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# Radio World

RW's Directory  
of Suppliers.  
See pp. 1D-28D

Vol 18, No 1

Radio's Best Read Newspaper

January 12, 1994

## Symphony Recorded for Radio Broadcast

by Nancy Reist

**SAN FRANCISCO** It's unlikely that Beethoven or Brahms ever dreamed of the significant role digital technology would play in presenting their music to audiences.

But for the San Francisco Symphony, a Sonic Solutions digital audio workstation has become an integral part of the path between live performances and their distribution over the radio.

Jack Vad is broadcast recording engineer and producer for the San Francisco Symphony, and in April 1992, the symphony invested in a Sonic Solutions' system (with six 1.6 gigabyte drives), which runs on a Macintosh Quadra 900, to facilitate the production of the symphony's radio broadcasts.

### Nationwide

Currently, the symphony is broadcast locally in San Francisco on KKHI-FM and is syndicated nationally through WFMT(FM) in Chicago to about 400 stations. The symphony also is in the process of negotiating a deal to expand the radio broadcasts into Europe.

Vad has used the Sonic Solutions

system to produce these shows for a full symphony season now, and he said it vastly improves the efficiency of the editing process—a fact which is important for him because he works with tremendous time constraints. "We

thing gets edited and we're back in rehearsal schedule."

### Hard drive recording

Vad said that each performance is recorded directly onto a hard drive. One

she has enough redundancy to take into account for down time and try to minimize it. I cannot personally think of very many more horrible things than having to produce two shows in the same week because something went wrong technically."

Vad said he generally uses nine mics for a symphony and 14 to 16 for a performance with a choir and soloist at the symphony hall. The symphony mics hang 45 to 50 feet from holes in the six-inch concrete ceiling and pass through a 59-piece, individually-adjustable plexiglass canopy which the symphony recently installed as part of its acoustical renovations.

The dangling mics cannot touch any part of this canopy because each part has to be able to move freely. "It's sort of a two-tiered jigsaw puzzle from up there; you have to get it through the hole, and then you have to get it past the canopy," Vad said.

The signal from the symphony is routed through a Studer 962 console to the A/D converter of a Panasonic 3700 DAT which is used as a backup recorder. It is then fed to the Sonic Solutions system via the AES port on the 3700. Vad said he is satisfied with the resolution of the 3700 A/D converter for recording performances with audiences, but he would

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are essentially producing a CD's worth of finished material a week," he said. "We have four performances generally, and the following Tuesday every-

of the 1.6 gigabyte drives will store a normal symphony performance. "The reason we have six is (that) I wanted to allow room for one to fail, which hasn't happened, but at some point it will. I think anybody who is doing this quick a turnaround has to make sure that he or

## Radio Ad Sales Is a Craft to Be Perfected

by Bob Harris

**DALLAS** The people that make millions, professional athletes like PGA golfers, pro basketball or football players, are constantly practicing their craft. If you want to be a better radio salesperson and make more money at the same time, maybe you should practice a little too.

You should practice selling every day. Selling is a professional occupation, and the sales professionals in any field who are the most successful spend significant amounts of time studying and practicing.

Unfortunately in radio, many of us do not seem to have this same professionalism or work ethic. And it shows in the failure rate of new radio salespeople and in the sales turnover ratio at many stations.

### Practice, practice

Radio, by and large, trains its people poorly or not at all. Do you know that a new waitress at a Hooters Restaurant

must go through two weeks of training before serving her first order of wings or pitcher of beer?



How many radio stations in this country offer two weeks, or any, sales training (or practice) before putting a rookie out on the street? I guarantee you that the Super Bowl Champion Dallas Cowboys, and every other professional team, put its rookies through hundreds of hours of intense practice before ever putting them into a game.

### Radio excites

Radio is an exciting and innovative medium and that is what makes it fun to sell. Stations constantly have new things to sell: new packages, new promotions, new personalities, new programs. But all too often salespeople are given a "new" package in the morning sales meeting and told to go sell their biggest and best clients today.

This doesn't seem to make much sense, continued on page 15 ▶

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# NEWSWATCH

## Morgan to Receive Engineering Award

**WASHINGTON** The NAB will award its Radio Engineering Award to Charlie Morgan, senior vice president, and vice president of engineering of Susquehanna Radio Corp., at the 1994 NAB spring convention in Las Vegas.

Morgan has been instrumental in development of radio technology standards through his involvement in the National Radio Systems Committee (NRSC). Morgan's list of accomplishments include guidance of the AM transmission and receiver standards (NRSC, AMAX) and the recently adopted

Radio Broadcast Data System (RBDS) standard.

The NAB Television Engineering Award will be awarded to Thomas Vaughan, founder of Micro Communications, who has pioneered high power components and antennas for TV and radio. He also has been involved in the on-going high definition television (HDTV) standard development.

