either inadequate bass performance, low sensitivity or poor power handling capability. Unlike the competition, B&W's proprietary polymer bass/mid-range driver lets the DM12 recreate realistic sound pressure levels even at low frequencies. And, through its use of B&W's proprietary APOC overload protection circuit, the DM12 can be safely used even with high-powered amplifiers.
Basic Specifications: Frequency Response: 85Hz to 20KHz ± 2dB freefield on listening axis at 2m.
Drive Units: Two, vertical in-line.
Overload Protection: (APOC) Audio Powered Overload Circuit.
Power Handling: Suitable for amplifiers having a power output of 15 watts or greater. No upper limit because of Audio Powered Overload Circuit (APOC).
Dimensions: Height: 355mm (14in).
Width: 220mm (8¾in).
Depth: 270mm (10½in).
Weight: 9.6Kg (21 lb).
Cabinet Finish: Standard: selected veneers of teak, walnut and black ash. Special: selected veneers of rosewood.
Suggested List Price: $650 per pair.

Multiple Choice:

A. Studio A is our most advanced music studio, featuring a 32-input Neve console, MCI 24-track recorder and a great Yamaha piano.

B. Studio B is an overdub studio with a versatile control room for 16-track music or media production. It includes an Amek console as well as MCI and Ampex multi-track recorders.

C. Studio C is our least expensive 16-track music studio, equipped with a 24-input MCI console, an MCI multi-track recorder and an eight-foot German Steinway.

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Mix 1981 AES Studio Spotlight

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Meeting expectations, as well as budgets.

Twenty-four track recording in Menlo Park.
970 O'Brien Drive, Menlo Park, California 94025 (415) 328-8338

Divide and conquer.

Conquer distortion, defeat clipping, clean up your mix.

Bi-amplification or tri-amplification with Yamaha's F-1030 frequency-dividing network can take you a long way down the road to audio perfection.

By separating high, mid and low frequencies before amplification, the F-1030 increases efficiency and headroom to the point where you need fewer amplifiers and speakers to produce the same sound level. What's more, by dividing the sound for several amplifiers and many sets of speakers, the F-1030 eliminates the cost of individual passive crossovers.

Control your own! Unlike other dividing networks, Yamaha's F-1030 offers dB-calibrated detented controls on both inputs and outputs, as well as transformer-coupled XLR and standard phone jack connectors. Twelve selectable crossover frequencies range from 250Hz to 8kHz, with your choice of 12dB/octave or 18dB/octave slopes, plus a switchable 40Hz 12dB/octave high-pass filter.

Use with confidence! Noise and distortion are virtually extinct. The Yamaha F-1030 will drive a full +24dBm (12.3 volt) output into a 600-ohm load. It will also accept input levels to +30dB.

The F-1030 crossover, like all our Professional Series equipment, was designed with you, the professional, in mind. It performs its job as expertly as you do yours. Visit your Yamaha dealer for a demonstration.

The F-1040, a 4-way crossover, will be available in early '80.

Because you're serious.

YAMAHA

Available at:

LEO'S PROFESSIONAL AUDIO
5447 Telegraph Ave., Oakland, CA 94609 (415) 652-1553

New Products SPEAKERS • MONITORS UPDATE

CETEC GAUSS
CS 318
9130 Glenoaks Blvd., Sun Valley, CA 91352
(213) 875-1900
Contact: J.R. Williams, Assistant Gen. Mgr.
Date Product Introduced: September 1980.
Product Description and Applications: A three-way custom system using an 18-inch sub-woofer for the low-frequency section, a 10-inch mid-bass loaded into a cash taper horn, and a Gauss 4080 compression driver on our 4140 horn. This system fulfills the need for a wide range system in a reasonably sized enclosure. Intended primarily for electronic keyboard reproduction.
Basic Specifications: Nominal Impedance: 4 Ohms LF, 8 Ohms HF.
Rated Power [$(Vrms)_2/Z$)]: LF 400, HF 150 Watts.
Sensitivity (1W, 1M): 98 dB SPL.
Useable Bandwidth: 35-13 KHz.
Crossover Frequency: 250 Hz, 1200 Hz.
Pattern: 100°H, 40°V.
Components: 4843A, 3184B, 4080, 4140, Xover(2).
Net Weight: 260 lbs.
M.F. Horn Cut-Off: 225 Hz.
Pink Noise SPL (1W, 1M): 101 dB.
Separate network required for 250 Hz Bi-Amp.

CETEC GAUSS
CS 221
9130 Glenoaks Blvd., Sun Valley, CA 91352
(213) 875-1900
Contact: J.R. Williams, Assistant Gen. Mgr.
Date Product Introduced: September 1980.
Product Description and Applications: A two-way custom system using two 10-inch woofers loaded into a new hyperbolic cosine flare horn and a Gauss 4080 compression driver mounted on a 4140 horn. The system has a built-in high level, passive crossover network with a crossover frequency of 1200 Hz. This new system is the answer to open, clear, high-level sound from a very small enclosure.
Basic Specifications: Nominal Impedance: 8 Ohms.
Rated Power [$(Vrms)_2/Z$)]: 200 Watts.
Sensitivity (1W, 1M): 101 dB SPL.
Useable Bandwidth: 60 - 13 KHz (-6 dB).
Crossover Frequency: 1200 Hz.
Pattern: 100°H, 40°V.
Components: 2x3164B, 4080, 4140, Xover.
Dimensions: 36"H x 24"D x 24"W.
Net Weight: 180 lbs.
M.F. Horn Cut-Off: 200 Hz.
Pink Noise SPL (1W, 1M): 103 dB.

GOLLEHON INDUSTRIES, INC.
GOLLEHON 280
2431 Clyde Park S.W., Grand Rapids, MI 49509
(616) 247-8231
Contact: John T. Gollehon.
Date Product Introduced: First introduced 1977, refined 1981 with larger drivers.
Product Description and Applications: The Gollehon 280 is a 2-way, full-range direct-radiating sound reinforcement speaker for installation in clubs, auditoriums, and music halls. The 280 features high power handling, high sound pressure levels, and high efficiency from 40 to 16 KHz. The 280 has seen widespread use recently as a keyboard speaker for musicians who demand reliability and specs for grueling keyboard applications. During the disco boom, the 280 was a popular designer's choice and remains a popular speaker for other areas of musical playback systems.
Basic Specifications: Freq. Response: 40-16 KHz.
Power Handling: 125 watts RMS.
Sensitivity: 102 dB, 1 watt at 1 meter, 8 ohms impedance, 90°/40° dispersion, 2 KHz crossover.
Weight: 60 lbs.
Suggested List Price: $550.00.

JAMES B. LANSING SOUND, INC.
F155 18" LF MUSICAL INSTRUMENT LOUDSPEAKER
8500 Balboa Boulevard, Northridge, CA 91329
(213) 893-8411
Contact: Nina Stern, PR; Ron Means, Pro. Div. Mgr.
Date Product Introduced: November 1980 (AES).
Product Description and Applications: Designed specifically for electric bass amplification systems, the 18-Inch E155 incorporates a massive Symmetrical Field Geometry (SFG) flux-stabilized magnet structure, new high temperature adhesives and composite voice coil formers. Provides great power handling capability and sensitivity with minimum distortion.
Basic Specifications: Power Capacity: 300 W (CSW)/ 600 W (CPM).
Sensitivity: 98 dB SPL (1W, 1M).
Suggested List Price: $324.00.

JAMES B. LANSING SOUND, INC.
2245H 18" LF LOUDSPEAKER
8500 Balboa Boulevard, Northridge, CA 91329
(213) 893-8411
Contact: Nina Stern, PR; Ron Means, Pro. Div. Mgr.
Date Product Introduced: November 1980 (AES).
Product Description and Applications: Features JBL's Symmetrical Field Geometry (SFG) flux-stablized magnetic structure, new high temperature adhesives and composite voice coil formers. Incorporates a new die-cast aluminum frame and integrally stiffened cone with foam surround: motor assembly of the 2245H is equipped with a long, one-inch deep voice coil for maximum excursion/linearity. Offers high sensitivity, great power handling capability and low distortion.
Basic Specifications: Frequency Range: 20 Hz - 2KHz.
Power Capacity (CPM): 600 W.
Sensitivity (1W, 1m): 95 dB SPL.
Voice Coil Diameter: 4-inch edgewound copper ribbon.
Suggested List Price: $324.00.

JAMES B. LANSING SOUND, INC.
224OH 18" LF TRANSDUCER
8500 Balboa Boulevard, Northridge, CA 91329
(213) 893-8411
Contact: Nina Stern, PR; Ron Means, Pro. Div. Mgr.
Date Product Introduced: November 1980 (AES).
Product Description and Applications: Features JBL's Symmetrical Field Geometry (SFG) flux-stablized magentic structure, new high temperature adhesives and composite voice coil formers. Equipped with a new die-cast aluminum frame and integrally stiffened cone with cloth surround: offers great power handling capability, minimum distortion and optimum low frequency linearity. Performs well in ported enclosures or as a horn driver.
Basic Specifications: Frequency Range: 30 Hz - 2KHz.
Power Capacity (CMP): 600 W.
Sensitivity (1W, 1m): 98 dB SPL.
Voice Coil Diamter: 4-inch edgewound copper ribbon.
Suggested List Price: $324.00.

