

SOUND & COMMUNICATIONS

BLUE BOOK

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TOPANGA

TWENTY-NINTH
1989
1990
EDITION



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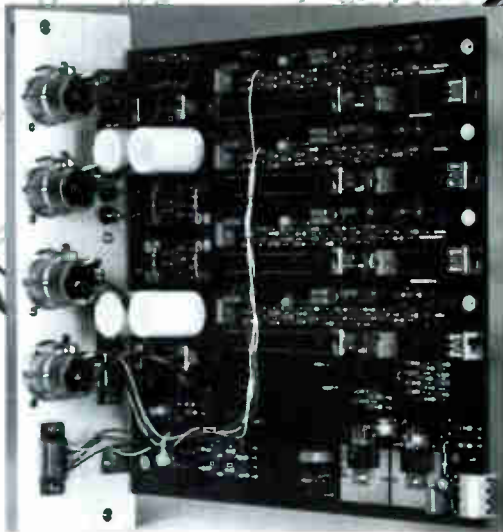
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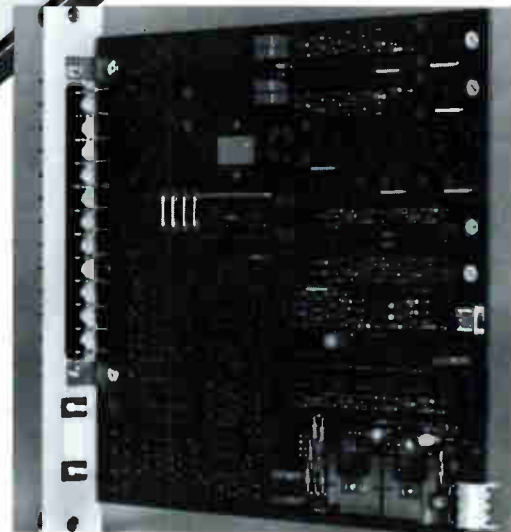
Two new Voice-Matic microphone mixer modules add automatic flexibility and operating performance to System 41 installations. The DJ-4114 Voice-Matic Microphone Mixer Module and DJ-4115 Voice-matic Master Module offer noise-free interconnection and total compatibility with all other System 41 components.



Model DJ-4114 Voice-matic Microphone Mixer Module

The DJ-4114 Input Mixing Module features buffered pre-amp outputs, pre or post gates, status LED and logic outputs and 18 volt phantom power supply. Optional features include remote level and input controls and 48 volt phantom power.

All IRP Products are made in the U. S. A.



Model DJ-4115 Voice-matic Master Module

The DJ-4115 Voice-matic Master Module mixes the microphone signals from all DJ-4114 Modules in the system along with any auxiliary input signals. Various remote controls are optional.

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This is the 29th edition of the Sound & Communications Blue Book, the only complete directory of suppliers to the sound contracting industry. You can find it all in the Blue Book, from carillons to powered mixers: Who makes them, where they are, who the personnel are. If it's not in the Blue Book, it probably doesn't exist.

The Blue Book is a mammoth undertaking which begins with The Form. The Form is sent several months prior to publication to all the manufacturers in the sound contracting industry. They fill in their information and return it to us, at which point we enter the information in the Blue Book database. It all sounds very easy; but of course there are deadlines and glitches and changes at the manufacturing level. A group of dedicated professionals at *Sound & Communications* makes it all happen.

This book is designed to be used all year as a reference work to do its job while you're doing your job. It can be used easily, and you can depend on its accuracy.

In recent years, we have added fax numbers for those of you who need information in a hurry. And we now have a listing of manufacturers representatives, so you know where to contact those people who are so vital to the industry. We've included a Brand Name Index, a Product Index, and an Index of Manufacturers.

This issue also contains a listing of that most elusive of suppliers — the software companies. It's the most complete listing we know of, in this business or any other, of those companies producing CAD software, with names, addresses, personnel and product descriptions all included.

We're proud of the Blue Book. We hope you'll use it and enjoy it. Please send your suggestions for next year, so we can continue to make it more and more useful and timely.

Welcome to the Blue Book.

SOUND & COMMUNICATIONS

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EVENTS

SEPTEMBER 1989

PLASA
London, UK
9/10 — 9/13

IBMA
Scottsdale, AR
9/20 — 9/23

OCTOBER 1989

NECA
Chicago, IL
10/1 — 10/3

SBE
Kansas City, MO
10/5 — 10/8

AES
New York, NY
10/18 — 10/21

NOVEMBER 1989

Lighting Dimensions
Nashville, TN
11/17 — 11/19

Acoustical Society of America
St. Louis, MO
11/27 — 12/1

DECEMBER 1989

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JANUARY 1990

NAMM
Anaheim, CA
1/19 — 1/21

EVENTS

FEBRUARY 1990

ICIA
Anaheim, CA
2/1 — 2/3

ISC South
Orlando, FL
2/15 — 2/17

MARCH 1990

AES
Montreux, Switzerland
3/13 — 3/16

APRIL 1990

NSCA
Las Vegas, NV
4/18 — 4/21

EDS
Las Vegas, NV
4/24 — 4/26

MAY 1990

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Anaheim, CA
5/1 — 5/3

JUNE 1990

ISC Central
Dallas, TX
6/12 — 6/14

NAMM
Chicago, IL
6/15 — 6/17

JULY 1990

Deadline for **Blue Book** forms

AUGUST 1990

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S E C O N D E D I T I O N

• New chapters on MIDI & SMPTE • New index • New diagrams



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World Radio History

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Products: lights

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VP Sls: Colin Gaines
Products: lights

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Dover, NH 03820
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Communications Co.
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San Diego, CA 92110
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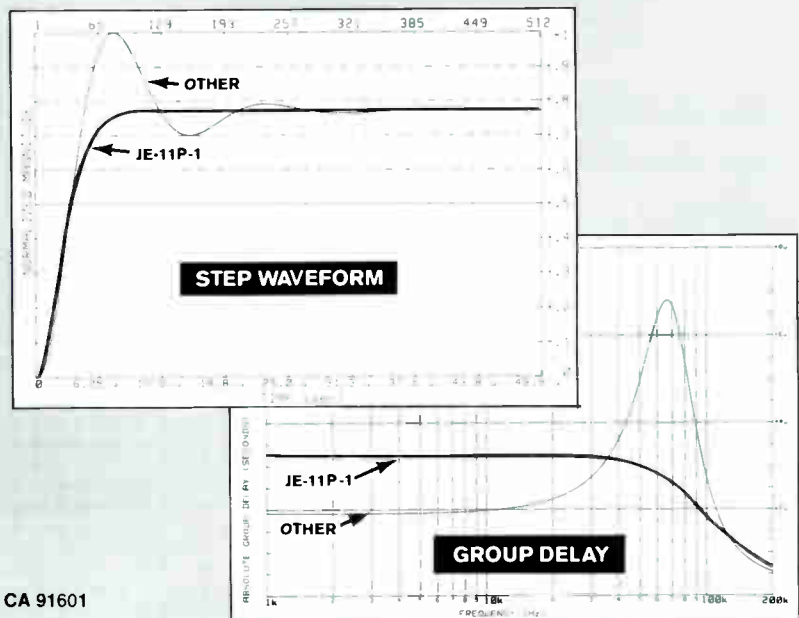
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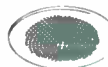
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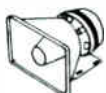
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Adv. Mgr.: D.V. O'Donnell, Office Mgr.: F. Bodnar
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MS, Morton Grove, IL, 312-966-2022
MS, Ontario, Canada, 416-675-3204

Omnimount Systems

10850 Vanowen St.
N. Hollywood, CA 91605
(818) 766-9000, FAX# 818-711-9669
Pres.: Alex Cyrell, VP: Susan Michelson, VP Mkt'g: Bruce Chantra, Sls: John Hix
Sigmat, Freehold, NJ, 201-462-1221
New West Audio, Burbank, CA, 818-955-9700
Benscik Assoc., Ocala, FL, 904-732-7775
Sound Mkt'g, Palos Hills, IL, 312-598-6888
Pro Audio Assoc., Burlington, MA, 617-229-6050
Products: hanging systems

Paladin

3543 Old Conejo Rd., Ste #102
Newbury Park, CA 91320
(805) 499-0318

Panduit

17301 Ridgeland
Tinley Park, IL 60477

800-777-3300, FAX# 708-532-1811

Peavey Electronics

711 A St.
Meridian, MS 39302
(601) 483-5365, FAX# 601-484-4278
Pres.: Hartley Peavey
Products: cabinet hardware, cleaning chemicals, connectors, knobs, lamps, speaker hardware

Penn Fabrication (USA)

PO Box 506
Hawthorne, NJ 07506
(201) 423-4404
Sls Dir.: Mike Panasuk, G. Mgr.: Richard Stratford, G. Mgr.: Gavin Naismith
Products: cabinet hardware, connectors, knobs, lamps, speaker hardware

PROTO-TEC

108 Fairlane Dr.
Joliet, IL 60435
(815) 744-7173
Products: panels

Seal-O-Matic

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Products: cabinet hardware, speaker hardware

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Products: cabinet hardware, cleaning chemicals, connectors, fabrication supplies, hanging systems, lamps, speaker hardware, tool kits, wire terminations

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Pres.: Peter Hughes, VP: Sherri Douglas
Products: wire terminations

Texwipe

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Upper Saddle River, NJ 07458
(201) 327-9100, FAX# 201-327-5945

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7200 McCormick Blvd.
Chicago, IL 60645
(312) 677-9500, FAX# 312-677-4476

Yale Audio of Florida

PO Box 2661
Tampa, FL 33601
(813) 876-6789
Pres.: Y. Brevda, Sls Mgr.: David Kentwood
Products: markers

HEADPHONES & HEADSETS

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250 Technology Circle
Scotts Valley, CA 95066
(408) 438-3833 (in CA), 800-538-0742
Pres.: Al Butcher, Exec VP: Phil Gattley, VP Sls: Kurt Siem, VP Consumer: George Poston
Products: boom-mic headsets, communications headsets

AKG ACOUSTICS

77 Selleck St.
Stamford, CT 06902
(203) 348-2121, 800-243-7885, FAX# 203-324-1942
Pres.: S. Richard Ravich, VP Op.: Derek Pilkington, VP Fin.: Bob Netter
Products: communications headsets, intercommunications headsets, isolation headsets, personal/stereo headphones, telecommunications headsets

Accusonics Systems

2101 Jericho Turnpike
New Hyde Park, NY 11040
(516) 328-3300
G. Mgr.: Dennis Goodman
Products: boom-mic headsets, communications headsets, intercommunications headsets, isolation headsets, telecommunications headsets

Alaun Engineering

2305 Florencita Dr.
Montrose, CA 91020
(818) 957-0618
Owner/Pres.: Al Braun, VP: M. Antoniate

Anixter Bros.

4711 Golf Rd.
Skokie, IL 60076
(312) 677-2600, 800-323-8167
Products: boom-mic headsets

Audiosears

2 South St.
Stamford, NY 12167
(607) 652-7305
Products: boom-mic headsets

Auditel Systems

396 Porter Ave.
Buffalo, NY 14201
(716) 886-0019, FAX# 716-886-1615
Pres.: David Langtry, Prod. Mgr.: Tony Roberson, Mkt'g Dir.: Jim Wood
Products: boom-mic headsets

Beyer Dynamic

5-05 Burns Ave.
Hicksville, NY 11801
(516) 935-8000, FAX# 516-935-8018
VP/G. Mgr.: Paul Murphy, Mkt'g Mgr.: Mike Solomon
Derek Allen, Burbank, CA, 818-840-8327
Bruce Marlin, Irving, TX, 214-869-0669
Tom Parnell, Bannockburn, IL, 312-234-6500
Bob Edsall, Asheville, NC, 800-999-9313
Dave Henderson, Burlington, MA, 617-229-6050
Products: boom-mic headsets, communications headsets, intercommunications headsets, isolation headsets, personal/stereo headphones, telecommunications headsets

BOSE—PRO PRODUCTS

The Mountain
Framingham, MA 01701
(508) 879-7330, FAX# 508-872-6541
G. Mgr.: David Bell, Nat'l Field Sls Mgr.: Timothy Dorwart, E. Reg. Mgr.: Robin Sibucan, W. Reg Rep: Michael Schneider
Products: intercommunications headsets

David Clark

PO Box 15054
Worcester, MA 01615
(617) 756-6216, FAX# 508-753-5827
Prod. Mgr. Comm.: George Conlon

Danavox/Telecommunications Div.

6400 Flying Cloud Dr.
Minneapolis, MN 55344
(612) 941-0690
Products: boom-mic headsets, communications headsets, telecommunications headsets

Dayton Industrial

126 Westpark Rd.
Dayton, OH 45459
(513) 236-3591

VP Sls/Mkt'g: Robert McDougall, VP Eng.: Kurt Farmer, Sr. Tech.: Frank Jaros
Products: personal/stereo headphones, telecommunications headsets

FOSTEX CORP. OF AMERICA

15431 Blackburn Ave.
Norwalk, CA 90650
(213) 921-1112, FAX# 213-802-1964
Exec. VP: Fred Huang, VP Sls/Mkt'g: Mark Cohen
Products: boom-mic headsets, personal/stereo headphones

HM Electronics

6675 Mesa Ridge Rd.
San Diego, CA 92121
(619) 535-6060, FAX# 619-452-7207
VP Mkt'g: J. Michael Hughes, Pro Audio Sls Mgr.: Eunice Davis, Ind'l Sls Mgr.: Bruce Slemmer, Cust. Svce Mgr.: Bill Kranzush, Mkt'g Coord.: Matt Riches
Derek Allen Assoc., Toluca Lake, CA, 818-843-6919
John Anthony, Stamford, CT, 203-322-9202
Applied Audio Mkt'g, Asheville, NC, 704-252-9313
A/V Mkt'g, Carmel, IN, 317-846-1034
Products: boom-mic headsets, communications headsets, intercommunications headsets, telecommunications headsets

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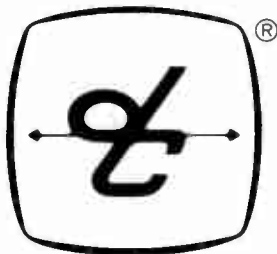


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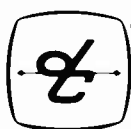
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Products: isolation headsets, personal/stereo headphones

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Products: communications headsets

Nady Systems

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Oakland, CA 94608

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Sls Mgr.: Royce Krilanovich, Mkt'g/Comm.: Chris Calder

Products: boom-mic headsets, intercommunications headsets

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Products: personal/stereo headphones

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Cypress, CA 90630

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Greg Braithwaite, Arlington Heights, IL, 312-981-7329

Pusecker Sls, Upper Montclair, NJ, 201-744-1834

David Bros., Finksburg, MD, 301-833-0920

Pro Audio Assoc., Burlington, MA, 617-229-6050

World Wide Electronics, Pembroke Pines, FL, 305-584-7024

Evans Sls & Mkt'g, Nashville, TN, 615-297-7997

New Horizons, Bannockburn, IL, 312-234-6500

Laker Assoc., Wauzata, MN, 612-475-2642

A/V Mkt'g, Carmel, IN, 317-846-1034

Innovative Audio, Pontiac, MI, 313-673-2280

J.B. Parent, Dublin, OH, 614-764-0064

Essential Mkt'g, St. Joseph, MO, 816-279-0776

Teneckit Assoc., Houston, TX, 713-528-2005

New West Audio, Burbank, CA, 818-955-9700

Brian Trankle Assoc., Belmont, CA, 415-595-4004

Northmar, Seattle, WA, 206-524-5170

Pearson & Pearson, Denver, CO, 303-722-6996

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345 Encinal St.

Santa Cruz, CA 95060

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Products: boom-mic headsets, communications headsets, intercommunications headsets, telecommunications headsets

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New York, NY 10014

(212) 989-1090, FAX# 212-989-3285

Contract Mgr./Sls: Ray Lefebvre

Sennheiser Electronic

PO Box 987
Old Lyme, CT 06371
(203) 434-9190, FAX# 203-434-1759

Products: boom-mic headsets, communications headsets, personal/stereo headphones

Setcom

1400 N. Shoreline Blvd.
Mountain View, CA 94043
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Sls Mgr.: Steve Kilczewski

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Pres.: James Kogen, VP Sls: Lottie Morgan, Dir. Tech. Mkt'g: John Phelan, Dir. Wired Mics: Alan Shirley, Dir. Wireless Mics: Sandy Schroeder, Dir. Sls: Al Hershner
Products: boom-mic headsets, communications headsets

Sony Professional Audio

1600 Queen Anne Rd.
Teaneck, NJ 07666
(201) 833-5200, 800-635-SONY, FAX# 201-833-9645
Nat'l Sls Mgr.: Bob Ott, Prod. Mgr.: Art Gonzales, Mkt'g Mgr.: David Kawakami
Sony Pro Audio, Paramus, NJ, 201-368-5185
Sony Pro Audio, Nashville, TN, 615-883-8140
Sony Pro Audio, Burbank, CA, 818-841-8711
Products: personal/stereo headphones

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Pres.: Yoshiro Ishida, Nat'l Sls Mgr./Communications Pro.: Richard Krochmal, Nat'l Sls Mgr./Pro. Music & Ent.: Rick Kamlet, Nat'l Sls Mgr./Intercom: Al Burns
Products: boom-mic headsets, personal/stereo headphones

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PO Box 3247
Barrington, IL 60010
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Professional Audio Mkt'g, Melville, NY, 516-367-8620
Watt Mkt'g, Allentown, PA, 215-820-7586
Audio Mkt'g Assoc., Brecksville, OH, 216-526-2426
Professional Sound & Lighting, Lakewood, CO, 303-986-5999
Design Factors, Hacienda Heights, CA, 213-6917-7576
Products: boom-mic headsets, communications headsets, intercommunications headsets, personal/stereo headphones, telecommunications headsets

Television Equipment Associates

PO Box 393

S. Salem, NY 10590

(914) 763-8893
Pres.: Bill Pegler, Mgr.: Steve Tocidowski
Products: telecommunications headsets

Telex Communications

9600 Aldrich Ave. S.
Minneapolis, MN 55420
(612) 884-4051, FAX# 612-884-0043
Pres.: Jeffrey Wetherell, VP Mkt'g: James Arrington, VP Sls: Dan Dantzler, Dir. Mkt'g: Dond Meeeen, Dir Adv.: Ronald Taylor
Westech/Lichtenauer, Culver City, CA, 213-870-9286
Bencsik Assoc., Ocala, FL, 904-732-9775
Burcaw & Assoc., Warren, MI, 313-573-4605
SAGA, Oswego, NY, 315-343-5739
Monfort Electronic Mkt'g, Ind., IN, 317-872-8877
Murphy & Cota, Atlanta, GA, 404-875-2525
Northland Assoc., Moorhead, MN, 218-233-4616
Rancilio Assoc., St. Louis, MO, 314-845-0202
J.Y. Schoonmaker, Dallas, TX, 214-349-1650
Sigmet, Valley Forge, PA, 215-783-6666
Weiler Electronic Sls, Worthington, OH, 614-885-7819
Ziskind Assoc., Rolling Meadows, IL, 312-577-1624
White Radio, Burlington-Ont., Canada, 416-632-6894
Silver Peak Mkt'g, Denver, CO, 303-467-9042
Pacnor Mkt'g, Lynnwood, WA, 206-771-6016
Products: boom-mic headsets, communications headsets, intercommunications headsets, isolation headsets, personal/stereo headphones, telecommunications headsets

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Group IV, Pacifica, CA, 415-755-4521
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RepNet, Lisle, IL, 312-963-0087

Vidicraft

0704 SW Bancroft St.
Portland, OR 97201
800-547-1491, FAX# 503-243-1995
Mgr.: Steve Johnson, Sls: Dave Landis, Prod.: Glenn Olson
Products: personal/stereo headphones

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Products: line isolators, line protectors, outlet strips, uninterrupted power

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Seattle, WA 98119
(206) 282-1000

Eneractive Group
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Elkhart, IL 46514
(219) 264-1393

Ethereal Concepts
754 46th Ave.
San Francisco, CA 94121
(415) 750-0431
Pres.: Lonnie Domnitz
Products: power control

Juice Goose, Div. of Whitenton Industries
7320 Ashcroft, #302
Houston, TX 77081
(713) 772-1404, FAX# 713-772-9124
Pres.: Richard Whitenton
Products: line isolators, line protectors, noise suppression, outlet strips, power control, power conversion, power relays, transformers, uninterrupted power

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Centerville, OH 45459
(513) 439-1758

Lumitrol
110 Bi-County Blvd.
Farmingdale, NY 11735
(516) 752-1411

LynTec
7030 Grandview
Merriam, KS 66204

(913) 722-4047
Pres.: Lynn J. Potter
Products: power control

Omni Q
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(206) 384-1750

Perma Power Electronics
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Chicago, IL 60648
(312) 647-9414, FAX# 312-647-1472
Pres.: Norman Ackerman, Mkt'g Mgr.: Jay Goldstein, Sls Mgr.: Mike Shatz
Products: line protectors, noise suppression, outlet strips, uninterrupted power

Polyphaser
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Gardnerville, NY 89410
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Powermark
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San Diego, CA 92123
(619) 565-8363

RTE Deltec
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San Diego, CA 92110
(619) 291-4211

Shape Magntronics
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Lombard, IL 60148
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Products: transformers

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Music Div. Head: Kris Billenstein
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Carson, CA 90746
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Octavio Brito, Boston, MA, 617-924-0660
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John Nolan, St. Louis, MO, 314-343-4765
Joe deBuglio, Toronto, Canada, 416-241-4240
Products: intrusion detection

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PO Box 324
Chester, NJ 07930
(201) 879-4159

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Bellevue, WA 98009
(206) 455-0510, 800-692-0200, FAX# 206-455-0071
Pres.: Jun Matsumoto, Sls Mgr.: Jim Morrison,
Mkt'g/Adv. Mgr.: Harry Quanz
Aiphone NE, Randolph, NJ, 201-328-1790
Aiphone Midwest, Westmont, IL, 312-323-5222
Aiphone SE, Douglasville, GA, 404-920-2811
Products: access control, announcement systems, audio surveillance, intercom, video surveillance

Alarm Accessory
501 Silverside Rd.
Wilmington, DE 19809
(302) 792-3620, 800-441-7082, FAX# 302-792-7713
Pres.: William Holt Sr., Op. Supervisor: Angela Bopp
Products: burglar alarms, vibration sensing

Alarm Controls
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Deer Park, NY 11729
(516) 586-4220, 800-645-5538, FAX# 516-586-6500
Pres.: Howard Berger, Sls Mgr.: John Benedetto
Products

Alarmco
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Canadaiqua, NY 14424

(716) 398-2510, FAX# 716-394-8861
Mkt'g: Ron Cook

All Electronics
PO Box 567
Van Nuys, CA 91408
(818) 904-0524, 800-826-5432, FAX# 818-781-2653
Mgr. Sls: Harold Oliver
Products: access control, ancillary components, announcement systems, burglar alarms, sirens

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(716) 896-4515, 800-828-7162, FAX# 716-896-4241
Mkt'g: Edwin Pokornowski
Products: access control

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4865 Pasadena Ave., Ste. 9
Sacramento, CA 95841
(916) 485-4050, FAX# 916-485-8354
Pres.: Harry Berndt, VP: Dennis Marchut
Products: door-lock systems

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PO Box 593
Plymouth, MI 48170
(313) 455-6410, 800-223-5274
Pres.: Ed Grzanowski
Security Components Int'l, Wayne, NJ, 201-942-7771
E.J. Machnik & Assoc., Snellville, GA, 404-972-4814
Emil Kirik & Assoc., Cleveland, OH, 216-581-7722
Allen Fishman & Assoc. Int'l, Oxford, CT, 203-888-9372
Pacvid, Los Angeles, CA, 213-650-7373
Products: signalling devices

Amtel Security Systems
1421 N.W. 165th St.
Miami, FL 33169
(305) 621-3100, 800-222-6835, FAX# 305-623-0613
Pres.: Suresh Gajwani, Dir. Mkt'g: Moe Weiner
Products: access control, door-lock systems, intercom

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Fenton, MO 63026
(314) 349-3110, 800-876-7337, FAX# 314-349-1251
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Atlas/Soundolier, Parsippany, NJ, 201-887-7800
Atlas Electronics, Toronto, Canada, 416-789-7761
Atlas/Ind'l, Fenton, MO, 800-362-5673
Atlas/Exp. Dept., Fenton, MO, 314-349-3110
Products: announcement systems, audio surveillance, intercom, signalling devices, sirens, strobes,

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VP Finance: Richard Nelson, Nat'l Sls Mgr.: Steven Weil, Dir. of Op: Kenneth Gmora
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Shelby, OH 44875
(419) 347-2400, FAX# 419-347-3070

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Columbus, OH 43212
(614) 488-3193

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Ramsey, NJ 07446
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Pres.: John Ochtera, VP Sls/Mkt'g: James Orr, Nat'l Sls Dir.: David Chambers
Products: audio surveillance, intercom

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San Jose, CA 95131
(408) 434-1149, 800-227-8065

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San Jose, CA 95131
(408) 434-1149, 800-227-8065, FAX# 408-434-6707
Pres.: Larry Tracy, VP: Rick Johnson, VP Sls/Mkt'g: Dave Green
Products: burglar alarms, duress, fire alarm, intrusion detection, signalling devices, vibration sensing

Cepco
21515 Parthenia St.
Canoga Park, CA 91304
(818) 998-7315

Clever Devices
PO Box 2002
Port Washington, NY 11050
(516) 767-0682, FAX# 516-767-3635
Pres.: William Long, Mkt'g Mgr.: Una Neary, Tech. Supp.: Mike Kafulas
Products: announcement systems

Coherent Communications
13756 Glenoaks Blvd.
Sylmar, CA 91342
(818) 362-9393, FAX# 818-362-7045
Products: CCTV, video surveillance, wireless systems

Communications Equipment
6443 Western Ave., Box 700
Glen Arbor, MI 49636

(616) 334-3081, FAX# 616-334-3661

Pres.: Darrell Thomas, Sls Mgr.: Thomas Garmhausen
Products: audio surveillance, intercom

Communications Products

4911 W. Good Hope Rd.
Milwaukee, WI 53223
(414) 351-4660

Products: door-lock systems

Computer Application Systems

552 NW 77th St.
Boca Raton, FL 33431
(305) 997-9660

Com-Tec

PO Box 965

Appleton, WI 54912

(414) 734-7105, FAX# 414-734-0493

Pres./Co-Owner: Ken McLellan, Exec. VP/Co-Owner:
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Products: access control, audio surveillance, CCTV, door-lock systems, duress, fire alarm, intercom, intrusion detection, signalling devices, smoke detectors, strobes, vibration sensing, video motion detection, video surveillance

Continental Instruments

70 Hopper St.

Westbury, NY 11590

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Pres.: Michael Morgenstern, VP: John Banks
CIC, Germantown, MD, 301-428-9541
CIC, Tarzana, CA, 818-345-7440

Products: access control

Cornell Electronics Products

PO Box 23411

Milwaukee, WI 53223

(414) 351-4660, 800-541-946, FAX# 414-351-4657

Pres.: Donald Glaubitz, VP: Gary Butler, Sls Mgr.:
Pauline Haack, Mkt'g: Randy Archer, SE Reg Sls Mgr.:
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LSM Assoc., Phelps, NY, 315-548-4891
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Avcom, North Olmsted, OH, 216-777-2060
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Kodo Assoc., Minneapolis, MN, 612-881-1255
Vector, Seattle, WA, 206-322-4343
Rancilio Assoc., St. Louis, MO, 314-845-0202
Dick Bellew Sls, Dallas, TX, 214-644-7881
Bidwell-Schwartz Assoc., Gardena, CA, 213-770-0300
Yocum Mkt'g., Mesa, AZ, 834-3334
Awrest, Fountain Hills, AZ, 602-946-1811

Products: access control, intrusion detection, signalling devices

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Needham, MA 02192

(617) 449-1533

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(513) 236-3591

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Farmer, Sr. Tech.: Frank Jaros

Products: strobes,

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Products: access control

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Products: wireless systems

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Products: fire alarm

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Products: video motion detection

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Products: fire alarm

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Products: announcement systems, burglar alarms, fire alarm, intrusion detection, signalling devices

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Products: wireless systems

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Products: access control

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US Reg. Office-S., Norcross, GA, 404-449-0499
Gov't Sls Office, Arlington, VA, 703-553-785-
European, Hampshire, UK, 44-0705-665-3
Products: CCTV, video motion detection, video surveillance

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Products: access control

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Products: audio, message announce

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Products: audio

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Owner: Robert Munger

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Closed Circuit Systems

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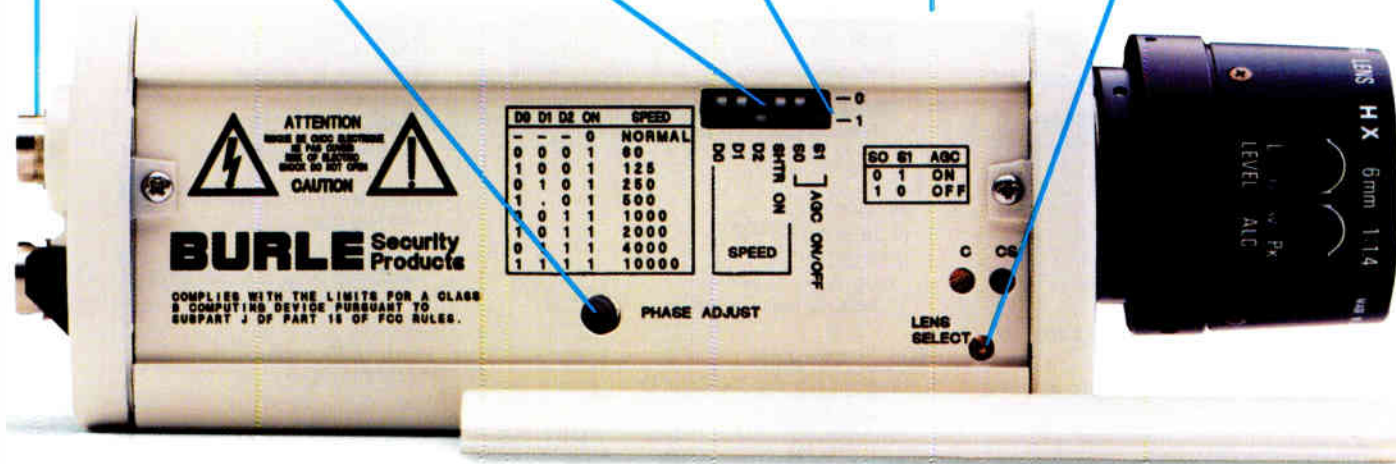
Phase Adjustable Line Lock.
Compensates for power line phase differentials to permit easy synchronization of multi-camera systems for roll free video switching.

Shutter Speed Enabler.
Easily accessible switches permit selection of 8 shutter speeds for "photo-finish" clarity of fast-moving objects.

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On/Off Switch enables camera AGC to maximize video gain when viewing low light level scenes.

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BURLE presents the best all-around camera in its class. The new TC650 series. The new design blends well into all environments. The TC650's compact size and rugged build are evident at a glance. Engineered specifically for compatibility with multi-camera systems, the TC650 offers unsurpassed ease of installation, flexibility in operation and dependable service. For instance, our camera's

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Products: accessories, cameras, channel converters, com-
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time-lapse recorders, transmission systems, video mixers,
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(213) 379-6391, FAX# 213-372-6420
Pres.: Mike Schmidt, VP Sls: Bob Schmidt, VP Mkt'g:
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 European Hdqtrs, Hampshire, UK, 44-0705-665-3

Products: accessories, cameras, computer interfaces, connectors, enclosures, fiber optics, hardware, lenses, message generators, modulators, monitors, multiplexers, pan/tilts, re-

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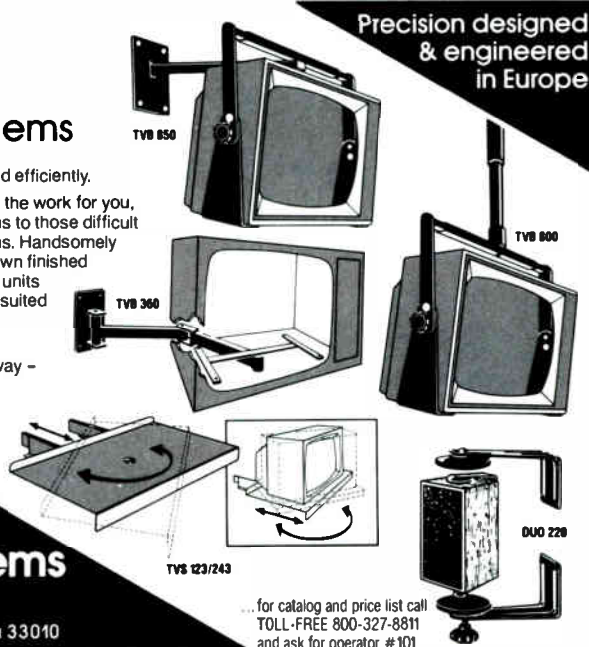
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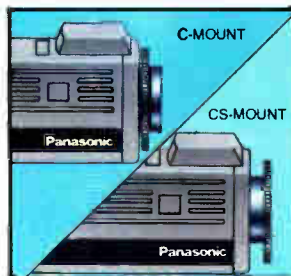
Take their optical versatility for example. With eleven high-quality, low cost CS-mount lenses, you can select just the right one for your specific application. From wide angle to super-wide to telephoto. From manual to ALC (Automatic Light Compensation).

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Products: signal processing amps

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Products: dual-channel

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**TELL YOUR
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IN THE
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Warning: To Avoid Risk Of Shock,

Ignore This Amp-To-Amp Confrontation.

Let's be frank. We're out to change your idea of what — and who — makes a professional power amplifier. So if you just bought a Crown MacroTech, turn the page — this comparison won't be a polite one. But it will stick to the facts.

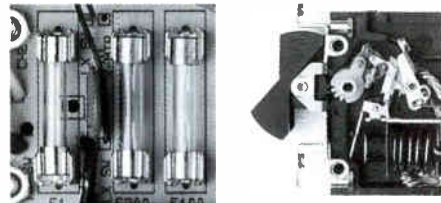
A look inside these two amps will give you a better idea of why BGW amps like the GTB Grand Touring Amplifier are built like no others in the world. And raise some questions about Crown MacroTechs.

mass of metal absorbs thermal transients without straining the fan. And without quick changes in transistor temperature. That's important: Transient musical loads put the worst kind of stress on power transistors. The effects of thermal cycling fatigue may not show up until after the warranty, but they can destroy lesser amps. Meanwhile, BGWs keep right on delivering clean, reliable power.

BGW pioneered DC speaker protection in 1971. We stopped using relays years ago, when they no longer met our reliability standards for BGW amps. The GTB, like all BGWs over 200 Watts, uses solid-state Thyristor Crow Bars to keep DC from ever reaching your valuable speaker cones or compression drivers.

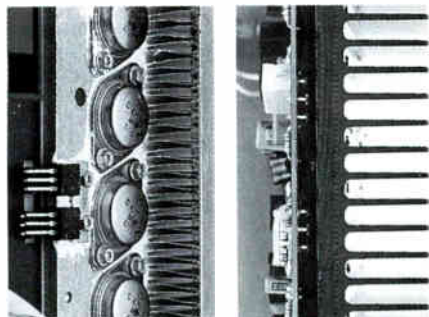
REAL SPEAKER PROTECTION

Most amps today are direct coupled, so a blown output transistor (the most common failure) connects the power supply directly to the speakers. Earlier MacroTechs had no protection against DC. Now Crown has learned their lesson — or have they? The sensing circuit and relay they now use shuts off the power transformer, but allows the filter capacitors to discharge stored DC energy directly into your drivers — risking real damage.



Left: Time is money, and with Crown's MacroTech you can lose plenty of both: You have to pull it out of the rack every time a fuse blows.

Right: The GTB's power switch is also a rocker-actuated magnetic circuit breaker. You can reset it in a second if power lines hiccup.



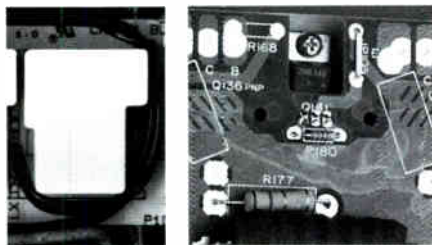
Left: The MacroTech uses mostly air to dissipate heat, not metal. The closely spaced fins are vulnerable to airborne dust and dirt.

Right: BGW uses ten pounds of aluminum to absorb thermal transients, extending power transistor life.

TAKING THE HEAT

If the MacroTech heat exchanger reminds you of an air conditioner, you've grasped its design. This approach works, at least until dust and dirt clog the fins. But as soon as the air flow slows or stops, temperature rises. Soon after that, the Crown shuts off — it could even fail.

The GTB uses massive extruded aluminum heat sinks with widely spaced fins. The



Left: Crown uses a slow-acting, less reliable relay. It can allow the filter capacitors to discharge stored energy directly into your drivers.

Right: BGW's modular power output section protects your speakers against DC damage with an instantaneous Thyristor Crow Bar. And the module is easily replaced in the unlikely event of failure.

MAKE YOUR OWN COMPARISON

Before you buy or spec your next power amp, call us at **800-468-AMPS** (213-973-8090 in CA). We'll send you tech info on BGW amps and the name of your nearest dealer: He can arrange a demo of any BGW model against any amp you choose. Then you'll be able to appreciate the advantages of BGW engineering with your ears, as well as your eyes.