## Two Appointed to Open NAB Radio Board Seats

**WASHINGTON** The NAB filled two

open positions on its radio board of directors last month, by appointing Charles M. Hillier, vice president and general manager, WKQX-FM Chicago; and Mike Tyler, general sales manager, Jones Satellite Networks, Dallas.

Hillier will represent the radio board's District 17, which covers the entire state of Illinois. He succeeds Wayne Vriesman, vice president, radio group, Tribune Broadcasting Co., Chicago, who left the District 17 slot to become NAB joint board chairman last summer.

Tyler fills one of the three network seats on the radio board (joining William Hogan, president of Unistar Radio Networks, and Nancy Widmann, president of CBS Radio). He replaces Roy Simpson, who recently left Jones for another position.

Hillier and Tyler's terms end in June

1995. The next NAB joint board meeting is set for next week (Jan. 17-20) in Carlsbad, Calif.

## LBA Acquires Geleco RF Business

**GREENVILLE, N.C.** LBA Technology has acquired RF systems and the component business of Toronto-based Geleco.

Under the agreement, all Geleco RF manufacturing assets and inventory will be relocated to Greenville, and its operations consolidated with LBA's expanded facility.

Geleco produced antenna tuning units and RF equipment for the Canadian market for several years.

## Money Sought For DAB Testing

**WASHINGTON** The Electronic Industries Association (EIA) is seeking funds to offset costs of testing digital radio broadcasting systems, which was to have begun Dec. 31.

The EIA has sent out letters to members of DAR subcommittee and National Radio Systems Committee (NRSC) members asking for their share of the

continued on page 9 ▶

# A Little Bit of MAGIC...



## Revealed!

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# Subcommittee Requests Subcarrier Proposals

by John Gatski

**WASHINGTON** With the National Radio Systems Committee (NRSC) recent release of a request for proposals, a high-speed data standard seems to be on the fast track for 1994.

During the NRSC's December meeting, its high speed FM subcarrier subcommittee developed and released a request for system proposals that would standardize high speed data technologies, such as LVHS, an electronic map/direction finding technology. Proposals are due by February 15.

Action began in late 1993 on the high-speed technology, through formation of the subcommittee, to eventually produce a standard—similar to the Radio Broadcast Data System (RBDS) that went into effect earlier this year.

According to John Marino, NRS coordinator and NAB manager for technical regulatory affairs, "we (the NRSC) would like to see it (a standard) happen in 1994."

High-speed data subcarriers work similarly to RBDS, which is a 57 kHz broadcaster subcarrier that can transmit: radio text, billboard information, retail information via "smart" cards, format codes for station selection, and a more automated EBS.

However, the RBDS data rate is 1.2 kilobits per second (kbps) while some high-speed technologies reach 14-20 kbps, allowing quicker and higher capacity tasks, such as vehicle tracking.

With the request for proposals will come a number of issues to sort out. One of the biggest concerns about subcarriers, including RBDS, is the interaction with other subcarriers such as paging, stock reports, etc.

Marino said there really is no subcarrier standard, other than RBDS. "There are a

lot of custom, proprietary subcarriers on the air," he explained.

For example, the Cue Paging System subcarrier is not 100 percent compatible with RBDS—an issue that had to be worked out before the standard was adopted.

The following are conditions (or "goals" as the NRSC calls them) the high speed data subcommittee has placed on the request for proposals:

- RBDS compatibility
- Subcarrier transparency
- No unacceptable FM signal degradation
- Enable use of low-cost receivers/decoders
- Multiplexing capability with other services
- Useable in automobile environment

The proposal also calls for the modulation level to be able to accommodate an analog subcarrier.

Systems proposals must be submitted with technical subscriptions and specifications and a general narrative description. The transmitted signal description must include modulation, base band center frequency, base band frequency spectrum, subcarrier injection levels, subcarrier channel symbol rate, word synchronization, error correction/detection, latency, information bit rate, and potential interference. The NRSC also is interested in the operational capabilities of the proposed systems.

The NRSC plans to develop a testing plan for the proposed system that could have a standard selected by the end of the year.

All proposal submissions should be sent to John Marino: NAB, Science and Technology Department, 1771 N Street, N.W., Washington, DC 20036. The phone number is 202-429-5391 (Fax: 202-775-4981).

# Pioneer Commits to DAB

by James Careless

**OTTAWA, Canada** Canadian DAB pundits recently received the break they need to make L-band digital radio a practical reality; Japanese equipment manufacturer Pioneer Electronics announced it will produce consumer L-band digital radio receivers within the next few years.

The announcement comes on the heels of Pioneer becoming the first non-European manufacturer to join the Eureka-147 DAB project. This move gives it access to Eureka-147 technology, the same technology being used by the Canadians.