MILLER & KREISEL SOUND CORP.
SATELLITE-VOLKSWOOFER SYSTEM-A
10391 Jefferson Blvd., Culver City, CA 90230
(213) 204-2854
Contact: Chuck Back, Publicity Director.
Date Product Introduced: January, 1981.
Product Description and Applications: Satellite-Volkswoofer System-A: Satellite-Subwoofer System. Woofer has internal amp for biamplification. Satellites are compact and designed for efficiency, power handling, sharp transient response, and sharp imaging. System was initially designed for monitoring use with digital and direct-to-disc recordings. Volkswoofer-A can be used as add-on subwoofer to existing systems.
Basic Specifications: S-1A Frequency Response: 55-22KHz ± 3dB.
Volkswoofer-A: 18-100 Hz ± 3dB, 60 watt amplifier RMS @ .5% THD.
Volkswoofer-A uses feedback circuit to correct for cone distortion.

NETWORKS, H.F. SECTION SYSTEMS
RENKUS-HEINZ
Renkus-Heinz, Inc. 17851 AB Sky Park Circle, Irvine, CA 92714
(714) 540-3154
Contact: Algis Renkus.
Date Product Introduced: February, 1981.
Product Description and Applications: The HFS Series of High-Frequency Systems are compact, portable and connect easily to any woofer system. The units come complete with exponential horn, compression driver, protective network and continuous attenuator. The enclosures are solidly constructed and carpeted for maximum sear resistance. A choice of 8 ohm and 16 ohm is available on all units. Crossover frequencies are fixed, but on special order, crossover frequencies can be changed, two-way crossovers can be substituted or the networks can be deleted altogether. Prices will change for these special units.

WESTLAKE AUDIO INC.
TM-3 & TM-4 MONITORS
2696 Lavery Ct., Unit 18, Newbury Park, CA 91320
(213) 655-0303
Contact: Westlake Audio Professional Sales Division.
Date Product Introduced: February 3, 1981.
Product Description and Applications: Westlake is now into production of the TM-3 and TM-4 Monitor System. The systems are 3-way, bi-amp (TM-3), or tri-amp (TM-4). Units are available with oak or walnut hardwood horns, finished for free-standing applications and unfinished for custom installation. Westlake received many requests for sound quality of the HR-1 Monitor without as much cost and complexity. The new TM-3 and TM-4 utilize the HR-1 mid and high frequency horn technology at a moderate price.
Basic Specifications: Dual 15 inch woofers, horn loaded compression tweeter and mid range.

New Products TAPE RECORDING UPDATE

MCI, INC.
JH-110BX SERIES
1400 West Commercial Blvd., Ft. Lauderdale, FL 33309
(305) 491-0825
Contact: Larry Lamoray, Marketing Manager.
Date Product Introduced: 1981.
Product Description and Applications: The JH-110BX Series includes mono and stereo recorders with options available to adapt them for any application. Standard features include totally transformerless circuitry, RTZ III tape timer/locator with four programmable memories, variable speed and a built in TVI (Tape Velocity Indicator). All machines are 2 speed (7½ · 15 ips) and include separate equalization and bias settings for each speed.
Basic Specifications: Record/Repro Response: 7½ ips, 30 Hz · 20 KHz + 75/ – 2 dB.
Record/Repro Response: 15 ips, 30 Hz · 24 KHz +.75/ – 2 dB.
S/N Ratio: 68 dB (A) weighted.
Suggested Retail Price: JH-110BX-2-VP, $5,295.00 list.

Mitsubishi Electric Sales America
X-80 PCM Recorder

MITSUBISHI ELECTRIC SALES AMERICA, INC.
DIGITAL AUDIO DIVISION
X-80, X80A, TWO CHANWEL
MASTERTAPE PCM RECORDERS
7045 North Ridgeway Ave., Lincolnwood, IL 60645
(800) 323-4216, (312) 982-9282 in Illinois.
Contact: Lou Dollenger, Sales Mgr., Sonny Kawakami, Mkt. Mgr.
Date Product Introduced: November 1980.
Product Description and Applications: The X-80 (portable) and X-80A (console) recorders are the only digital recorders whose tape can be razor-blade edited. This unique feature, which eliminates the need for an outboard electronic editor in many applications, is basically a by-product of the most sophisticated and powerful error-correction method ever devised, guaranteeing that all errors are detected and the greatest majority are completely corrected. The X-80 is a two-section portable unit designed for ease of location recording and mastering, the X-80A includes ease of maintenance, built-in speakers.
Basic Specifications: Dynamic Range: Greater than 90 dB.
Weight: X-80, 176¼ lb.; X-80A, 265 lb.
Distortion: Less than 0.05 % (ref. level).
Sampling Freq.: 50.4 KHz.
Power Consumption: 350 VAC (117v, 60 Hz.).
Code Bits: 16-Bit linear.
Connectors: XLR type (LR 3-14).
Freq. Response: 20 Hz · 20 KHz (+ 0.5 · – 1.0 dB).
Crosstalk: less than 85 dB.
Availability: Immediate.
Suggested List Price: X-80, $25,000 (single units); X-80A: $27,000.

Mitsubishi Electric Sales America
X-80A PCM Recorder

MITSUBISHI ELECTRIC SALES AMERICA, INC.
DIGITAL AUDIO DIVISION
X-800 32 CHANNEL PCM RECORDER
7045 North Ridgeway Ave., Lincolnwood, IL 60645
(800) 323-4216, (312) 982-9282 in Illinois.
Contact: Lou Dollenger, Sales Mgr., Sonny Kawakami, Mkt. Mgr.
Date Product Introduced: March 1981.
Product Description and Applications: Utilizing the same error-correction code as the X-80 Series recorders, this unit utilizes 1" tape at a speed of 30 ips, allowing for 1 hour recording time. A remoteable Auto-locater unit features auto or manual punch-in and punch-out, internal clocking, memory for 100 take-times, a number of search functions, variable speed. 44 tracks handle data, error-correction, SMPTE coding, analog data, and one track for storage of computerized mixing or timing data.
Basic Specifications: Dynamic range: greater than 90 dB.
Power consumption: 24 amp (117v, 60 Hz.)
Distortion: less than 0.05% (ref. level)
Editing functions: sync recording manual and auto. Punch-in, punch-out.
Sampling freq.: 50.4 KHz.
Code bits: 16-bit linear.
Freq. response: 20 Hz to 20 KHz (+ 0.5 – 1.0 dB)
Crosstalk: less than – 80 dB.
Weight: 400 kg.
Availability: September 1981.
Orders accepted now.
Suggested List Price: Less than $200,000.

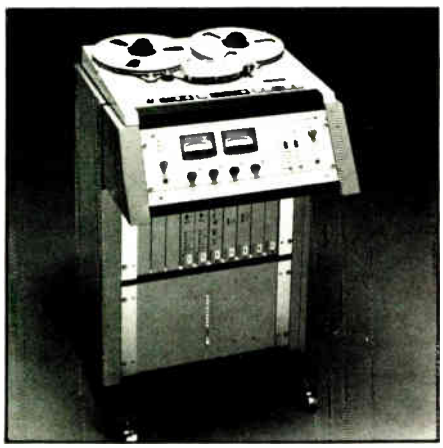
MITSUBISHI ELECTRIC SALES AMERICA, INC.,
DIGITAL AUDIO DIVISION
XE-1 ELECTRONIC EDITOR
7045 North Ridgeway Ave., Lincolnwood, IL 60645
(800) 323-4216, (312) 982-9282 in Illinois.
Contact: Lou Dollenger, Sales Mgr., Sonny Kawakami, Mkt. Mgr.
Date Product Introduced: May 1981.
Product Description and Applications: An important addition to the cut/splice editing capability of the X-80 Series recorders, the XE-1 offers many features that no electronic editor includes. Freely selectable crossfade times, digital fading for resetting recording levels, a CRT display that unmistakeably identifies edit points, a built-in mini-printer that records all editing chores during a project, and the ability to control three X-80 Series recorders for control and two for sync recording and playback.
Basic Specifications: PCM Data Input: 16-Bit serial, 50.4KHz. Sampling.
Edit code: SMPTE.
Precision: 833 microseconds.
Edit memory: 20 events.
Crossfade durations: 5-100 ms. (5ms. steps).
Digital fader: +6 to minus infinity dB.
Weight: 143lb.
Power Supply: 117v, 60 Hz.
Available: September, 1981.
Suggested List Price: Less than $30,000.

Mitsubishi Electric Sales America
X-800 32 Channel PCM Recorder

NAKAMICHI U.S.A. CORP.
NAKAMICHI 700ZXE
1101 Colorado Avenue, Santa Monica, CA 90401
(213) 451-5901
Contact: K. Aoyama, Marketing Coordinator.
Date Product Introduced: March 5, 1981.
Product Description and Applications: The 700ZXE, Auto-Tuning Cassette Recorder optimizes, through the Auto-Calibration processor, azimuth, bias, and level settings for the particular type being used. The optimum settings are automatically stored in memory for future use.
Basic Specifications: Frequency Response: 20-20,000 Hz ± 2 dB, 18-23,000 Hz ± 3 dB.
Signal to Noise Ratio: Better than 66 dB w/Dolby B type.
Total Harmonic Distortion: Less than 0.8% at 400 Hz 0dB.
Wow and Flutter: Less than 0.04% WTD rms.
20" (w) x 11" (H) x 10" (D), 14 kg (30 lbs. 14oz.)
Suggested List Price: $2,400.00.