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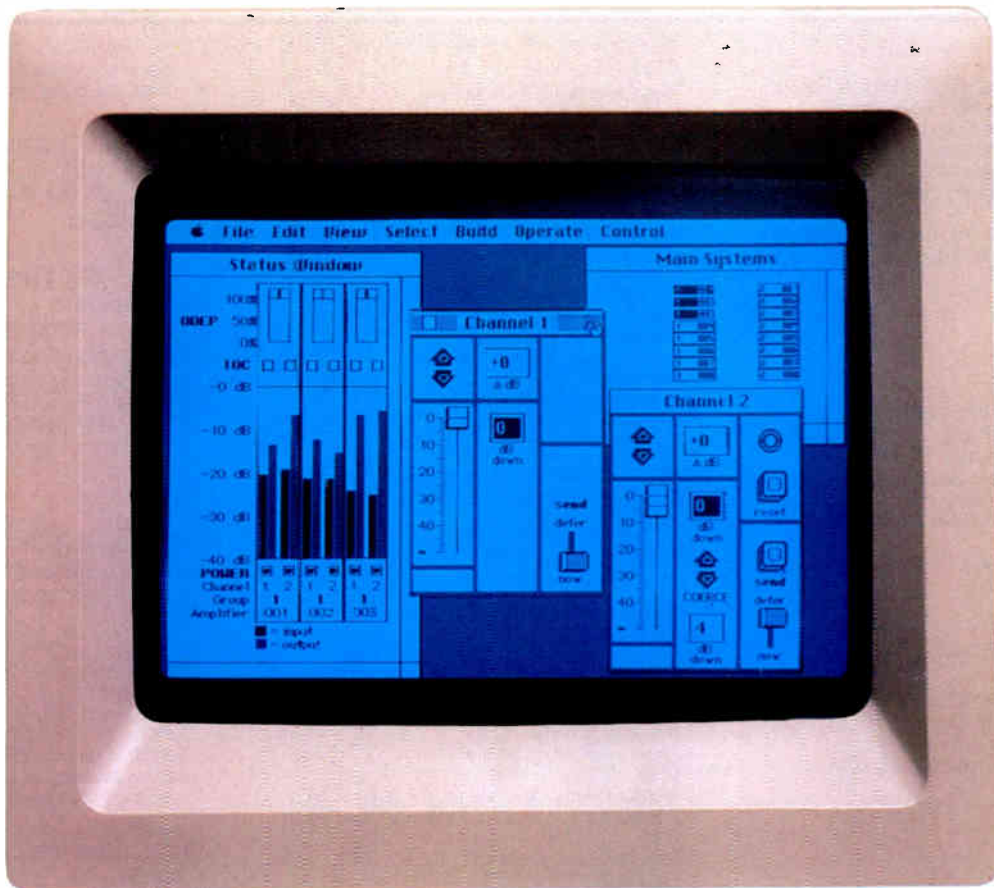
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Singer Products, Hialeah, FL, 305-558-3000
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MODEL VA-16
1-in/16-out Video/Audio Distribution System



Size 10"x12"x5" Deep
 "Halliburton" Alum Case
 Wt 8 lbs Price \$750

DESCRIPTION—
 The Model VA-16 1-in 16-out Video Audio Distribution System is useful as a network feed for courtroom or as a classroom feed for up to 16 monitors and audio amplifiers

SPECIFICATIONS—

VIDEO BNC Connectors
 DC to 8 MHz (-1db)
 Diff Gain 0.1%
 Diff Phase 0.2 deg
 Tilt & Overshoot < 1%
 Hum & Noise -60db
 Isolation -40db at 3.58 MHz
 R: 75 Ohms
 L: 75 Ohms
 Unity Gain
 In-Phase

AUDIO XL-Type Connectors
 Bal-in (10K), Bal-out (600 Ohms)
 30 HZ to 15 KHZ (-1db)
 Output Level +18 dbm
 THD 0.05%
 Signal Noise >70db

MODEL A-24/2ML
2-in/24-out (mic/line) Audio Press Box



Size 13"x18"x6" Deep
 "Halliburton" Alum Case
 Wt 16 lbs Price \$950

DESCRIPTION—
 The Model A-24/2ML Audio Press Box is a high quality transformer isolated versatile unit for conferences meetings courtroom, auditoriums, etc. it is a portable unit mounted in a Halliburton aluminum case

SPECIFICATIONS—

INPUTS
 Two Balanced microphone (switchable to line inputs at 10K ohms)
 Gain controls
 Vu Meter

OUTPUTS-24 SEPARATE OUTPUTS EACH ONE
 Transformer isolated
 "XLR" PhoneJack RCA and 3.5mm Jack
 Mic/Line Switch
 +18 dbm Output capability
 Ground Floating (Does not require ground lift)
 50HZ-15KHZ (-2db)
 50 db Channel isolation

POWER
 105-125V 50-60 HZ 5 Watts



COVER PLATES INCLUDED

Size 14"H x 19"W x 6"D
 Wt 5 lbs

MODEL V-44
4-Channel Video Dist. Amplifier

DESCRIPTION
 The Model V-44 Video Distribution Amplifier consists of a Model 512 Power Supply 4 Model 404 Video Distribution Amplifiers mounted on a Model H-5 V Panel Chassis. The back panel has a loop-thru BNC input connection and 4 output BNC connectors for each of the 4 channels

SPECIFICATION (per channel)
 DC to 8 MC (-1db)
 DC to 4.2 MC (-1db)
 Diff Gain 0.1%
 Diff Phase 0.2 deg
 Tilt & Overshoot < 1%
 Hum & Noise -60 db
 Isolation -40 db at 3.58 MC

PRICE: \$400

MODEL A-44
4-Channel Audio Dist. Amplifier

DESCRIPTION
 The Model A-44 Audio Distribution Amplifier consists of a Model 520 Power Supply 4 Model 422B Audio Distribution Amplifiers mounted on a Model H-5 A Panel Chassis. The back panel has four 12-terminal barrier stripe for input-outputs. There is one electronic balanced input and four balanced outputs for each of the 4-channels

SPECIFICATION (per channel)
 Bal (Electronic) Input Imp 20K Ohms
 Freq Resp 20CY to 20KC (-1db)
 Gain Unity (0 dbm) THD 0.05%
 Output Imp (600Ω) for 600Ω load
 Output Level +24 dbm

PRICE: \$440



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Products: interface units

Graham-Patten Systems

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IED Innovative Electronic Designs

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Louisville, KY 40299
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Bencsik Assoc., Ocala, FL, 904-732-9775
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Mkt'g Concepts, Irving, TX, 214-869-0669
Yora, White Bear Lake, MN, 612-770-9760
Torbett/Keiser Group, Loveland, CO, 303-669-1008
Derek Allen Assoc., Toluca Lake, CA, 818-840-8327
Plus Four Mkt'g, Walnut Creek, CA, 415-937-0650
North Shore Mkt'g, Seattle, WA, 206-284-9699
Island Instruments, Kaneohe, HI, 808-235-7544
Products: boardroom sound systems, computer control

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Jim Chase, Hermosa Beach, CA, 213-374-2128
Bill Hamilton, Folsom, PA, 215-543-4677
Bill Schuermann, St. Louis, MO, 314-644-2083
Tom Walter, N. Barrington, IL, 312-382-4925

Lectrosonics

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Products: intercom, lectures

Mag-Tags

2531 W. Tharpe
Tallahassee, FL 32303
(904) 386-5611, FAX# 904-385-5710
Owner: Alan Pippenger, CEO: Carolyn Pippenger
Products: supplies

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Westbury, NY 11590
(516) 334-6800, FAX# 516-334-6473
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Products: intercom, interface units

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103 W. Broad St.
Falls Church, VA 22046
(703) 237-0680, FAX# 703-237-1726
Products: image projectors

Niles Audio

12331 SW 130th St.
Miami, FL 33116
(305) 238-4373, FAX# 305-238-0185
Pres.: Ivan Zuckerman

Omni Q

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Blaine, WA 98230
(206) 384-1750

Opamp Labs

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Los Angeles, CA 90038
(213) 934-3566, FAX# 213-464-0977
Mgr.: B. Losmandy

P/H Electronics

117 E. Helena St.
Dayton, OH 45404
(513) 461-5898, 800-336-2219
Sls Coord.: Donna Martin

Panasonic/Ramsa

6550 Katella Ave.
Cypress, CA 90630
(714) 373-7277, FAX# 714-373-7242
Sls/Mkt'g Mgr.: Steve Wooley, Mkt'g Mgr.: Chris Foreman, W. Sls Mgr.: James Murray, Central Sls Mgr.: Greg Braithwaite, Telemkt'g Mgr.: Carla Campbell
James Murray, Cypress, CA, 714-373-7389
Greg Braithwaite, Arlington Heights, IL, 312-981-7329
Pusecker Sls, Upper Montclair, NJ, 201-744-1834
David Bros., Finksburg, MD, 301-833-0920
Pro Audio Assoc., Burlington, MA, 617-229-6050
World Wide Electronics, Pembroke Pines, FL, 305-584-7024
Evans Sls & Mkt'g, Nashville, TN, 615-297-7997
New Horizons, Bannockburn, IL, 312-234-6500
Laker Assoc., Wauzata, MN, 612-475-2642
A/V Mkt'g, Carmel, IN, 317-846-1034
Innovative Audio, Pontiac, MI, 313-673-2280
J.B. Parent, Dublin, OH, 614-764-0064
Essential Mkt'g, St. Joseph, MO, 816-279-0776
Teneckit Assoc., Houston, TX, 713-528-2005
New West Audio, Burbank, CA, 818-955-9700
Brian Trankle Assoc., Belmont, CA, 415-595-4004
Northmar, Seattle, WA, 206-524-5170
Pearson & Pearson, Denver, CO, 303-722-6996
Products: A/V speakers, audio for A/V

Protech Audio

Flowerfield, Bldg. #1
St. James, NY 11780
(516) 584-5855, FAX# 516-584-5904
Sls Mgr.: Bill Murphy, VP Eng.: Joseph Giambone
Peregrine SW Reps, Houston, TX, 713-589-8481
Products: audio for A/V, boardroom sound systems

PROTO-TEC

108 Fairlane Dr.
Joliet, IL 60435
(815) 744-7173
Products: lectures, supplies

Sharp Electronics/Prof. Products Div.

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(201) 529-8731, FAX# 201-529-9636
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, image projectors, intercom

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Products: AV

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Products: audio level, boardroom, custom, hardwired, microprocessor, remote monitoring

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Products: remote monitoring

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Darmstedter Assoc., Baldwinville, NY, 315-638-1261
John Anthony., Stamford, CT, 203-322-9202
Sigmat, Valley Forge, PA, 215-783-6666
Secom Systems, Atlanta, GA, 404-455-0672
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Ludwig Mkt'g., Kenosha, WI, 414-697-9355
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Derek Allen Assoc., Toluca Lake, CA, 818-840-8327
Plus Four Mkt'g, Walnut Creek, CA, 415-937-0650
North Shore Mkt'g, Seattle, WA, 206-284-9699
Island Instruments, Kaneohe, HI, 808-235-7544
Products: audio level, boardroom, microprocessor, remote monitoring

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Madison, WI 53719-1208
(608) 273-6333, FAX# 608-273-6336
G. Mgr.: Steven Cohan, Dir. R & D: Michael Konkle
Products: A/V, audio level, boardroom, custom, hardwired, microprocessor, remote monitoring

Monroe Electronics

100 HouseI Ave.
Lyndonville, NY 14098
(716) 765-2254, FAX# 716-765-9330
Dir. Mkt'g: Brian Ives, App. Eng.: Roland Phillips, Sls Rep.: Robert Caines

Moseley Assoc.

111 Castilian Dr.
Santa Barbara, CA 93117-3093
(805) 968-9621, FAX# 805-685-9638
Products: remote monitoring

Musically Intelligent Devices

3 Brian St.
Commack, NY 11725
(516) 864-1683

OXMOOR

237 Oxmoor Circle
Birmingham, AL 35209
(205) 942-6779, FAX# 205-942-9633
Nat'l Sls Mgr.: Richard Mitchell, Dir. Prod. Dev.: Joe Hanson, Prod. Mgr.: Jim Watson
ASR Enter., Lansdowne, PA, 215-259-8513
Dimension IX Mkt'g, Lewisville, TX, 214-436-3706
Evans Sls & Mkt'g, Nashville, TN, 615-297-7997
John Anthony, Stamford, CT, 212-585-2027
Yora, White Bear Lake, MN, 612-770-9760
Allwest Electronics, Camarillo, CA, 805-388-1789
Loomis & Assoc., Fremont, CA, 415-797-3500
Loppnow & Assoc., Issaquah, WA, 206-392-3936
World Wide Electronics, Pembroke Pines, FL, 305-584-7024
Repworks, Chicopee, MA, 413-533-0845
Products: audio level

Preh Electronic Industries

470 E. Main St.
Lake Zurich, IL 60047-2578
(312) 438-4000
Pres.: Marcel Didier
Products: A/V, custom, hardwired, wireless

Protech Audio

Flowerfield, Bldg. #1
St. James, NY 11780

(516) 584-5855, FAX# 516-584-5904

Sls Mgr.: Bill Murphy, VP Eng.: Joseph Giambone
Peregrine SW Reps, Houston, TX, 713-589-8481
Products: AV, audio level, boardroom, hardwired, remote monitoring

Sonance

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San Juan Capistrano, CA 92675
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Morris-Tait, N. Hollywood, CA, 213-877-4424
Tandem Mkt'g, Schaumburg, IL, 312-605-1960
Vestco, Merrit Island, FL, 407-454-9051
Balaton, Washington, DC, 202-471-1764
Products: audio level, hardwired

Sontec Electronics

Audio Dr.
Goldbond, VA 24094
(703) 626-7256

Sls Mgr.: Burgess Macneal
Products: audio level, EQ/remote

Sound Stream Technology

120 Blue Ravine Rd.
Folsom, CA 95630
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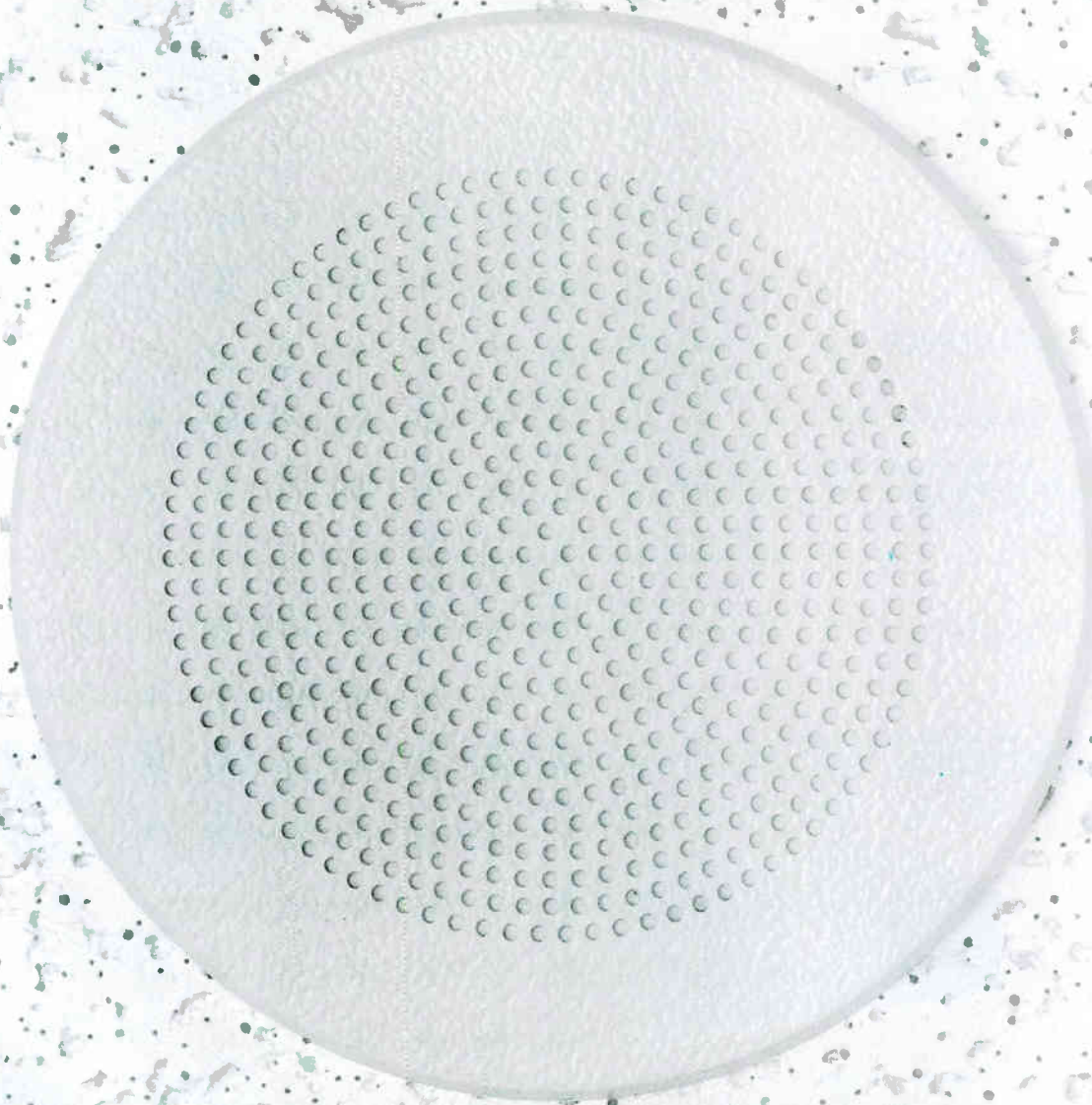
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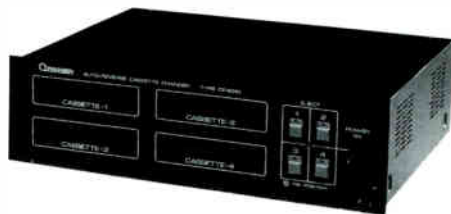
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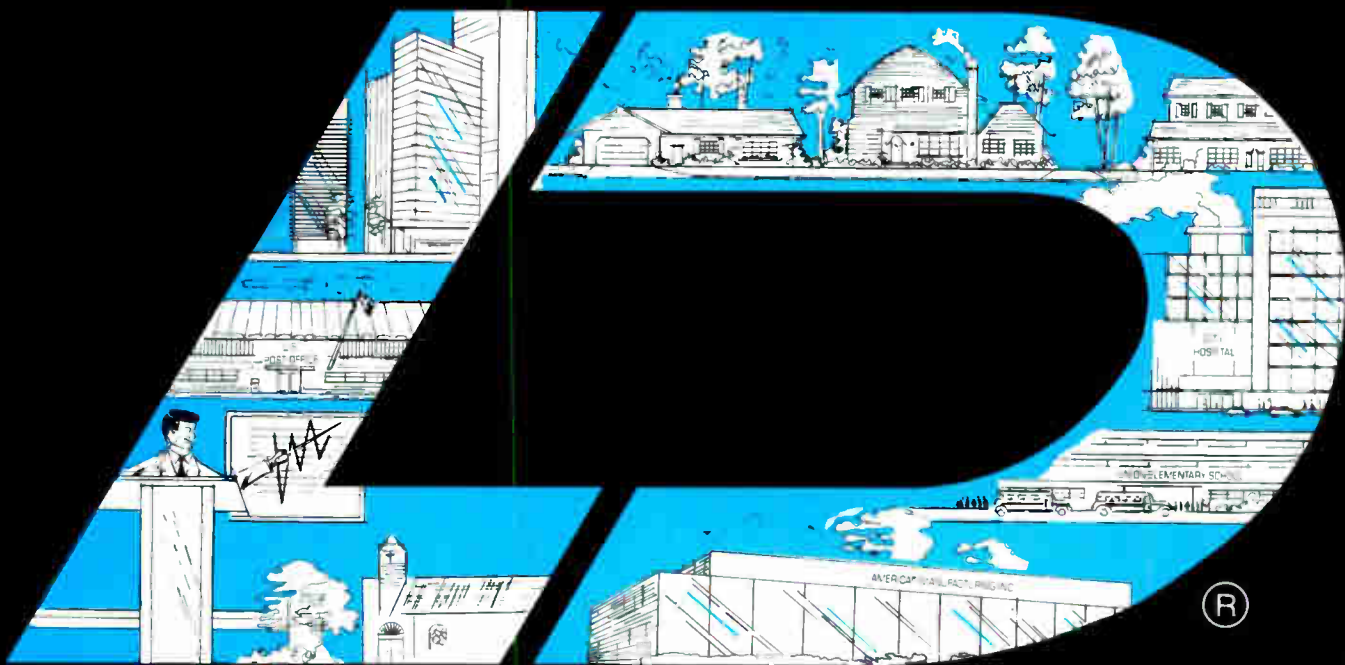
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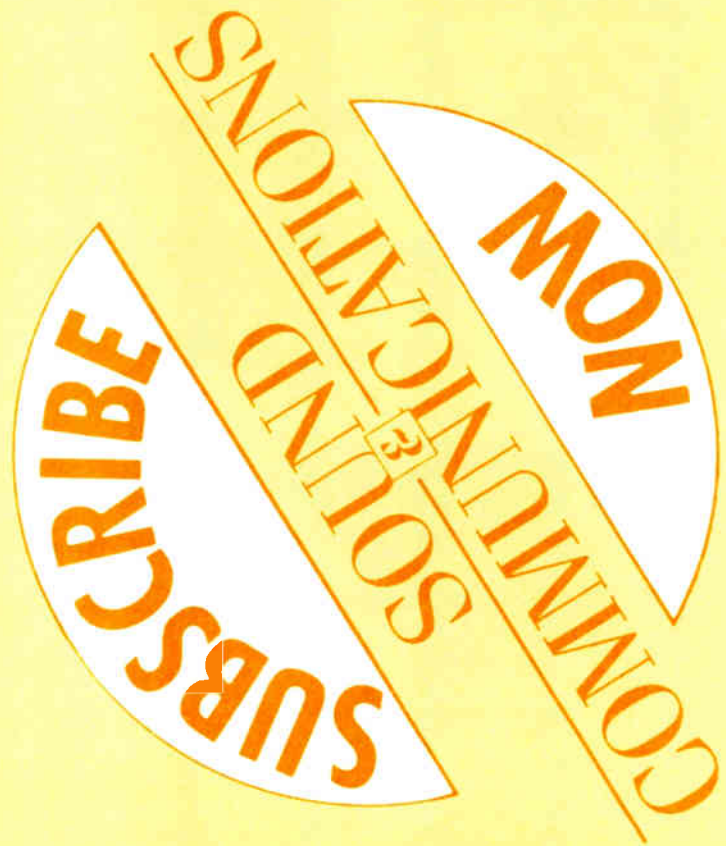
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 <input type="checkbox"/> Have salesman call
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 <input type="checkbox"/> Future projects</p> <p>(6) Number of employees at your company:
 <input type="checkbox"/> 1-3 <input type="checkbox"/> 4-10 <input type="checkbox"/> 11-25
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Aiphone Midwest, Westmont, IL, 312-323-5222
Aiphone SE, Douglasville, GA, 404-920-2811
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Products: multi-channel, telephone

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Brian Trankle & Assoc., Belmont, CA, 415-595-4004
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Products: drive-thru, VOX

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Products: tel-e-phone

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Allwest Electronics, 805-388-1789
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Linda Wick, Chicago, IL, 312-981-5136
Mike Wilcock, Los Angeles, CA, 818-335-0543
Products: digital, loudspeaking, microprocessor, multi-chan-

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SAGA, Oswego, NY, 315-343-5739
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8877
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Sigma, Valley Forge, PA, 215-783-6666
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Aiphone Midwest, Westmont, IL, 312-323-5222
Aiphone SE, Douglasville, GA, 404-920-2811
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Edwards, E. Reg./Ass. Sls Mgr.: Walter Best, Order
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 Tortech Electronics, Scarborough/Ontario, Canada, 416-282-1011
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 Products: annunciators, emergency call, microprocessor, nurse-call, visual, voice paging

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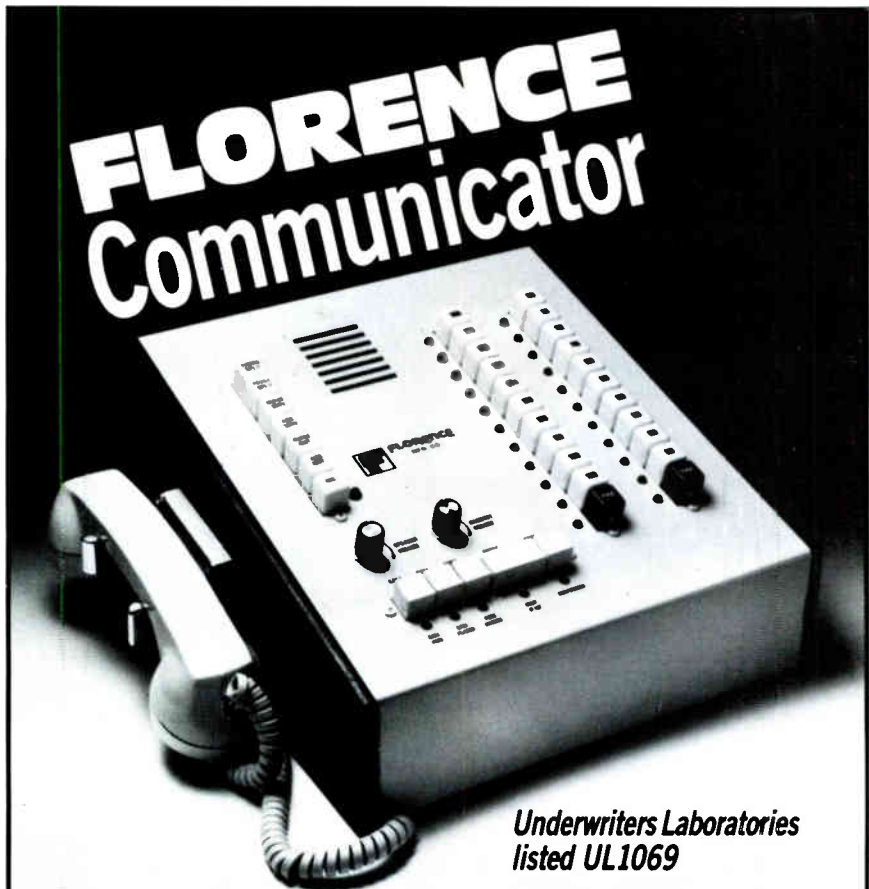
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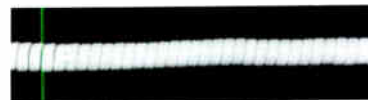
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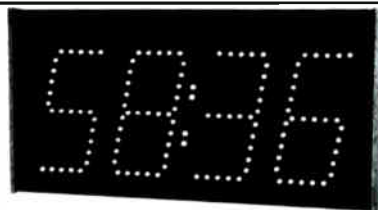
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Cardenas, Prod. Mgr.: Stan Severinis

Products: crossovers

FOSTEX CORP. OF AMERICA

15431 Blackburn Ave.

Norwalk, CA 90650

(213) 921-1112, FAX# 213-802-1964

Exec. VP: Fred Huang, VP Sls/Mkt'g: Mark Cohen

Products: stands

Fourjay Industries

PO Box 14617

Dayton, OH 45413-0617

(513) 890-6444, FAX# 513-890-1692

Pres.: J.M. (Jay) Fulkerson, Dir. Sls: M.W. (Bud)
Frawley, Eng./Mkt'g Mgr.: John Henley

Products: baffles, enclosure hardware, enclosure, grilles,

mounting hardware, transformers

Gemco Electronics

PO Box 993

Gallatin, TN 37066

(615) 452-5960, FAX# 615-451-0026

Pres.: Jerry Graves, Sls Mgr.: Byron Graves

H.O.M.E.

PO Box 225

Hermann, MO 65041

(314) 486-3111

Mkt'g: Arthur Brigham

Products: enclosure hardware

HARRIS/DRACON DIV.

809 Calle Plano

Camarillo, CA 93010

(805) 987-9511, 800-4-DRACON, FAX# 805-987-2547

VP/G. Mgr.: John Mason, VP Sls/Mkt'g.: Jack
McGuigan, Dir. Sls: Tom Erdmann, VP Eng.: Tom
Durstun, Mgr. Mkt'g Comm.: G. Eric Slayton, Prod.
Mgr. Paging: Tom Johnson

Duncan Way, El Toro, CA, 714-859-9932
John Muller, Chesapeake Beach, MD, 301-257-3686
Gary Foster, Columbia, MO, 314-442-2288
Bob Lincoln, Inidan Rock Beach, FL, 813-595-3055
Don Bivens, Lake Elsinore, CA, 714-244-8808
Sam Biasi, Alexandria, BA, 703-971-5095
Bill Boone, Libertyville, IL, 312-816-1080
Margaret Giambalvo, Short Hills, NJ, 201-564-8508
Mark Skilowitz, New Field, NJ, 609-697-4580
Dave Whalen, Houston, TX, 713-974-4373

Hi Lo Fabrication & Mfg.

PO Box 509

Rio Vista, TX 76093

(817) 373-2247

Pres.: C. Caro, Prod. Eng.: Cecil Caro, VP Mkt'g:
Bridget Caro

Products: baffles, crossovers, enclosure, stands

Int'l Components Corp.

105 Maxess Rd.

Melville, NY 11747

(516) 293-1500, 800-645-9154, FAX# 516-293-4983

Exec. VP: Irwin Friedman, VP: Harvey Grossman

Products: attenuators, crossovers, enclosure hardware, transformers

JBL PROFESSIONAL

PO Box 2200

Northridge, CA 91329

(818) 893-8411, FAX# 818-893-3639

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Mark Gander, Mkt'g Mgr.: Hector Martinez, Mkt'g Mgr.:
Steve Romeo

Jim Chase, Hermosa Beach, CA, 213-374-2128
Bill Hamilton, Folsom, PA, 215-543-4677
Bill Schuermann, St. Louis, MO, 314-644-2083

Tom Walter, N. Barrington, IL, 312-382-4925
 Products: crossovers, mounting hardware, stands

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 Products: attenuators, baffles, grilles, transformers

Lowell Mfg.

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 St. Louis, MO 63143
 (314) 781-9058, 800-325-9660, FAX# 314-645-4852
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 Design Factors, Hacienda Heights, CA, 213-697-7576
 Meyer Mkt'g, Deerfield Beach, FL, 305-481-9250
 Peregrine SW Repts, Houston, TX, 713-589-8481
 H.W. Phillips, Roswell, GA, 404-992-3070
 Puscecker Sls, Upper Montclair, NJ, 201-744-1834
 Products: attenuators, baffles, connectors, enclosure hardware, enclosure, grilles, mounting hardware, transformers

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 Pres.: Louis Maltz, VP: Elliott Maltz, Sls Mgr.: Stan Grey
 Miller Assoc., Stamford, CT, 203-869-7793
 Miller Assoc., Flushing, NY, 718-464-0617
 Forti Assoc., Kensington, MD, 301-949-1706
 Raymar Assoc., Duncanville, TX, 214-296-9833
 Products: attenuators, baffles, crossovers, grilles

MISCO Minneapolis Speaker

3806 Grand Ave. S.
 Minneapolis, MN 55409
 (612) 825-1010, FAX# 612-825-7010
 Products: baffles

McCauley Sound

13608 94th Ave. E.
 Puyallup, WA 98373
 (206) 848-0363, FAX# 206-841-3050
 Pres./Sls Mgr.: Tom McCauley, VP/Prod.: Pete McCauley

MIDDLE ATLANTIC PRODUCTS

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 Op. Mgr.: Scott Mathews
 Products: grilles

Mortronics

2567 38th Ave.
 Oakland, CA 94601
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 Owner: Kenneth Floyd
 Products: attenuators

Neutrik USA

1600 Malone St.
 Millville, NJ 08332
 (609) 327-3113, FAX# 609-825-4804
 G. Mgr.: James Cowan, Prod.t Mgr.: William Dorman, Prod. Mgr.: Kenneth Smalley

Products: connectors

Oaktron Industries

1000 30th St.
 Monroe, WI 53566
 (800) 257-4538
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711 A St.
 Meridian, MS 39302
 (601) 483-5365, FAX# 601-484-4278
 Pres.: Hartley Peavey
 Products: connectors, crossovers, enclosure hardware, grille cloth, mounting hardware, stands

Peerless Sales

1950 Hawthorne Ave.
 Melrose Pk., IL 60160
 (312) 865-8870, FAX# 312-865-2941
 VP: Walter Snodell, Mkt'g Mgr.: Frank R. Briggs
 Products: mounting hardware

Penn Fabrication (USA)

PO Box 506
 Hawthorne, NJ 07506
 (201) 423-4404
 Sls Dir.: Mike Panasuk, G. Mgr.: Richard Stratford, G. Mgr.: Gavin Naismith
 Products: connectors, enclosure hardware, grille cloth, grilles, mounting hardware

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PO Box 20037
 Oklahoma City, OK 73120
 (405) 751-3294
 Pres.: John Quade
 Products: enclosure

Quam-Nichols

234 E. 67th
 Chicago, IL 60637
 (312) 488-5800, 800-633-3669, FAX# 312-488-6944
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 R&S Sls, Rockville Center, NY, 516-678-6887
 Levy Lasser & Grams, Chicago, IL, 312-364-7800
 Bidwell Schwartz Assoc., Gardena, CA, 213-770-0300
 J.Y. Schoonmaker, Dallas, TX, 214-349-1650
 Cartwright & Beam, Atlanta, GA, 404-368-0160

Radian Audio Engineering

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 Placentia, CA 92670
 (714) 961-1213, FAX# 714-961-0869
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 Steven Taub, Silver Springs, MD, 301-622-9100
 Richard Geisler, Westerville, OH, 614-890-7788
 Tom Carlile, Woodland Hills, CA, 818-710-9580
 Dennis Dwinell, Spooner, WI, 715-635-2722
 John Caporale, Redmond, WA, 206-868-5577
 Carl Schwartz, Evanston, IL, 312-761-3771
 Michael Welsh, Orlando, FL, 407-843-0471
 John Fly, Lakewood, CO, 303-986-5999
 George Markunas, Avon, MA, 508-588-8043
 Wane Fuday, Fairfax, CA, 415-459-6880
 Neal Hunter, Syracuse, NY, 315-437-2992
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Svce Mgr.: Brian Miller
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Audio Resources, Westmont, IL, 312-655-1180
AMH Sls, Palos Verdes Est., CA, 213-373-2034
Golden Mkt'g, Framington Hills, MI, 313-553-7077
Nothmar, Seattle, WA, 206-524-5170
Products: custom, flush-mount, full-range, high-frequency
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New Hyde Park, NY 11040
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G. Mgr.: Dennis Goodman

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Mkt'g/Adv. Mgr.: Harry Quanz
Aiphone NE, Randolph, NJ, 201-328-1790
Aiphone Midwest, Westmont, IL, 312-323-5222
Aiphone SE, Douglasville, GA, 404-920-2811
Products: flush-mount, full-range, paging horns, paging,
voice communications



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Oklahoma City, OK 73126-010
(405) 324-5311, FAX# 405-324-8981
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Dev.: Ted Uzzle, Nat'l Sls Mgr.: Jerry Spriggs,
Mgr./Export Mkt'g: John Sexton, Tech. Svces Mgr.:
Gary Jones
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horns, paging, stage monitors, studio/reference monitors,
sub-woofer, systems

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RPM Mkt'g, Carrollton, TX, 214-446-9277
New Horizons, Bannockburn, IL, 312-234-6500
Crescendo Assoc., Inc., Mirimar, FL, 305-961-0886
Creative Audio, Marietta, GA, 404-642-7827
Watt Mkt'g, Allentown, PA, 215-820-7586
Products: paging horns, processor controlled, stage moni-
tors, sub-woofer



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(815) 784-5118
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Credit Mgr.: Rosella Johnson, Chief Eng.: Loren
Schrader, Purch. Agent: Ray Melton
Ted Firaneck Sls, Pontiac, MI, 313-373-9595
Nevco, Crestwood, MO, 314-843-7406
W.A. Hendrickson, N. Scituate, MA, 617-545-0652
Maish Sls, Mulberry, IN, 317-296-2322
TMC Sls, Ft. Lee, NJ, 201-944-8340
Shamrock Sls, Dayton, OH, 513-258-1227
Pacnor Mkt'g, Lynwood, WA, 206-771-6016
Murphy & Cota, Atlanta, GA, 404-875-2525
Mel Foster Tech. Sls, Edina, MN, 612-941-9800
Bencsik Assoc., Ocala, FL, 904-732-9775
Stinson Assoc., Havertown, PA, 215-446-8585
Lewis & Dunnigan, Syracuse, NY, 315-446-5522
Arch Hoyne, Arlington Heights, IL, 312-398-1681
Wes Tech Mkt'g, Culver City, CA, 213-837-1398
Meyer & Ross, Burlingame, CA, 415-348-6800
Products: columns, full-range, music system speakers,
outdoor, portable, surface-mount

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Fenton, MO 63026
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Reg./Sls Mgr.: Bud Waters, W. Reg./Ass. Sls Mgr.: Jim
Edwards, E. Reg./Ass. Sls Mgr.: Walter Best, Order
Entry Dept. Mgr.: Dale McIntyre
Atlas/Soundolier, Parsippany, NJ, 201-887-7800
Atlas Electronics, Toronto, Canada, 416-789-7761
Atlas/Ind'l, Fenton, MO, 800-362-5673
Atlas/Exp. Dept., Fenton, MO, 314-349-3110
Products: ceiling, columns, compact, components, custom,
decorative, environment protected, explosion-proof, flush-
mount, foreground, full-range, high-frequency drivers, high-
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system speakers, noise masking, omni-directional, outdoor,
paging horns, paging, surface-mount, systems, talkback,
voice communications

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Dave Arnold

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powered, studio/reference monitors, sub-woofer, systems

Auernheimer Labs & Co.