NAKAMICHI U.S.A CORP.
NAKAMICHI 700ZXL
1101 Colorado Avenue, Santa Monica, CA 90401
(213) 451-5901
Contact: K. Aoyama, Marketing Coordinator.
Date Product Introduced: January 28, 1981.
Product Description and Applications: The 700ZXL cassette recorder features the A.B.L.E. Auto-Calibration processor which automatically sets azimuth, bias, level, and equalization prior to recording, and the 700ZXL features a true Random Access Music Memory that subsonically encodes up to 15 programs per side.
Basic Specifications: Frequency Response: 20-20,000 Hz ± 1.5 dB; 18-24,000 Hz ± 3 dB.
Signal to Noise Ratio: Better than 66 dB w/Dolby B type.
Total Harmonic Distortion: Less than 0.8% at 400 Hz 0 dB.

Wow and Flutter: Less than 0.04% WTD rms.
20" (w) x 11" (H) x 10" (D), 14Kg (30lbs. 14 oz.).
Suggested List Price: $3,000.



Otari Corporation
MTR-10-2 Recorder

OTARI CORPORATION
MTR-10-2, MTR-10-4 PROFESSIONAL RECORDERS
2 Davis Drive, Belmont, CA 94002
(415) 592-8311
Contact: Steve Krampf, Mktg. Dir.
Date Product Introduced: January, 1981.
Product Description and Applications: The MTR-10 Series is offered in two professional formats, ¼" two channel and ½" four-channel (easily converted to ¼", two channel). Both feature the most advanced features and performance from state-of-the-art electronics and mechanical design. Applications are for recording studios, broadcast production, soundtrack and advanced industrial uses where exceptional quality master recordings are required.
Basic Specifications: Full D.C. PLL Servo tape transport operation governed by an integral microprocessor; transport logic and dual real-time counter controlled by a separate microprocessor.
Tape speeds of: 30/15 ips, 15/7.5 ips or 7.5/3.75 ips.
Freq. Response: ¼" at 30 ips, 40 to 28 KHz, at 15 ips 20 to 20 KHz; ½" at 30 ips 60 to 28 KHz, at 15 ips-30 to 20 KHz.
S/N Ratio: at 30 ips-66 dB/2 track unweighted AES, at 15 ips-63 dB/2 & 4 track unweighted NAB.
Wow & Flutter: at 30 ips-0.04% unweighted, at 15 ips-0.06% unweighted.
Suggested List Price: Two channel = $6450. Four channel = $8450.

OTARI CORPORATION
5050 BQ-SERIES II PROFESSIONAL RECORDER
2 Davis Drive, Belmont, CA 94002
(415) 592-8311
Contact: Steve Krampf, Mktg. Mgr.
Date Product Introduced: January, 1981.
Product Description and Applications: A compact replacement for the MX5050-OXD. A ¼", four channel machine with dual speed (15/7 1/2 ips); variable speed D.C. capstan servo; selective reproduce; motion sensing control logic; built-in test and cue oscillator; plug-in heads; and easily accessible electronics adjustments. Punch-in and out record without clicks and pops; front panel editing and adjustable cue; bridging input and low impedance output for driving 600 ohm loads (balancing can be accomplished with optional output transformers); exceptional signal-to-noise and crosstalk.
Basic Specifications: 10 1/2" reel capacity.
Switchable speed pairs (3 3/4-7 1/2 or 7 1/2 -15 ips).
Four head stacks.
Flutter and Wow: 15 ips-less than 0.05%, 7 1/2 ips-less than 0.06%.
Frequency response: 15 ips (at0 VU) -30 to 20,000 Hz ± 2 dB, at 7 1/2 ips (at -10 dB) -30 to 12,000 ± 2 dB.
S/N Ratio at 15 ips-63 dB NAB weighted, at 71/2 ips 62 dB NAB weighted.
Suggested List Price: $2,995.

OTARI CORPORATION
5050 MARK III-8
2 Davis Drive, Belmont, CA 94002
(415) 592-8311
Contact: Steve Krampf, Mktg. Mgr.
Date Product Introduced: Spring AES.**Product Description and Applications:** A ½" 8 track replacing the 5050-8D, retaining all of the performance, reliability and features of its predecessor. It offers compact size, added flexibility in production features. Full function remote option and advance transport control through a proprietary Otari microprocessor.
Basic Specifications: Specifications will be available at AES.

New Products TAPE RECORDING UPDATE

SONY CORP. OF AMERICA
PCM—1610 DIGITAL AUDIO PROCESSOR
9 W. 57th St., New York, NY 10019
(212) 371-5800
Contact: Roger Pryor, General Manager, Sony Digital Audio Products (213) 537-4300.
Date Product Introduced: May 12, 1981 (AES debut).
Product Description and Applications: The PCM-1610 is a two-channel, 16-bit digital audio processor. The unit incorporates a Cyclic Redundancy Check Code, an advanced error correcting code, which protects against drop-out, analyzes and replaces missing information, and eliminates pulse noises or crossword error. With the addition of a variable mute selector, the system protects against bit errors. The automatic SMPTE time code generator allows immediate editing and assemblage of recorded material, using the Sony DAE-1100 digital editor or a video editing console. The PCM-1610 has a switchable intrasformer/transformerless function on inputs and outputs.
Basic Specifications: Better than 90 dB dynamic range.
Distortion less than 0.05 percent over entire audio spectrum.
Unmeasurable wow and flutter.
Compatible with all tapes made on the PCM-1600, which the 1610 replaces.
16-bit linear quantization, the accepted professional standard.
77 lbs.; 17" x 10½" x 18¾" inches.
Suggested List Price: $28,000.

SOUNDCRAFT INC.
SCM382
20810 Manhattan Place, Suite 120, Torrance, CA 90501
(213) 328-2595
Contact: Wayne Freeman.
Date Product Introduced: 1981.
Product Description and Applications: 24 track multitrack recorder, full function remote control, including 9 memory autolocator. Compact size.

Studer Revox America
PR-99

STUDER REVOX AMERICA, INC.
PR 99
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5851
Contact: Gerald LeBow, Sr. VP.
Product Description and Applications: The professional's Revox-PR99 with balanced (XLR) inputs/outputs, calibrated/uncalibrated levels, ASA-VU metering with LED peak indicators. Rugged die-cast chasis for rack or console mounting 10.5 inch reel capacity, selectable tape speeds remote control option. Complete editing facilities, dump, editing, head access, and 2-way self sync. Studer designed transport, die cast head block assembly and tension arms provide instant smooth start-up and outstanding tape handling.

Basic Specifications: Frequency response of the PR99 is rated at 30-20,000 Hz, +2/-3dB at 7-½ ips, with a 66dB signal/noise ratio and a fluxivity of 500nWb/m (less than 1.5% distortion.)
Wow and Flutter: using the DIN peak-weighted measurement standard, is 0.08% at 7-½ ips.
Output level is internally adjustable from -20dBu to +9dBu at 0VU. Standard setting for 0VU is a +4dBu line level with a magnetic fluxivity of 250nWb.
Customers may specify the 0VU reference line level, bias, tape, and 0VU fluxivity.
Suggested List Price: $2,095.

STUDER REVOX AMERICA, INC.
STUDER A80VU MKIII MULTITRACK RECORDER
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Contact: B. Hochstrasser, Pres. or D. Beard, Mgr. Techn. Svcs, Studer.
Date Product Introduced: November 1980.
Product Description and Applications: New version of the renowned A80VU series of recorders. New close proximity headblock for excellent punch-in/punch-out performance, new channel switching logic and improved audio electronics. The MKIII system includes a 20 memory microprocessor controlled autolocator as well as a multifunction channel remote control.
Suggested List Price: 4-track expandable to 8 tracks: $14,500.
8-track: $19,950.
16-track: $31,250.
24-track: $42,000.

STUDER REVOX AMERICA, INC.
STUDER B67 MKII TAPE RECORDER
1425 Elm Hill Pike, Nashville, TN 37210
(615) 254-5651
Contact: Bruno Hochstrasser, Pres. or Doug Beard, Mgr Techn. Svcs, Studer Division.
Date Product Introduced: NAB Las Vegas, April 12, 1981
Product Description and Applications: Improved version of the successful Studer B67 series of recorders. Improved editing facilities with locking tension arms, and dual servo brakes. Better head access for tape marking, etc. New transport control. All service adjustments are now accessible behind hinged front panel.
Suggested List Price: From $4250.

UNITED RESEARCH LAB. CORP.
AUTO-SENSE
16 East 52nd Street, New York, NY 10022
(212) 751-4663. TWX 710 581-3622
Contact: George Adams, Pres.
Date Product Introduced: August 1, 1980.
Product Description and Applications: Electronic motion sensing for Ampex 300, 350, 351, 354, and 440 recorders. For older machines which do not incorporate this safety feature. (Patented).
Suggested List Price: $295.00.

AUDIO AND VIDEO TAPE

CERTRON CORPORATION
CERTRON CASSETTE TAPE ON HUBS
1701 S. State College Blvd. Anaheim CA 92806
(800) 854-3943, (714) 634-4280
Contact: Monica Terrill, Industrial Products Sales Manager.
Date Product Introduced: January 1981.
Product Description and Applications: Certron offers cassette tape on hubs for blank loaders and duplicators. Three qualities are available: Low Noise (LN) for economical loading or voice duplication—High Energy (HE) for extraordinary dynamic range and extended high frequency sensitivity—FEREX 2 (FE)—The top of our line—super high output, normal bias, 120u equalization producing extended lows, a solid mid-range and extended high range. 20 hubs per carton/7200 ft. per hub.
Basic Specifications: Specifications and samples are available upon request from Certron Corporation.
Suggested List Price: Prices for hubs are as follows: C60 50A Low Noise (LN), $3.00 per hub; C90 30T Low Noise (LN), $3.90 per hub; G60 50A High Energy (HE), $3.90 per hub; G60 50T High Energy (HE), $4.20 per hub; G90 30T High Energy (HE), $4.80 per hub.