4561 E. Florence Ave.
Fresno, CA 93725
(209) 442-1048
Owner: Curly Auernheimer

Aural

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Sls Eng.: Chuck King
Products: high-power, horns, low-frequency drivers, port-
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Op.: Luis Gutierrez, VP Mkt'g/Sales: Robert
Hagemann, VP Eng.: Alex Bertagni
Products: ceiling, components, custom, decorative, envi-
ronment protected, flush-mount, foreground, full-range,
multi-way/high-powered, music system speakers, noise
masking, omni-directional, outdoor, paging, surface-mount,
systems, voice communications

Bag End

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Eng.: Henry Heine

Bogen Communications

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Pres.: John Ochtera, VP Sls/Mkt'g: James Orr, Nat'l
Sls Dir.: David Chambers
Products: ceiling, columns, compact, environment protect-
ed, flush-mount, foreground, full-range, horns, music sys-
tem speakers, outdoor, paging horns, paging, powered, sur-
face-mount, systems, talkback, voice communications

BOSE—PRO PRODUCTS

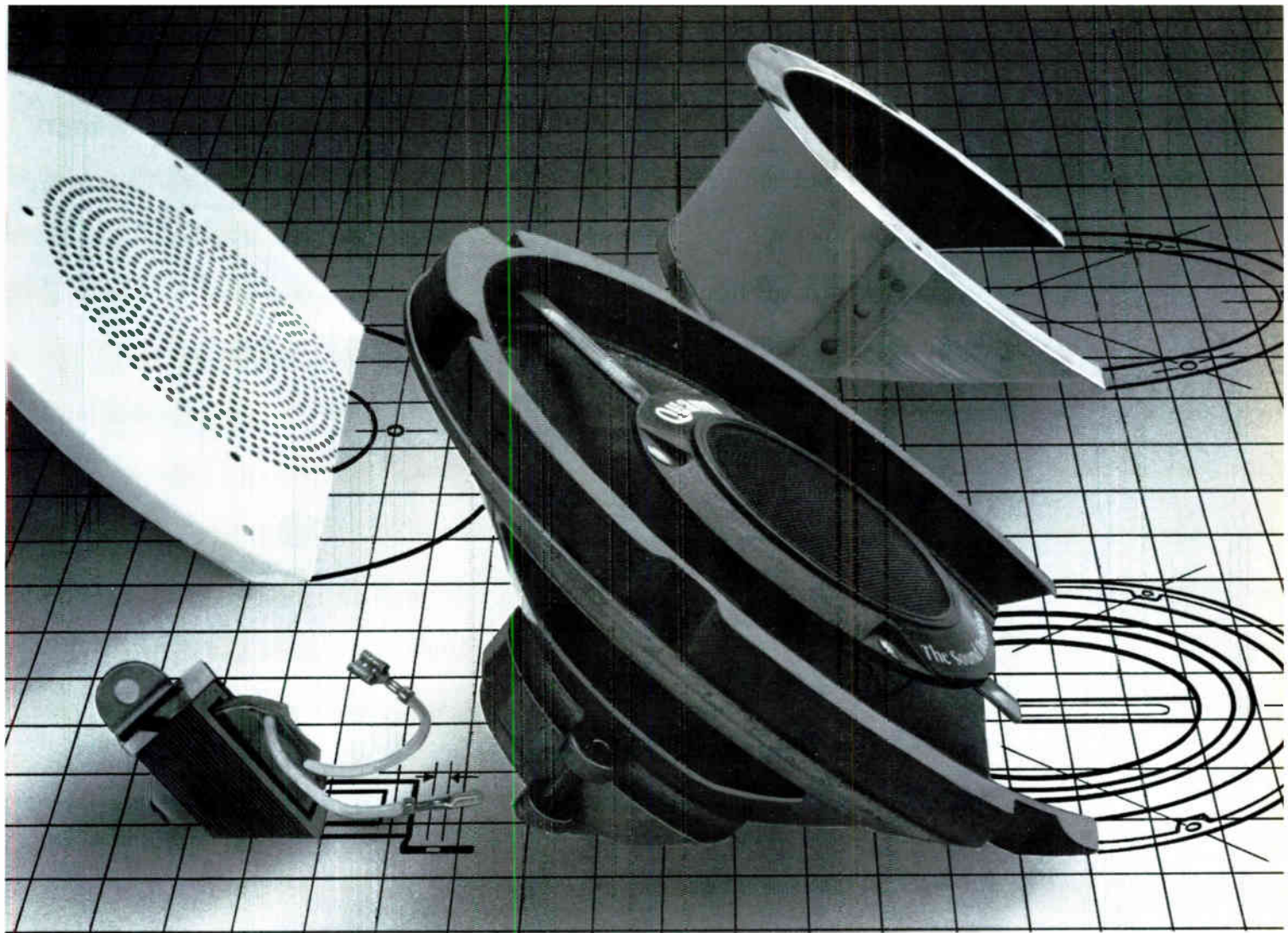
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Products: ceiling, custom, flush-mount, foreground, music
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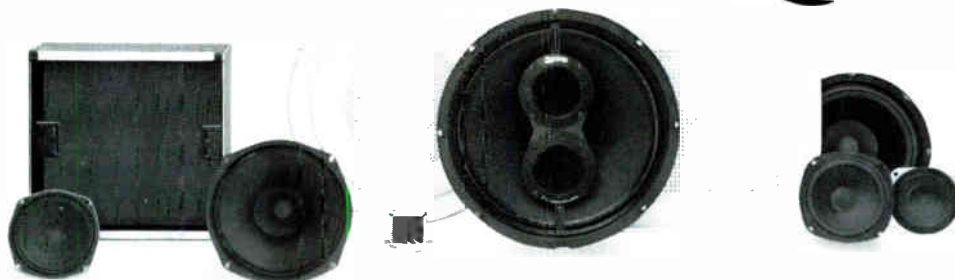
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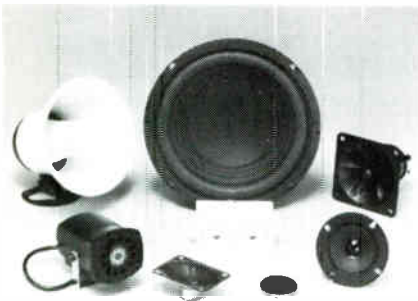
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Sls: Christine Howze, Nat'l Field Sls Mgr.: Chris Berger

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Rob Welles, San Francisco, CA, 415-334-4477

Pacific Audio Group, Torrance, CA, 213-719-1383

New Resource, Norwell, MA, 617-659-1463

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Audio Mkt'g Assoc., Breckville, OH, 216-526-2426

Powerline Mkt'g, Evanston, IL, 312-864-1147

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Bencsik Assoc., Ocala, FL, 904-732-9775

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Pearson & Pearson, Denver, CO, 303-722-6996

Vector Corp., Seattle, WA, 206-322-4343

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800-442-1564, FAX# 214-939-0328

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Seattle, WA 98108

(206) 527-4371

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Products: high-power, horns

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Warren Anderson, Svce Mgr.: Cliff Carlson

Wally Smutts, Toronto-Ont, Canada, 312-584-2300

Doug Fellabaum, Sycamore, IL, 815-895-7573

Don Mouritzen, Beecher, IL, 312-946-9655

Ken Lind, St. Charles, IL, 312-584-2300

Pete Kendal, Jacksonville, FL, 904-262-6025

Ed Nuhring, Portland, OR, 503-244-4262

Jim Lacey, Moreno Valley, CA, 714-243-1160

Jack Brown, Dallas, TX, 214-943-7528

Products: ceiling, columns, components, environment protected, flush-mount, full-range, high-frequency drivers, horns, low-frequency drivers., music system speakers, omni-directional, outdoor, paging horns, paging, portable, voice communications

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(612) 675-3650

Pres.: David Nordschow

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Millbrook, NY 12545

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Michener, VP Sls: Dave Talbot

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Western Audio Sls, Colendale, CA, 818-246-3806

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To perform accurately, a reinforcement system must act like a single sound source, radiating a coherent arc of sonic energy. The only way to do this is with a *curved array* in which the speakers combine acoustically to produce a single wavefront.

Coherence By Design

In 1980, Meyer Sound created the first curved loudspeaker arrays. And spawned a host of imitations. Today, curved arrays are everywhere. After all, arranging loudspeakers in an arc is a pretty simple chore.

But making a loudspeaker array perform coherently requires extremely complicated engineering. The intricate dynamics of arrays dictate absolutely linear phase and frequency response from every component. Horns must be designed to work together smoothly and efficiently. Crossover frequencies must be selected to preserve consistent directivity within tight tolerances. And each unit in the system must combine seamlessly with the others under all circumstances.

When every one of these conditions is met, the curved array becomes a virtual point source. And only one manufacturer has mastered all of these criteria — Meyer Sound.

Theory & Practice

Every audio professional knows the difference between promotion and real-world performance. With so

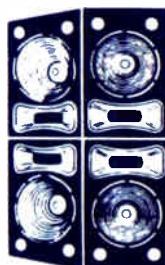
many manufacturers claiming arrayability, how do you judge the truth of our claims? The same way that you should judge everyone else's: with your trained ears. When you walk across the hall, does the sound of the loudspeaker system change? Do you hear phasing, flanging or comb filtering? Does the sonic image shift dramatically? Are the lyrics drowned in a sea of reverberation? If so, then the array is not functioning as a coherent point source.

Meyer Sound's proven loudspeaker arraying techniques have resulted from the most thorough research and analysis in the industry. They produce dependable point-source arrays in environments ranging from free-field to the most difficult performance venues.

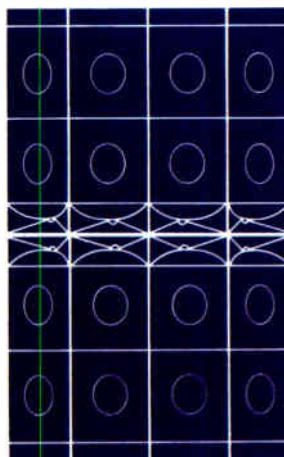
So set your stage with confidence. Meyer Sound loudspeaker systems are built from the ground up to preserve coherent propagation of sonic energy.

And the proof is in the sound: clear and consistent. Everywhere you need it.

Both the UPA-1A and MSL-3 deliver high sound pressure levels with ultra-low distortion, for maximum intelligibility and fidelity. Efficient, high-powered, rugged and reliable, their specifications meet the most demanding professional needs.



The compact UPA-1A allows controlled coverage of wide areas in theaters, clubs and concerts.

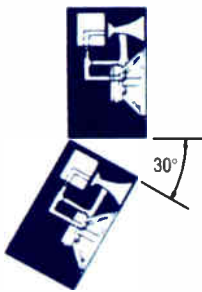


The MSL-3 covers a broad range of large-scale reinforcement applications.



Carnegie Hall A coherent array of UPA-1A loudspeakers, supplemented by MSL-3s and 650-R2 subwoofers (not pictured), is permanently installed for live performance reinforcement..

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UPA-1A in typical vertical configuration.



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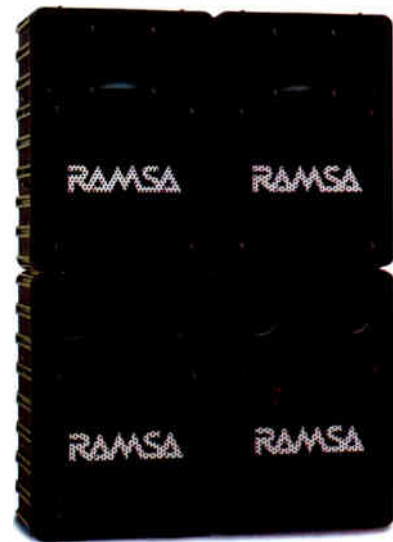
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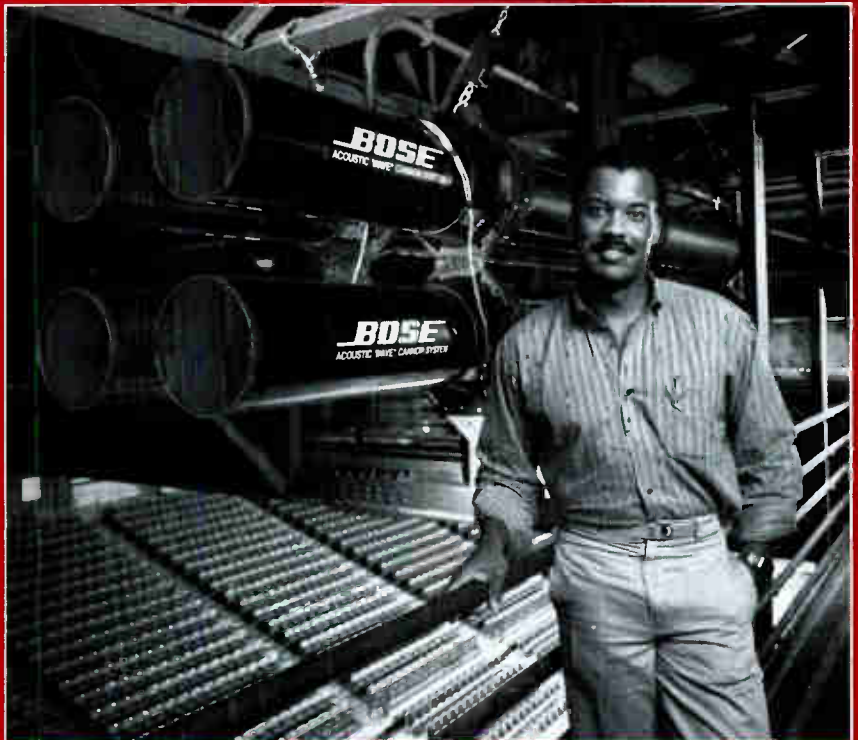
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LOUDSPEAKER LISTINGS CONTINUE ON PAGE 122

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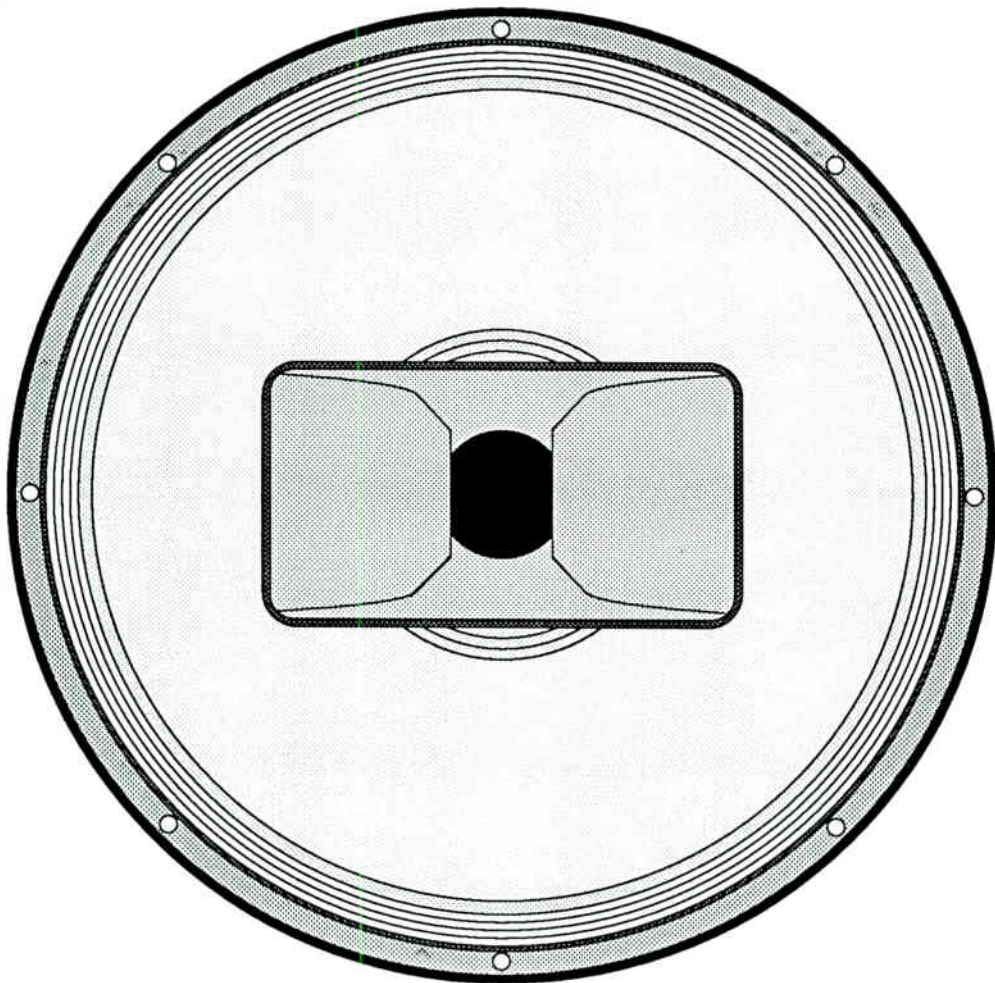
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Coaxial Transducers

and Time Offset Correction (TOC™) Accessories



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Introduction

PAS Coaxial Transducer Systems answer the need for compact high-performance two-way loudspeaker systems in a wide variety of exacting monitoring and sound reinforcement applications.

Coaxial design radiates lows and highs through one acoustic 'window', resulting in precise imaging and stereo localization. PAS coaxial transducers feature a unique constant coverage high frequency horn that overcomes high frequency beaming without coloration and distortion. Smooth, phase-coherent response is obtained with PAS's exclusive Time Offset Correction (TOC™), which normalizes acoustic centers of the low and high frequency sources.

PAS coaxial loudspeakers are available in 12 inch and 15 inch versions. Three models of 15 inch transducers are available: all come less the high frequency compression driver, allowing designers and users to tailor the performance of the high frequency component to the specific application, budget or listening preference. True versatility.

When combined with PAS-developed Time Offset Correction™ technology, PAS coaxial

loudspeakers demonstrate virtually ripple-free, monotonic phase response from 100 Hz to 10 kHz.

The 15 inch coaxial systems are a logical choice for applications that call for extended low frequency response. The CXL-1580C is an extended-bass version of the CX-1580C, incorporating a voice coil and magnetic circuit designed for large cone excursions with high linearity. The CXL-2580C is a high power transducer, featuring a large, four-inch LF voice coil and a constant coverage horn designed to accept large-format two-inch throat compression drivers.

The 12 inch coaxial loudspeaker, model CX-1280C, provides an extension of mid-frequency power response in exchange for a slight reduction in low frequency output, and is ideally suited for vocal-range systems and three-way installations when augmented with subwoofers.

All PAS coaxial loudspeakers incorporate a Constant Coverage horn design for 30 by 60 degree dispersion. The horn configuration, unique in coaxial loudspeakers, assures a smooth, interference-free transition from (wide angle) low frequencies to controlled distribution at high frequencies. Slightly larger than other coaxial horns, the PAS horns provide more useful loading to low frequencies, enabling the crossover frequency to be lowered to 1200 Hz. This reduces dependence upon the cone transducer for upper mid-frequency output, resulting in smoother power response. Careful attention to throat geometry results in constant angular coverage to beyond the audible frequency range in one-inch throat versions, with almost imperceptible narrowing above 10 kHz in the two-inch.

PAS manufactures three frequency dividing networks for coaxial system use—two passive and one active—all with Time Offset Correction. The passive systems differ only in their Time Offset Correction, which is optimized for either shallow or deep structure compression drivers. The TOC-23 active frequency dividing processor includes a wealth of functions and operator features with which to optimize and control system performance for the most demanding of applications.

(TOC™)

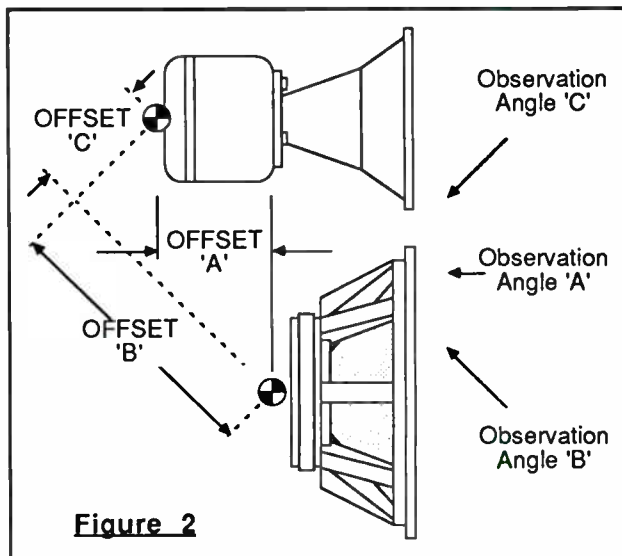
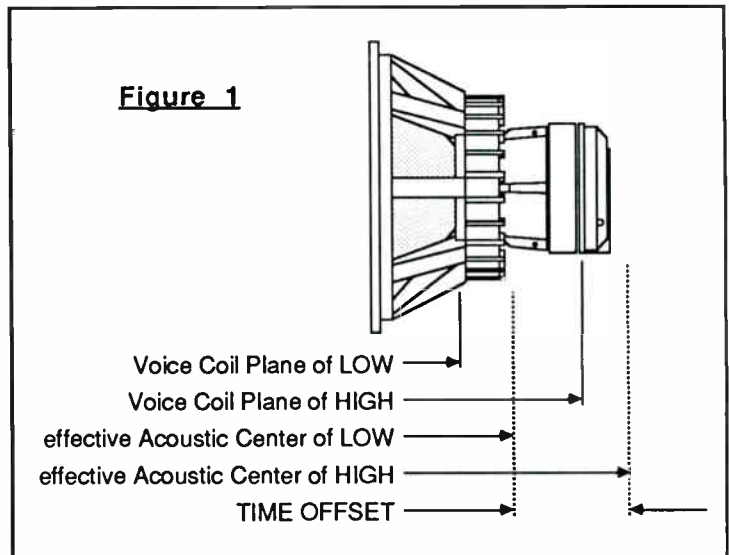
TIME OFFSET CORRECTION THEORY OF OPERATION

The PAS model CXL-2580C coaxial loudspeaker is illustrated at right (shown with a JBL 2450 compression driver). Note that the effective acoustic centers of the low and high frequency transducers are separated by a finite distance. This distance in feet, divided by the speed of sound (1128 ft./second), is the time offset between the transducers.

This means that a low frequency signal will arrive at the listener's ears before the high frequency signal. In conventional two-way loudspeaker systems, the offset is usually sufficient to result in smearing and loss of transient integrity.

PAS-developed Time Offset Correction™ delays the low frequency signal equal to the time offset, thereby making both loudspeakers effectively radiate from the same acoustic center. Coaxial loudspeaker systems are the only two-way sources that can be completely time-corrected for offset acoustic centers.

In conventional two-way systems that employ separate low and high frequency loudspeakers, Time Offset Correction will substantially improve coherency along the primary axis in the direct field. Figure 2 illustrates this configuration. Note that the time offset between low and high frequency sources changes, however, depending upon the angle of observation. Along the primary axis, observation angle 'A', the LF is slightly ahead of the HF source. Below the system, observation angle 'B', the LF is advanced further, while above the system, observation angle 'C', the order is reversed, and the HF leads the LF source. In contrast, because low and high frequency energy radiates from a common 'acoustic window' in coaxial loudspeaker systems, Time Offset Correction will be virtually absolute. Coaxial systems with TOC™ have virtually ripple free, monotonic phase response from 100 Hz to 10 kHz.



With Time Offset Correction™, low and high frequency acoustic signals will be coherent in phase and amplitude at crossover frequency, which requires a special frequency dividing network. At the crossover point, the high pass and low pass filters should be 6 dB below the respective passband amplitudes. For ripple-free performance, their outputs must sum coherently in magnitude and phase at all frequencies.

PAS passive frequency dividing networks are 2nd-order Bessel filters, while the active TOC-23 employs 4th-order linear phase filters. Both types result in seamless acoustic transition from low to high frequency loudspeaker components.

TOC-23 Systems

Figure 3 shows a typical TOC-23 application. The TOC-23 input is electronically balanced, and will bridge balanced or unbalanced lines. Balanced and unbalanced outputs are provided.

The output of the HF amplifier is returned to the TOC-23 to sense and control the average power delivered to the high frequency driver. The high frequency limiter provides a 4:1 compression ratio with a 'soft-knee' characteristic. Attack time is 5 ms, slow enough to ignore transient peaks in high frequency program with large crest factors, yet fast enough to protect from low frequencies and excessive heating. Limiting is undetectable in normal operation, although it can be defeated. A recessed front panel control is provided to set the threshold of limiting for the particular high frequency transducer and application.

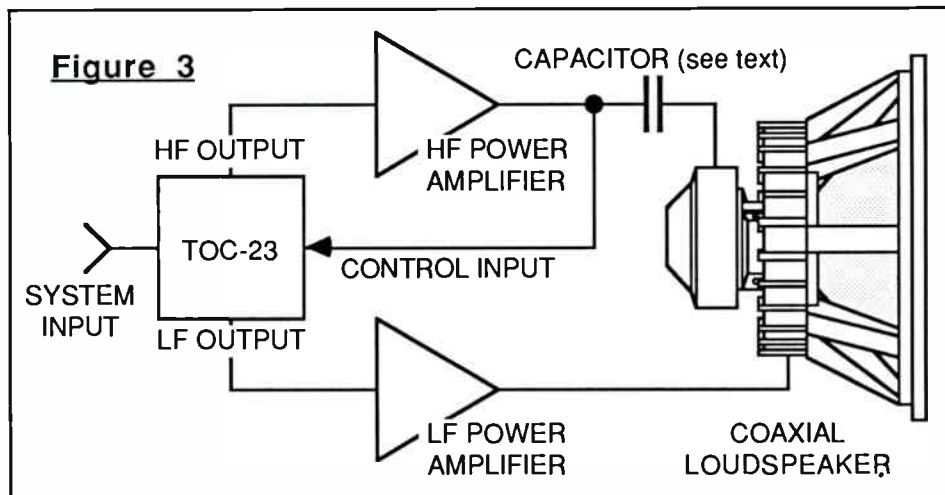
A DC blocking capacitor is recommended between the amplifier and HF driver. Capacitors should be non-polarized with a voltage rating at least twice that of the DC rail voltage of the power amplifier. A value of 50 μF will give 6 dB per octave roll-off below 400 Hz at 8 ohms.

The TOC-23 provides an input limiter with similar characteristics except for a 10 ms attack time and without amplifier sensing. The longer integration time optimizes limiter response to the weighting of typical wide-range program material. Limiting is subtle and inaudible in normal operation.

Crossover filters are 4th-order Linear Phase. High and low pass sections sum coherently in amplitude and phase, with crossover at minus 6 dB. When used in the 2-way mode, the TOC-23

provides a low pass output for driving subwoofer amplifiers.

Outputs are grounded when the TOC-23 is off. A delay circuit lifts the ground 3 seconds after switching the AC power on. Outputs are immediately grounded upon interruption of AC power. Any high quality, non-bridged amplifier may be used with the TOC-23.



Passive Crossover Systems

The CX-1280C, CX-1580C and CXL-1580C provide outstanding performance when used with PAS TOC™ passive crossover networks.

The J-1.2k and R-1.2k are identical except for the Time Offset Correction. Model J-1.2k has delay correction for deep-structured one-inch drivers—the JBL 2425/2426, TAD TD-2001 and all Alnico products. The R-1.2k has a slightly shorter delay optimized for shallow-structured drivers, including the Renkus Heinz 1800, Emilar EK-175B and late vintage Altec one-inch drivers.

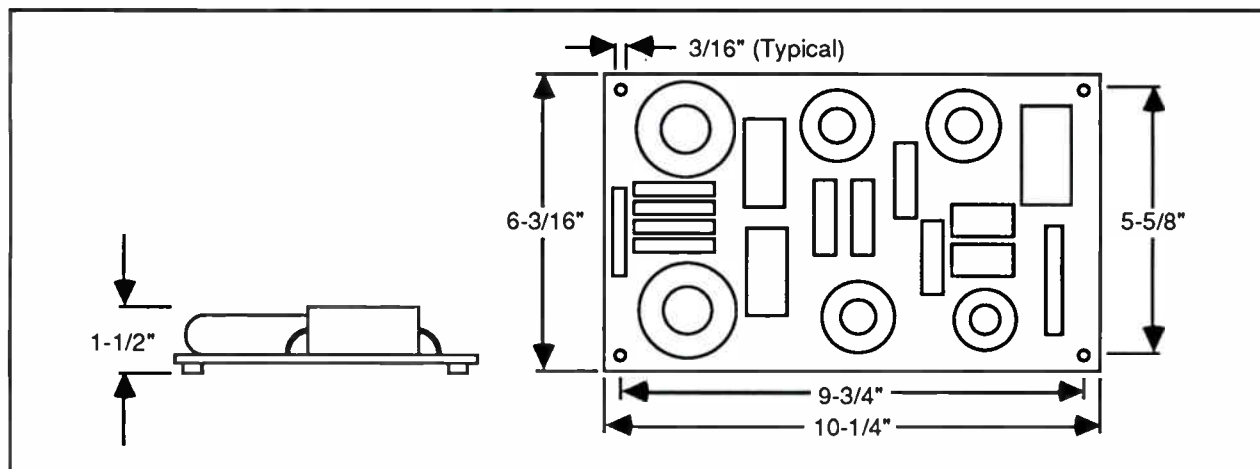
Because Time Offset Correction aligns the low and high frequency transducers to radiate from the same effective acoustic center, the passive

crossovers must meet rigid performance criteria. The J-1.2k and R-1.2k are 2nd-order Bessel filters (12 dB/octave) with a crossover frequency of 1200 Hz. This results in high pass and low pass sections that sum coherently in phase and amplitude at all frequencies, with crossover at minus 6 dB.

Passive TOC™ crossovers use only the highest quality components throughout to insure that exacting acoustic performance will be realized with PAS coaxial transducers. There are no controls and no field adjustments are needed for proper operation.

J-1.2k and R-1.2k

passive TIME OFFSET CORRECTION (TOC™) FREQUENCY DIVIDING NETWORKS



The J-1.2k and R-1.2k are passive frequency dividing networks with TOC™ (Time Offset Correction) for PAS models CX-1280C, CX-1580C and CXL-1580C coaxial transducers.

Both models provide second-order linear phase high and low pass filters that cross over at 1200 Hz, when used with the recommended transducers and 8 ohm compression drivers. Both incorporate equal group delay in their respective high pass and low pass filters due to their filter topology, and shelving equalization to optimize the HF response of the compression driver for the constant coverage horn.

Because coaxial transducers have a common LF and HF radiation axis, the signal to the low frequency component can be delayed for phase coherent, time corrected performance.

The R-1.2k includes Time Offset Correction for one-inch 'pancake' compression drivers, such as the Emilar EK-175-8B and Renkus Heinz 1800. The J-1.2k Time Offset Correction is optimized for deep-structured one-inch compression drivers, including the JBL 2425, 2426 and the TAD TD-2001. Both are designed for 8 ohm low and high frequency load impedances.

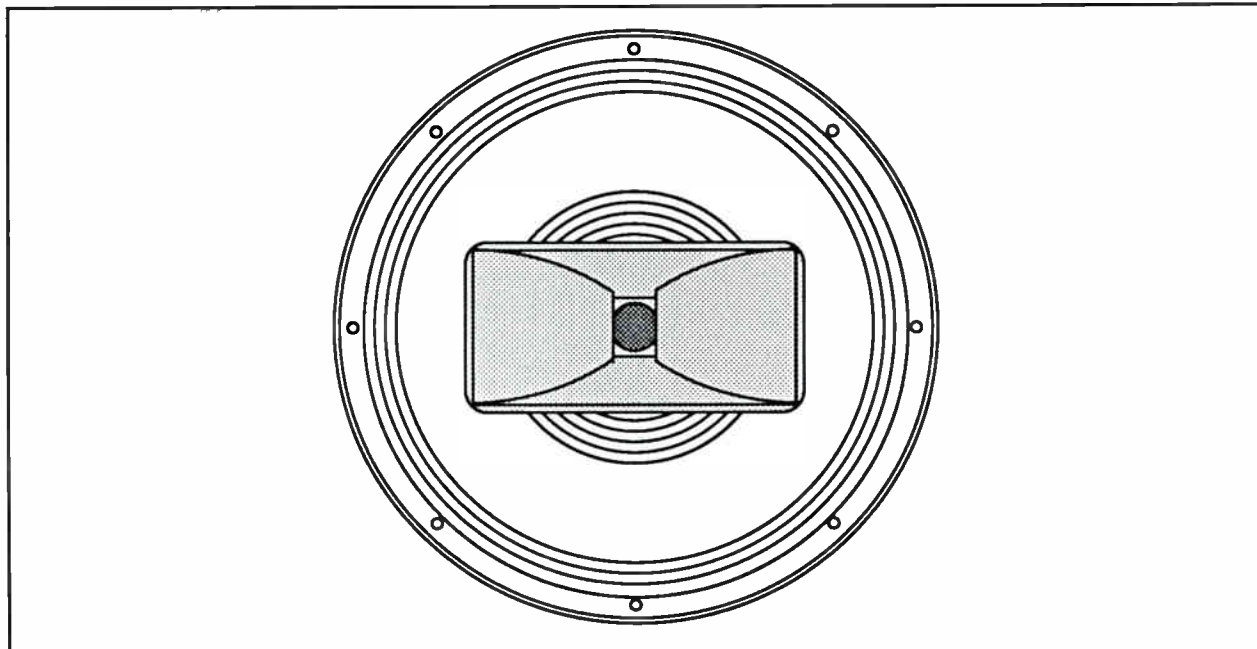
The J-1.2k and R-1.2k are constructed on thick glass-epoxy printed circuit boards using massive copper traces for conductors. Only the highest quality components are used. Inductors are precision wound, individually calibrated air-core type; capacitors are non-polarized and selected for high current capacity.

SPECIFICATIONS

Type:	Passive frequency dividing network with TOC™ (Time Offset Correction)	TOC™ (Time Offset Correction):	<u>Model J-1.2k:</u> for JBL 2425, 2426, TAD TD-2001 <u>Model R-1.2k:</u> for RH 1800 Emilar EK-175B
Crossover:	1.2 kHz, 12 dB/octave crossover at -6 dB	Special Features:	Driver power response EQ
Filter Type:	Bessel	Dimensions:	260 mm (10-1/4) long 157 mm (6-3/16) wide 38 mm (1-1/2) high
Power Capacity:	300 watts	Weight:	2.7 kg (6 lb) net 3.2 kg (7 lbs) shipping
Nominal Impedance:	8 ohms, input 8 ohms, LF & HF loads		

CX-1280C

COAXIAL TRANSDUCER SYSTEM



The CX-1280C system combines a high power, high efficiency, twelve-inch low frequency driver with a constant coverage high frequency horn that will accept standard high performance one-inch compression drivers. This versatility allows the high frequency component of the coaxial system to be tailored to specific applications, budgets or listener preferences. Drivers are easily changed in the field with simple hand tools.

The low frequency section of the CX-1280C employs an edge-wound copper ribbon voice coil, coated with Kapton as an insulator and chemically bonded to a Kapton voice coil form, using a patented winding technique. This results in an exceptionally rugged voice coil assembly that won't de-bond when heated to extreme temperatures under very high power.

The magnetic structure is energized by high output ferrite, assembled from precision blanchard ground components of high permeability and joined to a rigid cast aluminum frame. The pole piece is machined through for coaxial mounting of the HF horn, which joins a cast aluminum magnet cover that is machined to accept standard two and three bolt pattern high performance compression drivers.

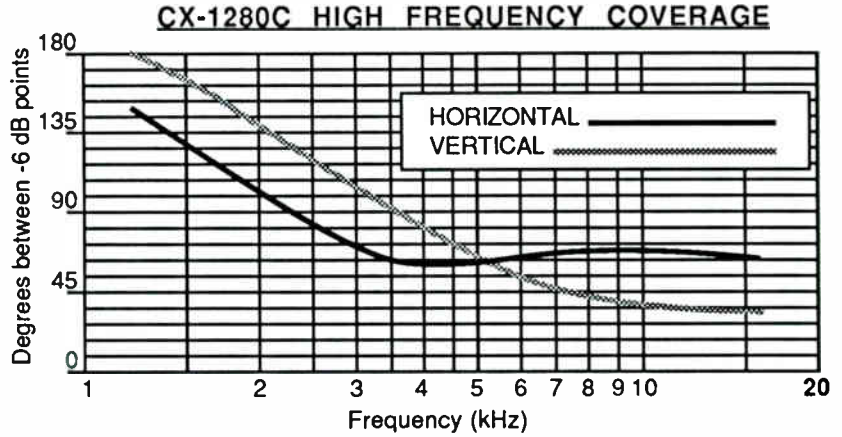
The cone and suspension components were designed with low moving mass for high efficiency and excellent transient characteristics, yet high internal stiffness for good damping and distortion performance. The transducer starts when the music starts, and stops when it is supposed to.

The loudspeaker's Thiele-Small parameters have been chosen to yield extended and linear low frequency performance in compact enclosures.

Because low and high frequency transducers share a common axis of radiation, the signal to the low frequency component can be delayed to achieve a phase coherent, time corrected loudspeaker system. PAS manufactures both passive and active crossovers for the CX-1280C, incorporating TOC™ (Time Offset Correction) for the most popular one-inch compression drivers. All PAS crossovers with TOC™ incorporate linear-phase low and high pass filters that have equal group delay characteristics.

The CX-1280C delivers a level of performance and versatility that is unsurpassed for a wide variety of high level sound reinforcement, on-stage monitoring and demanding music playback applications.

The graph at right shows the -6 dB coverage of the CX-1280C high frequency horn. Horizontal coverage is smooth and uniform from 3.5 kHz to above 16.5 kHz. Below 3.5 kHz, the coverage gradually widens until the 1.2 kHz crossover is reached, resulting in a virtually seamless transition to the LF transducer. In the vertical direction, the horn's directivity is a mirror of the power response of high quality one-inch compression drivers, enabling smooth, uniform response within 60° horizontal and 30° vertical included angles.