New Products TAPE RECORDING UPDATE

FUJI MAGNETIC TAPE DIVISION, FUJI PHOTO FILM USA, INC.
H621 PREMIUM 1" VIDEOTAPE
350 Fifth Avenue, New York, N.Y. 10118
(212) 736-3335
Contact: Len Stein, Public Relations (212) 245-7831.
Product Description and Applications: The H621 premium one-inch videotape features Fuji's proprietary Beridox formulation. This tape delivers a cleaner, sharper, more accurate picture that reduces the generation gap between original master tape and final dubs.

FUJI MAGNETIC TAPE DIVISION, FUJI PHOTO FILM USA, INC.
FUJI PREMIUM BERIDOX
¾" U-MATIC VIDEOCASSETTES
350 Fifth Avenue, New York, N.Y. 10118
(212) 736-3335
Contact: Len Stein, Public Relations (212) 245-7831.
Product Description and Applications: Fuji Beridox Premium U-Matic videocassettes feature superior color reproduction, low noise and improved durability, they are ideal for the widest range of tasks from original photography through editing and duplication. Available in standard size KCA-10, KCA-15, KCA-20, KCA-30 and KCA-60, as well as compact KCA-10 and KCA-20.

FUJI MAGNETIC TAPE DIVISION, FUJI PHOTO FILM USA, INC.
FUJI FINE-GRAIN BERIDOX VHS AND BETA VIDEOCASSETTES
350 Fifth Avenue, New York, N.Y. 10118
(212) 736-3335
Contact: Len Stein, Public Relations (212) 245-7831.
Product Description and Applications: Fine grain Beridox VHS and Beta cassettes offer excellent color reproduction, sharp clear pictures and superior stop-motion performance. Fuji's premium videocassettes feature improved binder materials and backings for multiple re-recordings with few drop-outs packaged in Fuji's unique white non-shedding plastic sleeve.

LARKSONG CASSETTES
MAF CASSETTES
10 Scott Place, Point Arena, CA 95468
(707) 882-2833, (800) 358-8236
Contact: Alan Niven.
Date Product Introduced: December 1980.
Product Description and Applications: Lowest distortion, highest output, widest response audio cassette with new transport design for trouble-free performance at high speed or real time operation. Available in 2 box styles.
Basic Specifications: MOL: +6 dB.
Sensitivity: +7.5 @16KHz; HDL3.
Distortion: 0.4% @ 250 nW/m.
Dynamic Range: 63 dB.
Standard Lengths: C-45, C-60, C-85, C-100, C-120.
Suggested List Price: Quantity prices start at $0.75. No minimum.

New Products OTHER EQUIPMENT UPDATE

AMBER ELECTRO DESIGN LTD.
MODEL 358 FREQUENCY COUNTER AND 359 BALANCING INTERFACE
4810 Jean Talon West, Montreal, Quebec, CAN H4P2N5
(514) 735-4105
Contact: Wayne Jones, President.
Date Product Introduced: April 1981.
Product Description and Applications: Model 358 Frequency Counter is an accessory that can be added to the Amber Model 3500 Distortion and Noise Measuring Set. It provides a convenient digital readout at both internal oscillator frequency and an external signal frequency...Model 359 Balancing Interface is also an accessory available for the 3500 that provides 600 ohm balanced inputs and outputs for checking of professional and broadcast equipment.
Basic Specifications: Model 358 Frequency Counter provides high resolution (0.1Hz or 0.01Hz) and fast update (100ms or 1 second gate time). It has auto-ranging and automatic signal detection circuits to prevent erroneous readings. Model 359 Balancing Interface provides balanced or floating, bridging or terminating inputs and outputs, measurement signal selection and simple operation.

AX
4B-1 PORTABLE RACK
7801 Melrose Ave., Los Angeles CA 90046
Contact: Paula Lintz, Marketing.
Date Product Introduced: March 1981.
Product Description and Applications: The 4B-1 is a portable, self-powered rack that will hold four modules of the Aphex Line of Equalizers and Compressor/Expanders. The 4B-1 has dual ¼" and T-T size patching on the rear for input, output and sidechain access. It is a valuable tool that will allow an engineer or producer to easily carry four of his favorite modules from studio to studio.
Basic Specifications: 5¼" high x 8" wide x 7" deep. 110-240 VAC 25 watts.
Suggested List Price: $349.00.

AUDIO & DESIGN RECORDING, INC.
D'ZAP!
P.O. Box 786, Bremerton, WA 98310
Toll Free: 1-800-426-6170; Local: 206-275-5009.
Contact: Nigel Branwell, V-P (Sales).
Date Product Introduced: December 1980.
Product Description and Applications: A hand held device designed primarily for use by musicians and their road crews but is also popular in the studio. D'ZAP!:
*Locates shock hazard potentials between various types of equipment.
*Checks cords used in Audio, Video, and Power Applications.
*Detects many grounding problems.
*LED's display Shock Hazard and status of guitar/patch cord.
Basic Specifications: Cord Check: Will check for Phase and Continuity in 2 and 3 conductor cords. Will give shock hazard potential up to 1000 volts.
Suggested List Price: $55.00.

AUDIO ENGINEERING ASSOC.
MS-38 MARK IV
1029 N. Allen Ave, Pasadena, CA 91104
(213) 798-9127
Contact: Wes Dooley.
Date Product Introduced: January 1981.
Product Description and Applications: The new AEA MS-38 Active Matrix Decoder is an unmatched advancement in M-S recording technology. This transformerless, single-control device provides simple, high quality decoding (matrixing) of the Mid and Side (sum and difference) signals into conventional (left and right) stereo, without the problems previously inherent in transformer-based matrix units. From monaural to 'super-wide' stereo, the integrity of the sonic image remains constant, without awkward shifts in channel balance or level.
Basic Specifications: Differential inputs accept balanced, line-level signals from the M and S microphones via gold-plated TRS ¼" phone jacks; outputs (left and right signals) are single-ended at line-level, also via gold-plated TRS jacks. The MS-38 is thus designed to interface with the recording chain between the microphone pre-amplifier and the input channel controls (i.e. in the pre-fader/EQ patch loop) for maximum flexibility. The Mark IV version features reduced current consumption when operated from batteries.
Suggested List Price: $435.00.

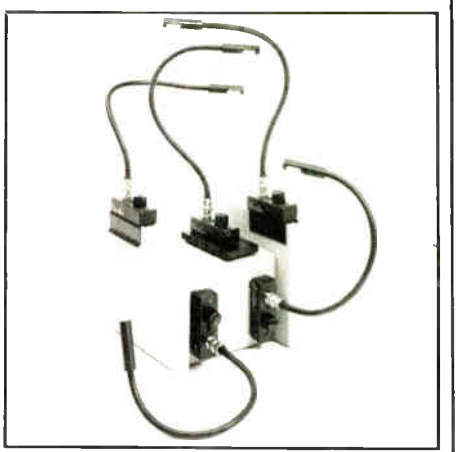
BEYER
MATCHING TRANSFORMER
c/o Frank Barth 500 Fifth Ave., Suite 2700, New York, NY 10110
(212) 398-0820
Contact: Gerald M. LeBow.
Date Product Introduced: Spring AES.
Product Description and Applications: Beyer Matching Transformers are available wired into rugged cables or in compact plug-in form, with Cannon, phone or DIN connectors. The line includes transformers that match either 200 or 500 ohm impedances to 2,000, 5,000, 45,000, 50,000 or 80,000 ohms, as well as isolation transformers with a 200 ohm input and output impedance for use in preventing ground loops and other interface problems.

BEYER
MONITOR/TALKBACK HEADPHONES
c/o Frank Barth 500 Fifth Ave., Suite 2700, New York, NY 10110
(212) 398-0820
Contact: Gerald M. LeBow.
Date Product Introduced: Spring AES.
Product Description and Applications: Designed to withstand temperature/humidity extremes, both the headphone and microphone units may be ordered with a variety of impedance options. Headband and ear cushions are foam-filled and covered in comfortable softskin. Acoustic isolation of each earphone is rated at 20dB.
Basic Specifications: The earphone(s) of the DT 108/9 provide a frequency response from 30-20,000Hz, with a nominal 400-ohm impedance. A 1mW input produces an acoustic output of 94dB SPL, and the phones will produce a 124dB SPL beyond the threshold of pain—without burnout. The microphone unit is rated for 40-12,000Hz response, has a 200 ohm impedance, and a hypercardioid pick-up pattern.
Suggested List Price: Professional user net for the DT 108 is $89.95, and $106.00 for the dual-phone DT 109.

BOGEN DIVISION/LEAR SIEGLER, INC.
CFC-1 EQULAIZER AND ACOUSTIC FEEDBACK CONTROLLER
Box 500, Paramus, NJ 07852
(201) 343-5700
Contact: VP, Marketing, Joseph A. Palmieri.
Date Product Introduced: October, 1980.
Product Description and Applications: To shape response curves, eliminate acoustic feedback and increase usable gain. Internally select gain of either +11 dB or 0 dB for extra gain when needed and avoidance of gain overlap problems without turning down the volume level for excellent signal-to-noise ratio. Input channel accepts a high-Z unbalanced input or with accessory plug-in transformer, a low-Z input, balanced or unbalanced. Ten active filters in ⅔-octave increments give graphic display, hi and lo cut filters, filter bypass switch, level controls, choice of AC or battery operation, wall or rack mounting (with accessories).
Basic Specifications: 10 filters centers at ISO preferred frequencies. Filter attenuation of 0 to 14 dB. Frequency response of 20 to 20,000 Hz ±2 dB. additional 6 dB/octave rolloff ajustable below 140 Hz & above 4000 Hz.
Output Noise Level of 20-20,000 Hz: better than −82 dB; typically −100 dB with internal gain set at +11 dB.
Rated Output of 4V @ less than 1% THD, 20-20,000 Hz.
Output clipping level minimum of 5.5V.
THD 0.5% maximum at rated output in filter & bypass modes with filter level controls full up at 1000 Hz.
One high-Z, unbalanced (phone jack) output.
Power on-off indicator light. 13 transistors, 4 diodes.
Size 11 3/8"W x 2 7/8"H x 7 3/4"D.