PERFORMANCE SPECIFICATIONS

Type:	Low frequency transducer with coaxially-mounted constant coverage high frequency horn
Amplitude Response:	± 3 dB, 40 Hz to 16.5 kHz ¹
Pressure Sensitivity:	LF: 98 dB (1w, 1m, half-space) HF: 112 dB ¹
LF Power Capacity:	200 watts (EIA RS-426A)
LF Impedance:	8 ohms (nominal)
HF Coverage angles:	Horizontal: 60 degrees (-6 dB points, nom.) Vertical: 30 degrees
HF Axial Directivity:	11 dB, 2 kHz—16 kHz (+1, -3 dB)
Recommended Crossover:	1.2 kHz with Time Offset Correction (TOC™)

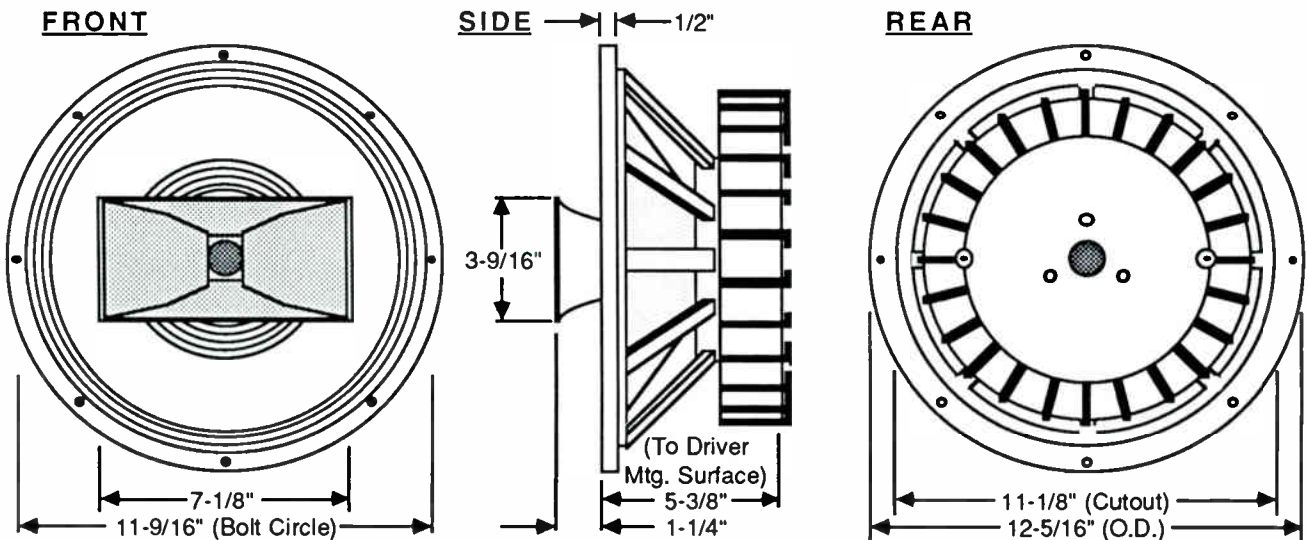
THIELE-SMALL PARAMETERS

f_s :	59 Hz
Q_{ts} :	0.24
Q_{ms} :	10.1
Q_{es} :	0.25
V_{as} :	47 L (1.7 ft ³)
η_0 (half space):	3.8 %
S_D :	0.047 m ² (73 in ²)
X_{max} :	1.8 mm (0.07 in)
V_D :	84 cm ³ (5.2 in ³)

PHYSICAL SPECIFICATIONS

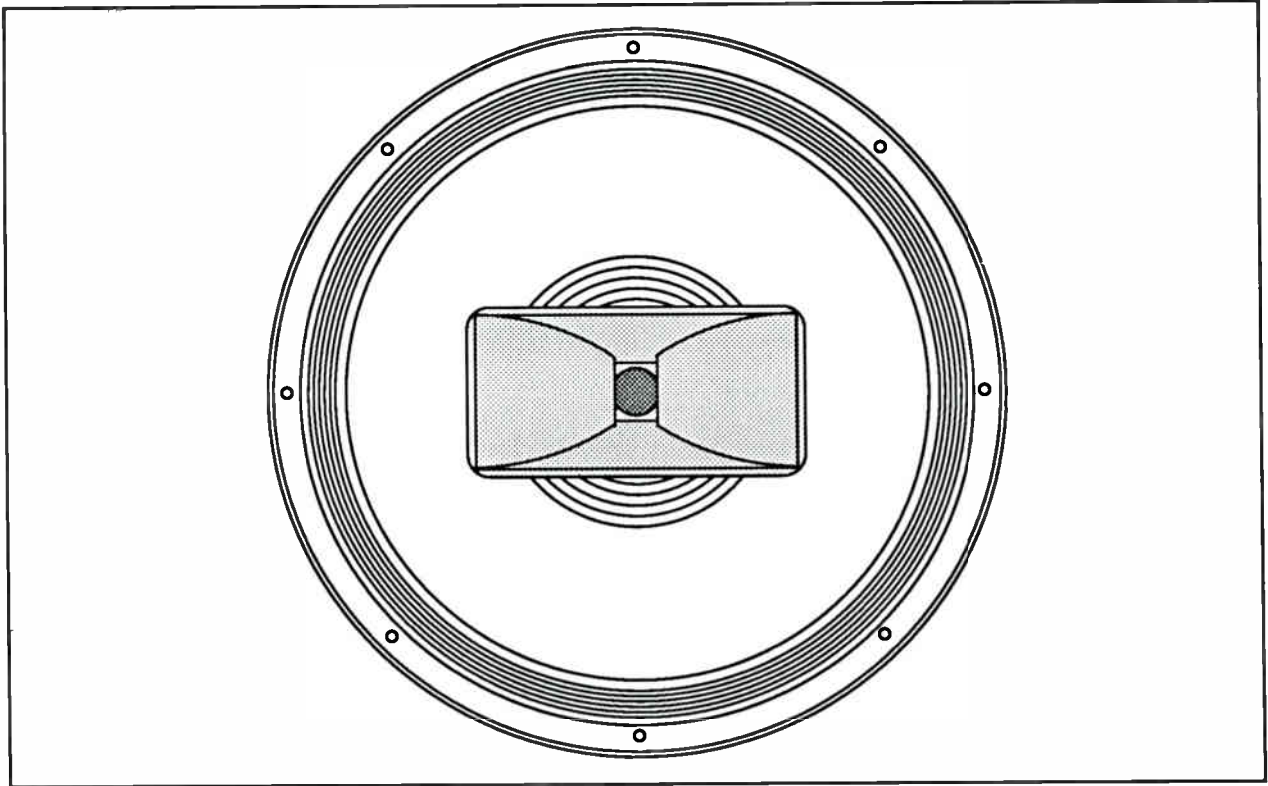
Dimensions:	313 mm (12-5/16) diameter 143 mm (5-5/8) deep
Weight:	11.4 kg (25 lb) net; 12.7 kg (28 lbs) shipping

¹ Performance specifications for HF section are with JBL 2426 compression driver.



CX-1580C

COAXIAL TRANSDUCER SYSTEM



The CX-1580C system consists of a high power, high efficiency, fifteen-inch low frequency driver and a coaxially-mounted constant coverage high frequency horn that will accept standard high performance one-inch compression drivers. The option of various high frequency components allows the coaxial system to be custom-tailored to specific applications, budgets or listener preferences. Simple hand tools are the only requirement to change compression drivers in the field.

The low frequency section of the CX-1580C employs an edge-wound copper ribbon voice coil, coated with Kapton as an insulator, then chemically bonded to a Kapton voice coil form. This patented technique creates an exceptionally rugged voice coil assembly that won't come apart when heated to extreme temperatures under very high power.

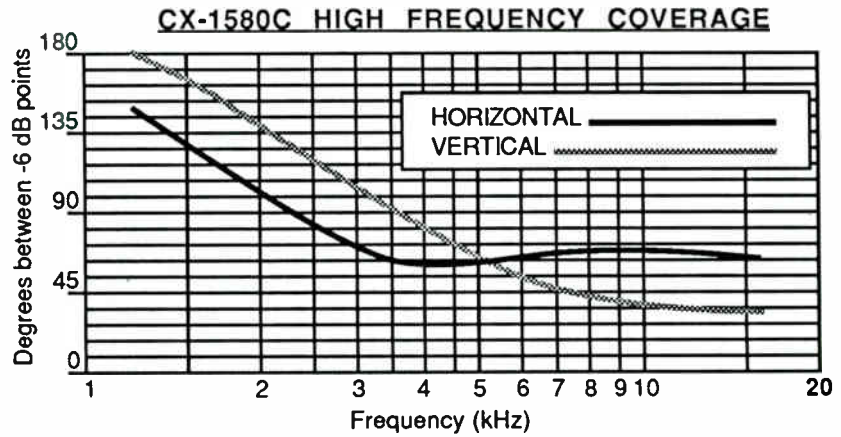
A high-output ferrite ring is sandwiched between precision blanchard ground plates of high permeability and joined to a rigid cast aluminum frame. The pole piece is precision machined to

coaxially mount the HF horn, which terminates in a removable cast aluminum magnet cover. The cover is machined to accept standard two and three bolt pattern compression drivers.

The cone was designed with low moving mass for high efficiency, while maintaining high internal stiffness for low distortion performance. The suspension components retain precise centering of the voice coil assembly and provide an optimal balance with the electromotive forces to achieve exceptional transient attack and decay characteristics.

Because low and high frequency transducers share a common axis of radiation, the signal to the low frequency component can be delayed to achieve a phase coherent, time corrected loudspeaker system. PAS manufactures both passive and active crossovers for the CX-1580C, incorporating TOC™ (Time Offset Correction) for the most popular one-inch compression drivers. All PAS crossovers with TOC™ incorporate linear-phase low and high pass filters that have equal group delay characteristics.

The graph at right shows coverage between -6 dB points of the high frequency horn. Horizontal coverage is smooth and uniform from 3.5 kHz to above 16.5 kHz. Below 3.5 kHz, the coverage gradually widens until the 1.2 kHz crossover, where directivity smoothly transitions to that of the LF transducer. In the vertical direction, the horn's directivity is a mirror of the power response of high quality one inch compression drivers, enabling smooth and uniform response within the horn's nominal 60° horizontal by 30° vertical coverage angles.



PERFORMANCE SPECIFICATIONS

Type:	Low frequency transducer with coaxially-mounted constant coverage high frequency horn
Amplitude Response:	± 3 dB, 35 Hz to 16.5 kHz ¹
Pressure Sensitivity: (1w, 1m, half-space)	LF: 97 dB HF: 112 dB ¹
LF Power Capacity:	200 watts (EIA RS-426A)
LF Impedance:	8 ohms (nominal)
HF Coverage angles: (-6 dB points, nom.)	Horizontal: 60 degrees Vertical: 30 degrees
HF Axial Directivity:	11 dB, 2 kHz—16 kHz (+1, -3 dB)
Recommended Crossover:	1.2 kHz with Time Offset Correction (TOC™)

THIELE-SMALL PARAMETERS

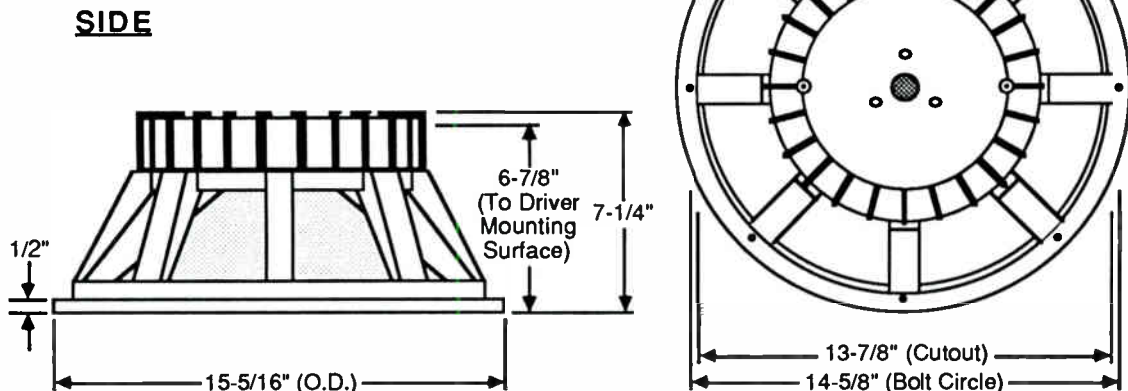
f_s :	38 Hz
Q_{ts} :	0.33
Q_{ms} :	17.2
Q_{es} :	0.34
V_{as} :	225 L (8.0 ft ³)
η_0 (half space):	4.0 %
S_D :	0.073 m ² (113 in ²)
X_{max} :	2.3 mm (0.09 in)
V_D :	100 cm ³ (6.2 in ³)

PHYSICAL SPECIFICATIONS

Dimensions:	389 mm (15-5/16) diameter 184 mm (7-1/4) deep
Weight:	12.3 kg (27 lb) net; 13.6 kg (30 lbs) shipping

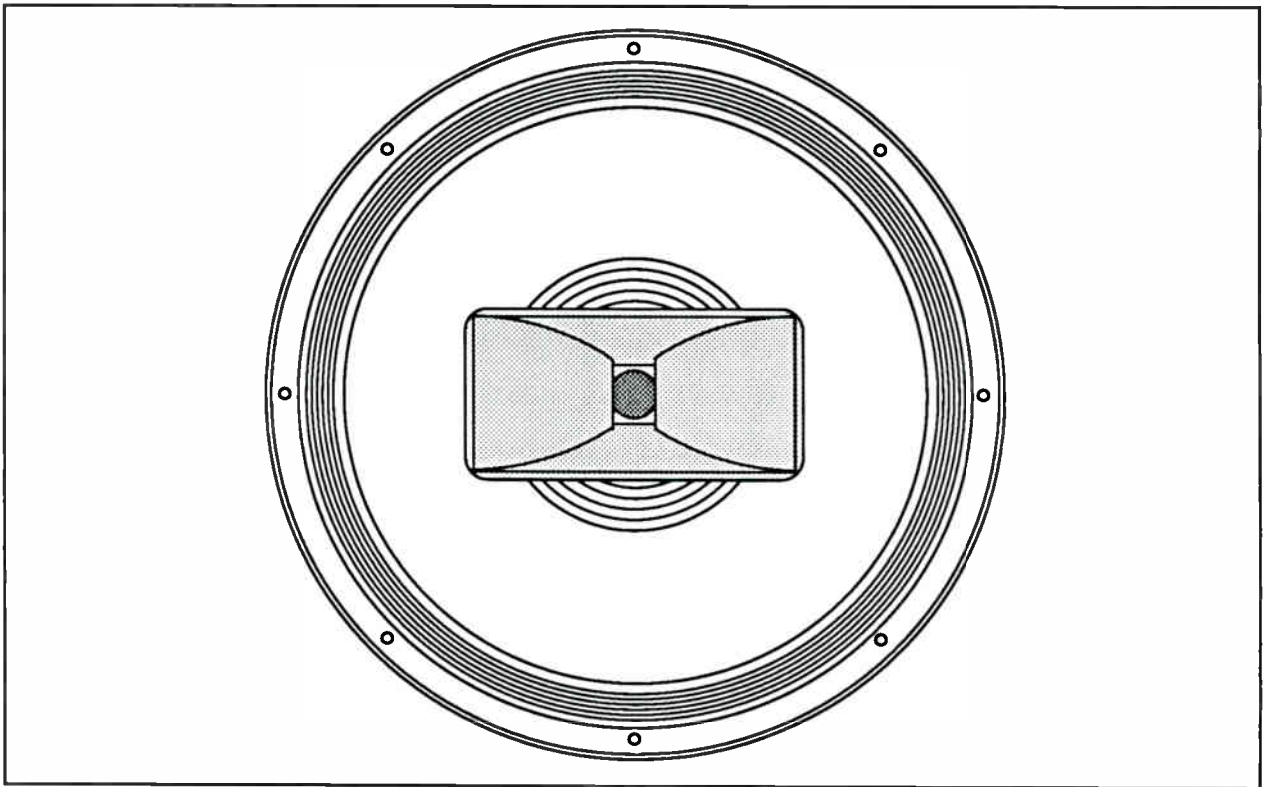
¹ Performance specifications for HF section are with JBL 2426 compression driver.

REAR



CXL-1580C

COAXIAL TRANSDUCER SYSTEM



The CXL-1580C system consists of a high power, extended-bass 15-inch transducer and a coaxially-mounted constant coverage horn that will mount high performance 1-inch compression drivers. Versatility to mount different high frequency drivers allows the coaxial system to be tailored to specific applications, budgets or listener preferences. Simple hand tools only are required to change drivers in the field.

The LF transducer uses an over-hung voice coil to maintain a constant amount of wire in the magnetic gap under long cone excursions for extended linear low frequency output. The edge-wound copper ribbon coil is coated with Kapton as an insulator, then chemically bonded to a Kapton voice coil form. This patented technique makes an exceptionally rugged voice coil assembly that won't come apart, even when heated to extreme temperatures at very high power.

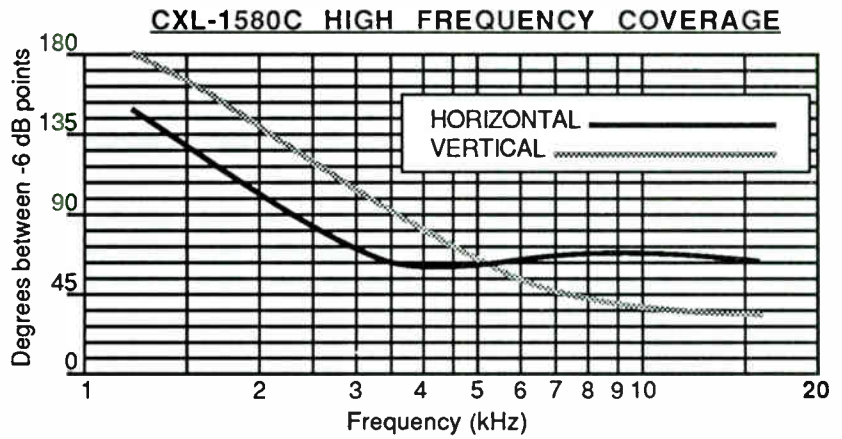
The magnetic circuit consists of a high-output ferrite ring sandwiched between blanchard ground plates of high permeability, joined to a rigid cast aluminum frame. The pole piece coaxially mounts the HF horn, which extends through the magnet assembly to a removable cast aluminum magnet cover. The cover is machined to accept standard two and three bolt pattern compression drivers.

The cone was designed with high internal stiffness for extended and linear low frequency performance. In spite of this, moving mass remains moderately low for a transducer of the CXL-1580C's linearity, resulting in an exceptional balance of efficiency, transient attack and decay characteristics and linear low frequency output capability.

Because low and high frequency transducers share a common axis of radiation, the signal to the low frequency component can be delayed to achieve a phase coherent, time corrected loudspeaker system. PAS manufactures both passive and active crossovers for the CXL-1580C, incorporating TOC™ (Time Offset Correction) for the most popular one-inch compression drivers. All PAS crossovers with TOC™ incorporate linear-phase low and high pass filters that have equal group delay characteristics.

The PAS CXL-1580C was designed for smooth and extended low frequency alignments in enclosures of moderate dimensions. Its linear response, efficiency, high power capacity and versatility of compression driver selection, when combined with PAS's exclusive TOC™ crossovers result in performance that is incomparable

The graph at right shows coverage between -6 dB points of the high frequency horn. Horizontal coverage is smooth and uniform from 3.5 kHz to above 16.5 kHz. Below 3.5 kHz, the coverage gradually widens until the 1.2 kHz crossover, where directivity smoothly transitions to that of the LF transducer. In the vertical direction, the horn's directivity is a mirror of the power response of high quality one inch compression drivers, enabling smooth and uniform response within the horn's nominal 60° horizontal by 30° vertical coverage angles.



PERFORMANCE SPECIFICATIONS

Type:	Low frequency transducer with coaxially-mounted constant coverage high frequency horn
Amplitude Response:	± 3 dB, 30 Hz to 16.5 kHz ¹
Pressure Sensitivity: (1w, 1m, half-space)	LF: 98 dB HF: 112 dB ¹
LF Power Capacity:	300 watts (EIA RS-426A)
LF Impedance:	8 ohms (nominal)
HF Coverage angles: (-6 dB points, nom.)	Horizontal: 60 degrees Vertical: 30 degrees
HF Axial Directivity:	11 dB, 2 kHz—16 kHz (+1, -3 dB)
Recommended Crossover:	1.2 kHz with Time Offset Correction (TOC™)

THIELE-SMALL PARAMETERS

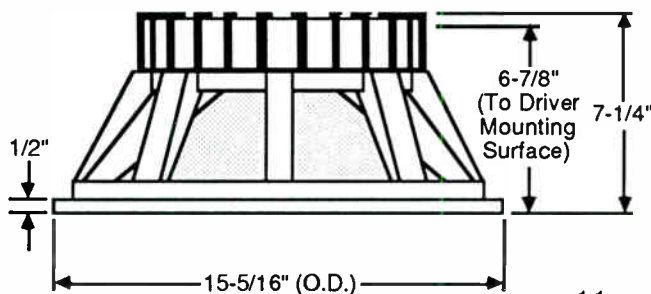
f_s :	36 Hz
Q_{ts} :	0.34
Q_{ms} :	16.7
Q_{es} :	0.35
V_{as} :	304 L (10.7 ft ³)
η_0 (half space):	3.9 %
S_D :	0.073 m ² (113 in ²)
X_{max} :	6.4 mm (0.25 in)
V_D :	278 cm ³ (17.5 in ³)

PHYSICAL SPECIFICATIONS

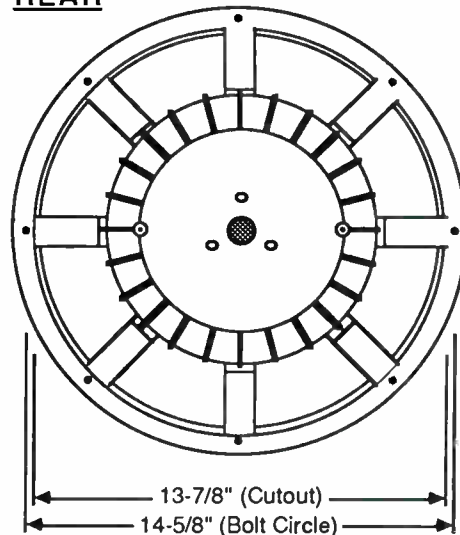
Dimensions:	389 mm (15-5/16) diameter 184 mm (7-1/4) deep
Weight:	12.3 kg (27 lb) net; 13.6 kg (30 lbs) shipping

¹ Performance specifications for HF section are with JBL 2426 compression driver.

SIDE

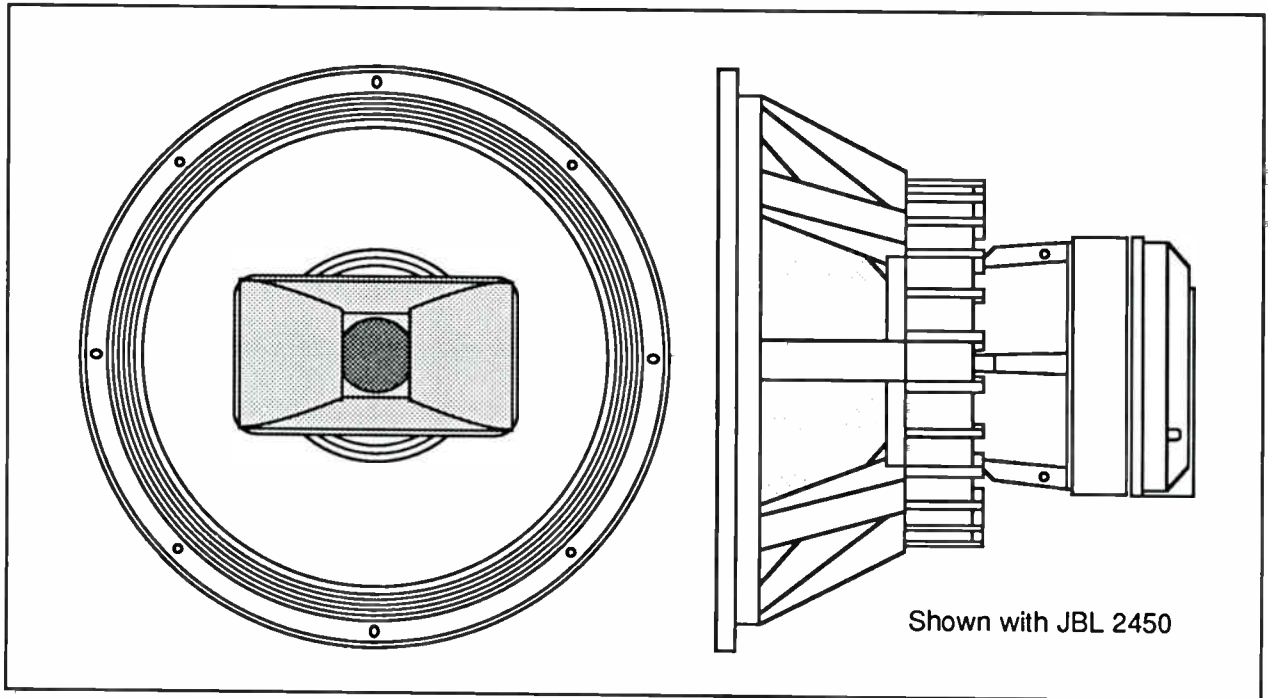


REAR



CXL-2580C

COAXIAL TRANSDUCER SYSTEM



Coaxial systems offer the advantage of point-source time-coherent location of low and high frequency components. But for demanding high-level sound reinforcement and monitoring applications, coaxial systems have lacked sufficient acoustic power output capability, especially in the critical middle frequency range. That is, until the PAS CXL-2580C.

The CXL-2580C system consists of a high power 15-inch bass driver and a constant-coverage high frequency horn with a 2-inch throat aperture that will accept standard four bolt large format compression drivers, allowing the high frequency component of the coaxial system to be tailored to specific applications, budgets or listener preferences. Drivers are easily changed in the field with simple hand tools.

This unique combination of acoustic elements enables greater overall acoustic output, a lowering of the crossover frequency for smoother mid-frequency power response, substantially reduced distortion and improved overall system reliability.

The low frequency section employs a robust 4-inch edge-wound copper ribbon voice coil, coated with Kapton as an insulator and chemically bonded to a Kapton voice coil form, using a patented winding technique. This results in an exceptionally rugged voice coil assembly that won't de-bond when heated to extreme temperatures under very high power. The magnetic structure is energized by high output ferrite,

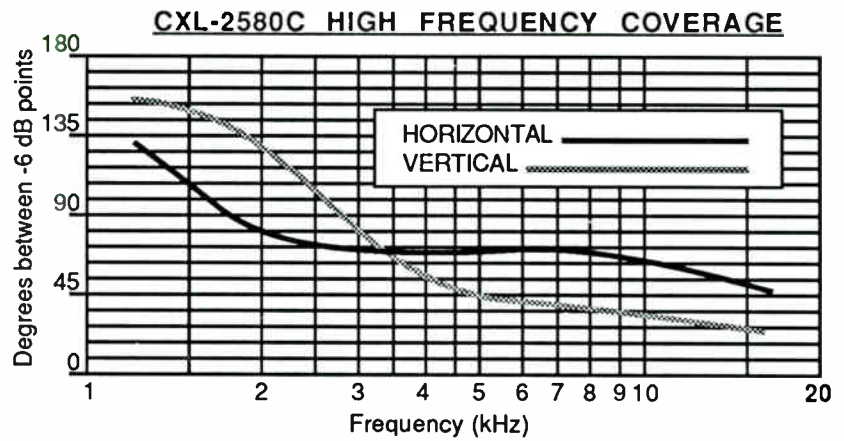
assembled from precision blanchard ground components of high permeability and joined to a rigid cast aluminum frame. The unique pole piece provides coaxial mounting of the large-throat horn, while maintaining uniformly high magnetic flux along the entire voice coil gap for efficient, linear operation.

Along with the magnetic system, the cone and suspension components have been designed to allow very large and linear cone displacement for extended low frequency response, while providing complete freedom from cone breakup, even when driven to extremely high output levels.

Because low and high frequency transducers share a common axis of radiation, the signal to the low frequency component can be delayed to achieve a phase coherent, time corrected loudspeaker system. PAS builds both passive and active crossovers for the CXL-2580C, incorporating TOC™ (Time Offset Correction) for the most popular two-inch drivers. All PAS crossovers with TOC™ incorporate linear-phase low and high pass filters that have equal group delay characteristics.

The CXL-2580C delivers a level of performance and versatility that is unsurpassed in two-way systems. For critical high-level applications, it will play louder, sound better, and be more reliable than any other coaxial system available.

The CXL-2580C HF horn coverage, nominally 60° horizontal by 30° vertical, is shown at right. At the lower frequencies, where pattern control is governed by dimensional constraints, the horn makes a nearly monotonic transition to the directivity of the LF driver. Above 10 kHz, the coverage has been allowed to gradually narrow to 45° by 22.5° (an artifact of the large throat aperture), rather than introduce convolutions in the throat to control short wavelength coverage at the expense of added distortion and sound coloration.



PERFORMANCE SPECIFICATIONS

Type: Low frequency transducer with coaxially-mounted constant coverage high frequency horn

Amplitude Response: ± 3 dB, 35 Hz to 16.5 kHz¹

Pressure Sensitivity: LF: 98 dB
 (1w, 1m, half-space) HF: 114 dB¹

LF Power Capacity: 400 watts (EIA RS-426A)

LF Impedance: 8 ohms (nominal)

HF Coverage angles: Horizontal: 60 degrees
 (-6 dB points, nom.) Vertical: 30 degrees

HF Axial Directivity: 11 dB, 1.2 kHz—16 kHz
 (± 3 dB)

Recommended Crossover: 1.2 kHz with Time Offset Correction (TOC™)

THIELE-SMALL PARAMETERS

f_s : 48 Hz

Q_{ts} : 0.34

Q_{ms} : 14.0

Q_{es} : 0.35

V_{as} : 100 L (3.5 ft³)

η_0 (half space): 3.1 %

S_D : 0.085 m² (132 in²)

X_{max} : 6.4 mm (0.25 in)

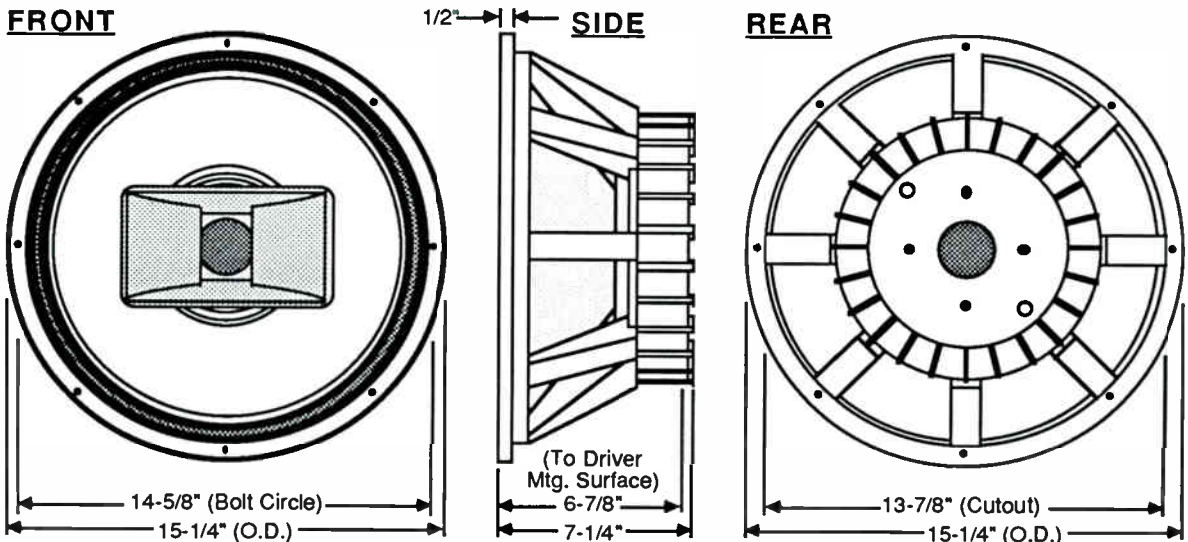
V_D : 539 cm³ (33 in³)

PHYSICAL SPECIFICATIONS

Dimensions: 387 mm (15-1/4" diameter)
 184 mm (7-1/4" deep)

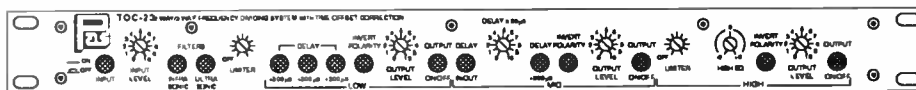
Weight: 12.3 kg (27 lb) net; 13.6 kg (30 lbs) shipping

¹ Performance specifications for HF section are with JBL 2445J compression driver.



TOC-23

active TIME OFFSET CORRECTION (TOC™) COAXIAL SYSTEM PROCESSOR



The TOC-23 is a line-level dividing network and system processor for use with loudspeaker systems in bi-amplified and tri-amplified applications. The TOC-23 includes two-way and three-way 4th-order linear phase active crossover circuitry with constant group delay, adjustable Time Offset Correction (TOC™), turn-on/turn-off transient protection relays, infrasonic and ultrasonic high pass/low pass filters, adjustable input and high frequency output limiters.

Crossovers are at the minus 6 dB points, and the outputs sum coherently in magnitude and phase at all frequencies. For coaxial system use, the TOC-23 may be used in the two-way operating mode, with or without subwoofers. The TOC-23 provides the recommended crossover frequency of 1200 Hz, which is selected by DIP switches accessible from the top of the instrument. Both balanced and unbalanced inputs and outputs are provided.

A wealth of controls have been included to aid in system alignment, testing and trouble-shooting. The input limiter is adjustable with a front panel threshold control, which includes an 'off' position. The high frequency output limiter derives a sense input from the output of the high frequency power amplifier to control the average power level delivered to the high frequency driver. A front panel control adjusts the threshold of high frequency output limiting. Output level controls for low, mid and high outputs are also installed on the TOC-23 control panel. Level controls are recessed screwdriver adjust type. Controls include:

Input controls: input muting switch; input level potentiometer; system high pass switch; system low pass switch, limiter threshold /off potentiometer.

Low frequency output controls: adjustable Time Offset Correction™ (3) two-position switches; polarity reverse switch; output level potentiometer; output muting switch.

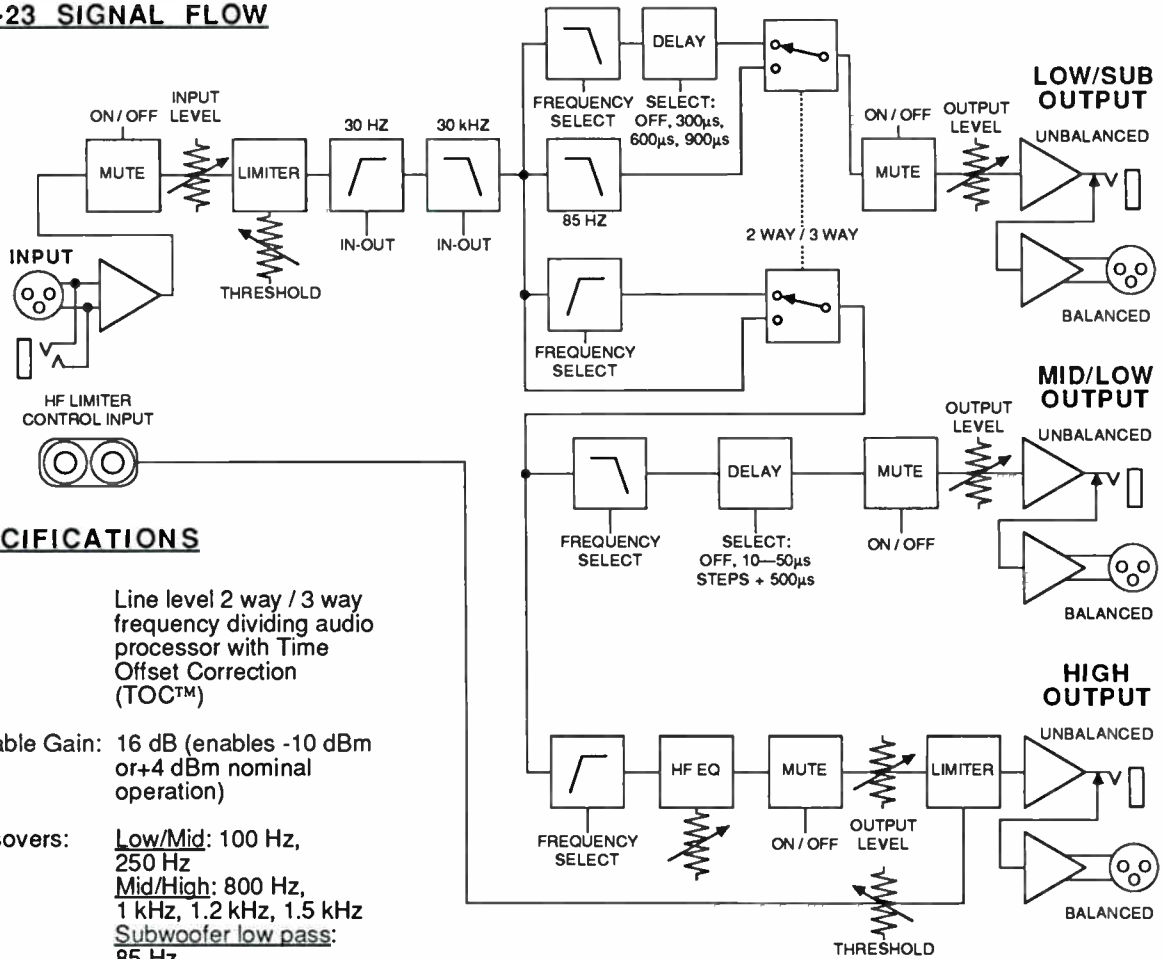
Mid frequency controls: adjustable Time Offset Correction™ (1) two-position switch, (1) 10-position rotary switch; TOC™ in/out switch; polarity reverse switch; output level potentiometer; output muting switch.