CAE, INC.
LITTLITE SM
2828 Stommel Rd., Ypsilanti, MI 48197
(313) 482-6568
Contact: John Malek/Marketing Manager.
Date Product Introduced: January 1, 1981.
Product Description and Applications: The SM is used for semi-permanent placement of L-1 or L-2 on equipment. It enables fast placement of lamp directly over equipment in use and easy removal for storage, with minimal effect on the equipment.
Suggested List Price: $2.00.

CAE, INC.
LITTLITE CL
2828 Stommel Rd., Ypsilanti, MI 48197
(313) 482-6568
Contact: John Malek/Marketing Manager.
Date Product Introduced: January 1, 1981.
Product Description and Applications: The CL, for use in temporarily clamping an L-1 or L-2 onto music stands, console sideplated, clipboards, etc., adjusts to clamp thickness of 1/16 in. to 3/4 inch.
Suggested List Price: $4.00.



CAE, Inc.
Littlelite WB

CAE, INC.
LITTLITE WB
2828 Stommel Road, Ypsilanti, MI 48197
(313) 482-6568
Contact: John Malek/Marketing Manager.
Date Product Introduced: January 1, 1981.
Product Description and Applications: The WB allows free standing operation of any L-1 or L-2, where application requires a moveable lamp of user would prefer not affix lamp to equipment.
Suggested List Price: $6.00.

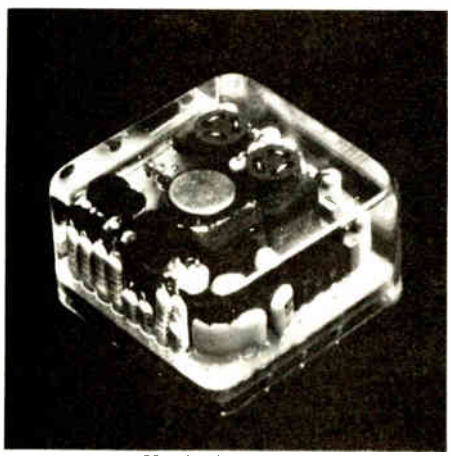
CLEAR-COM INTERCOMS
SYSTEM II
759 Harrison Street, San Francisco, CA 94107
(415) 989-1130
Contact: Edward M. Fitzgerald, Director of Sales.
Date Product Introduced: NAB-April 1981.
Product Description and Applications: The new System II family of main and remote stations reflect years of experience in designing and producing high quality/performance intercoms. Portable and fixed intercom systems including rack and wall mount are offered in single and multiple channel versions. A wide choice of headsets combine to meet most applications in professional touring, entertainment, television and industrial applications.
Basic Specifications: System features solid-state electronics interconnected with standard microphone cable. Designed for use with dynamic microphones and headsets. Station bridging impedance greater than 20Kohms over a frequency response of 200 to 10KHz.
Suggested List Price: Systems vary in price from $500 to $3000.00 depending on selection of main and remote stations.

CM LABS DIV., AUDIO INTERNATIONAL, INC.
CM260
Box 477, Monticello Rd., Albany, KY 42602
(606) 387-6658
Contact: Geoffrey Hall, Marketing Mgr.
Date Product Introduced: 1980.
Product Description and Applications: A system using phantom power which drives hi z or lo z headphones and provides musician with level and tone controls. Each system includes a master power supply and 6 amplifiers. Amplifiers are connected to master supply with standard microphone cable.
Basic Specifications: Amplifier power = 20 watts RMS into 8 ohm load at less than .5% THD.
Gain: 30dB or 50 dB switchable.
Suggested List Price: $1199.00.

COUNTRYMAN ASSOCIATES, INC.
TYPE 95 FET DIRECT BOX
417 Stanford Ave., Redwood City, CA 94063
(415) 364-9988
Contact: David MacMillan.
Date Product Introduced: April 1981.
Product Description and Applications: This new active direct box provides the same unsurpassed sound quality that made the Type 85 Box the industry standard for direct feeds from basses, lead guitars and synthesizers. Its extremely high impedance eliminates loading and active gain provides superior performance with low output keyboards and pickups. The Type 95 features automatic ground selection, built in RF filtering, and separate pickup and speaker level inputs.
Basic Specifications: Frequency Response: 20 Hz to 20 KHz ± .5 dB.
Distortion: .05%.
Input Impedance: 10 MEG ohms.
Input Noise: 2 mV max.
Power: 9 volt battery.
Suggested List Price: $114.95.

dbx, INC.
THE 941 AND THE 942
71 Chapel Street, Newton, MA 02195
(617) 969-3210
Contact: Mr. David W. Roudebush, National Sales Mgr.
Date Product Introduced: April, 1981.
Product Description and Applications: The 941 is a dual channel encode only Type II noise reduction module featuring active balanced inputs and + 24dBm drive capability. The 942 is a dual channel decode only version of the 941 including switch selectable provision for decoding dbx encoded discs. Any quantity of encode and decode channels can be mixed to obtain up to 16 channels of Type II noise reduction in a single 5¼" high 900 series frame.
Basic Specifications: Input + 24dBm max., 25Kohms bal. - 18.5Kohms unbal.
Output: + 24dBm max., drive 600 ohms or greater.
Freq. Resp.: 40Hz-20KHz ± .5dB,-1dB at 30 Hz (encode/decode cycle).
Effective Noise Reduction: 30dB plus 10dB additional headroom.
Slew Rate: less than 10V/us.
Suggested List Price: To be announced.

EECO
MULTI-CUE SYNCHRONIZER
1601 E. Chestnut Ave., Santa Ana, CA 92701
(714) 835-6000
Contact: P.E. Conlon.
Date Product Introduced: 1981.
Product Description and Applications: EECO Incorporated has announced the availability of its MQS-100A Series Multi-Cue Synchronizer, a frame-accurate, microprocessor-based SMPTE/EBU time code instrument. The new model, an enhanced version of EECO's MQS-100, is equipped with several new features designed to increase the efficiency, precision and flexibility of video or audio tape production. Enhancements include transfer of time code information from any machine to any cue or Event register, variable pre-roll, Event offset capability, three "scratchpad" memories accessible from the keyboard and the ability to make mode changes on-the-run.
Suggested List Price: $13,900.00.



Hardy Company
990 Discrete Op-Amp

THE HARDY CO.
990 DISCRETE OPERATIONAL AMPLIFIER
P.O. Box AA631, Evanston, IL 60204
(312) 864-8060
Contact: John Hardy, President.
Date Product Introduced: March 1981.
Product Description and Applications: The original component layout has been revised, streamlining assembly, simplifying and reducing component handlin, while retaining critical thermal proximities. The 990 directly replaces API 2520 modules, has a one-year warranty for materials and workmanship, and just plain sounds better!
Basic Specifications: Testing has been expanded to include a total of 48 hours of active burn-in at 100°C/212°F, with 24 hours early in the manufacturing cycle and 24 hours just prior to shipment. In addition, the output transistors are specially screened by their manufacturer (National Semiconductor), with electrical testing of all devices at 125°C/257°F.
Spec highlights include: Equipvalent input noise of −133.7dBv (re 0.775V, shorted input, BW = 20KHz). Maximum output level of +24dBv @ RL =75ohms. Slew rate = 18V/uS @RL = 150ohms, 16V/us @ RL = 75 ohms.

KDISC
STUDER A-80 UPDATE
26000 Springbrook Avenue, Saugus, CA 91350
(213) 888-6010
Date Product Introduced: 1981.
Product Description and Applications: Kdisc is marketing a Studer A-80 update. According to the Kdisc developement engineers, you simply replace your Studer A-80 output amplifier with a direct plug in replacement Kdisc 2572 card. Comparative listening tests show significant improvement in frequency response, detail and clarity. The Kdisc 2572 has virtually eliminated crossover distortion while lowering both IMD and THD by a minimum of ten times. Additionally, they have improved the signal to noise ratio 10dB and increased the slew rate 16 times.
Basic Specifications: Output: Balanced and Floating +24d½bm.
Frequency Response: 30 Hz to 15KHz +0dB to −.2dB typical.
20Hz to 20KHz +0dB to −.4dBm typical.
Distortion: 1KC at −4dBm .005% THD typical.
Output: S.M.P.T.E. IMD .0035 IMD typical.
Signal to Noise Ratio: Unweighted (−4dBm output). 88 dB typical.
Slew Rate: 16v/usec min.