High frequency controls: limiter threshold/off potentiometer; high frequency EQ boost/cut potentiometer; polarity reverse switch; output level potentiometer; output muting switch.

The TOC-23 includes a turn-on/turn-off protection circuit, which grounds the outputs the moment AC power is de-energized. A delay circuit maintains this condition for approximately 3 seconds after power is applied to protect systems from transients which could occur in equipment ahead of the TOC-23.

The TOC-23 combines two-way and three-way loudspeaker sources into a time and phase-coherent, high definition reinforcement or playback system of unsurpassed transient accuracy and overall sonic excellence.

TOC-23 SIGNAL FLOW



SPECIFICATIONS

Type: Line level 2 way / 3 way frequency dividing audio processor with Time Offset Correction (TOC™)

Available Gain: 16 dB (enables -10 dBm or +4 dBm nominal operation)

Crossovers:
Low/Mid: 100 Hz, 250 Hz
Mid/High: 800 Hz, 1 kHz, 1.2 kHz, 1.5 kHz
Subwoofer low pass: 85 Hz

Crossover Filters: 4th order (24 dB/octave) Linear Phase. Crossover occurs at -6 dB.

Bandpass Filters: 30 Hz and 30 kHz, 2nd order (12 dB/octave)

Time Offset Correction (TOC™):
Low: 900µs, in 300µs increments
Mid: (low in 2-way mode): up to 1000µs in ten 50µs steps and one 500µs step

Inputs: XLR and 1/4-inch RTS selectable -10 or +4 dBm, balanced or unbalanced 10 k ohm, +26 dBm (max.)

Outputs: XLR balanced or 1/4-inch unbalanced -10 or +4 dBm nominal, +20 dBm (max)

Limiters:
Input Limiter: "soft-knee" type, 10 ms. attack time, 50 ms. release, 4:1 ratio
HF Output: "soft-knee" type, 5 ms. attack time, 20 ms. release, 4:1 ratio.

Hum and Noise: Better than -86 dBm at unity gain.

Transient Protection: NC relays ground outputs until energized 3s after power is applied—closure is immediate when power is removed.

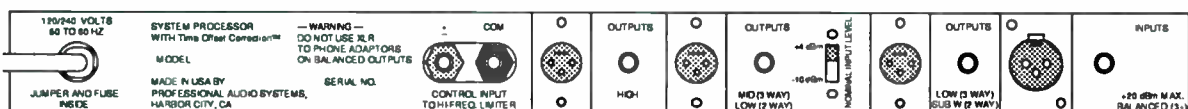
Power Requirements: 120/240 V, 50/60 Hz AC, 6 watts.

Mechanical: Black anodized aluminum chassis and panel.

Dimensions: 483 mm (19 in) wide
 44 mm (1-3/4 in) high
 241 mm (9-1/2 in) deep

Weight: 2 kg (4-1/2 lbs) net
 3.2 kg (7 lbs) shipping

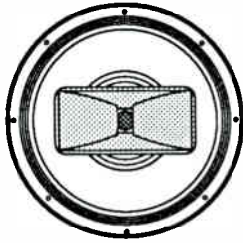
TOC-23 REAR PANEL



Coaxial Transducers

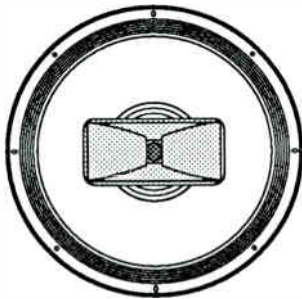
and Time Offset Correction (TOC™) Accessories

November 1, 1989 PRICE LIST



CX-1280C.....\$210.00
 12-inch Coaxial Transducer System for one-inch compression driver, less driver and frequency dividing network.

Shipping weight: 12.7 kg (28 lbs)

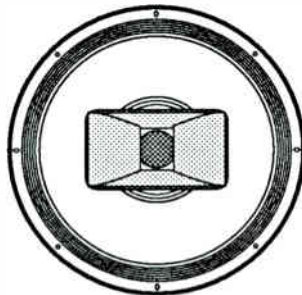


CX-1580C.....\$228.00
 15-inch Coaxial Transducer for one-inch compression driver, less driver and frequency dividing network.

Shipping weight: 13.6 kg (30 lbs)

CXL-1580C.....\$228.00
 15-inch Extended-Bass Coaxial Transducer, as above.

Shipping weight: 13.6 kg (30 lbs)



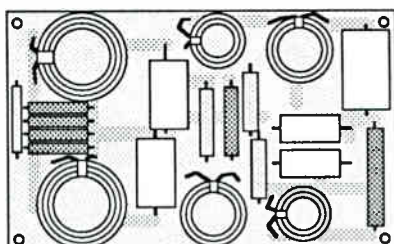
CXL-2580C.....\$300.00
 15-inch High Power Coaxial Transducer for two-inch compression driver, less driver and frequency dividing network.

Shipping weight: 13.6 kg (30 lbs)



TOC-23.....\$775.00
 Active Frequency Dividing System with TOC™ processing features, subsonic/supersonic filters, subwoofer output, limiters and turn-on/turn-off relay protection.

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J-1.2k.....\$125.00
 Passive crossover for CX-1280C, CX-1580C, CXL-1580C, with TOC™ (JBL 2425, 2426, TAD TD-2001 drivers)

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R-1.2k.....\$125.00
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The Richard C. Heyser Scholarship Loan Fund has been set up to honor Dick Heyser, a highly gifted, loved and respected engineer, with a lasting memorial. The scholarship loan will financially assist promising graduate engineering students in the field who, otherwise, could not continue with their studies.

In March of 1987 Dick died, just a few months before he would have assumed the office of AES President. He not only was active in AES but he contributed greatly to the audio field through his Time Delay Spectrometry discoveries. He gave of himself on a personal level as well. Carolyn Davis, Co-Founder of Synergetic Audio Concepts, said of the fund, "Dick, himself, gave so much to all those with whom he came in contact, especially those just starting out; we feel Dick would have been pleased to know he is being remembered in this way."

In conjunction with this memorial, a major update of The PHD Program[†] will be dedicated to Dick Heyser and all the proceeds will go to the Richard C. Heyser Scholarship Loan Fund.

You may obtain a program for a donation of \$300.00 or more; prior owners may upgrade for a donation of \$50.00 or more. Make your check payable to the Richard C. Heyser Scholarship Loan Fund. Send to the Richard C. Heyser Scholarship Loan Fund, c/o *Sound and Communications*, 25 Willowdale Avenue, Port Washington, NY 11050.

[†] Trademark of Ambassador College.

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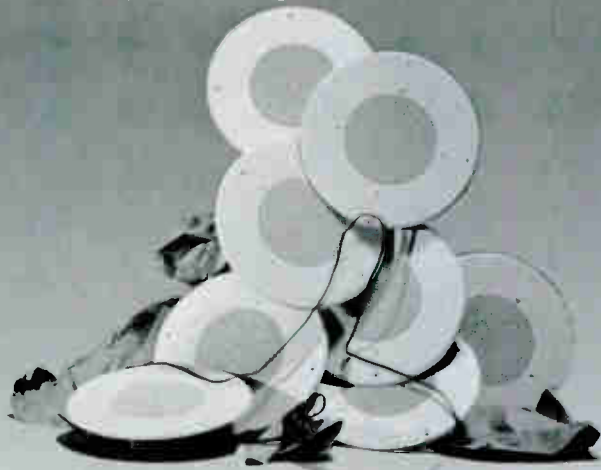
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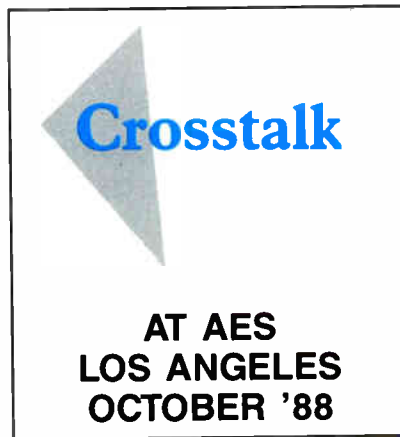
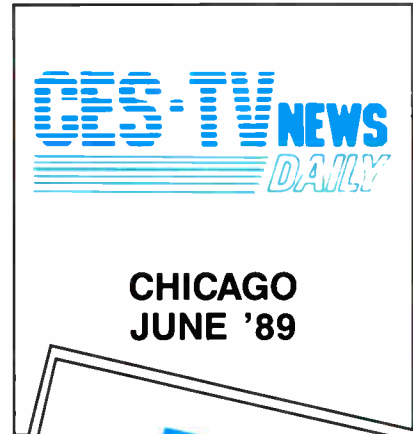
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 (714) 842-9969, FAX# 714-842-9571
 Sls/Mkt'g: Leon Hsieh, Pres./G. Mgr.: Hugh Hsieh,
 Chief Eng.: S.W. Hsu
 Design Factors, Hacienda Heights, CA, 213-697-7576
 Fort Assoc., Kensington, MD, 301-949-1706
 George Pettico, Berkeley, IL, 312-261-0342
 Repworks, Chicopee, MA, 413, 533-0845
 Weller Electronic, Worthington, OH, 614-885-7819
 Products: high-power, horns, paging horns, portable, talk-back

SHURE BROTHERS
 222 Hartrey Ave.
 Evanston, IL 60202-3696
 (312) 866-2200, FAX# 312-866-2279
 Pres.: James Kogen, VP Sls: Lottie Morgan, Dir. Tech.
 Mkt'g: John Phelan, Dir. Wired Mics: Alan Shirley, Dir.
 Wireless Mics: Sandy Schroeder, Dir. Sls: Al Hershner
 Products: full-range, outdoor, paging horns, paging, portable

Sonance
 32992 Calle Perfecto
 San Juan Capistrano, CA 92675
 (714) 661-7558, 800-582-7777, FAX# 714-240-4995
 Pres.: Scott Struthers, VP: Geoff Spencer, Nat'l Sls
 Mgr.: Dave Donald, Asst. Nat'l Sls Mgr.: Caroline Kelly
 Bach, New York, NY, 212-727-0404
 Morris-Tait, N. Hollywood, CA, 213-877-4424
 Tandem Mkt'g, Schaumburg, IL, 312-605-1960
 Vestico, Merrit Island, FL, 407-454-9051
 Balaton, Washington, DC, 202-471-1764
 Products: ceiling, environment protected, flush-mount, foreground, music system speakers, outdoor, sub-woofer, sur-

face-mount, systems

SOUNDSPHERE

Sonic Systems
 737 Canal St., Bldg. 23B
 Stamford, CT 06902
 (203) 356-1136, FAX# 203-324-0893
 Pres.: Peter Hamilton, VP Mkt'g: John Karamon
 Products: flush-mount, full-range, music system speakers, omni-directional, outdoor, paging

Sony Professional Audio
 1600 Queen Anne Rd.
 Teaneck, NJ 07666
 (201) 833-5200, 800-635-SONY, FAX# 201-833-9645
 Nat'l Sls Mgr.: Bob Ott, Prod. Mgr.: Art Gonzales, Mkt'g
 Mgr.: David Kawakami
 Sony Pro Audio, Paramus, NJ, 201-368-5185
 Sony Pro Audio, Nashville, TN, 615-883-8140
 Sony Pro Audio, Burbank, CA, 818-841-8711
 Products: studio/reference monitors

Soundscape Speakers
 PO Box 1563
 Windermere, FL 34786
 (407) 876-6884
 Sls Mgr.: Susan Collins
 Products: outdoor

Sound Tech
 230 Lexington Dr.



“THE SETTING IS A KNOCKOUT”

The New York Times, Friday, October 23, 1987

DINER'S JOURNAL

The forbidding Black Rock, as the CBS Building on Avenue of the Americas at 53rd Street is dubbed, has sprouted an exotic flower called China Grill, an offshoot of Chinoise on Main in Santa Monica, California.

The setting is a knockout—a soaring block-long space with pale jade-colored walls, huge eggshell-colored light shades suspended from the ceiling and a gleaming open kitchen.

This restaurant originally had forty twelve-inch coaxial speakers in its 30 ft. high ceiling. They have been replaced with six #168 black Soundsphere loudspeakers which are deftly hidden between the eggshell light shades. The manager and staff state that the background music is even and “delightful!”

Steven M. Rosstad of United States Communications, New York City, is impressed by the sound quality and cost-saving installation. Steven looks forward to using Soundspheres as a “problem solver” in future challenging situations.

Write or call direct for further information.

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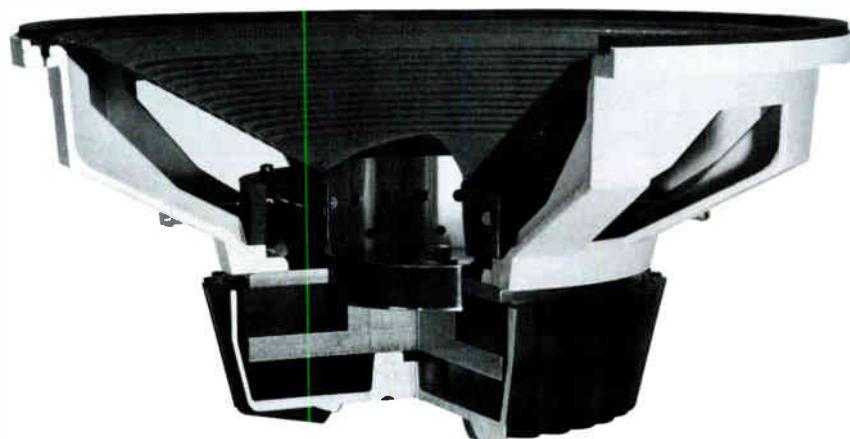
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Sun Valley, CA 91352

(213) 875-1900



Circle 230 on Reader Response Card

World Radio History

Buffalo Grove, IL 60089
(312) 541-3520, 800-877-6863, FAX# 312-541-3616

Pres.: Rudy Schlacher, Gen. Sls Mgr.: David Beirut, Exp. Sls Mgr.: William Robinson, Sls Dir.: Todd Peren
Products: columns, compact, components, decorative, foreground, full-range, high-frequency drivers, high-power, low-frequency drivers, mid-bass, multi-way/high-powered, music system speakers, portable, stage monitors, sub-woofer, tweeters

SpeakerCraft
3615 Presley Ave.
Riverside, CA 92507
(714) 787-0543, FAX# 714-787-8747
Dir. Mkt'g: Randy Peede
Products: ceiling, decorative, environment protected, foreground, full-range, outdoor, surface-mount

Speco Div. Components Specialties
PO Box 624
Lindenhurst, NY 11757
(516) 957-8700, 800-645-5516, FAX# 516-956-9142

Pres.: Louis Keller, VP G. Mgr.: James Ganci, V.P. Sls: Mel Hulkower, Sls Mgr.: Eric Forman, Sls Expeditor: Bernice Zachman
Products: ceiling, columns, compact, components, decorative, environment protected, flush-mount, foreground, full-range, high-frequency drivers, high-power, horns, low-frequency drivers, music system speakers, omni-directional,

outdoor, paging horns, paging, portable, powered, systems, tweeters, voice communications

Spectra Sonics
3750 Airport Rd.
Ogden, UT 84405
(801) 392-7531
Pres./Owner: William Dilley, Eng./Sls: Gregory Dilley

Studer Revox America
1425 Elm Hill Pike
Nashville, TN 37210
(615) 254-5651, FAX# 615-256-7619
Products: studio/reference monitors

Sunn Musical Equipment
1130 Columbia St.
Brea, CA 92621
(714) 990-0909, 800-854-6230, FAX# 714-990-3986
Pres.: Bill Schultz, Dir. Mkt'g: Joe Green
Products: full-range, high-frequency drivers, horns, low-frequency drivers, music system speakers, outdoor, portable, stage monitors

TEI Electronics
PO Box 246
Hialeah, FL 33011
(305) 888-3980, 800-327-8811, FAX# 305-885-4950

Pres.: Danny Alonso, VP: Mireya Muniz, Nat'l Sls Mgr.: Walter McNulty, Cust. Svce: John Tembras, Sls: Orlando Pineda, Sls: Jose Hurcades
Products: ceiling, compact, components, flush-mount, full-range, horns, paging horns, portable, tweeters

TOA ELECTRONICS
PO Box 2047
S. San Francisco, CA 94080
(415) 588-2538, 800-843-4750, in-state 800-in CA 800-632-2157, FAX# 415-588-3349
Pres.: Yoshio Ishida, Nat'l Sls Mgr/Comm. Pro.: Richard Krochmal, Nat'l Sls Mgr./Pro. Music & Ent.: Rick Kamlet, Nat'l Sls Mgr./Intercom: Al Burns
Products: ceiling, compact, components, environment protected, flush-mount, foreground, full-range, high-frequency drivers, high-power, low-frequency drivers, monitor panels, multi-way/high-powered, music system speakers, outdoor, paging horns, paging, portable, stage monitors, studio/reference monitors, sub-woofer, surface-mount, tweeters

TALK-A-PHONE
5013 N. Kedzie Ave.
Chicago, IL 60625
(312) 539-1100, FAX# 312-539-1241
Pres.: Z. Liberman, VP: S. Shanes, Sls Mgr.: Dan Kagan
Products: ceiling, environment protected, flush-mount, horns, outdoor, paging horns, paging, talkback, voice communications

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Is there a revolution in reproduced sound? Has video caused sound designers to think about the delivery of music in new ways? What's new in the coding, decoding and design of surround sound? How important is it? Designers, engineers and installers discuss the revolution for the home and for public places.

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3. MIDI: New Applications

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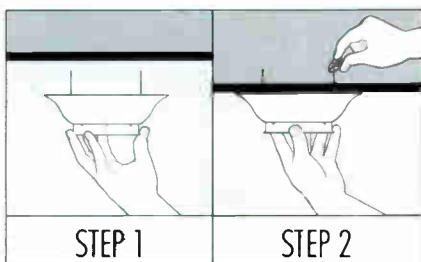


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Simply push the twin metal mounting posts through any lift-out ceiling tile, then secure the QM-300 Series speaker in place with the Push-n-Lok[®] mounting system. The posts double as speaker leads, and special clips make wiring and installation one easy step.

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STEP 2



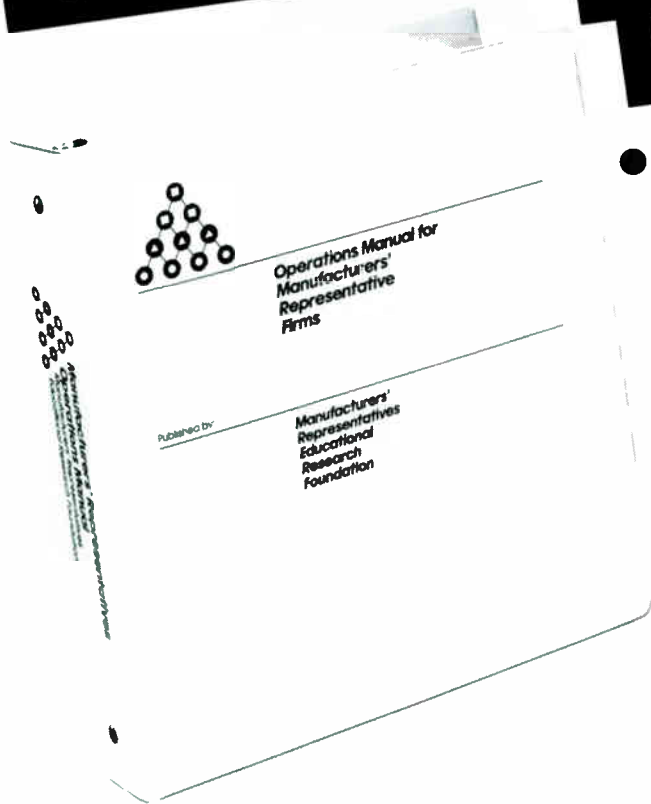
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JSA

To install, simply puncture ceiling tiles with the mounting posts. Then secure in place and connect speaker leads with our Push-n-Lok[®] retaining clips. To remove, reverse procedure.

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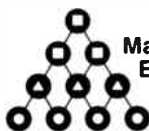
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Mkt'g Mgr.: Bill Calma, Inside Sls: Rob Hofkamp,
Credit Mgr.: Kathy Kent, Svce: Ivan Frivarski,
Ship./Rec.: Fred Baetz
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Hot House Mkt'g, Highland, NY, 914-691-6077
Powerlines Mkt'g, Evanston, IL, 312-864-1147
Tech. Mkt'g, Atlanta, GA, 404-840-7893
WorldWide, Pembroke Pine, FL, 305-584-7024
TK Group, Loveland, CO, 801-298-8902
Kodo & Assoc., Minneapolis, MN, 612-881-1255
Blackhawk Mkt'g, Pacific Palisades, CA, 213-454-8196
Pro Musica Sls, Keene, NH, 603-352-4831
Bob White & Assoc., Solon, OH, 216-248-1317
Protech Mkt'g, Newport Beach, CA, 714-723-0498
JMS Mkt'g, Austin, TX, 512-266-1113
Centurian-Throckmorton, Glencoe, MO, 314-227-7222
Products: ceiling, components, custom, environment protected, explosion-proof, foreground, full-range, high-frequency drivers, high-power, low-frequency drivers, monitor panels, music system speakers, stage monitors, studio/reference monitors, sub-woofer, tweeters, voice communications

Technical Audio Devices (TAD)

Pioneer Electronics (USA)
2265 E. 220th St.

Long Beach, CA 90810
(213) 835-6177

VP Mkt'g: Mike Fidler, Sr. Mgr. Prod. Planning: Mark Makabe, Market Planner: Deanna Lee

Products: ceiling, components, custom, environment protected, explosion-proof, foreground, full-range, high-frequency drivers, high-power, low-frequency drivers, monitor panels, music system speakers, stage monitors, studio/reference monitors, sub-woofer, tweeters, voice communications

Turbosound

611 Broadway, #841
Millbrook, NY 10012

(212) 460-9940, FAX# 916-677-6287

Pres.: Alan Wick, VP Sls/Mkt'g: Dan Abelson, VP Elec. Prod.: Dave Talbot, App. Eng.: Tim Kalliches

Products: full-range, multi-way/high-powered, portable, stage monitors, sub-woofer, systems

UREI

PO Box 2200
Northridge, CA 91329

(818) 893-8411, FAX# 818-893-3639

Pres.: Ronald Means, VP Sls: Ken Lopez, VP Mkt'g: Mark Gander, Mkt'g Mgr.: Hector Martinez, Mkt'g Mgr.: Steve Romeo

Jim Chase, Hermosa Beach, Ca, 213-374-2128
Bill Hamilton, Folsom, PA, 215-543-4677
Bill Schuermann, St. Louis, MO, 314-644-2083
Tom Walter, N. Barrington, IL, 312-382-4925

Products: systems

Valcom

1111 Industry Ave.
Roanoke, VA 24013

(703) 982-3900, FAX# 703-983-7032

Mkt'g: Donald Buck, Cust. Svce.: Gordon Bailey

Waldom Electronics

4301 W. 69th St.

Chicago, IL 60629

(312) 585-1212, FAX# 312-585-7847

Pres.: Mario Vescovi, Prod. Mgr.: Mark Baumann,
Prom. Mgr.: Andrew Placco

Products: components, full-range, high-frequency drivers, horns, low-frequency drivers, mid-bass, music system speakers, tweeters

Westlake Audio/Prof. Prod. MFG

Group

2696 Lavery Ct., #18

Newbury Park, CA 91320

(805) 499-3686, FAX# 805-498-2571

David Wexler & Co.

3553 W. Peterson Ave.

Chicago, IL 60659

(312) 478-9800, FAX# 312-478-9095

Pres.: B.R. Wexler, VP: David Wexler, Mkt'g: Joan Morris

Products: ceiling, columns, compact, custom, environment protected, explosion-proof, flush-mount, full-range, high-frequency drivers, high-power, horns, low-frequency drivers, mid-bass, multi-way/high-powered, music system speakers, outdoor, paging horns, paging, portable, powered, stage monitors, studio/reference monitors, sub-woofer, surface-mount, systems, talkback, tweeters, underwater, voice communications

Wheelock

273 Branchport Ave.

Long Branch, NJ 07740

(201) 222-6880, 800-631-2148, FAX# 201-222-8707

Pres.: P.W. Tarlton, VP Mkt'g: W.L. Goldstein, VP Eng.: S.W. Andrews, Mkt'g Mgr./Tel-Paging: A. Arian, Mkt'g Mgr./Life Safe-Ind.: R. Haus

Products: ceiling, flush-mount, horns, outdoor, paging horns, paging, powered, talkback

Workman Electronic Products

PO Box 3828

Sarasota, FL 33578

(813) 371-4242

Yamaha Music Corp. of America/Prof.

Audio Div.

PO Box 6600

Buena Park, CA 90662

(714) 522-9011, FAX# 714-522-9312

Products: compact, full-range, high-power, music system speakers, powered, processor controlled, stage monitors, studio/reference monitors, sub-woofer, systems

Yorkville Sound

56 Harvester Ave.

Batavia, NY 14020

(716) 344-1978

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ROSS
SYSTEMS

CAD SOFTWARE SUPPLIERS

In December 1988 an overview article on computer-aided sound system programs appeared in *Sound & Communications*, and since then we have been reviewing new software monthly. Locating and obtaining programs from a JBL or a Bose does not seem to be a challenge to our readers, but finding some of the smaller software publishers has been a problem. This month's "CAD Topics" includes a directory of software publishers whose programs might be of interest to sound engineers. If you have used, know of, or have developed a program that would be of use in sound contracting, please let us know.

In recent issues of *Sound & Communications*, we have reviewed: JBL's CADP 2.0, Bose Modeler 2.0, Bose Speaker CAD 1.0, North Star's Umbulus Mapper 3.0, North Star's Umbulus Array 3.0, Prohs and Harris PHD 4.0.

Future reviews will be on Mark IV's Acousta-CADD, JBL's CADP II, Source Phoenix's CASE, and the Bose Modeler 3.0. Our new column, "CAD Topics," will explore acoustical mapping techniques, mechanical CAD programs, intelligibility prediction software, reverb prediction software, cluster lobing simulation programs, flowcharting-block diagram software, computer bulletin boards, and more.

This directory listing of software programs useful for sound system engineering is limited to programs that we have already encountered. Again, if you know of others, please let us know.

SOUND SYSTEM DESIGN PROGRAMS

Altec Lansing Corporation
P.O. Box 26105
Oklahoma City, OK 73126
Contact: John Lanphere
(405) 324-5311

CALCULATOR UTILITIES

These programs include "Array" which generates a table of mapping points when used with Altec's array perspective graph paper, "Layout" for scaling a room in which a distributed system will be laid out, "Fitz" and "Sabine-Time," "Eyring," reverb time programs, "Ring" which compares the gain needed by a sound system to when the system will feedback, and more. The calculator programs are available at no charge on bar code for the HP 41, although they are also available in BASIC on disk for IBM compatibles (and other computers that run BASIC).

ACOUSTA-CADD

This program is a comprehensive sound system design program that runs on IBM compatibles.

Bose Corporation

The Mountain
Framingham, MA 01701
Contact: Mark Christensen
(415) 865-9370

MODELER

A comprehensive sound system design program that runs on the Macintosh computer.

Also available from Bose are Rackmaker and Speaker CAD. These are adjunct programs that aid in system layout of mechanical design elements.

Electro-Voice, Inc.
600 Cecil St.
Buchanan, MI 49107
(616) 695-6831

VAMP (Very-Accurate-Mapping-Program)

A sound system layout program intended for use with the HP41 calculator and overlays, but is now also available for use with IBM compatibles (in conjunction with the overlays).

Acousta-CADD

A comprehensive sound system design program that runs on IBM compatibles, available through both Altec and EV.

JBL Professional

8500 Balboa
Northridge, CA 91329
Contact: Steve Romeo
(818) 893-8411

CADP I

A comprehensive sound system design program for IBM compatibles. Version 4.0 will be released in August.

CADP II (available January 1990)

A new comprehensive sound system design program for IBM compatibles, with a version for the Mac to follow.

North Star Sound, Inc.

1406 First Avenue South
Minneapolis, Minnesota 55403
Contact: Tom McCarthy
(612) 871-6016

Umbulus Room Mapper Umbulus Array Builder

Sound System design programs work in conjunction with an IBM compatible and overlay transparencies.

PHD Program c/o Sound & Communications Magazine

Richard C. Heyser
Scholarship Loan Fund
25 Willowdale Avenue
Port Washington, NY 11050

A sound system design program for IBM compatibles. The program's distribution is facilitated by *Sound & Communications* and the AES, and technical support is provided by Ambassador College.

Source Phoenix

2041 West Butler Road
Phoenix, AZ 85021
Contact: David McNally
(602) 266-9294

CASE Computer Aided Sound Engineering (available later this year). A comprehensive sound system design program that runs on IBM compatibles.

G.R. Thurmond and Associates

1509 Brushy View Cove
Austin, TX 78754
Contact: G.R. Thurmond
(512) 837-7252

Horn Dispersion Layouts

This is a technique for laying out sound systems (especially when oblique angles are not required) and a useful tool for both visualization and initial cost estimation. The approach uses overlays and a computer is not required.

University Sound, Inc.

13278 Ralston Avenue
Sylmar, CA 91342
Contact: Advertising Department
(818) 362-9516

Easy-VAMP

A sound system layout technique somewhat similar in concept to the "Horn Dispersion Overlays" developed by G.R. Thurmond. Easy-VAMP uses floor plan iso-bar overlays without the need for a computer or calculator.

MECHANICAL DESIGN AND LAYOUT PROGRAMS

Auto CAD

2320 Marinship Way
Sausalito, CA 994965
(800) 445-5415

Auto CADD

The de facto standard of mechanical design programs, available for both IBM compatibles and the Macintosh computer.

Bose Corp.

The Mountain
Framingham, MA 01701
Contact: Mark Christensen
(415) 865-9370

Speaker CAD

Rack Maker

Sound system mechanical drawing programs (speaker clusters and equipment racks) that run on the Mac computer. Typically these programs are used with the Modeler sound system design program.

Generic Software

11911 North Creek Parkway So.
Bothell, WA 98011
(800) 228-3601

A mechanical drawing program available for the Mac and IBM compatibles.

VDP

749 Carver Rd.
Las Cruces, New Mexico 88005
Contact: Dr. Walter Black
(505) 524-9669

VIDCAD

AUDCAD

These programs are predrawn file libraries of equipment: for mechanical design and used as an adjunct to Auto CADD.

SPEAKER DESIGN SOFTWARE

The following programs aid in the design or selection of box volume and tuning, driver selection, crossover network design, etc.

Carvin

1155 Industrial Avenue
Escondido, CA 92025
Contact: John Murphy
(619) 747-1710

Audio CAD

A speaker box design program for the Mac.

CMS Electronics

P.O. Box 42389
Portland, OR 97242
(503) 231-7247

Leap

A speaker box design program, including multiple driver enclosures, for the IBM compatible computer.

Old Colony Sound Lab

P.O. Box 243
Peterborough, NH 03458
(603) 924-9467

Box Response

A speaker box design program, version available for the Apple II, Commodore, and IBM computer.

Loudspeaker Modeling Program

Full range frequency response prediction program for Apple II, Mac, IBM, and Commodore computers.

Scientific Design Software ('SDS')

Contact: Linda Telesky
P.O. Box 3248
Chatsworth, CA 91313
(818) 718-1201

CASD

A box design and crossover design program for IBM compatible and Apple II computers.

CACD

A sophisticated ('real world') crossover design program for IBM compatible and Mac computers.

CLUSTER LOBING PREDICTION SOFTWARE

Joseph G. Mitchell

1120 Stonehedge Drive
Schaumburg, IL 60194
(312) 882-7400

A Model (Array Model)

Interference effects between multiple drivers, column speakers, overlapping horns, etc., may be modeled. The program is in color, enabling more than one

frequency to be modeled simultaneously.

Renkus-Heinz

176191 Armstrong Ave.
Irvine, CA 92714
Contact: Russ Farrell
(714) 250-0166

ALS-1

A program that lets the user model interference effects at any one frequency or within a $\frac{1}{3}$ octave band of multiple drivers, column speakers, overlapping horns, and varying array techniques. Runs on IBM compatible computers.

AcousticsI Engineering Software

These programs are for estimation of reverberation time, noise leakage, articulation, and other acoustical factors.

R.J. Lemker and Associates

345 Montclair
Covington, KY 41016
(606) 261-9529

RT 60 Reverberation Program

A reverberation time calculation utility, useful for CADP, Umbulus and other sound system design programs that do not have reverberation utilities. For MS-DOS/IBM compatibles. Helpful for treating "what ifs" for room acoustics.

TPM Software

P.O. Box 77
Cabin John, Maryland 20818
(301) 229-4901

OPTORT60

A reverberation time calculation utility, useful for CADP, Umbulus and other sound system design programs that do not have reverberation utilities.

Helpful for "what ifs" in treating room acoustics.

AI

Articulation Index calculation utility, useful for Umbulus and other programs that do not have an intelligibility function.

STC

Sound transmission coefficient prediction (of sound leakage) through walls, etc.

TPM Software programs run on IBM compatibles.

PRINTER/ GRAPHICS UTILITIES PROGRAMS

Application Techniques, Inc.

10 Lomar Park Drive
Pepperell, MA 01463
(617) 433-5201

Piazazz

**Jewell Energy
Technologies, Inc.**
4302 Southwest Alaska St.
Seattle, WA 98116
(206) 937-1081

Grafplus

American Programers Guild, Ltd.

12 Mill Plain Road
Danbury, CT 06811
(203) 794-0396

Inset

All these programs are for screen capture to either printer or disk. These programs will enable you to capture graphics from various programs and insert into your reports, or print out in different sizes, or in color.

FLOW CHART PROGRAMS

Flow charting programs are typically developed for organization charts, but can be useful to the sound contractor in equipment signal flow diagrams, and quicker and easier to use than full scale CAD programs (such as Auto CAD).

Haventree Software Limited

P.O. Box 1039P
Thousand Island Park, NY 13692
(613) 544-6035

Easy Flow

Patton & Patton Software Corporation

81 Great Oaks Boulevard
San Jose, CA 95119
(408) 629-5044

Flow Charting II+

GRAPHICS PLOTING PROGRAMS

This program is useful for users with specialized needs, such as for graphically depicting polar response of speaker arrays, etc.

Amtec Engineering, Inc.

P.O. Box 3633
Bellview, WA 98009
(206) 827-3304

Techplot

—Compiled by Mike Klasco

MICROPHONES

MICROPHONES

ACO Pacific

2604 Read Ave.
Belmont, CA 94002
(415) 595-8588, FAX# 415-591-2891

Pres.: Noland Lewis, Dir. Mkt'g/Sls: Noland Lewis
Products: condenser, electret condenser, instrumentation, miniature, specialty

AKG ACOUSTICS

77 Selleck St.
Stamford, CT 06902
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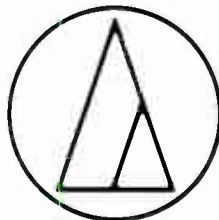
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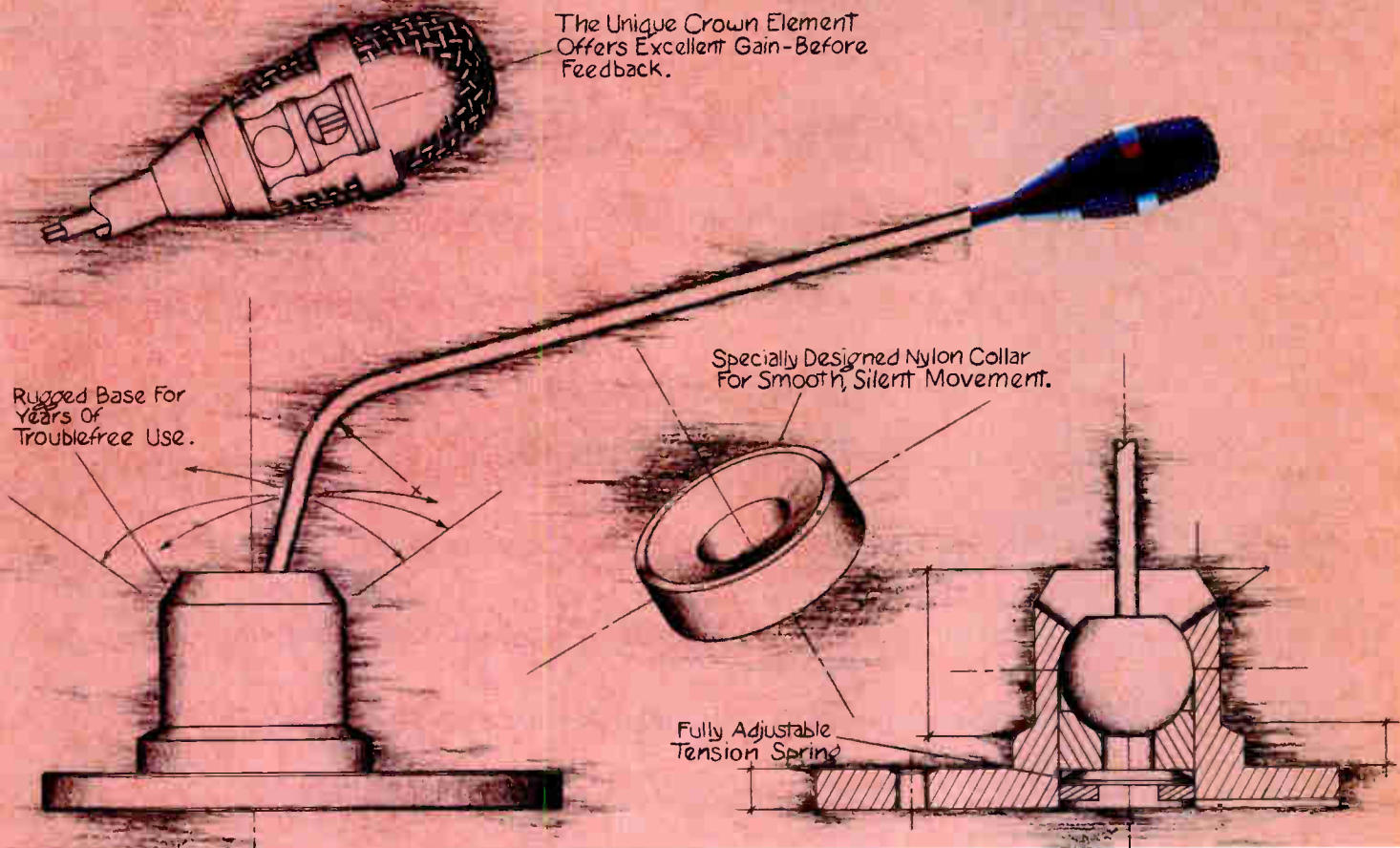
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Podium mikes have in the past exhibited a number of flaws to the installer and to the end user. Crown engineering set to the task of defining those flaws and eliminating them. Further, we wanted to incorporate new ideas necessary to make the LM™ series everything a podium mike must be.