LINEAR & DIGITAL SYSTEMS, INC.
PS-1 NOISE SUPPRESSION AND
POWER PROTECTION UNIT
46 Marco Lane, Centerville, Ohio 45459
(513) 439-1758
Contact: Jerry Gabbard, President.
Date Product Introduced: April 1981.
Product Description and Applications: The Model PS-1 is a power line conditioning unit designed primarily for sound reinforcement systems, although its unique combination of features makes it useful in laboratory, instrumentation and industrial environments. The transient suppressor provides protection from high voltage spikes on the power line from such sources as lightening strikes to nearby utility poles and inductive (i.e. motors & transformers) switching. The radio frequency interference (RFI) filter reduces noise from radio transmitters such as CB and from light dimmers, invariably found in night clubs which are usually the cause of the every-present sound system "buzz". Three neon lamps indicate relative phasing of the line, neutral and ground connections, thereby detecting improper wiring and/or grounding of the outlet in use. The latching relay prevents re-application of AC power to loads until the power on switch is manually depressed. This feature allows the user to properly sequence power-up and thereby avoid AMP/speaker damage (or destruction!). Additional features include a built-in circuit breaker, EIA standard 19" rack mounting, six grounded outlets and an 8 foot power cord.
Suggested List Price: $129.00.

MITSUBISHI ELECTRIC SALES AMERICA, INC.,
DIGITAL AUDIO DIVISION.
DDL-1 DIGITAL DELAY UNIT
7045 North Ridgeway Avenue, Lincolnwood, IL 60645
(800) 323-4218, (312) 982-9262 in Illinois
Contact: Lou Dollenger, Sales Mgr., Sonny Kawakami, Mkt. Mgr.
Date Product Introduced: November 1980.
Product Description and Applications: The DDL-1 Delay for Disk Cutting allows for extremely precise delay of the digital program signal. A unique cost-saving feature incorporates the 16bit conversion process in the X-80 Series Recorders, eliminating the need for extra converters in this unit. Delay time selectable by thumbwheel swtich for 33⅓ or 45 rpm cutting.
Basic Specifications: Input: 2ch. PCM Signal.
Code Bits: 16-bit linear.
Sampling Freq.: 50.4KHz.
Delay time: 0.01-1.95 seconds. (3.25 sec. with optional board).
Steps: 0.01 second steps.
Accuracy: 0.5 milliseconds.
Available: Immediately.
Suggested List Price: $9,000.00.

NORTRONICS
PROFORMANCE SERIES™
8101 Tenth Ave., North, Minneapolis, MN 55427
(612) 545-0401
Contact: Ken Lubitz, National Sales Mgr.
Date Product Introduced: February 1981.
Product Description and Applications: The Proformance Series, the first complete line of professional tape care and maintenance products includes bulk erasers, alignment tapes for both broadcast and studio use, head demagnetizers and an array of head cleaners, splicing products and more. Perhaps the most innovative product in the new line is the model PF-380 Broadcast Cartridge-Head Degausser which is the only product of its kind on the market. All products in the Proformance Series meet or exceed the highest standards set by NAB, UL or other applicable professional testing organizations.

RTS SYSTEMS
TWI-326 UNIVERSAL INTERFACE
1100 West Chestnut St., Burbank, CA 91508
(213) 843-7022
Contact: Ron Fuller, Sales Manager.
Date Product Introduced: October 1980.
Product Description and Applications: TWI-326 is designed to interface two different types of intercom systems to each other. Applications include coupling of carbon-mic type systems, matrix four-wire systems, telephone lines and camera systems, and telephone lines into audio consoles (two-wire or four-wire operation). It will also couple the RTS Systems TW intercom system to any type of intercom, or any of the above mentioned systems to one another.
Basic Specifications: Gain—Four wire: 30 dB each direction. Two Wire: 24 dB (TYP) each direction.
Frequency response: four wire to four wire 200 ohm termination: 100 Hz to 20 KHz (−3 dB)
Balance/Null: 20 dB to 40 dB
Input/output voltage range: −30 dBu to +10 dBu
Interfaceable line impedance range: 2 ohms and above
Four wire input impedance: 20 kilohms
Two wire input impedance: 10 kilohms

Peak current drive: ±200 mA
Withstanding voltage between channel A & B: ±500 V
Common mode rejection ratio between A & B 80 dB at 60 Hz.
Suggested List Price: Pro Net $1,470.00.

THE KEN SHAFFER GROUP, INC.
DCQ—DUAL CHANNEL CUE
10 E. 49th St., New York, N.Y. 10017
(212) 371-2335
Contact: Joshua Anzaroot.
Date Product Introduced: April 1981.
Product Description and Applications: The D.C.Q. (Dual Channel Cue) is a wireless stereo cue system designed specifically for use in recording studios to provide unlimited mobility for artists and performers. This rack panel stereo transmitter with corresponding belt pack receiver delivers clean, hi level output to drive any studio's head phones. This innovative product is a VLF loop system, easy to install with virtually no set up time for engineers.
Basic Specifications: VLF Loop w/300 MW output that covers 2500 sq. ft. area.
Stereo outputs w/switch selectable 2 channel mono.
Suggested List Price: Transmitter, $475.00; Receiver, $325.00.

THE KEN SHAFFER GROUP, INC.
I.E.D.—[IN-EAR DEVICE]
10 E. 49th St., New York, N.Y. 10017
(212) 371-2335
Contact: Joshua Anzaroot.
Date Product Introduced: January 1981.
Product Description and Applications: The I.E.D. [In-Ear Device] is a wireless electronic cue receiving system capable of providing audio signals and voice communications to an individual unobtrusively—without wires or cords of any kind connected to the ear or head area. The I.E.D. is wireless—but it's not RF! It requires none of the care of tuning of conventional radio transmission systems, and no legal (FCC) licensing. For further information, please contact The Ken Shaffer Group, Inc.
Basic Specifications: Case: high impact plastic
Color: R-1—beige; R-2—beige
Size: R-1—1½" x ⅝" x ⅜"
R-2—¾" x $\frac{5}{32}$" (ear canal portion only .150 x .240 x .25)
Amplifier: three stage silicon integrated circuit
Receiver: magnetic
Current drain: R-1—1.0 ma; R-2—0.4 ma
Battery life: R-1—average 120 - 150 hours;
R-2—average 30 - 40 hours
Temperature range: 0°C to 50°C (storage −20°C to 65°C)
Maximum acoustic output: 120 dB SPL @ 1000 Hz (into a 2cc cavity)
Signal to noise ratio: 40 dB @ 100 Hz
Noise suppression: 50/60 Hz, −45 dB @ 1000 Hz.
Suggested List Price: $300.00.

SHURE BROTHERS, INC.
M97EJ-AH
222 Hartrey Ave., Evanston, IL 60204
(312) 866-2200
Contact: Scott Mastricola, Product Mgr., High Fidelity Products.
Date Product Introduced: December 1980.
Product Description and Applications: This is a phono cartridge permanently integrated in a headshell with a universal 4-pin bayonet mount and an overhang adjustment with overhang accessories. The M97EJ-AH comes with the exclusive Shure Dynamic Stabilizer to handle any warp problems and to neutralize static electricity build up. It also includes a telescoped stylus shank for improved trackability and a side guard stylus deflector to protect the stylus.
Basic Specifications: Tracking force range: 1.5 - 3 grams (with stabilizer in use, the T.F. should be set at ½ gram higher)
Stylus tip: .4 x .7 mil elliptical
Trackability: at 2.0 gram (2.5 gram setting if stabilizer is used) 400 Hz - 30 cm/sec., 1 KHz - 41 cm/sec., 10 KHz - 34 cm/sec.
Channel separation: 20 dB at 1 KHz
Output: 4.0 mV at 5 cm/sec
Optimum load: 47 Kohms, 200-300pF
Frequency response: 20 - 20 KHz.
Suggested List Price: $101.00.

SOUND TECHNOLOGY, INC.
TR-150 TEST RECORD
1400 Dell Avenue, Campbell, CA 95008
(408) 378-6540
Contact: Sonny Funke, National Sales Mgr.
Date Product Introduced: April 1981.
Product Description and Applications: Test Record to be used with the Sound Technology Model 1500A Audio Test System and the Model 1110A Test Pre-Amp to measure characteristics of phono cartridges and turntables.

New Products OTHER EQUIPMENT UPDATE

Will be available in May 1981. Record had test groups organized for adjustments, clinic tests or detailed performance tests. Tests include channel balance, phasing, frequency response, trackability (vertical tracking), channel separation, speed error, flutter, and a quiet groove.
Basic Specifications: Record has four test groups: Set-up and Adjust Group: reference level and balance, trackability adjust, anti-skate adjust.
Clinic Test Group: (for quick testing during retailer's phono cartridge clinic) phasing, frequency response, trackability (vertical tracking), anti-skate (vertical or horizontal tracking), and channel separation.
Detailed Test Group: similar to clinic test group but with more detailed measurements.
Misc. Test Group: includes speed and flutter test and a quiet groove.
Suggested List Price: $50.00.

SOUND TECHNOLOGY, INC.
OPTION 007 FOR MODEL 1500A AUDIO TEST SYSTEM (ONE THIRD OCTAVE SPECTRUM ANALYZER)
1400 Dell Avenue, Campbell, CA 95008
(408) 378-6540
Contact: Sonny Funke, National Sales Mgr.
Date Product Introduced: April 1981.
Product Description and Applications: Option 007 for the Model 1500A (One Third Octave Spectrum Analyzer) provides spectral analysis of noise and flutter, and improves channel separation measurements. Application's: identification and analysis of noise components and wow and flutter components; analysis of room or speaker response using pink noise generator and two calibrated microphones for simultaneous "on axis" and "off axis" response; depth of erasure to – 70 dB.
Basic Specifications: Noise and channel separation measured from 20 Hz to 20 KHz with ⅓ octave resolution. Wow and flutter measured from 0.5 Hz to 200 Hz with ⅓ octave resolution. Filters are of constant percentage type conforming to ANSI Class II. Spectral tests are "sweep" type with approx. times: 20 sec/channel for noise, 4 min./channel for flutter and 80 sec/channel for channel separation. Format: a "card" that easily plugs into any Model 1500A with latest software updates. Available: May 1981.
Suggested List Price: $1,500.00.

SOUND TECHNOLOGY, INC.
MODEL 1110A TEST PRE-AMP
1400 Dell Avenue, Campbell, CA 95008
(408) 378-6540
Contact: Sonny Funke, National Sales Mgr.
Date Product Introduced: April 1981.
Product Description and Applications: A test pre-amp to be used in conjunction with the Model 1500A Audio Test System and the Sound Technology TR-150 Test Record to measure various characteristics of turntables and phono cartridges.
Basic Specifications: Nothing available yet. Product available July 1981.
Suggested List Price: To be advised.

SPECTRA SONICS
MODEL 802 SIGNAL GENERATOR & MODEL 510 BANDPASS FILTER
3750 Airport Rd., Ogden, Utah 84403
(801) 392-7531
Contact: Gregory D. Dilley.
Date Product Introduced: January 1981.
Product Description and Applications: Now for the first time, any audio professional can make precise noise measurements, calibrate tape machines, and sound systems, at an affordable price. The Spectra Sonics Model 802 Signal Generator and the Model 510 Bandpass Filter combine performance, reliability, and durability in a compact design. The self-powered test instruments allow for portable use without sacrifice to performance and reliability.
Basic Specifications: Model 510 battery powered band pass filter:
Gain: 60 dB ± .5 dB
Output impedance: less than 100 ohms
Input impedance: 10,000 ohms
Output loading: 600 ohms to infinity
Frequency response: 20 Hz - 3 dB (18 dB/oct), 20 KHz – 3 dB (18 dB/oct), pass band flat ± .2 dB
Connections: male banana for output, female banana/binding post for input
Weight: 226.8 grams (8 oz.).

Model 802 battery powered signal generator:
Output impedance: 0-1000 ohms unbalanced
Output loading: 600 ohms (essential for calibration)
Output level: continuously variable from infinity (– 74 dBm) to + 4 dBm; + 11 dB (unterminated)
Output Calibration: panel calibrated, infinity – 10 dBm, – 2 dBm, – 0 dBm, + 2 dBm and + 4 dBm.
Frequency selection: 50 Hz, 100 Hz, 1 KHz, 10 KHz and 15 KHz.
Frequency tolerance: within ± 10% of frequency selected.
Power requirement: two 9 V rectangular batteries (NEDA #1604)
Weight: 240.2 grams (12 oz.)
Suggested List Price: Model 510, $130.00; Model 802, $150.00.

SIE PUBLISHING
PROFESSIONAL AUDIO BUYERS GUIDE
31121 Via Colinas, Suite 1003,
Westlake Village, CA 91362
(213) 991-3400
Contact: Howard Parker, President.
Date Product Introduced: February 1981.
Product Description and Applications: The Professional Audio Buyers Guide is a reference manual of sound and recording equipment and contains professional products from 70+ manufacturers. Mixers by Neotek, TEAC, Tangent, DMI, Biamp, Tapco, Quantum Audio, Yamaha, and Soundcraft are represented. Recorders by Otari, Revox, TEAC, Tascam, and Akai are included. Microphones, equalizers, amplifiers, test equipment, speakers and even cable and connectors are all shown and described.
Basic Specifications: Size is 8½" x 11" format.
Suggested List Price: Retail: $15.95. Dealer and educational prices are available.

SOUND INVESTMENT ENTERPRISES
PS-40A PROJECTOR INTERFACE
31121 Via Colinas, Suite 1003,
Westlake Village, CA 91362
(213) 991-3400
Contact: Jim McCadliss.
Date Product Introduced: November 1980.
Product Description and Applications: The PS-40A connects between a movie projector's speaker output and a sound system microphone input to provide direct feed of the films audio into the sound system. The input (from the projector) is a standard ¼" phone jack and it's output is a male 3 pin XLR connector. The PS-40A is wired using EIA industry standard convention (positive voltage to tip of input provides positive voltage to pin 3 of output).
Basic Specifications: The input of the PS-40A is designed to provide a load to the projectors amplifier and the output of the PS-40A provides a transformer balance 250 ohm low impedance microphone level signal to the sound system. Size is 4" L x 1½" W x 1½" H and weight is 8 oz.
Suggested List Price: Retail is $59.95. Dealer pricing is available.

SOUND INVESTMENT ENTERPRISES
PS-40V PROJECTOR INTERFACE
31121 Via Colinas, Suite 1003
Westlake Village, CA 91362
(213) 991-3400
Contact: Jim McCandliss, Audio Consultant.
Date Product Introduced: December 1980.
Product Description and Applications: The PS-40V connects between a movie projector speaker output and a video recorders audio input to provide a direct feed of the films audio into the video recorder for transfer of film to video. The input and output connectors are standard ¼" phone jacks, the PS-40V is wired using EIA industry standard convention (positive voltage to tip of input provides positive voltage to tip of output).
Basic Specifications: The input of the PS-40V is designed to provide a load to the projectors amplifier and the output of the PS-40V provides a unbalanced line level signal to the video recorders audio input. Size is 4"L x 1½"W x 1½"H and weight is 8 oz.
Suggested List Price: Retail is $59.95. Dealer Pricing is available.

SOUNDER ELECTRONICS, INC.
PROGRAMMABLE PATCH BAY MODEL FX-1000S
21 Madrona St., Mill Valley, CA 94941
(415) 383-5811
Contact: Hamilton K. Agnew, Pres.
Date Product Introduced: (Future) End of April 1981.
Product Description and Applications: The rack mount Programmable Patch Bay allows the musician or studio engineer to remotely control up to 8 signal processing devices, 4 output locations (amps, tracks, etc.) and 8 control functions for equipment using shorting-type switches. Sixteen "PreSets" can be easily programmed from virtually limitless combos and can be recalled at the touch of a button. This eliminates the problem of growing more feet to hit several buttons at once. The FX-1000S standarizes switch pressures and locations and centralizes all functions for quick, easy access.
Basic Specifications: Super-quiet J-FET Switching, Rack mount, ¼" Phone and Cannon connectors, optional remote keyboard and footswitch.
Suggested List Price: Production models available at the end of April at suggested retail of $1,295.00.

WESTLAKE AUDIO INC.
CMB-2 STEREO, CONNECTOR MULT AND INTERFACE BOX
2696 Lavery Ct. Unit 18, Newbury Park, CA 91320
(213) 655-0303
Contact: Westlake Audio Professional Sales Division.
Date Product Introduced: March 11, 1981
Product Description and Applications: The CMB-2 functions as an Interface Adaptor Box, Signal Multing Box, Signal Switching Box, as well as a trouble shooting aid. Through use of switch selection the Box can be isolated into a maximum of four (4) sections or it can function as one continuous, twenty six (26) connector, three (3) conductor mult.
Basic Specifications: Completely passive in design the CMB-2 accommodates male and female XLR, Phone (TRS), TT (tiny Telephone Patch-cord), Phono, BNC, Banana and Terminal Strip connections. This compact Box measures 4.5 x 2.5 x 7.5 inches (11.5 x 6.4 x 19.1 centimeters) and weighs less than 2 pounds (.91 kilograms).

WIREWORKS CORPORATION
BANDITS™ CABLE MARKING SYSTEM
380 Hillside Avenue, Hillside NJ 07205
(201) 686-7400
Contact: Joel Katz, Marketing Manager.
Date Product Introduced: November 1980.
Product Description and Applications: Bandits™ are flexible, irradiated polyolifin tubes, hot-stamped with your imprint, positioned and heat shrunk six inches from the male connector of a Wireworks mic cable. This standard placement allows for easy identification, yet the Bandit™ is not visible at the microphone. Each Bandit™ color indicates a specific cable length.
Basic Specifications: For as little as $1.25 per cable, plus a $15.00 set-up charge for orders of less than 25 cables. 40 characters on two lines can be accommodated.

SEE page 82

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Belmont, California 94002
(415) 592-8311 Telex: 910-376-4890