In consulting experienced sound contractors, we determined that to be aesthetically appealing and unobtrusive in use solves only a part of

the problems of past designs; long-term client satisfaction and ease of installation and maintenance are as important as the need for excellent gain-before-feedback and natural, uncolored sound. So is meaningful shock isolation. And there is more . . .

In the LM series, a unique method of keeping proximity effect under control is employed for predictable performance and uniform intelligibility at all distances. Coupling this with thorough shielding and increased RF protection, the LM series is, as usual for Crown, at the forefront of this technology. That's where we want to be, that's our inspiration.



"After 30 years and thousands of church installations, we finally found what we really wanted all along. Thanks Crown for listening, we should have spoken with you first."

Per Haugen
General Communications



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World Radio History

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Fin.: Bob Netter
Products: hand-held

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Mgr.: Earl "Buzz" Goodwin, Sls Mgr.: Garry Elliott
Products: body packs, hand-held

Beyer Dynamic

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Bruce Marlin, Irving, TX, 214-869-0669
Tom Parnell, Bannockburn, IL, 312-234-6500
Bob Edsall, Asheville, NC, 800-999-9313
Dave Henderson, Burlington, MA, 617-229-6050
Products: body packs, hand-held

Coherent Communications

13756 Glenoaks Blvd.
Sylmar, CA 91342
(818) 362-9393, FAX# 818-362-7045
Products: body packs, hand-held



Comtek

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Mkt'g Dir.: Steve Dupaix, Svce Mgr.: Laurel Robertson,
Credit Mgr.: Dana Pelletier, Cust. Svce: Stacey Hayes-Garcia
Products: body packs, hand-held

HM Electronics

6675 Mesa Ridge Rd.
San Diego, CA 92121
(619) 535-6060, FAX# 619-452-7207
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Eunice Davis, Ind'l Sls Mgr.: Bruce Slemmer, Cust.
Svce Mgr.: Bill Kranzush, Mkt'g Coord.: Matt Riches
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John Anthony, Stamford, CT, 203-322-9202
Applied Audio Mkt'g, Asheville, NC, 704-252-9313
A/V Mkt'g, Carmel, IN, 317-846-1034
Products: body packs, hand-held

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Rio Rancho, NM 87174
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Products: body packs, hand-held

NADY SYSTEMS

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(415) 652-2411, FAX# 415-652-5075
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Calder
Products: body packs, hand-held

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Meridian, MS 39302
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WIRELESS TECHNOLOGY

Microphones Headphones/Headsets

See our Special Report
in the November '89 issue of

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Samson Technologies

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Exp. Mgr.: Kevin Moran, Sls: Mike Hennessey, Sls:
Dave Olivier, Sls: Mike Vallerella
Image Mkt'g, Fountain Valley, CA, 714-957-0630
Jamm Dist., Flossmoor, IL, 312-799-0550
Audio Assoc., Fulton, MD, 301-604-1645
Reflex Mkt'g, Hempstead, NY, 516-565-2323
JMS Mkt'g, Austin, TX, 512-266-1113
Products: body packs, hand-held

Schell Electronics

120 N. Lincoln
Chanute, KS 66720
(316) 431-2350, FAX# 316-431-2365
Sls Mgr.: Janice Schell
Products: body packs, hand-held

Sennheiser Electronic

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Old Lyme, CT 06371
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Unique compander circuits deliver extended dynamic range and S:N ratios unheard of at Toa's installed cost.

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A simple tab-stop keeps the mic from rolling off tabletops and lecterns. An obvious convenience, perhaps, but another Toa feature.

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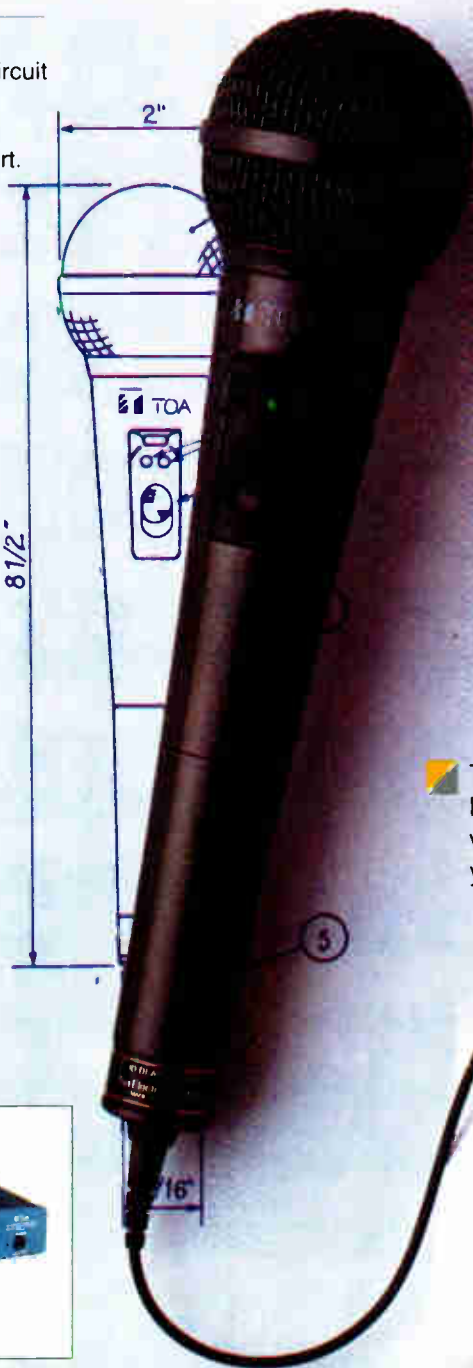
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Both diversity and non-diversity systems allow you to add multiple mics by simply plugging in receiver modules. No tools. No fuss.



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Toa's lightweight wireless amplifier accommodates twin non-diversity receivers. A model with an auto-reverse cassette is available.

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 Wireless Mics: Sandy Schroeder, Dir. Sls: Al Hershner
 Products: body packs, hand-held

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1600 Queen Anne Rd.
 Teaneck, NJ 07666
 (201) 833-5200, 800-635-SONY, FAX# 201-833-9645
 Nat'l Sls Mgr.: Bob Ott, Prod. Mgr.: Art Gonzales, Mkt'g
 Mgr.: David Kawakami
 Sony Pro Audio, Paramus, NJ, 201-368-5185
 Sony Pro Audio, Nashville, TN, 615-883-8140
 Sony Pro Audio, Burbank, CA, 818-841-8711
 Products: body packs, hand-held

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 Cupertino, CA 95016
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 Alan Gordon Enter., Hollywood, CA, 213-466-3561
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 632-2157, FAX# 415-588-3349
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 Richard Krochmal, Nat'l Sls Mgr./Pro. Music & Ent.:
 Rick Kamlet, Nat'l Sls Mgr./Intercom: Al Burns
 Products: body packs, hand-held

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 8877
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 Products: body packs, hand-held

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 Buchanan, MI 49107
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 Wireless Mkt'g Mgr.: Claude Kleinman, Dir. of Mkt'g:
 Jim Long, Exec. VP: Paul McGuire
 Products: body packs, hand-held

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Wireless manufacturers make many confusing claims regarding system specifications. Take our suggestion: listen to a Nady 101/201 or a Nady 1200 side-by-side with any other wireless on the market - regardless of the claimed specs - and you'll be impressed with the extra 15 dB dynamic range you get with Nady Wireless.

The Nady IR-300 is a Large-Area Infrared system with a unique modular design for easy, efficient installation in any size facility. You don't have to run AC to power the emitters. And you can add to the system as needed in the future. Best of all, you can have a Nady IR-300 infrared package for one-third to one-half less than the competition gets for the same area coverage.

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Ordon & Co., Chicago, IL, 312-527-4569
Comlogic, Los Angeles, CA, 818-845-0199
Studio Consultants, New York, NY, 212-586-7376
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Omni Technology, Nashville, TN, 615-451-9662
Products: broadcast, custom, digital, ENG, modular, portable., powered, production, rack-mount, recording, theatrical, VCA

API Audio Products
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Springfield, VA 22153
(703) 455-8188, FAX# 703-455-4240

Advantage
14270 NW Science Pk Dr.
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Products: gated

Alesis
3630 Holdrege Ave.
Los Angeles, CA 90016
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Wald, Reg. Sls Mgr.: Ted Keffalo, VP Finance: Barbara
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Maryann Nuccini, Account: Kathy De Santo, Prod.
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Cambridge, Westerville, OH, 614-890-7788
GMI/New England, Avon, MA, 617-588-8043
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Metropolis Mkt'g, Edison, NJ, 201-225-0085
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Products: broadcast, microprocessor, MIDI, modular, monitor, portable., production, rack-mount, recording, theatrical

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Svce Mgr.: Ray Dillfield, Traffic Mgr.: Bill Kaylor,
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Peter Schmitt, Leonia, NJ, 201-944-2806
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 Products: modular, paging, rack-mount

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 Products: broadcast, ENG, production, rack-mount, recording

Autogram
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 Plano, TX 75074
 (214) 424-8585, 800-327-6901
 Pres.: Ernest Andele Jr.

Broadcast Electronics
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 Quincy, IL 62305
 (217) 224-9600, FAX# 217-224-9607
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 Products: broadcast, modular

D & R USA
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 Arlington, TX 76012

Biamp Systems
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 Portland, OR 97208
 (503) 641-7287, 800-826-1457, FAX# 503-626-0281
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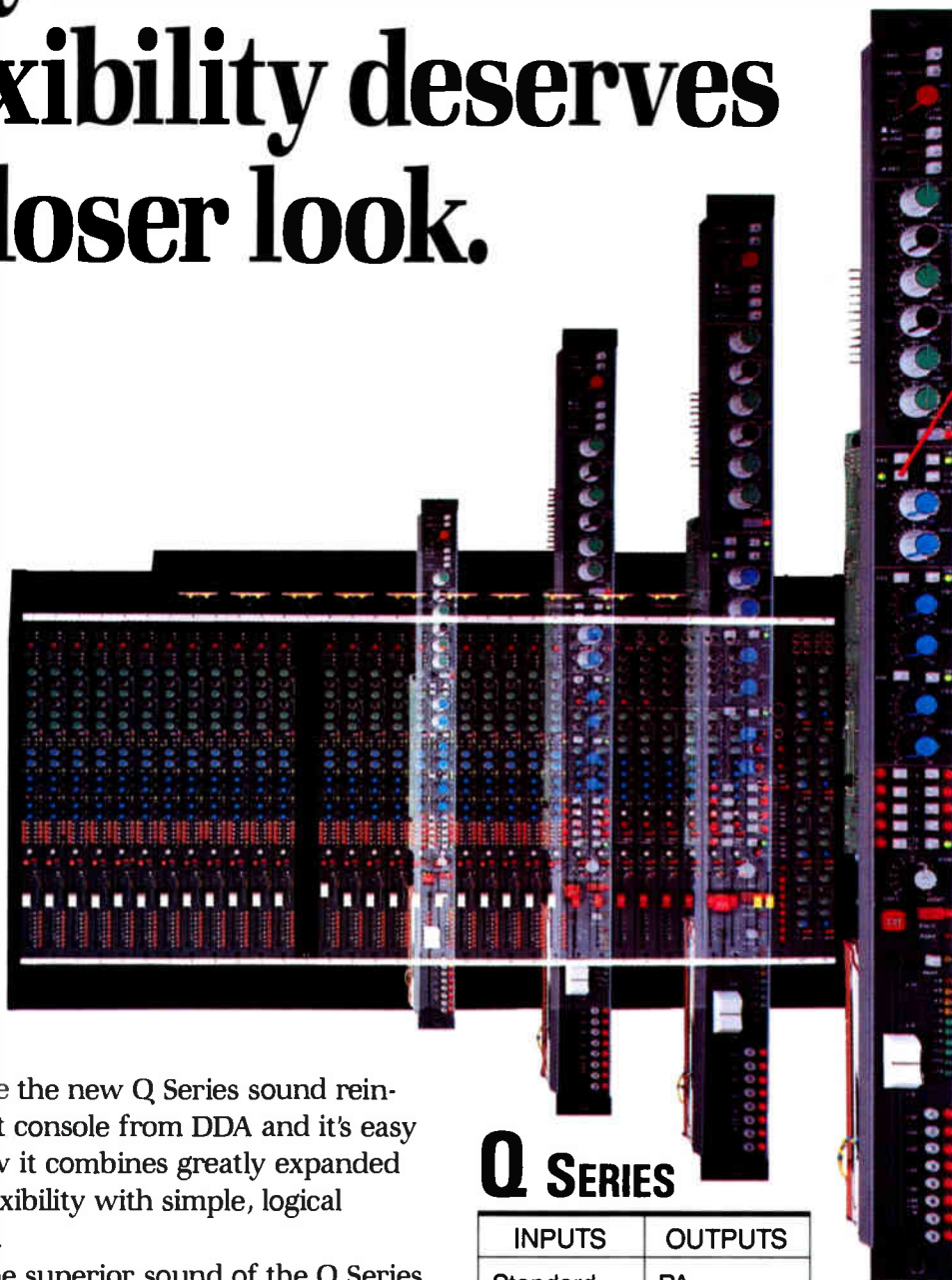
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Q Series provides 8 Aux Buses from every input with 3-Band EQ on the Aux Master Sends.

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 Dir. Mkt'g: Jim Long, Chief Eng.: Earl Harris
 Products: portable,, powered

Europa Technology
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 Venice, CA 90291
 (213) 392-4985

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 15431 Blackburn Ave.
 Norwalk, CA 90650
 (213) 921-1112, FAX# 213-802-1964
 Exec. VP: Fred Huang, VP Sls/Mkt'g: Mark Cohen
 Products: rack-mount, recording

Furman Sound
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 Greenbrae, CA 94904
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 Sls Mgr.: Joseph Desmond, Credit Mgr.: Susan
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 6050
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 New Horizons, Bannockburn, IL, 312-234-6590
 Pacific Audio Group, Gardena, CA, 213-719-1383
 Products: rack-mount

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 Sls Mgr.: Bob Allen, Svce Mgr.: Rick Rogers
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 Louisville, KY 40299
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 Secom Systems, Atlanta, GA, 404-455-0672
 Bencsik Assoc., Ocala, FL, 904-732-9775
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 Monford Electronics Mkt'g., Indianapolis, IN, 317-872-
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C.M. Sls, Farmington Hills, MI, 313-553-8070
 Ludwig Mkt'g., Kenosha, WI, 414-697-9355
 B.C. Electronic Sls, Mission, KS, 913-262-1720
 Mkt'g Concepts, Irving, TX, 214-869-0669
 Yora, White Bear Lake, MN, 612-770-9760
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 Derek Allen Assoc., Toluca Lake, CA, 818-840-8327
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 North Shore Mkt'g, Seattle, WA, 206-284-9699
 Island Instruments, Kaneohe, HI, 808-235-7544
 Products: automatic, gated, microprocessor, modular, pag-
 ing, rack-mount, VCA

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 Products: automatic, microprocessor

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 Products: broadcast, custom, ENG, portable,, rack-mount,
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Products: custom, modular

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Tom Walter, N. Barrington, IL, 312-382-4925
Products: broadcast, monitor, portable., production, rack-
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Products: rack-mount, recording

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Products: signal enhancers

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Products: EQs

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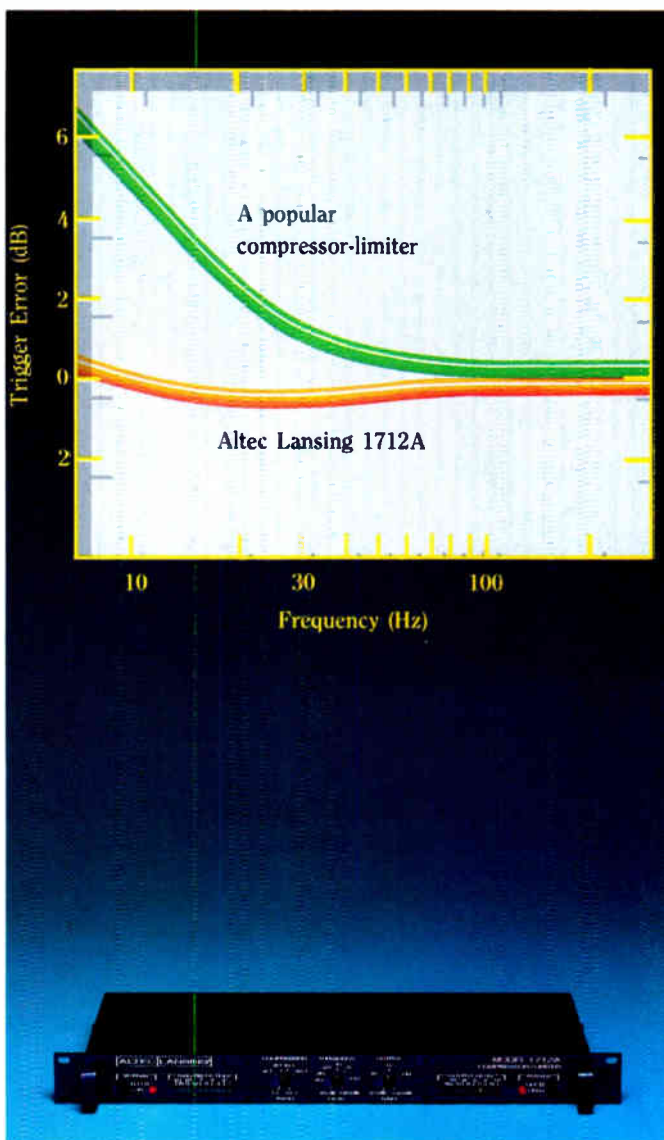
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In compressor-limiters, peak reversion equals audible pumping. One major reason for dissatisfaction with limiters in sound systems is the way many of them initiate limiting action at inappropriate times: they change the sound level unexpectedly, when the signal dynamics don't require it. This false triggering is called pumping, and is very audible.

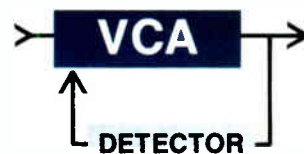
The problem of audible pumping is a complex one, and its cause is often not apparent on the test bench. It is sometimes impossible to duplicate the triggering heard in dynamic sound system use, with tones or with pink noise. And yet the pumping goes on.

Altec Lansing research has discovered the cause of pumping in many contemporary limiters, and prevented it in the new model 1712A.

Compressor-limiters use detector circuits that monitor the envelope of the audio signal passing through. Limiting action is controlled by this detector. Not only must the frequency response of the audio circuit in the limiter be flat, but the detector itself must have a flat frequency response. Otherwise, it would trigger limiting action at different levels for different frequencies. If the unit is excessively sensitive at some frequencies, signals at levels that the limiter should ignore cause unwanted action.



The popular limiter shown in the graph has an excellent frequency response for the audio signal passing through it. However, its triggering is more sensitive at all frequencies below 100 Hz, and 5 dB more sensitive at 10 Hz. It has reverted from r.m.s. to peak detection: peak reversion. Who cares about 10 Hz? You will, if subsonic junk is making your limiter attenuate all frequencies at unexpected and unwanted times.



When envelope detection comes after limiting action, tracking accuracy suffers.

Altec Lansing engineers also decided to control the limiter by detecting the incoming signal. Many limiters detect the signal after their own limiting action. These limiters must detect tenths of decibels to control tens of decibels. The new Altec Lansing 1712A compressor-limiter uses the much more robust feedforward system.

In compressor-limiters, the benefit of peak reversion correction is reduced false triggering and audible pumping. The benefit of feedforward control design is greater tracking accuracy.

Fact.

In Compressor-Limiters, Peak Reversion = Audible Pumping



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ARE STAGGERING!

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COST EFFECTIVE CAPABILITIES. Modular flexibility. Uncompromising performance. All without a premium price. That's the FLEX System manifesto. There is no expensive main-frame to buy; you only pay for the functions you want, when you want them.

Say, for example, you only need a 3 channel mixer with one channel of crossover. The FLEX System delivers. And when your needs expand, just add more modules. No need to obsolete old equipment for a loss.

Whether you use two modules or twenty modules, the FLEX System remains cost effective. And supremely flexible. Year after year.

SUPERLATIVE PERFORMANCE, RANE RELIABILITY. The design and performance of each and every Flex module is, in a word, superlative. Every model carries top-grade studio specifications, utilizing the best components available. The result is unsurpassed performance and reliability.

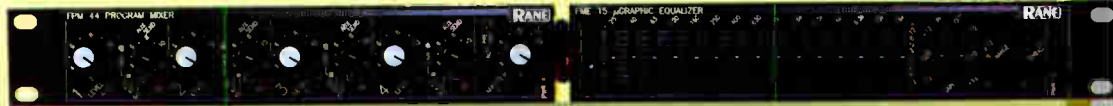
Our HR compatible modules may be compact, but they're stuffed with more top-notch features than you would have thought possible. For example, the **FMI 14 Mixer Input module** measures only 1.75" x 10.5", yet it boasts a -128dB EIN mic stage, switchable phantom power, true 20dB pad, powerful 3-way EQ section, insert loop, two source-selectable Aux sends and balanced master channel outputs. A single DIN cable, supplied with each module, routes the Master and Aux buses from unit to unit for quick and clean hook-up.

+15/-20dB boost/cut, 2-octave down to 1/30th-octave bandwidth range for notch capability, and a full 10Hz-20kHz frequency sweep range for unprecedented flexibility.

The **FME 15 MicroGraphic Equalizer** brings Interpolating Constant-Q filter performance to the Flex line, pioneered by our full-sized GE 30

current balanced outputs, and you've got a powerful, flexible new crossover standard.

This is but a sampling of the innovative Flex Modules to be released this year. We encourage you to obtain separate, detailed data sheets on the many FLEX System modules. Then compare these with the best standard equipment available. You'll discover that FLEX offers the best of all worlds: compact, cost effective, flexible, uncompromising performance.



The **FMM 42 Master Module** not only provides Aux returns and mixing, but features extra mic and stereo line inputs with ducking capability for paging and other applications.

For even more mixing flexibility, the **FPM 44 Program Mixer** allows 4 separate mic or line inputs to be mixed to 4 output programs, with pre or post fade switch selection for the Aux sends. Both the direct balanced/unbalanced terminal strip and the DIN Flex bus inputs and outputs can be used simultaneously for easy expansion and integration into larger systems.

Carrying on a fine tradition of innovative equalizer technology, Rane sets yet more new standards with the Flex Series. The **FPE 13 Parametric Equalizer** provides 3 separate bands, each capable of

model which has set new industry standards. Minimized filter interaction, smooth combined response and fully balanced three-pin and terminal strip input/output are but a few of the features. Both the FME 15 and the FPE 13 also provide an exclusive Patch I/O jack which allows direct connection to an insert loop jack with a single 1/4" TRS patch cable.

The **FAC 24 Active Crossover** is the next generation to follow in the respected footsteps of our AC 22 and AC 23 designs. In addition to the proven 24dB/octave Linkwitz-Riley performance, the FAC 24 features a true 24-position frequency selector switch to provide plug-in card accuracy and repeatability with the convenience of a knob. Add to this a built-in CD Horn EQ section, electronic phase alignment, summing LF input and three-pin high-

FLEX MODULAR SIGNAL PROCESSORS Series

RANE

10802-47th Ave. W.
Everett, WA 98204
(206) 355-6000

(503) 687-8412, 800-423-1082, FAX# 503-687-0632
 Pres./Dir. of Eng: Gary Hardesty, Office Mgr.: Kathleen Gallagher
 Products: crossovers, digital encoding, digital delays, digital signal processors, interface units,

Audio Logic

5639 S. Riley Ln.
 Salt Lake City, UT 84107
 (801) 268-8400, 800-453-7484, FAX# 801-262-4966
 Pres.: John Johnson, VP Finance: Jay Fuller, Int'l Sls: Wayne Morris, W. Sls: Scott Grow, Mkt'g Comm.: Dean Stubbs
 Products: 1/3 octave EQs, crossovers, de-essers, digital delays, EQs, compressors, graphic EQs, interface units., limiters, noise gates, signal enhancers

Audio Systems

PO Box 1174
 Bismarck, ND 58502
 (701) 223-3800, 800-852-6522, in-state 800-932-8975, FAX# 701-222-8102
 Pres./Eng: Lynn Mader, VP/Sls: Lyle Mader
 Products: ambient noise controlled level controllers, crossovers, limiters, VCAs

Azden

147 New Hyde Pk Rd.
 Franklin Square, NY 11010
 (516) 328-7500
 Mkt'g: Den Bush

BBE SOUND

5500 Bolsa Ave., Ste. 245
 Huntington Beach, CA 92649
 (714) 897-6766, 800-233-8346, FAX# 714-895-6728
 Chairman: John McLaren, VP: Scott Anderson, Op Mgr.: Jennifer Drescher, Nat'l Sls Mgr.: Fred Coyner, Mkt'g Dev. Mgr.: Jim Lucas, Tech Svcs Mgr.: Ryan Coultts
 Products: signal enhancers

BSS Audio/Edge Distribution

RR-2, Box 144C Milewood Rd.
 Millbrook, NY 12545
 (914) 567-1400, FAX# 914-677-6873
 VP Sls/Electronics: David Talbot, VP Op.: Hilary Michener, Pres.: Alan Wick
 Products: ambient noise controlled level controllers, crossovers, de-essers, compressors, levelers, limiters, noise gates

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 Framingham, MA 01701
 (508) 879-7330, FAX# 508-872-6541
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 Products: EQs

Brooks Electronic System Technology

4061 E. La Palma Ave., Ste. B
 Anaheim, CA 92807
 (714) 630-2383, 800-323-1188, in-state 800-in CA 800-523-8486

CADD Creative Audio Design & Development

1875-D Panama St.
 Brossard, Que., Canada J4W 2S8
 (514) 466-1691, FAX# 514-672-3399
 Pres.: Pierre Pare, Eng. Sls: Shane Morris, Eng. Sls: Denis Lambert
 Products: de-essers, digital signal processors

Calibration Standard Instruments

PO Box 2727
 Oakland, CA 94602
 (415) 531-8725
 Owner: Edward M. Long
 Products: crossovers

Carvin

1155 Industrial Ave.
 Escondido, CA 92025
 (619) 747-1710, 800-854-2235, FAX# 619-747-9065
 Pres.: Carson Keisel, Sls Mgr.: Neal Taylor

Chandler Industries

590 19th St.
 San Francisco, CA 94107
 (415) 626-1742, FAX# 415-626-0671
 CEO: Paul Chandler, VP: Adrian Chandler, Credit Mgr.: Leisa Mock, E. Coast Rep: Michael Rain, W. Coast Rep: Ross Wright, Cust. Svce: Chris Chandler
 Products: automatic EQs, preamps, signal enhancers



HOW TO LEVEL A HOTEL FOR UNDER \$350.

DOD graphic equalizers are veritable workhorses for improving public address sound quality in airports, shopping malls, hotels and public buildings.

That's because DOD makes more configurations of quality graphic EQs for more professional applications, than any other company in the world. For a lot less than you'd expect.

For a demonstration, see your professional audio dealer or sound contractor.

He'll recommend DOD with no reservations.



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R-431 Graphic Equalizer (top) R-830 Graphic Equalizer (bottom)

Circle 211 on Reader Response Card

90 ways to depart from the straight and narrow.



Prepare to expand your horizons. With the Yamaha DEQ7, the completely digital equalizer. With not one but 30 different EQ and filter configurations, in stereo.

To be specific, it has 11 graphic EQs, four parametric, three tone configurations, five band pass/band reject filters, six dynamic filters and one multi-notch filter configuration, plus up to 738 ms of delay per channel.

But, in the Yamaha tradition of never leaving well enough alone, we did some expanding of our own.

Like memory. The DEQ7 has sixty user-programmable memory locations, so you can store and title your favorite curves, and recall them any time manually or via MIDI. There are digital I/Os for direct connection to other digital components, as well as analog inputs and outputs.

Since we're on the subject of output, it's equally important to mention that, in the opinion of many critical users, the DEQ7 produces an open, natural-sounding EQ. Which means that you can create extreme EQ settings without creating extreme anxiety.

The Yamaha DEQ7 Digital Equalizer.

It'll throw you a few new curves. Catch one at your nearby Yamaha Professional Audio dealer.

Yamaha Music Corporation, Professional Audio Division, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario M1S 3R1.

YAMAHA
Engineering Imagination™

Circuit Research Labs

2522 W. Geneva Dr.
Tempe, AZ 85282
(602) 438-0888, 800-535-7648, FAX# 602-438-8227
Pres.: Ronald Jones, CFO: Kym Kippes, Eng. Mgr.: Chuck Adams
Bill Ammons, Tempe, AZ, 800-535-7648
Doug Charette, Tempe, AZ, 800-535-7648
Products: signal enhancers

Clever Devices

PO Box 2002
Port Washington, NY 11050
(516) 767-0682, FAX# 516-767-3635
Pres.: William Long, Mkt'g Mgr.: Una Neary, Tech. Supp.: Mike Kafulas
Products: digital effects, digital encoding, digital signal processors

Creative Audio Design & Development

1875 Rue Panama, Ste. D
Brossard, Que., CD J4W2S8
(514) 672-8862, FAX# 514-672-3399
Pres.: Pierre Pare, VP Eng.: Shane Morris, Eng. R&D: Denis Lambert

Crown Int'l

PO Box 1000
Elkhart, IN 46517
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Products: crossovers, de-essers

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1231 S.E. Gideon St.
Portland, OR 97202
(503) 232-4445
Pres.: Rich Stevenson, Eng. Mgr.: Bob Herb

dbx, Div. of BSR North America

PO Box 100C
Newton, MA 02195
(617) 964-3210, FAX# 617-527-5288
Nat'l Sls Mgr.(Pro): Scott Berdell, Int'l Sls Mgr.: Ilisa Aronow, OEM Sls Eng.: Ken Nevard, VP Mkt'g: John Stierberg, Sr. Prod. Specialist: Bob Accettullo, Pres.: Mike Kelly
Products: 1/3 octave EQs, automatic EQs, preamps, de-essers, digital signal processors, EQs, compressors, graphic EQs, limiters, noise gates, notch filters, parametric EQs, octave EQs, signal enhancers, VCAs

DOD Electronics

5639 South Riley Ln.
Salt Lake City, UT 84107
(801) 268-8400, 800-453-7484, FAX# 801-262-4966
Pres.: John Johnson, Int'l Sls: Wayne Morris, W. Sls: Scott Grow, VP Finances: Jay Fuller, Comm.: Dean Stubbs
Products: 1/3 octave EQs, crossovers, digital delays, digital signal processors, EQs, compressors, graphic EQs, limiters, signal enhancers

Digidesign

1360 Willow Rd., Ste. 101
Menlo Park, CA 94025
(415) 327-8811, FAX# 415-327-0777
Pres.: Peter Gotcher, COO: Paul Lago, Prod. Mkt'g Mgr.: Suz Howells
Products: audio/video synchronizers, digital effects, digital signal processors

Digitech

5639 South Riley Ln.
Salt Lake City, UT 84107
(801) 268-8400, FAX# 801-262-4966
Pres.: John Johnson, VP Finance: Jay Fuller, Int'l Sls: Wayne Morris, W. Sls: Scott Grow, Corp. Comm.: Dean Stubbs
Products: 1/3 octave EQs, digital effects, digital reverbs, digital delays, digital signal processors, EQs, graphic EQs

Dolby Laboratories

100 Polero Ave.
San Francisco, CA 94103
(415) 558-0200, FAX# 415-863-1373
Chairman: Ray Dolby, Pres.: Bill Jasper, VP: Joan Allen, VP Sls & Mkt'g: Ed Schummer, US Sls Mgr.: George Douglas

Dynasound

6439 Atlantic Blvd.
Norcross, GA 30071
(404) 242-8176, FAX# 404-242-8858
Products: EQs, levelers

Edge Distribution/Turbosound

144C Milewood Rd.
Millbrook, NY 12545
(914) 567-1400, FAX# 914-677-6477
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JND, Fairfax, CA, 415-459-3186
Western Audio Sls, Colendale, CA, 818-246-3806
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Mike Chafee Ent., Sarasota, FL, 813-921-4294
Steffey Mkt'g, Chicago, IL, 312-480-3575

Editron USA

748 N. Seward St.
Hollywood, CA 90038
(213) 464-8723, FAX# 213-464-5786

Electro-Voice

600 Cecil St.
Buchanan, MI 49107
(616) 695-6831, 800-527-6701, FAX# 616-695-1304
Pres.: Robert Pabst, VP Sls & Mkt'g: Paul McGuire, Dir. Mkt'g: Jim Long, Chief Eng.: Earl Harris
Products: crossovers, graphic EQs

Eltrex Int'l

2 Columbia Dr.
Amherst, NH 03031
(603) 886-3500, 800-432-7631, FAX# 603-886-3508
Sls Mgr.: Bill Ryan
Products: digital delays, VCAs

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One Alsan Way
Little Ferry, NJ 07643
(201) 641-1200, FAX# 201-641-1640
Sls Mgr.: Gil Griffith
Innovative Sls/Mkt'g, Irvine, CA, 714-975-1130
Products: digital effects, digital delays, digital signal processors, compressors, limiters, signal enhancers

FOSTEX CORP OF AMERICA

15431 Blackburn Ave.
Norwalk, CA 90650
(213) 921-1112, FAX# 213-802-1964
Exec. VP: Fred Huang, VP Sls/Mkt'g: Mark Cohen
Products: audio/video synchronizers, graphic EQs

Furman Sound

30 Rich St.
Greenbrae, CA 94904
(415) 927-1225, FAX# 415-927-4548
Sls Mgr.: Joseph Desmond, Credit Mgr.: Susan Furman, Chief Eng.: Jim Murphy, Op. Mgr.: Ed Specht
Metropolis Mkt'g, Edison, NJ, 201-225-0085
Professional Audio Assoc., Burlington, MA, 617-229-6050
Secom Systems, Atlanta, GA, 404-455-0672
New Horizons, Bannockburn, IL, 312-234-6590
Pacific Audio Group, Gardena, CA, 213-719-1383
Products: 1/3 octave EQs, crossovers, de-essers, digital reverbs, EQs, compressors, graphic EQs, limiters, noise gates, parametric EQs, signal metering

Gaines Audio

PO Box 17888
Rochester, NY 14609
(716) 266-0780, 800-442-0780
Ownr: Jon Gaines

Gentner Electronics

PO Box 27647
Salt Lake City, UT 84127
(801) 975-7200, FAX# 801-977-0087
Pres./CEO: Russell Gentner, COO: William Trowbridge, VP Eng.: William Gillman, Dir. Mkt'g/Sls: Elaine Jones, Dir. Mkt'g/Sls-Audio/Best: Gary Crowder, Mkt'g Coord.: Kelli Maag
Products: compressors, limiters

Hybrid Arts

8522 National Blvd.
Los Angeles, CA 90232
(213) 841-0340, FAX# 213-841-0346
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Louisville, KY 40299
(502) 267-7436, FAX# 502-267-9070
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Repworks, Chicopee, MA, 413-533-0845
Darmstedter Assoc., Baldwinville, NY, 315-638-1261
John Anthony, Stamford, CT, 203-322-9202
Sigmat, Valley Forge, PA, 215-783-6666
Secom Systems, Atlanta, GA, 404-455-0672
Bencsik Assoc., Ocala, FL, 904-732-9775
C.L. Pugh, Cleveland, OH, 216-238-1777
Monford Electronics Mkt'g., Indianapolis, IN, 317-872-8877
C.M. Sls, Farmington Hills, MI, 313-553-8070
Ludwig Mkt'g., Kenosha, WI, 414-697-9355
B.C. Electronic Sls, Mission, KS, 913-262-1720
Mkt'g Concepts, Irving, TX, 214-869-0669
Yora, White Bear Lake, MN, 612-770-9760
Torbett/Keiser Group, Loveland, CO, 303-669-1008
Derek Allen Assoc., Toluca Lake, CA, 818-840-8327
Plus Four Mkt'g, Walnut Creek, CA, 415-937-0650
North Shore Mkt'g, Seattle, WA, 206-284-9699
Island Instruments, Kaneohe, HI, 808-235-7544
Products: ambient noise controlled level controllers, compressors, levelers, noise gates, signal metering

ITT/DES

20 Mayfield Ave.
Edison, NJ 07607
(201) 225-6121, 800-524-1646
VP: Donald Duthaler, Chief Eng.: Jeffrey Stellman

Industrial Research Products

415 Busse Rd.
Elk Grove Village, IL 60007
(312) 439-3600, 800-255-6993, FAX# 312-640-9607
G. Mgr.: Brian Benn, Mkt'g Mgr.: Roger Carroll, Sr. Sls

THE IEQ WITH Smartcurve™

Not Just Another Programmable Equalizer With MIDI™

The IEQ with Smartcurve™ is a programmable, high performance graphic equalizer that includes a video output. For those who wish to enjoy the video output of the IEQ, ART makes the IEQ Video Monitor.* Smartcurve™, proprietary software developed by ART gives you instant actual frequency response as easy as the push of a button. The IEQ Family consists of both the 2/3 octave and the 1/3 octave graphic equalizers. Both types come in two varieties, Controllers and Satellites. A Controller is a self-contained programmable intelligent graphic equalizer capable of controlling 15 satellites at once. IEQ Satellites are exactly the same unit except the front panel controls are eliminated.*

IEQ Model Specifications:

Controller & Satellite

- 128 battery backed presets
- MIDI
- Frequency Response 20Hz-20kHz \pm 0.5dB
- THD \leq .009% @ 1kHz, 0dBm typical
- Dynamic Range \geq 100dB typical
- Balanced inputs and outputs

*IEQ Video Monitor Features

- 19" rack mountable
- NTSC compatible monochrome monitor
- 4 Selectable inputs
- Standard RCA jacks for easy connections

It Has To Be A Work Of . . .



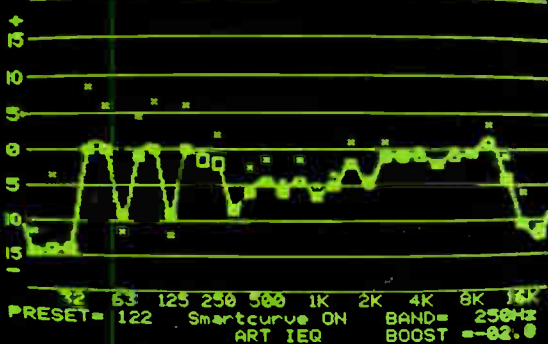
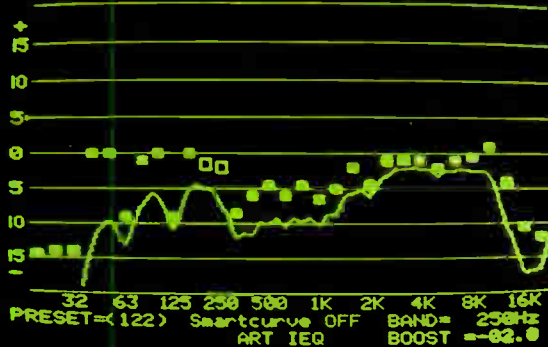
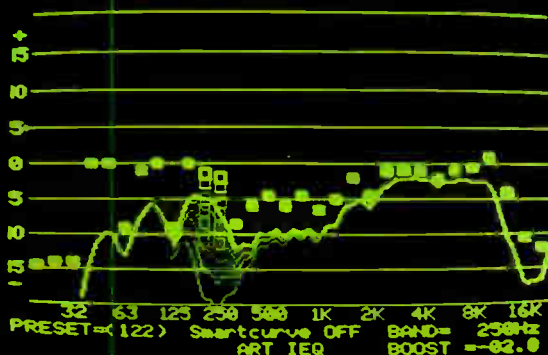
Applied Research & Technology

215 Tremont Street
Rochester, NY 14608
(716) 436-2720

TELEX 4949793 ARTROC
FAX (716) 436-3942

For more information see your local dealer.

Circle 224 on Reader Response Card



1 See the Sound

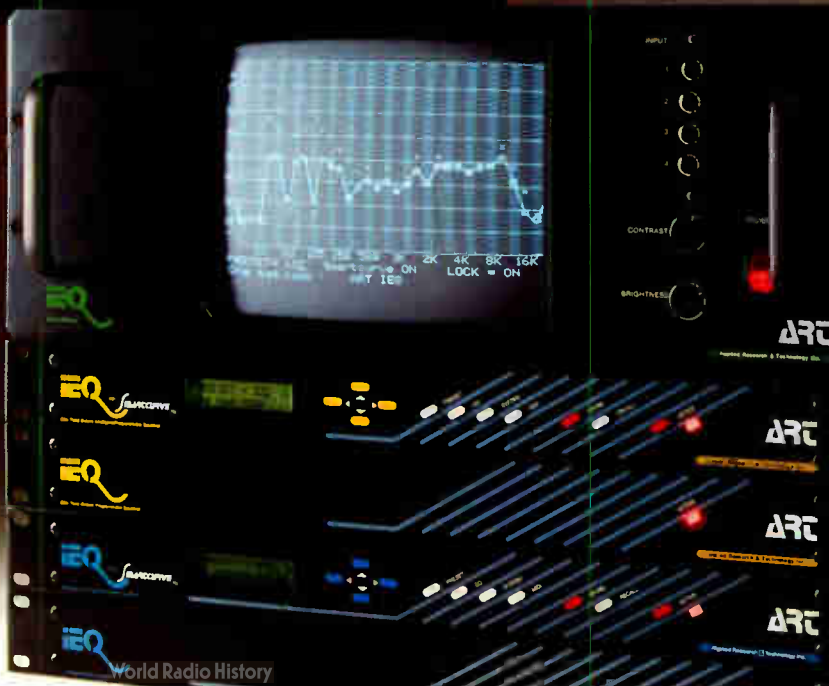
This is a video output of the IEQ as the unit is being adjusted. The sliders can be moved \pm 15dB in 1/2dB steps to get the exact response you need. With the simple push of a button, complex equalization can be done in seconds with incredible accuracy.

2 Hear the Sound

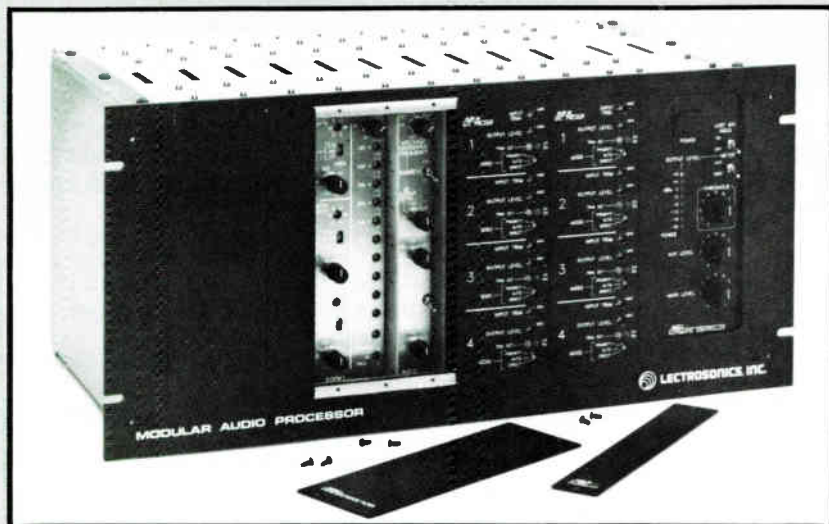
The power of the IEQ readily becomes apparent as the video display plots the frequency response due to the slider settings. The IEQ offers high quality constant "Q" equalization. The video graphic display shows the correlation between the sliders and the frequency response.

3 Perfect Sound

Turn Smartcurve™ on and perfect equalization is at your fingertips. Note the difference between the second frame (Smartcurve™ OFF) and this frame. The position of the sliders represent the actual frequency response of the EQ. Interaction between bands is virtually eliminated. Incredible! Just think, now when you adjust the EQ you get exactly what you need. The "perfect" EQ? Let your eyes and ears decide.



Audio processing and wireless...

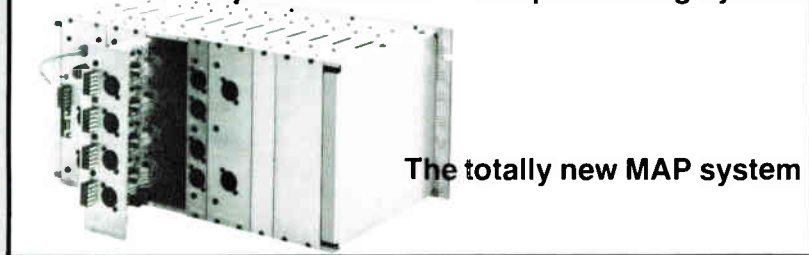


...all in one

Modular audio processing is a relatively new concept, and a much needed component in professional sound system design. In the past, contractors and consultants have had to specify a variety of different components from a number of different sources in order to meet the needs of their customers, with inherent duplication (power supplies for example) and the addition of "superfluous" features which complicated the system.

The MAP system approach breaks down the various functions into specialized plug-in modules, and provides a single 19" rack mounted component with the exact functions needed. This creates a much more cost-effective final package without sacrificing quality or limiting future system expansion. This is the future in audio signal processing. Complex, fully automatic sound systems just became a whole lot simpler.

A complete modular audio processing system



The totally new MAP system

Plug-in circuit cards allow you to customize a 19" rack mounted component that meets your customer's exact needs. Modules are available for automatic mixing, equalization and notch filtering, active crossover networks and RF transmission and receiving. Of course, the system is expandable and easily interfaced with other audio processing in a single, customized package.

For more information: 1-800-821-1121



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 Los Angeles, CA 90040
 (213) 685-5141, FAX# 213-722-0911

Pres.: Tom Beckman, Dir. Comm.: Nancy Kewin,
 Comm.: Barbi Clark

SCV

1101-A Air Way
 Glendale, CA 91201
 (818) 500-0137

Semco

3782 Westridge Ave.
 W. Vancouver, B.C., Canada V7V 3H5
 (604) 922-0526

G. Mgr.: Elk Ebert

Products: crossovers, digital delays, EQs, compressors,
 graphic EQs, interface units., limiters, notch filters, paramet-
 ric EQs, octave EQs, VCAs

Senior Technology

13431 Pumice St.
 Norwalk, CT 90650
 (213) 802-9942, FAX# 213-802-9945

Pres.: Steve P.Y. Kim, VP: Fred K.H. Kim, Nat'l Sls

Mgr.: Irv Weisman

EESCO Systems, Los Angeles, CA, 213-666-9601

Elrep Sls, Tucker, GA, 404-938-7109

Forti & Assoc., Kensington, MD, 301-949-1706

Dobbs Stanford, Dallas, TX, 214-358-0800

Mkt'g Insights, Glenview, IL, 312-729-2047

Products: 1/3 octave EQs, crossovers, octave EQs

Sescom

2100 Ward Dr.
 Henderson, NV 89015
 (702) 565-3400, 800-634-3457, FAX# 702-565-
 4828

Pres.: Franklin Miller

Products: crossovers, de-essers, compressors, levelers, li-
 miters, noise gates, parametric EQs, signal metering, tran-
 scription preamps

Sonic Research Assoc.

PO Box 13744
 Arlington, TX 76094-0744
 (817) 792-2061

Pres./Mkt'g: Kyle A. Holbrook, VP Tech.: Michael J.
 Yacovone, Op. Mgr.: Olvy L. Johnson

Sontec Electronics

Audio Dr.
 Goldbond, VA 24094
 (703) 626-7256

Sls Mgr.: Burgess Macneal

Products: EQs, compressors, interface units., limiters, pa-
 rametric EQs, transcription preamps

Sony Professional Audio

1600 Queen Anne Rd.
 Teaneck, NJ 07666
 (201) 833-5200, 800-635-SONY, FAX# 201-833-
 9645

Nat'l Sls Mgr.: Bob Ott, Prod. Mgr.: Art Gonzales, Mkt'g
 Mgr.: David Kawakami

Sony Pro Audio, Paramus, NJ, 201-368-5185

Sony Pro Audio, Nashville, TN, 615-883-8140

Sony Pro Audio, Burbank, CA, 818-841-8711

Products: 1/3 octave EQs, digital reverbs, compressors

SPECIFIED EQ.



Orban's equalizers excel because they offer unsurpassed flexibility and because they sound *more musical* on a wider range of program material than any other equalizer. Our parametric designs are capable of creating broad, gentle EQ curves with minimum phase-shift and with less ringing than graphic equalizers. Their extraordinary range and versatility allows Orban parametrics to solve a wide range of recording, production, and system problems that graphics and ordinary parametrics typically can't handle effectively.

642B Parametric Equalizer/Notch Filter: Orban's newest, elegant, "constant-Q" parametric. Four bands per channel (can be switched at the front panel to dual 4-band or single-channel 8-band). Features infinite-depth notching made more convenient by a vernier on the frequency control for fine tuning. Continuously-tunable 18dB/octave high-pass and 12dB/octave "Automatic Sliding Besselworth"TM low-pass filter. Noise and distortion specs better than 16-bit digital.

674A/672A Graphic Parametric Equalizers: Combines eight bands of "reciprocal" parametric EQ with tunable high and low-pass filters (12dB/octave). Graphic-type controls simplify set-up and operation. Can be used as a full electronic crossover cascaded with the main EQ in one cost-effective package. Ideal for room and system tuning as well as a wide range of production chores.

787A Programmable Mic Processor: Combines 3-band, "constant-Q" parametric EQ with a compressor, de-esser, and compressor/noise gate in a fully programmable package. Designed for both mic and line-level inputs, the unit can be used to store 99 commonly-used instrumental and vocal settings for instantaneous recall. MIDI, RS-232, and remote control interface options.

Security Covers: Attractive, acrylic security covers are available to fit all standard 19" rack-mount products—from one to four rack spaces, in opaque white, clear, and transparent blue.

CONSULTANTS

Orban Specification Language
is available free as text or on disk.

orban

A Division of AKG Acoustics, Inc.
645 Bryant St., San Francisco, CA 94107 (415) 957-1067 Telex: 17-1480 FAX: (415) 957-1070

Circle 249 on Reader Response Card

Sound Tech

230 Lexington Dr.
Buffalo Grove, IL 60089
(312) 541-3520, 800-877-6863, FAX# 312-541-3616

Pres.: Rudy Schlacher, Gen. Sls Mgr.: David Beirut,
Exp. Sls Mgr.: William Robinson, Sls Dir.: Todd Peren
Products: 1/3 octave EQs, crossovers, compressors, graphic EQs, limiters

Spectra Sonics

3750 Airport Rd.
Ogden, UT 84405
(801) 392-7531

Pres./Owner: William Dilley, Eng./Sls: Gregory Dilley

Studio Master

PO Box 2344
Ft. Worth, FL 76113
(817) 336-5114
Dale Peterson

Studio Technologies

5520 W. Touhy Ave.
Skokie, IL 60077
(312) 676-9177, FAX# 312-982-0747

Pres.: Gordon Kapes, Mkt'g Comm. Mgr.: Jennifer Shore

Sunn Musical Equipment

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(817) 336-5114, 800-433-5627, FAX# 817-870-1271
Chairman of the Bd./CEO: Tommy Moore, Pres.: Jerry Freed, VP Sls: C.H. Murray, Dir. Akai EMI: Mike McRoberts, Akai Prod. Specialist: Kevin Kennedy

Jaydik Communications

PO Box 3002
Spokane, WA 99220
(509) 747-1246
Mkt'g: Dick Myers

LynTec

7030 Grandview
Merriam, KS 66204
(913) 722-4047
Pres.: Lynn J. Potter
Products: matrix

Moseley Assoc.

111 Castilian Dr.
Santa Barbara, CA 93117-3093
(805) 968-9621, FAX# 805-685-9638
Products: matrix, microprocessor, remote controllable

Patch Bay Designation

4742 San Fernando Rd.
Glendale, CA 91204
(818) 241-5585, FAX# 818-507-5050
Pres.: Scott Lookholder, Op. Mgr.: Charlie Schufer, Shop Foreman: Kevin Duhart, Artist: Rosie Gloria, Art Coord.: Joaquin Serrano

Protech Audio

Flowerfield, Bldg. #1
St. James, NY 11780
(516) 584-5855, FAX# 516-584-5904
Sls Mgr.: Bill Murphy, VP Eng.: Joseph Giambone
Peregrine SW Repts, Houston, TX, 713-589-8481

Products: audio/video, components, matrix, remote controllable

PROTO-TEC

108 Fairlane Dr.
Joliet, IL 60435
(815) 744-7173
Products: mic splitters, mult boxes

Semco

3782 Westridge Ave.
W. Vancouver, B.C., Canada V7V 3H5
(604) 922-0526
G. Mgr.: Elk Ebert
Products: audio/video, remote controllable

TARGET TECHNOLOGY

PO Box 609
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(916) 639-2102
Pres.: Peter Hughes, VP: Sherri Douglas
Products: audio/video, components, remote controllable

Tascam (TEAC Professional Division)

7733 Telegraph Rd.
Montibello, CA 90640
(213) 726-0303, FAX# 213-727-7656
Mkt'g Mgr: Bill Mohrhoff, Nat'l Sls Mgr.: Gregg Hildebrandt, W. Reg. Mgr.: Fred Allard, S. Reg. Mgr.: Bill Stevens, E. Reg. Mgr.: Chuck Prada
Products: audio/video

360 Systems

18740 Oxnard St.
Tarzana, CA 91356
(818) 342-3127, FAX# 818-342-4372
Dir. Mkt'g: Don Bird, Dir. Sls: David Geoghegan
Products: matrix, microprocessor, remote controllable

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Win-Cor Electronic Sls, Manhasset, NY, 516-627-9474
Liberty Electro Mkt'g, Topsfield, MA, 617-887-6655
Len Jackson Sls, Camano Island, WA, 206-387-6767

Utah Scientific

1685 W. 2200 S.
Salt Lake City, UT 84119
(801) 973-6840, 800-453-8782, FAX# 801-973-0255
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0704 SW Bancroft St.
Portland, OR 97201
(503) 223-4884, 800-547-1491, FAX# 503-243-1995
G. Mgr.: Steve Johnson, Nat'l Sls Mgr.: Dave Landis, Prod. Mgr.: Glenn Olson
Products: audio/video, matrix

Yamaha Music Corp. of America/Prof.

Audio Div.
PO Box 6600
Buena Park, CA 90662
(714) 522-9011, FAX# 714-522-9312
Products: matrix, remote controllable

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Fin.: Bob Netter
Products: headphones

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Twinsburg, OH 44087
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Mkt'g: Bob Harris
Products: lighting controls & effects

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Mgr.: Jennifer Drescher, Nat'l Sls Mgr.: Fred Coyner,
Mkt'g Dev. Mgr.: Jim Lucas, Tech Svcs Mgr.: Ryan
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Products: processors

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Michael Schneider
Products: sub-woofers

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(203) 225-0555
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Chief Eng.: Sheldon Glick

Cerwin-Vega

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Simi Valley, CA 93065
(805) 584-9332, FAX# 805-583-0865
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Sls Mgr.: Rich Mandella, Tech. Sls: John Davies
Products: sub-woofers

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(215) 876-3400, 800-523-4934, FAX# 215-874-0190
Pres.: Bruce Howze, VP Eng.: John Wiggins, VP Exp.
Sls: Christine Howze, Nat'l Field Sls Mgr.: Chris Berger
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Mel Foster Tech. Sls, Edina, MN, 612-941-9800
Rob Welles, San Francisco, CA, 415-334-4477
Pacific Audio Group, Torrance, CA, 213-719-1383
New Resource, Norwell, MA, 617-659-1463
Sigmet, Freehold, NJ, 201-462-1221
Audio Mkt'g Assoc., Breckville, OH, 216-526-2426
Powerline Mkt'g, Evanston, IL, 312-864-1147
Evans Sls & Mkt'g, Nashville, TN, 615-297-7997
Bencsik Assoc., Ocala, FL, 904-732-9775
R.J. Throckmorton Sls, Bailwin, MO, 314-227-7222
Rep Tech, Terrell, TX, 214-222-2131

Pearson & Pearson, Denver, CO, 303-722-6996
Vector Corp., Seattle, WA, 206-322-4343
Products: sub-woofers

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GLI/Integrated Sound Systems

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(516) 351-2100
Products: DJ mixers, headphones

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O'Ryan Industries

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Vancouver, WA 98682
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Innovative Sls & Mkt'g, Irvine, CA, 714-975-1130
Vector, Seattle, WA, 206-322-4343
Dobbs Standford, Dallas, TX, 214-358-0800
Mkt'g Insights, Glenview, IL, 312-729-2047
Vespoli Entertainment, Ashtabula, OH, 216-992-9792
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Thom Enterprises, Charlotte, NC, 704-343-9234
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8596
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Professional Audio Supply, Ft. Worth, TX, 817-483-
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Singer Products, Hialeah, FL, 305-558-3000
Electrex, FL, 305-651-5752
Products: turntable cartridges, & accs., turntables

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(203) 434-9190, FAX# 203-434-1759
Products: headphones

Skytronics Electrical

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Pres.: Oscar Mederos, Mkt'g: Mike Uruski
Products: DJ mixers, sub-woofers

Sound Tech

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Products: sub-woofers

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Fairfax, CA 94930
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Products: DJ mixers, lighting controls & effects, processors

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Products: lighting controls & effects

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Products: sub-woofers

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Products: headphones

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WesTech/Lichtenauer, Culver City, CA, 213-870-9286
Bencsik Assoc., Ocala, FL, 904-732-9775
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Rancilio Assoc., St. Louis, MO, 314-845-0202
J.Y. Schoonmaker, Dallas, TX, 214-349-1650
Sigmat, Valley Forge, PA, 215-783-6666
Weller Electronic Sls, Worthington, OH, 614-885-7819
Ziskind Assoc., Rolling Meadows, IL, 312-577-1624
White Radio, Burlington-Ont., Canada, 416-632-6894
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Pacnor Mkt'g, Lynnwood, WA, 206-771-6016

Products: headphones

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Pres.: Adrian Ball, VP: Harry Gandhi

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Products: digital systems, digital voice recording

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Milwaukee, WI 53224
(414) 357-2020, 800-558-7022, FAX# 414-357-2029
Products: sign systems

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Products: digital systems, message units, digital voice recording

Automation Devices

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(814) 474-5561

Benjamin Int'l

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Pres.: Joseph Benjamin, VP: Charles Tanner

Clever Devices

PO Box 2002
Port Washington, NY 11050
(516) 767-0682, FAX# 516-767-3635
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Supp.: Mike Kafulas

Products: digital systems, message units, digital voice recording

CompuSonics Video

2345 Yale St.
Palo Alto, CA 94306
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Eltrex Int'l

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Amherst, NH 03031
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Sls Mgr.: Bill Ryan
Products: digital systems, message units, digital voice recording

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Products: digital systems

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Products: digital systems, message units, digital voice recording

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Chuck Olson Assoc., Renton, WA, 206-255-8692

RWR, Rock Hill, SC, 803-324-5111
 RWR, Norcross, GA, 404-263-9349
 RWR, Alabaster, AL, 206-663-2744
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 Products: digital systems, cart machines, message units, digital voice recording

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 ASR Enter., MD, VA, 301-893-0001
 Design Factors, SC, 213-676-6752
 Products: message units

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 (805) 685-2960

3M SOUND PRODUCTS
 551-1W, 3M Center
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 (612) 733-9214, FAX# 612-736-7614
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 Products: cart machines

Sierra Video Systems
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 Grass Valley, CA 95945
 (916) 273-9331

360 Systems
 18740 Oxnard St.
 Tarzana, CA 91356
 (818) 342-3127, FAX# 818-342-4372
 Dir. Mkt'g: Don Bird, Dir. Sls: David Geoghegan
 Products: digital systems, message units

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 800-632-2157, FAX# 415-588-3349
 Pres.: Yoshio Ishida, Nat'l Sls Mgr./Comm. Pro.:
 Richard Krochmal, Nat'l Sls Mgr./Pro. Music & Ent.:
 Rick Kamlet, Nat'l Sls Mgr./Intercom: Al Burns
 Products: message units

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 Eng.: Bernard Sayers, Sls Mgr.: Rick Bottom, Mfg.
 Supervisor: E.W. Stokes
 Chuck Olson Assoc., WA, 206-271-5416
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 PO Box 1030
 Londonderry, NH 03053
 (603) 434-8234, FAX# 603-434-1265
 Exec. VP: Ken Ritter
 Products: digital systems, digital voice recording

Neutrik USA
 1600 Malone St.
 Millville, NJ 08332
 (609) 327-3113, FAX# 609-825-4804
 G. Mgr.: James Cowan, Prod.t Mgr.: William Dorman,
 Prod. Mgr.: Kenneth Smalley
 Products: digital systems, digital voice recording

Otari
 378 Vintage Pk Dr.
 Foster City, CA 94404
 (415) 341-5900, FAX# 415-341-7200
 Pres.: Jack Soma, Mkt'g Mgr.: John Carey, Controller:
 Jim Pierce

PHI Technologies
 4605 N. Stiles
 Oklahoma City, OK 73105-3328
 (405) 521-9000

STOP FEEDBACK!



The MacKenzie Feedback Eliminator (model FE-1) is a solid-state, digital record/play unit which has no moving parts and requires no maintenance. It is designed to be installed between the power amplifier and the paging system. When a paging station is actuated, the message is digitized on a real-time basis and stored in memory. When the paging station deactuates, the recorded page is played over the paging system speakers. Since the open microphone has been eliminated, amplifiers can be turned up to any desired level without any feedback at all.

Voice reproduction is entirely natural-sounding. Message length is up to 30 seconds. The on-board microprocessor senses message termination and automatically switches from the *Record* mode to the *Page Playback* mode with no "dead time."

HOW THE FE-1 WORKS:

- 1) When the paging station is actuated, a contact closure furnished by the paging system actuates the *Record* mode.
- 2) The user makes the page.
- 3) When the paging system releases the contact closure, the FE-1 automatically switches from the *Record* to the *Play* mode and sends out the page.

For additional information about the FE-1 Digital Feedback Eliminator, call MacKenzie Laboratories toll-free: **800-423-4147**

MACKENZIE MacKenzie Laboratories, Inc.
 5507 Peck Road, Arcadia, California 91006 USA, 818/579-0440 FAX: 818/448-7131

MAGNETIC TAPE SYSTEMS & SUPPLIES

AGFA-Gevaert, Magnetic Tape Div.

100 Challenger Rd.
Ridgefield Park, NJ 07660
(201) 440-2500, FAX# 201-342-4742
VP G. Mgr.: Maria Curry, Nat'l Sls Mgr.: Andrew Da
Puzzo, Audio Prod. Mgr.: Joe Tibensky, Video Prod.
Mgr.: Chris Emery, Mkt'g. Comm. Mgr.: Teri Sosa

AVSCO

1880 Embarcadero Rd.
Palo Alto, CA 94303
(415) 493-3814
Pres.: Richard Wilson, G. Mgr.: Veldon Leverich, Office
Mgr.: Diane Leverich

Accurate Sound

3515 Edison Way
Menlo Park, CA 94025
(415) 365-2843, FAX# 415-365-3057
Pres.: Ronald Newdell, VP Sls: Don O'Bella

Akai Professional/IMC

PO Box 2344
Fort Worth, TX 76113
(817) 336-5114, FAX# 817-870-1271
CEO: Tommy Moore, Pres.: Jerry Freed, CFO: Jay
McKim, Credit Mgr.: Bob Sanford, VP Sls: John Maher
John Chez, Ringos, NJ, 201-788-5151
Jerry Sehi, Ft. Lauderdale, FL, 305-525-0872
Grendal Hanks, Lake Forest, CA, 714-768-2633
Tom Steuckert, Santa Clara, CA, 408-249-6136
Bill Thompson, Lake Villa, IL, 312-356-8818

American Recorder Technologies

PO Box 3592
Simi Valley, CA 93063
(805) 527-9580, 800-782-6911, FAX# 805-527-
1433
Pres.: Alan Adelstein

Ampex Recording Media Corp.

401 Broadway, M/S 22-02
Redwood City, CA 94063
(415) 367-3809, FAX# 415-367-4132
Pres.: Thomas Wheeler, VP Sls/Cust. Svce US:
Richard Antonio, G. Mgr./Instr. Prod.: George Armes,
Corp. Controller: Clara Munley, VP Op.: Eugene
Nyland, G. Mgr.-A/V Prod.: Phillip Ritti
Ampex RMC, San Fernando, CA, 818-365-8627
Ampex RMC, Arlington Heights, IL, 312-593-6000
Ampex RMC, Carrollton, TX, 214-960-1162
Ampex RMC, Allendale, NJ, 201-825-9600
Ampex RMC, Nashville, TN, 615-242-0022

R.B. Annis

1101 N. Delaware St.
Indianapolis, IN 46202
(317) 637-9282, FAX# 317-637-9282
Pres.: R.B. Annis, Mgr.: R.D. Hudson
Products: degaussers, demagnetizers

Apex Machine

3000 N.E. 12th Terrace
Ft. Lauderdale, FL 33334
(305) 566-1572, FAX# 305-563-2844
Sls Exec.: Alfred Coningsby III, Sls Exec.: Todd
Coningsby

Atis

6025 Atlantic Blvd., Ste. D

Norcross, GA 30071

(404) 446-7234, FAX# 404-446-7237
VP Tech Svcs: Peter Lorenz, Nat'l Sls Mgr.: Tony
Vespoli
Products: cassette recorders, reel-to-reel recorders & play-
ers, transcription systems

Audico

219 Crossen Ave.
Elk Grove, IL 60007
(312) 640-1030
Pres.: Bill Hinkle, VP: Norm Deletzke

Audiocom

8100 Oak Ln., Penthouse 401
Miami Lakes, FL 33016
(305) 825-4653, 800-272-0555, FAX# 305-558-
8799
Pres./CEO: Ron Deblinger, VP Operations: Art Hecht,
Dir. Mkt'g: Stu Ginsberg
Products: cassette players & changers, cassette recorders,
cassette tape

Audiolab Electronics

5831 Rosebud Ln., Bldg C
Sacramento, CA 95841
(916) 348-0200, FAX# 916-348-1512
VP Mkt'g: Ronald Stefan
Products: degaussers, demagnetizers

BASF, Information Systems

19 Crosby Dr.
Bedford, MA 01730-1471
(617) 271-6642, FAX# 617-275-2708

Benjamin Int'l

1460 Old Country Rd.
Plainview, NY 11803
(516) 753-0700, 800-572-8989, FAX# 516-753-
0839
Pres.: Joseph Benjamin, VP: Charles Tanner
Products: degaussers, demagnetizers

Bonneville Media Communications

130 Social Hall Ave.
Salt Lake City, UT 84111
(801) 237-2400
Products: cassette tape

Burlington Audio/Video Tapes

106 Mott St.
Oceanside, NY 11572
(516) 678-4414, 800-331-3191, FAX# 516-678-
8959
Pres.: Ruth Schwartz, VP: Rudy Schwartz, Jr. VP/Sls:
Jan Schwartz, Sls Mgr.: Ray Colon
Products

Capitol Magnetic Products

6902 Sunset Blvd.
Hollywood, CA 90028
(213) 461-2701
Pres.: Edward C. Khoury, Sr. VP/Sls: H. J. "Bud"
Jackson, VP Int'l Sls: Larry Krutsinger, Managing
Dir./U.K.: Steve Castle, Dir./Tech. Mkt'g: Joseph
Kempier

Chemtronics

681 Old Willets Path

Hauppauge, NY 11788

(516) 582-3322

EI Mar Plastics

821 E. Walnut St.
Carson, CA 90746
(213) 327-3180, 800-255-5210, FAX# 213-327-
0491
Pres.: Allen Schor, Sls Mgr.: Maxine Hesse
Products: cassette tape

Electronic Specialists

PO Box 389
Natick, MA 01760
(617) 655-1532

Fidelipac

PO Box 808
Moorestown, NJ 08057
(609) 235-3900, FAX# 609-235-7779
Pres.: Roger Thanhauser, Mkt'g Dir.: Larry Lamoray,
Sls Dir.: Jack Ducart, Eng. Dir.: Bill Franklin, Dom. Sls:
Joanne Donahue, Int'l Sls: Rosemary Jukes

FOSTEX CORP. OF AMERICA

15431 Blackburn Ave.
Norwalk, CA 90650
(213) 921-1112, FAX# 213-802-1964
Exec. VP: Fred Huang, VP Sls/Mkt'g: Mark Cohen
Products: cassette recorders, multi-tracks, reel-to-reel re-
corders & players, test tapes

Gauss

9130 Glenoaks Blvd.
Sun Valley, CA 91352
(213) 875-1900, FAX# 818-767-4479
Pres.: James Williams, Cust. Svce Mgr./Dup.: Joe
O'Conner, Nat'l Sls Mgr./Speakers: Paul Hugo, Chief
Eng./Speakers: Walter Dick, Cust. Svce/Speakers:
Bonnie Armstrong, Cust. Svce/Dup.: Don King
Brian Trankle & Assoc., Belmont, CA, 415-595-4004
Peter Schmitt, Leonia, NJ, 201-944-2806
Hustling Ent., Yakima, WA, 509-966-2574
Richard Pass, Langhorne, PA, 215-757-6100
Master Recording Supply, Burbank, CA, 818-841-7500
Products: high-speed duplicators

GSC General Security/Benjamin

1460 Old Country Rd.
Plainview, NY 11803
(516) 753-0700, 800-572-8989, FAX# 516-753-
0839

Geneva Group of Companies

7255 Flying Cloud Dr.
Eden Prairie, MN 55344
(612) 829-1724
Pres.: Edward Griffin, Sls Mgr.: Bruce Bowen

IGM Communications

4041 Home Rd.
Bellingham, WA 98226
(206) 733-4567, FAX# 206-734-7939
Pres.: Jim Wells, Sls: Carl Peterson, Op. Mgr.: Rick
Sawyer
Products: cart recorders/players, carts, reel-to-reel record-
ers & players

Infonics

2302 E. Michigan Blvd.

Michigan City, IN 46360
(219) 879-3381
Pres.: Carol Lant, VP: David Smith

(415) 221-2000

Lincolnwood, IL 60646-168
(708) 677-3000, 800-323-7520, FAX# 708-677-1311
VP Sls: Thomas Tisch
Products: cleaners

Int'l Electro-Magnetics
350 N. Eric Dr.
Palatine, IL 60067
(312) 358-4622

Microtran
PO Box 236
Valley Stream, NY 11582
(516) 561-6050, FAX# 516-561-1117
Pres.: Albert Eisenberg, VP Sls: Walter Benschler, Chief Eng.: Vulf Ozechov, Purch. Agent: Belle Moskowitz, Prod. Mgr.: Charles Meyer, Adv. Mgr.: Lou Anne O'Conner
Products: degaussers, demagnetizers

Saki Magnetics
26600 Agoura Rd.
Calabasas, CA 91302
(818) 880-4054, FAX# 818-880-6242
Pres.: Eugene Sakasagawa, Dir./Sls & Mkt'g: Trevor Boyer

Int'l Music Co. (I. M. C.)
PO Box 2344
Ft. Worth, TX 76113
(817) 336-5114, 800-433-5627, FAX# 817-870-1271
Chairman of the Bd./CEO: Tommy Moore, Pres.: Jerry Freed, VP Sls: C.H. Murray, Dir. Akai EMI: Mike McRoberts, Akai Prod. Specialist: Kevin Kennedy
Products

Nakamichi America
19701 S. Vermont Ave.
Torrance, CA 90502
(213) 538-8150, 800-421-2313, FAX# 213-324-7614
Pres.: Yas Yamazaki, Exec. VP/G. Mgr.: Dean Miller, VP Sls: Jett Logan, VP Op.: Ray Privette, Mkt'g Mgr.: Jun Sakamoto
Products: cassette recorders, cassette tape, demagnetizers

Sony Professional Audio
1600 Queen Anne Rd.
Teaneck, NJ 07666
(201) 833-5200, 800-635-SONY, FAX# 201-833-9645
Nat'l Sls Mgr.: Bob Ott, Prod. Mgr.: Art Gonzales, Mkt'g Mgr.: David Kawakami
Sony Pro Audio, Paramus, NJ, 201-368-5185
Sony Pro Audio, Nashville, TN, 615-883-8140
Sony Pro Audio, Burbank, CA, 818-841-8711
Products: cassette recorders

Int'l Tapetronics/3M
PO Box 241
Bloomington, IL 61702
(309) 828-1381, 800-447-0414, FAX# 309-828-1386
Sls Rep.: Tom Becker, Sls Rep.: John Schaab, Sls Rep.: Jim Woodworth, Prod. Specialist: Chuck Kelly
Products: cart recorders/players, carts

Nortronics
8101 Tenth Ave. N.
Minneapolis, MN 55427
(612) 545-0401, FAX# 612-540-8678
Pres.: John Yngve, Mkt'g Oper. Mgr.: Karen Nickolauson, Eng. Mgr.: Mike Drees
Products: heads

SOUND CRAFT-DIV. OF JBL
PO Box 2200
Northridge, CA 91329
(818) 893-4351, FAX# 818-893-3639
Pres.: Ron Means, VP Sls: Ken Lopez, VP Mkt'g: Mark Gander, Nat'l Sls Mgr.: David Kimm, Tech. App.: Gary Lynn
Jim Chase, Hermosa Beach, CA, 213-374-2128
Bill Hamilton, Folsom, PA, 215-543-4677
Bill Schuermann, St. Louis, MO, 314-644-2083
Tom Walter, N. Barrington, IL, 312-382-4925
Products: multi-tracks, reel-to-reel recorders & players

JRF Magnetic Sciences
101 Landing Rd.
Landing, NJ 07850
(201) 398-7426, FAX# 201-579-6021

Otari
378 Vintage Pk Dr.
Foster City, CA 94404
(415) 341-5900, FAX# 415-341-7200
Pres.: Jack Soma, Mkt'g Mgr.: John Carey, Controller: Jim Pierce

Sprague Magnetics
15720 Stagg St.
Van Nuys, CA 91406
(818) 994-6602, 800-553-8712, FAX# 818-994-2153

MACKENZIE LABORATORIES
PO Box 3029
Arcadia, CA 91006
(818) 579-0440, 800-423-4147, FAX# 818-448-7131

PHI Technologies
4605 N. Stiles
Oklahoma City, OK 73105-3328
(405) 521-9000
Pres.: Gary Zebrowski, Dir. Op.: Bill Seaman, Sls Mgr., Consumer: Dan Reynolds, Sls Mgr., Sys./OEM: Michael Morgan

Standard Tape Laboratory
26120 Eden Landing Rd., Ste. 5
Hayward, CA 94545
(415) 786-3546
Pres.: Frank Lennert

Pres.: Addison Taylor, VP/Chief Eng: Nagy Khattar, Sls Supervisor: Joe Vitale, Mkt'g/Training: Emory Straus
Avwest, Phoenix, AZ, 602-946-1811
Lex Lawson Assoc., Dallas, TX, 214-272-8482
Avcom, N. Olmstead, OH, 216-777-2060
Rancilio Assoc., St. Louis, MO, 314-845-0202
Rancilio Assoc., Kansas City, KS, 913-491-9883
Warren Assoc., Santa Clara, CA, 408-988-7762
Piper Assoc., Needham, MA, 617-449-1144
Bencsik Assoc., Ocala, FL, 904-732-9775
Design Factors, Los Angeles, CA, 213-697-7576
Riley & Petchell Sls, Detroit, MI, 313-937-3000
Monfort Electronics, Indianapolis, IN, 317-872-8877
Gustafson Systems Sls, Chicago, IL, 315-358-2505
Chuck Olson Assoc., Renton, WA, 206-255-8692
RWR, Rock Hill, SC, 803-324-5111
RWR, Norcross, GA, 404-263-9349
RWR, Alabaster, AL, 206-663-2744
Northland Assoc., Moorehead, MN, 218-233-4616
Products: cart recorders/players

Peavey Electronics
711 A St.
Meridian, MS 39302
(601) 483-5365, FAX# 601-484-4278
Pres.: Hartley Peavey
Products: cassette recorders

Studer Revox America
1425 Elm Hill Pike
Nashville, TN 37210
(615) 254-5651, FAX# 615-256-7619
Products: cassette recorders, reel-to-reel recorders & players

Magnefax Int'l
Route 1 Box 764
Rogers, AR 72756
(501) 925-1818, FAX# 501-925-1841
Pres.: Dennis W. Tallakson
Products: degaussers, high-speed duplicators

Projector Recorder Belt
PO Box 176
Whitewater, WI 53115
(414) 473-2151

Sunkyoung Int'l, Audio Div.
17106 S. Avalon Blvd.
Carson City, CA 90746
(213) 327-5010, 800-237-8372, FAX# 213-327-0276
Mkt'g: Tony Kim

Magnetic Reference Lab (MRL)
229 Polaris Ave., Ste. 4
Mountain View, CA 94043
(415) 965-8187, FAX# 415-965-8548
Pres.: John McKnight, Prod. Mgr.: Charles Booye, Adm. Assistant: M. Marlana Govaars

Quantam Audio Labs
2752 Walnut Ave.
Tustin, CA 92680
(714) 838-8833, FAX# 714-838-9619
Sls Eng.: David Rollins
Products: degaussers

Taber Mfg. & Eng. Co./AVSC
1880 Embarcadero Rd.
Palo Alto, CA 94303
(415) 493-3814

Mann Endless Cassette Industries
PO Box 1347
San Francisco, CA 94101

Recortec
1290 Lawrence Station Rd.
Sunnyvale, CA 94089
(408) 737-3443, FAX# 408-734-2140
Dir. Mkt'g: R. Ronald Truxell, VP: Eldon Corl, Pres.: Lester Lee

Tape-Athon
13633 Crenshaw Blvd.
Hawthorne, CA 90250
(213) 676-6752, FAX# 213-676-9532
Pres.: Leon "Lee" Tate, G. Mgr.: Robert Haller, Dir.