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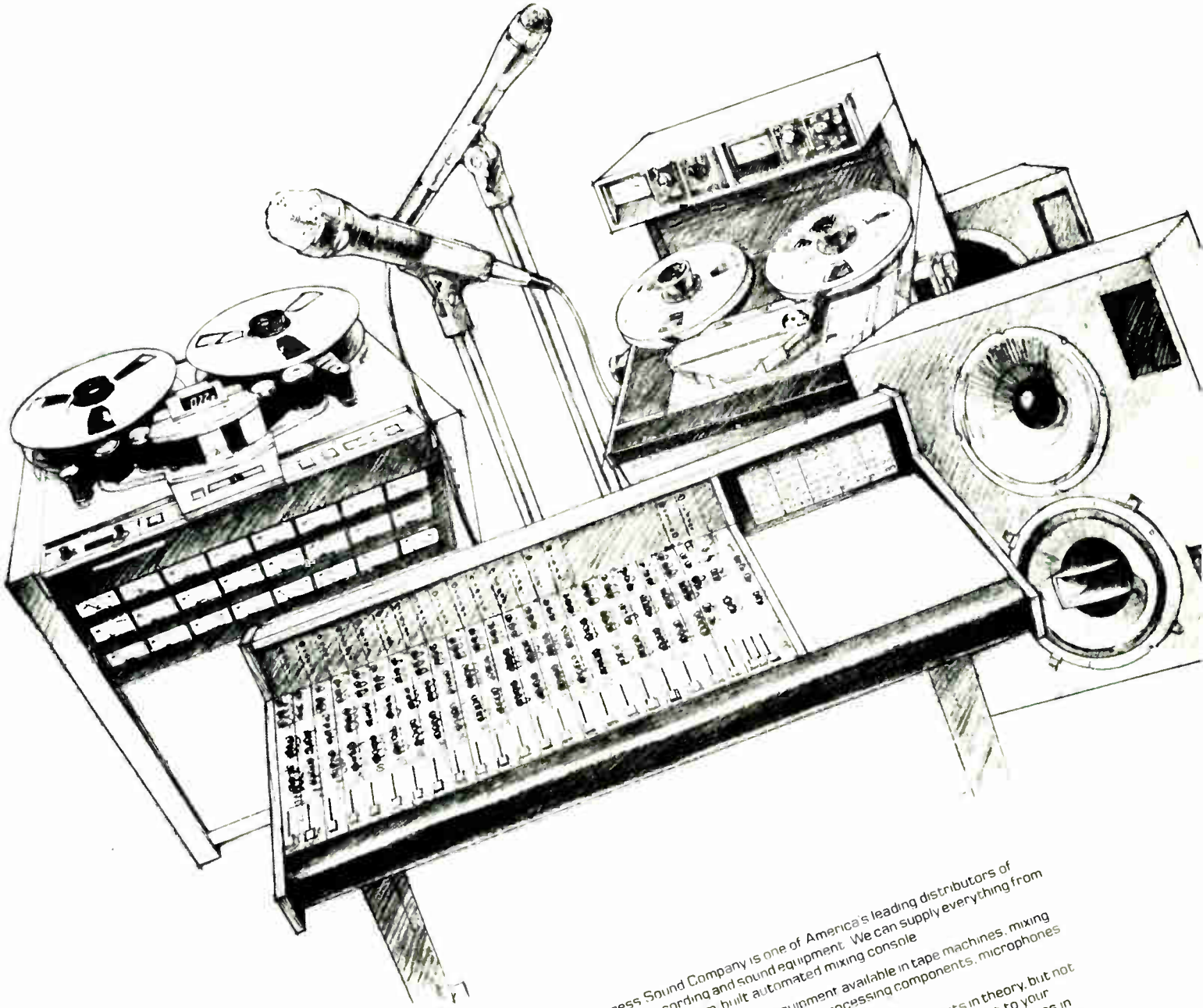

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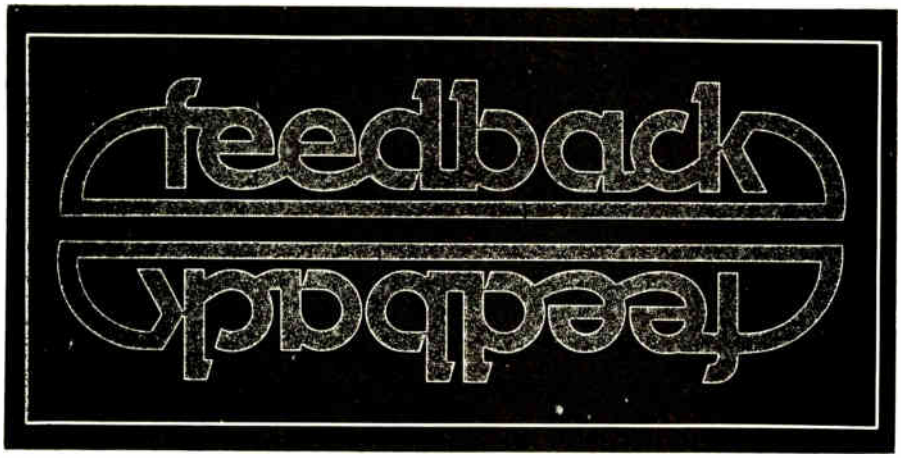


Dear Mix:

As one who has spent most of his working years in the field of disk cutting, first as a mastering engineer and more recently as the developer and manufacturer of the Zuma Disk Mastering Computer, I find the letters in the March issue from Mssrs. Temmer, Block, and Steele to be quite disturbing. Rather than enlighten the reader, they simply further confuse a situation already blown way out of proportion. Mr. Temmer cites system comparisons which Mr. Block says couldn't have possibly been made. On the other hand Mr. Block defends his system against a model lathe that Mr. Temmer never directly refers to. And Mr. Steele endeavors to prove his point through a rather dubious method. I hope that this letter will serve to put things in a proper perspective.

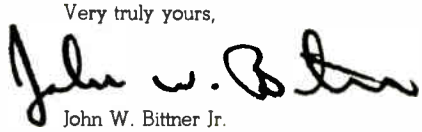
First, let me explain the difference between the current and prior generation of lathe controllers. The current generation (Compudisk, VMS-80 lathe, Zuma. etc.) all incorporate means by which the computer stores, in effect, a rather accurate "picture", usually in a digital format, of the previous groove cut. Then prior to cutting the next groove, the computer recalls this information, and compares it to a "picture" of the groove it is about to cut. If these "pictures" show it to be possible, the computer nestles the wiggles of the new groove with those of the previous one. This is an improvement over previous systems, such as the one in the VMS-70 lathe, which weren't smart enough to perform this trick. The second improvement has to do with the new computers being able to keep track of the space they have made during any one turntable revolution. This is important because the next groove to be cut always has to be out of the way of the previous groove. The new generation computers know how far they have moved from the previous groove and are therefore able to make a very accurate prediction as to how much further in they must move the cutter. The older generation did not have this information available to them and were therefore forced to continue making space whether it was necessary or not, just to be on the safe side. As these are the two major improvements responsible for greater disk cutting density, it should be expected that any disk, computer or lathe incorporating them would be similarily efficient.

It should be kept in mind, that in any disk cutting system the space utilized is determined primarily by the program being cut. It is conceivable for example, that the program may never allow the computer to nestle the grooves. However, this is unlikely, as music is essentially random. We agree with Gerry Block's claim of a 2-3 dB increase in efficiency over a stock VMS-70 as it not only correlates quite well with what the users of our Zuma Computers have told us, but corresponds to the theoretical improvement that one would expect from a groove nestling algorithm.

Although the comparisions made by Steele and Block, as well as others, perhaps tell us something, they do not tell us the whole story. As Bob Ludwig of Masterdisk correctly pointed out, such comparisions must be made under carefully controlled conditions. We are dealing with grooves whose typical width is less than a single strand of hair and with the space between them perhaps a tenth of that! Tom Steele's comment regarding the need for perfectly matched preview and program channels is well taken. Unfortunately, he then fails to take this into consideration when he atributes the increased efficiency he observed solely to his computer. Perhaps the disk he is comparing was not cut on such a matched system, but a more serious fault is the invalid assumption that had the original mastering engineer been able, he would have automatically cut the disk at some higher level. As we can't know this for sure, the comparison he describes doesn't prove anything.

Disk cutting is an art. It is the art of compromise. A little less level for a cleaner playback. A little less bass for more level and so on. And as an art, the final product is a reflection of the artist who created it, the mastering engineer. During the past year and a half, I have personally installed eighteen Zuma computers in cutting facilities coast to coast. I dare say that no two of them had their systems aligned and set up the same way, yet all were, and continue to produce, their share of hits. Disk cutting computers are tools of the artist, nothing more. The man using the tool is, and always will be, more important than the tool itself. That is something we should all be able to agree upon.

Very truly yours,



John W. Bittner Jr.
President,
Zumaudio, Inc.

When he was only 16, Mick built a studio in his basement, which later became PCI Recording of Rochester, New York. In 1971, he met another Rochester resident named Chuck Mangione. The two have worked together ever since. Mick spent a year at Act One Studios in Buffalo, then returned to PCI, before his association with Mangione brought him to L.A. in 1975. Since then, he's been an independent engineer, working with people like Peter McIan, Cher and Lani Hall.

ON GEOGRAPHY

"The difference used to be that there were different players, different producers, different artists recording in different cities. The records out of New York were a little more hard-hitting, energetic kind of records. The records that came out of L.A. were a little smoother. Stylistically, there was a difference. Now, they're moving around, recording different parts of albums in different places. I can't tell anymore. Half the time, I see a lot of the people I know from rhythm sections in New York out here. And when I've been in New York, I've seen a lot of friends from out here there. So you can very easily be fooled into thinking something is done where it isn't."

ON STEREOTYPING

"The first year I was here, I had to work on a lot of demos for people for practically nothing to demonstrate that I could record something else besides what Chuck did, because that would give me a very limited amount of work. It took a little while to get out of that. So I had to give away a lot of time to prove it."

ON HONESTY

"I don't like second-guessing. I mean, 'Yes, well, will the public like this? Will they love this?' I can't tell. And I think that really few producers really can tell in advance if the public is going to love the record or not. I think the best thing you can do from everybody's standpoint—artist, producer, musicians—make an honest record that everybody involved with loves."

ON SPECIAL EFFECTS

"I really haven't heard anything new for quite a while. I think that was mostly all explored by George Martin and the Beatles in the '60s. Now, it's refinements on that, putting different things together, you know. I don't think that I have heard a new effect in years—a new specific sound."

ON TAPE

"3M's new formulations came out first, usually. As a matter of fact, I know that, because 206 came out before 406 did. 250 came out before 456 did. 3M's been a leader with new formulations on tape.... I think 3M is ahead. The difference in audio is minimal. The difference in durability is great. After several hundred passes through the machine, 250 still has more oxide left on it, which is a big advantage. I'm not plugging the tape to get the ad. I really am using it, finding it more rugged. That's my main point."

SCOTCH 250
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