Research Technology Int'l
4700 W. Chase Ave.

Eng.: Bernard Sayers, Sls Mgr.: Rick Bottom, Mfg. Supervisor: E.W. Stokes
 Chuck Olson Assoc., WA, 206-271-5416
 Bencsik Assoc., Fl, 800-342-0197
 Murphy & Cota, NC, SC, 404-875-2525
 ASR Enter., MD, VA, 301-893-0001
 Design Factors, SC, 213-676-6752
 Products: cassette players & changers, multi-tracks, reel-to-reel recorders & players

Tascam (TEAC Professional Division)
 7733 Telegraph Rd.
 Montibello, CA 90640
 (213) 726-0303, FAX# 213-727-7656
 Mkt'g Mgr: Bill Mohrhoff, Nat'l Sls Mgr.: Gregg Hildebrandt, W. Reg. Mgr.: Fred Allard, S. Reg. Mgr.: Bill Stevens, E. Reg. Mgr.: Chuck Prada
 Products: cassette recorders, cleaners, demagnetizers, high-speed duplicators, multi-tracks, reel tape, reel-to-reel recorders & players, test tapes

Technics Professional
 One Panasonic Way

Secaucus, NJ 07094
 (201) 348-7000
 Products: reel-to-reel recorders & players

VIF Int'l
 PO Box 1555
 Mountain View, CA 94042
 (408) 739-9740
 Pres.: Nancy Mackechnie, Advisor/Int'l Op.: Gordon Mackechnie

Versadyne Int'l
 504-D Vandell Way
 Campbell, CA 95008
 (408) 379-0900, FAX# 408-379-0902
 Pres.: Robert Kratt
 Products: high-speed duplicators

Weircliffe
 2752 Walnut Ave.
 Tustin, CA 92680

(714) 838-8833, FAX# 714-838-9619
 Chair./CEO: Roger Bailey, G. Mgr./US Op.: Stuart Dunford, Sls: Jim Owen
 Weircliffe UK, Exwick Exeter, UK, 44-3-927-2132
 Paltex Europe, Haarlem, Netherlands, 31-2-332-7845
 Com Logic, Burbank, CA, 818-845-0199
 Landy Assoc., Waltham, MA, 617-890-6325
 Products: degaussers

Xedit
 133 S. Terrace Ave.
 Mount Vernon, NY 10550
 (914) 668-0388, 800-431-8900

Yamaha Music Corp. of America/Prof. Audio Div.
 PO Box 6600
 Buena Park, CA 90662
 (714) 522-9011, FAX# 714-522-9312
 Products: cassette recorders, multi-tracks

PA SYSTEMS

ADA Amplification Systems
 7303 Unit D Edgewater Dr.
 Oakland, CA 94621-3095
 (415) 632-1323, 800-241-8888, FAX# 415-632-9358
 W. Sls: Lisa Carrell-Gonden, E. Sls: Eric Schultheis, Int'l Sls: Lorry Marcus

ATI - Audio Technologies
 328 W. Maple Ave.
 Horsham, PA 19044
 (215) 443-0330, FAX# 215-443-0394
 Pres.: Samuel Wenzel, VP: Edward Mullin

AIPHONE INTERCOM SYSTEMS
 PO Box 90075
 Bellevue, WA 98009
 (206) 455-0510, 800-692-0200, FAX# 206-455-0071
 Pres.: Jun Matsumoto, Sls Mgr.: Jim Morrison, Mkt'g/Adv. Mgr.: Harry Quanz
 Aiphone NE, Randolph, NJ, 201-328-1790
 Aiphone Midwest, Westmont, IL, 312-323-5222
 Aiphone SE, Douglasville, GA, 404-920-2811
 Products: mixer/amp, music distribution, signalling, telephone, zoned

ALTEC LANSING
 PO Box 26105
 Oklahoma City, OK 73126-010
 (405) 324-5311, FAX# 405-324-8981
 Pres.: Dave Merrey, VP Mkt'g: Chuck Lange, Dir. Mkt'g Dev.: Ted Uzzie, Nat'l Sls Mgr.: Jerry Spriggs, Mgr./Export Mkt'g: John Sexton, Tech. Svcs Mgr.: Gary Jones

ASHLY

ASHLY AUDIO
 100 Fernwood Ave.
 Rochester, NY 14621
 (716) 544-5191, 800-828-6308, FAX# 716-266-4589

Pres.: William Thompson, Sr. VP: Bob French, VP: David Malloy, Office Mgr.: Ellen Price
 Products: mixer/preamps, signalling

Audio Systems
 PO Box 1174
 Bismarck, ND 58502
 (701) 223-3800, 800-852-6522, in-state 800-932-8975, FAX# 701-222-8102
 Pres./Eng: Lynn Mader, VP/Sls: Lyle Mader
 Products: modular, zoned

Auditel Systems
 396 Porter Ave.
 Buffalo, NY 14201
 (716) 886-0019, FAX# 716-886-1615
 Pres.: David Langtry, Prod. Mgr.: Tony Roberson, Mkt'g Dir.: Jim Wood
 Products: mixer/preamps, modular

Bogen Communications
 PO Box 575
 Ramsey, NJ 07446
 (201) 934-8500, FAX# 201-934-9832
 Pres.: John Ochtera, VP Sls/Mkt'g: James Orr, Nat'l Sls Dir.: David Chambers
 Products: mixer/amp, mixer/preamps, modular, music distribution, telephone, zoned

Community Light & Sound
 333 E 5th St.
 Chester, PA 19013
 (215) 876-3400, 800-523-4934, FAX# 215-874-0190
 Pres.: Bruce Howze, VP Eng.: John Wiggins, VP Exp. Sls: Christine Howze, Nat'l Field Sls Mgr.: Chris Berger
 Cordial-Riley Mkt'g, Sterling Heights, MI, 313-826-8980
 Mel Foster Tech. Sls, Edina, MN, 612-941-9800
 Rob Welles, San Francisco, CA, 415-334-4477
 Pacific Audio Group, Torrance, CA, 213-719-1383
 New Resource, Norwell, MA, 617-659-1463
 Sigmet, Freehold, NJ, 201-462-1221
 Audio Mkt'g Assoc., Breckville, OH, 216-526-2426
 Powerline Mkt'g, Evanston, IL, 312-864-1147
 Evans Sls & Mkt'g, Nashville, TN, 615-297-7997
 Bencsik Assoc., Ocala, FL, 904-732-9775
 R.J. Throckmorton Sls, Ballwin, MO, 314-227-7222
 Rep Tech, Terrell, TX, 214-222-2131
 Pearson & Pearson, Denver, CO, 303-722-6996
 Vector Corp., Seattle, WA, 206-322-4343

Products: modular

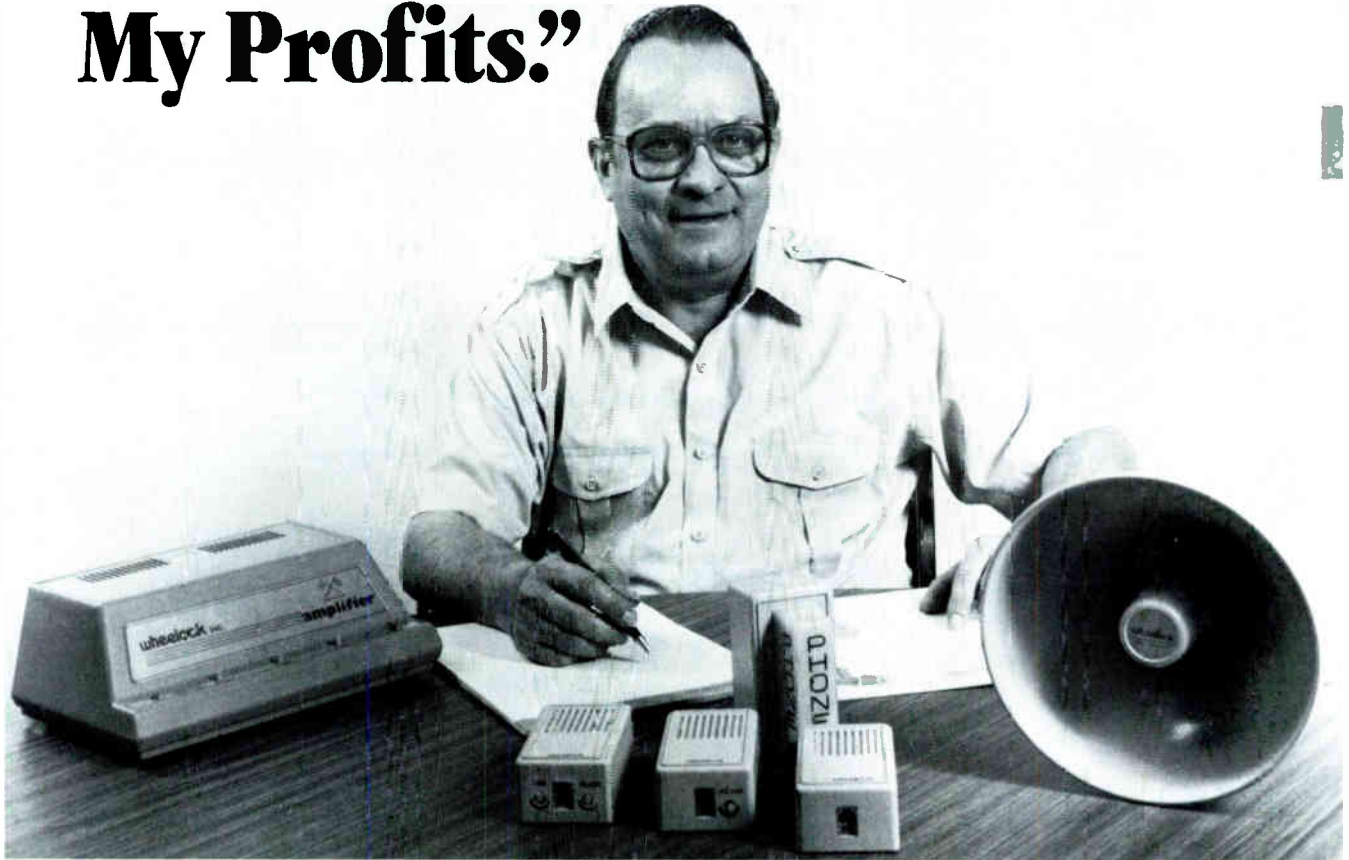
Crown Int'l
 PO Box 1000
 Elkhart, IN 46517
 (219) 294-8000, FAX# 219-294-8329
 Pres./CEO: Clyde Moore, Crown Div. Head: Gil Nichols, Amplifier Prod. Dir.: Verne Searer, Sls Mgr.: Jim Beattie, Mkt'g Svcs: Gerry Barclay, Mic. Prod. Line Mgr.: Bob Herrold

J.W. DAVIS & CO.
 PO Box 26177
 Dallas, TX 75226
 (214) 651-7341, 800-527-5705, in-state 800-in TX 800-442-1564, FAX# 214-939-0328
 Pres.: Charles Griffith, VP Sls: Jack Tucker
 Products: mixer/amp, mixer/preamps, modular, music distribution, signalling, telephone, zoned

Dayton Industrial
 126 Westpark Rd.
 Dayton, OH 45459
 (513) 236-3591
 VP Sls/Mkt'g: Robert McDougall, VP Eng.: Kurt Farmer, Sr. Tech.: Frank Jaros
 Products: music distribution, telephone

DUKANE
 2900 Dukane Dr.
 St. Charles, IL 60174
 (312) 584-2300, FAX# 312-584-2370
 Pres./CEO: J. McWilliams Stone Jr., Group VP: William Finnegan, Div. G. Mgr.: Steven Deppa, Nat'l Sls Mgr.: Warren Anderson, Svce Mgr.: Cliff Carlson
 Wally Smutts, Toronto-Ont, Canada, 312-584-2300
 Doug Fellabaum, Sycamore, IL, 815-895-7573
 Don Mouritzen, Beecher, IL, 312-946-9655
 Ken Lind, St. Charles, IL, 312-584-2300
 Pete Kendal, Jacksonville, FL, 904-262-6025
 Ed Nuhring, Portland, OR, 503-244-4262
 Jim Lacey, Moreno Valley, CA, 714-243-1160

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With Wheelock telephone extension alerts and paging products, I'm able to win more bids because I sell total communication systems, that are easy-to-sell, easy-to-install and have an outstanding record for reliability and performance.

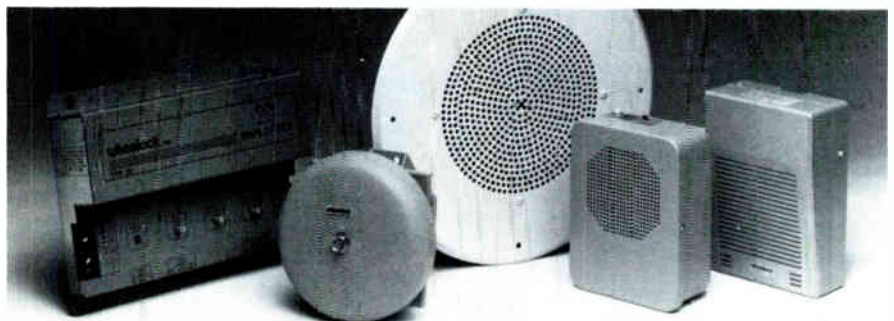
Only Wheelock offers me both . . .

- A complete line of telephone call alerting signals and . . .
- An innovative telephone integrated voice paging product line

The visual, audible and combination alerts solve the problem of missed phone calls in virtually any business, industrial or institutional environment.

The amplified speakers and centralized (70V) amplifier systems fulfill a wide variety of applications, and their innovative design allows me to sell the customer only what is needed, while providing for easy future expansion.

I'm able to meet my customer's requirements because of Wheelock's wide range of products, for example the new modular TelBell, is a loud, attention getting alert ideal for noisy locations and/or



for medium to large area coverage indoors or outdoors. Zone controls have separate zones of paging plus all call, and can control one way paging speakers and talk back speakers and horns. The paging amplifiers conveniently mount on shelf or wall, and have automatic level control for telephone and microphone inputs — which maintains rated output without distortion. Voice operated background music mute is also a standard feature.

And when I call Wheelock their experienced customer service representatives expedite my orders with computerized order entry system.

For more information and a catalog on alert and paging products contact Wheelock, Inc. 273 Branchport Ave., Long Branch, NJ 07740. Telephone (201) 222-6880.

And to help you be more competitive on potential jobs you may be working on, and to save you more money contact Wheelock's Customer Service Department and ask about our current product promotion.

wheelock
INC.

Jack Brown, Dallas, TX, 214-943-7528
 Products: mixer/amp, mixer/preamps, modular, music distribution

ELENEX (WEST)

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 San Diego, CA 92121
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Edcor

1948 East Pomona
 Santa Ana, CA 92705
 (714) 258-0777, 800-854-0259, FAX# 714-258-7117
 Pres.: Larry Weston
 Products: mixer/amp, mixer/preamps, modular, telephone

Electro-Voice

600 Cecil St.
 Buchanan, MI 49107
 (616) 695-6831, 800-527-6701, FAX# 616-695-1304
 Pres.: Robert Pabst, VP Sls & Mkt'g: Paul McGuire, Dir. Mkt'g: Jim Long, Chief Eng.: Earl Harris
 Products: mixer/amp, mixer/preamps

Fanon Courier

14811 Myford Rd.
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Fender Musical Instruments

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 Brea, CA 92621
 (714) 990-0909, FAX# 714-990-3986
 VP Electronic Prod.: Steve Grom

Formula Audio

Rte. 5, Box 440-3, Hwy 39
 Zebulon, NC 27597
 (919) 269-6441
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 Hank Dunn Assoc., Doylestown, PA, 800-243-6875
 Raleigh Perry & Assoc., Buford, GA, 404-945-3142
 DBG Mkt'g, Montreal, Quebec, 514-488-9564
 ProTek, Plano, TX, 214-596-6065
 Products: modular

Gallien-Krueger

1355 Dell Ave.
 Campbell, CA 95008
 (408) 379-3344, FAX# 408-379-0247
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 Products: mixer/preamps, modular, music distribution, zoned



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 (805) 987-9511, 800-4-DRACON, FAX# 805-987-2547
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 John Muller, Chesapeake Beach, MD, 301-257-3686
 Gary Foster, Columbia, MO, 314-442-2288
 Bob Lincoln, Inidan Rock Beach, FL, 813-595-3055
 Don Bivens, Lake Elsinore, CA, 714-244-8808
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 Bill Boone, Libertyville, IL, 312-816-1080
 Margaret Giambalvo, Short Hills, NJ, 201-564-8508
 Mark Skilowitz, New Field, NJ, 609-697-4580
 Dave Whalen, Houston, TX, 713-974-4373

Hill Audio

5002B N. Royal Atlanta Dr.
 Tucker, GA 30084
 (404) 934-1851, FAX# 404-934-1840
 Sls Mgr.: Bob Allen, Svce Mgr.: Rick Rogers
 Products: mixer/amp

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 Monford Electronics Mkt'g., Indianapolis, IN, 317-872-8877
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 Ludwig Mkt'g., Kenosha, WI, 414-697-9355
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 Mkt'g Concepts, Irving, TX, 214-869-0669
 Yora, White Bear Lake, MN, 612-770-9760
 Torbett/Keiser Group, Loveland, CO, 303-669-1008
 Derek Allen Assoc., Toluca Lake, CA, 818-840-8327
 Plus Four Mkt'g, Walnut Creek, CA, 415-937-0650
 North Shore Mkt'g, Seattle, WA, 206-284-9699
 Island Instruments, Kaneohe, HI, 808-235-7544
 Products: mixer/amp, mixer/preamps, modular, signalling, zoned

Industrial Research Products

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 Piper Assoc., Needham, MA, 617-449-1144

Sigmat, Freehold, NJ, 201-462-1221
 Richard Pass Assoc., Langhorne, PA, 215-757-6100
 Stanin Mkt'g, Chesterion, IN, 219-929-4127
 Bencsik Assoc., Ocala, FL, 904-732-9775
 EESCO Systems, Los Angeles, CA, 213-666-9601
 Products: mixer/amp, mixer/preamps, modular

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270 N. Geneva Rd.
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KDM Electronics

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 Repronics, New Madison, OH, 513-996-0530
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 Products: mixer/amp, mixer/preamps, modular, music distribution, zoned

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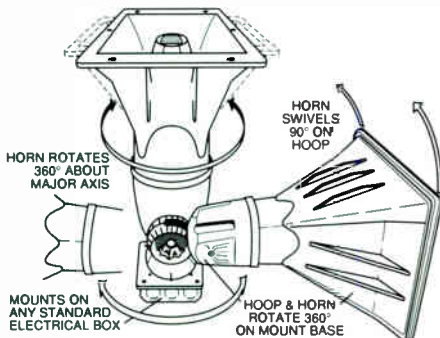
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Evans Sls & Mkt'g, Nashville, TN, 615-297-7997
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Yore, White Bear Lake, MN, 612-770-9760
Allwest Electronics, Camarillo, CA, 805-388-1789
Loomis & Assoc., Fremont, CA, 415-797-3500
Loppnow & Assoc., Issaquah, WA, 206-392-3936
World Wide Electronics, Pembroke Pines, FL, 305-584-7024
Repworks, Chicopee, MA, 413-533-0845
Products: music distribution

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(201) 392-4050, FAX# 201-392-4436
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Tech. Sup. Supervisor: George Lidlow, Accts Mgr.:
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Innovative Audio, Pontiac, MI, 313-673-2280
J.B. Parent, Dublin, OH, 614-764-0064
Essential Mkt'g, St. Joseph, MO, 816-279-0776
Tenackit Assoc., Houston, TX, 713-528-2005
New West Audio, Burbank, CA, 818-955-9700
Brian Trankle Assoc., Belmont, CA, 415-595-4004
Northmar, Seattle, WA, 206-524-5170
Pearson & Pearson, Denver, CO, 303-722-6996
Products: mixer/amp, mixer/preamps

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Meridian, MS 39302
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Pres.: Hartley Peavey
Products: mixer/amp, mixer/preamps

Protech Audio

Flowerfield, Bldg. #1
St. James, NY 11780
(516) 584-5855, FAX# 516-584-5904
Sls Mgr.: Bill Murphy, VP Eng.: Joseph Giambone
Peregrine SW Repts, Houston, TX, 713-589-8481
Products: mixer/amp, mixer/preamps, modular, music distribution, signalling, telephone, zoned

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Everett, WA 98204
(206) 355-6000, FAX# 206-347-7757
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Nat'l Sls Mgr.: Ray Bloom
Products: modular

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Sylmar, CA 91342
(818) 362-9516, FAX# 818-367-5292
Pres.: Hugh T. Wilcox, Sls Support Rep: Michelle
Price, Sls Coord.: Jean Hurst
Products: mixer/amp, mixer/preamps, modular, music distribution, signalling, telephone, zoned

Senior Technology


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Mgr.: Irv Weisman
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Elrep Sls, Tucker, GA, 404-938-7109
Forti & Assoc., Kensington, MD, 301-949-1706
Dobbs Stanford, Dallas, TX, 214-358-0800
Mkt'g Insights, Glenview, IL, 312-729-2047
Products: mixer/amp, music distribution, telephone, zoned

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 Products: mixer/amp, mixer/preamps

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 11460 Sunrise Gold, Ste. B
 Rancho Cordova, CA 95742
 (916) 635-3011, 800-367-7945, FAX# 916-635-1787
 Owner: Wade Stewart, Adm.: Michelle Horan
 Products: mixer/preamps

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 Brea, CA 92621
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 Products: mixer/amp

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 Design Factors, SC, 213-676-6752
 Products: mixer/amp, music distribution

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 Products: mixer/preamps

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 Products: amps, speakers

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 Products: DC battery powered, lecturns, megaphones, mixer amps, mixers, powered speakers, speakers

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 W.A. Hendrickson, N. Scituate, MA, 617-545-0652
 Maish Sls, Mulberry, IN, 317-296-2322
 TMC Sls, Ft. Lee, NJ, 201-944-8340
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 Bencsik Assoc., Ocala, FL, 904-732-9775
 Stinson Assoc., Havertown, PA, 215-446-8585
 Lewis & Dunnigan, Syracuse, NY, 315-446-5522
 Arch Hoynce, Arlington Heights, IL, 312-398-1681
 Wes Tech Mkt'g, Culver City, CA, 213-837-1398
 Meyer & Ross, Burlingame, CA, 415-348-6800
 Products: columns, DC battery powered, lecturns, speakers

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 Products: lecturns, powered speakers, speakers

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 21300 Superior St.
 Chatsworth, CA 91311
 (818) 407-2438, 800-722-0500, in-state 800-682-5300, FAX# 818-407-2405
 Pres.: Michael Custer, VP Sls/Mkt'g: Chuck Stone, Mkt'g Mgr.: Loretta Blinn
 Califone Industries, Vancouver B.C., Canada, 604-254-5148
 Products: amps, DC battery powered, lecturns, megaphones, mixer amps, powered speakers, speakers

Celestion Industries
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 (508) 429-6706, FAX# 508-429-2426
 Pres.: Peter Wellikoff, Dir. Sls/Mkt'g: Barry Fox, Cust. Svce: Danielle Jacques, Svce Mgr.: Steve King
 Products: amps, powered speakers, speakers, weatherproof speakers

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 Simi Valley, CA 93065
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Products: speakers

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Bencsik Assoc., Ocala, FL, 904-732-9775
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Rep Tech, Terrell, TX, 214-222-2131
Pearson & Pearson, Denver, CO, 303-722-6996
Vector Corp., Seattle, WA, 206-322-4343
Products: speakers, weatherproof speakers

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PO Box 1000

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St. Charles, IL 60174

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Jim Lacey, Moreno Valley, CA, 714-243-1160
Jack Brown, Dallas, TX, 214-943-7528

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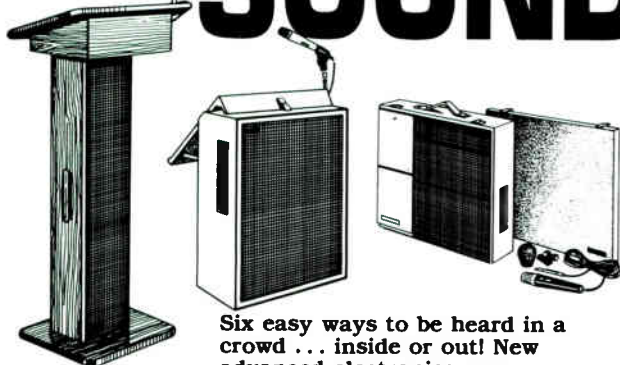
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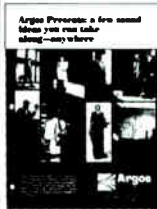
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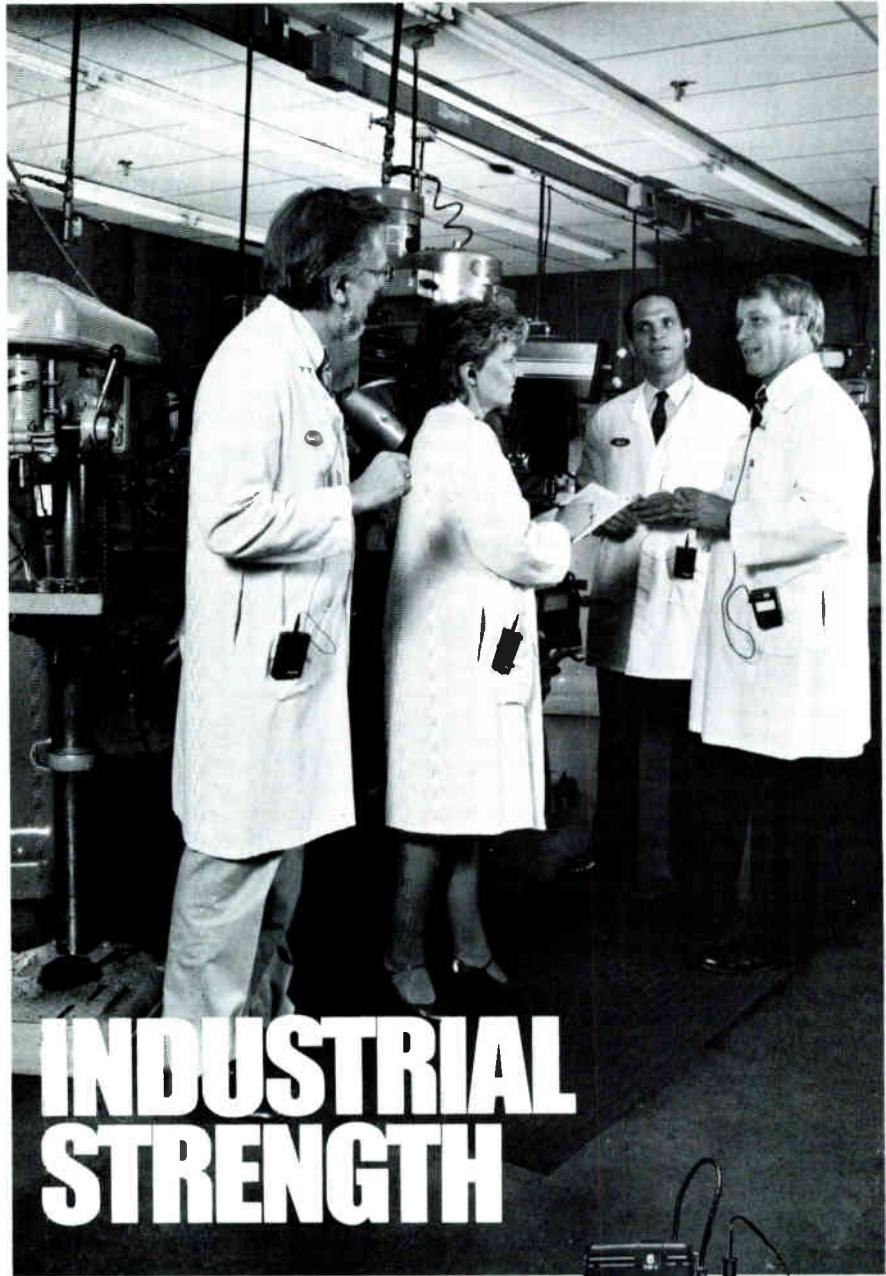
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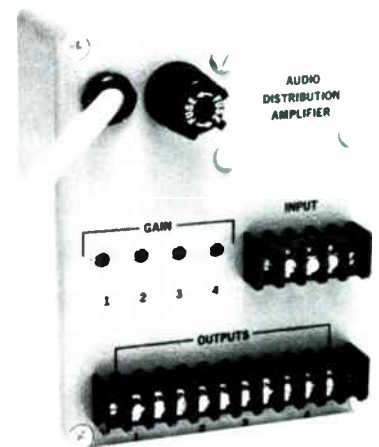
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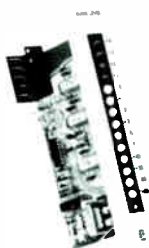
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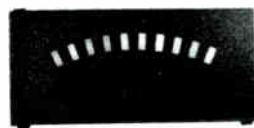
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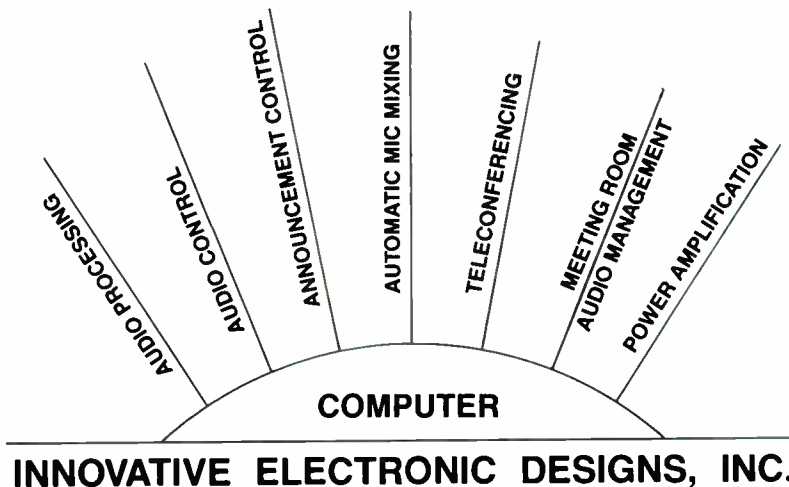
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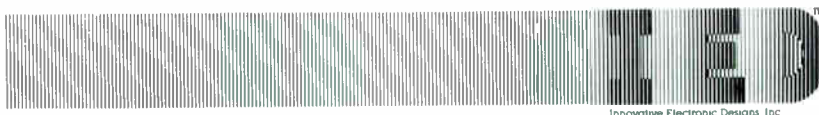


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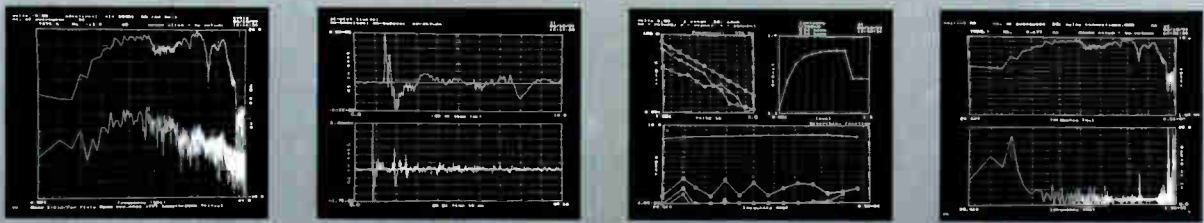
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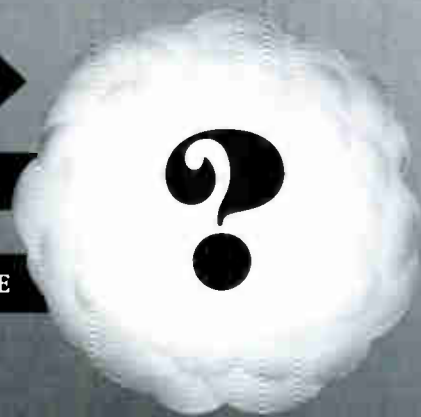
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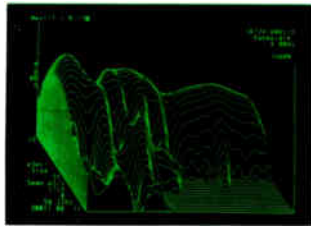
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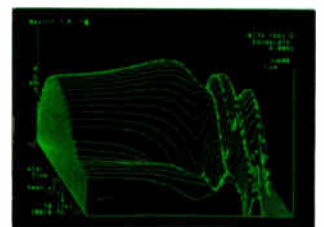
3-D (TEF)



Production Testing



TEF Rapid Speech
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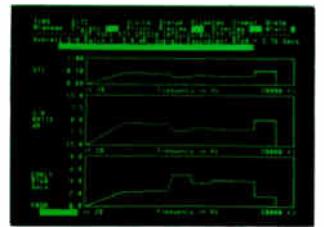
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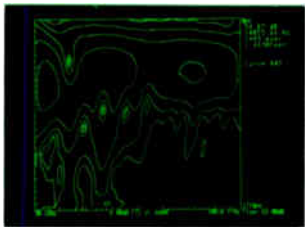
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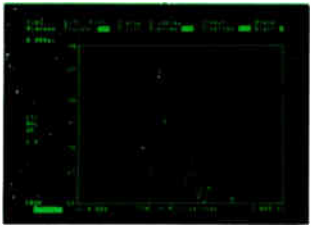
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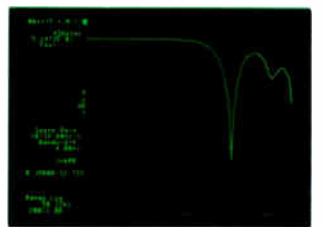
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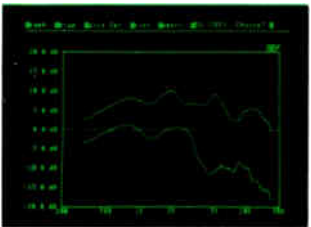
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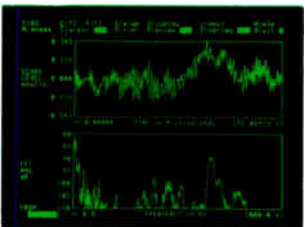
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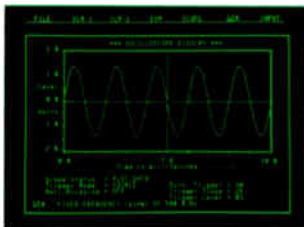
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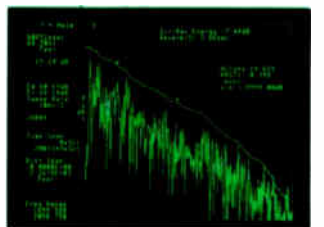
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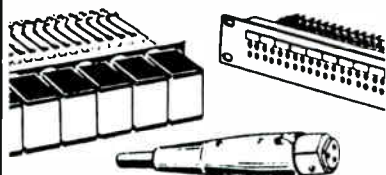
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