**Pioneer hopes to have prototypes available for use with these test sites sometime in 1995.**

"We feel that it's well-suited to both satellite and terrestrial broadcasting," said Samuel Dy, vice president of National Marketing for Pioneer Electronics of Canada. "We're hoping to see that there will be a world standard that will come out of this for the L-band."

Such a world standard would, of course, make the production of consumer L-band receivers commercially

feasible—something that the Canadian market, with a population of 26 million, cannot do on its own.

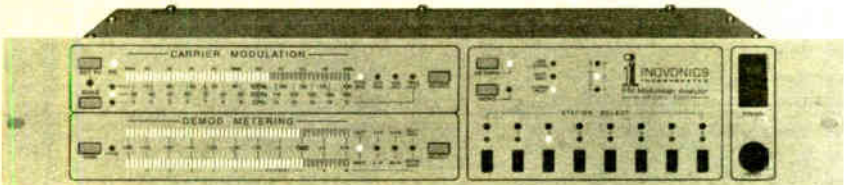
Still, Dy is cautiously optimistic about Pioneer's chances. With Canada, Mexico and much of Europe already committed to L-band as their DAB transmission bandwidth, he said "the market may well be big enough." Pioneer's announcement also might prompt Japan to take a closer look at L-band for DAB, he said.

For the Canadian consortium of government, public and private broadcasters, Pioneer's announcement could not have come at a better time. Through a new corporation—Digital Radio Research, or DRRI—the consortium is about to establish two permanent Eureka-147 DAB stations in eastern Canada early this year.

The first will be in Montreal, Quebec. It will be used in tandem with transmitters located at Rigaud and Saint-Sauveur to test the Single Frequency Network

continued on page 9 ▶

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# A Look Ahead to 1994's Big Events

**WASHINGTON** If Thanksgiving and Christmas are times for reflection, then the onset of January certainly must be for looking ahead. And what a year awaits radio. In our last issue, we summed up all the big stories for you and what we expect to happen in 1994.

Now I would like to fill you in on the goings-on at **RW** and some of the things you can expect to see in these pages. For openers, you will be receiving more



issues of **RW** in 1994. We are increasing our frequency of publication from 24x per year to 26x per year (every other week versus twice a month). If you study our editorial calendar for next year, you will see that *Running Radio* and *Studio Sessions* are now scheduled to run in alternate issues every time—no out-of-sequence scheduling.

In addition, we are continuing to add features to **RW** that are designed to help you improve the way you do business. Last time out we introduced *Tube Talk*, by John Diamantis.

This time out we're introducing a sales column for the *Running Radio* section, written by Bob Harris. Bob's 30-year involvement with radio sales includes stints at major market radio stations (Group W's Star 105 as well as KLIF(AM) in Dallas), grocery/vendor sales, newspaper sales (at the Miami Herald), program syndication sales (at TM Century 21 and Drake/Chenault), television sales, radio/direct mail

coupon book sales and currently, Professional Sports Marketing in Dallas.

Bob's column will give you practical guidelines and proven methods you can implement immediately in your sales efforts. Among the topics he will tackle: Making the Percentages Work for You; Win-Win Selling; Don't Stop Asking for the Order until They Say No; Selling with Ideas; Looking for Leads; 20 Sources of New Business; Phone Power; Getting a Better Sales ROI; Selling with Promotions; Do Your Homework First; and Become a Partner, Not an Adversary.

As always, I'd like to encourage you to write in with any comments, criticisms or suggestions.

Also on tap for 1994 is the continuing Contract Engineer's Forum, and a brand new Consultant's Corner (in the works, coming your way soon).

**RW** also will be featuring an increased number of field tests and product evaluations as part of *Studio Sessions*, *Features* and *Buyer's Guide*.

Ed Montgomery begins an eight-part course in this issue. Once again, the course is offered through the Northern Virginia Community College and you can earn Continuing Education Units upon its completion.

The revised course offers an introduction to the theory and practical applications of active electronic devices. The course will show examples of how the devices work as well as ideas on how to use them.

In this issue you will find **RW's** sourcebook of product suppliers. Find contact names, telephone and fax numbers, as well as brief descriptions (provided by the companies) of what each company has to offer. Keep the issue handy and refer to it all year.

Our "In-Depth" reports on pressing industry matters will continue to enhance the news section. Look for our

special coverage on "dueling algorithms" (this is a big one we will be tackling in two separate parts) coming up next.

The NAB spring convention will be held one month earlier this year (March instead of the usual April). Look for complete preview coverage in our second February issue, and complete post-show coverage in the second April and first May issues.

We will resume our "In-Depth" reports in May, with a list of topics that includes reports on RF Radiation, digital audio radio, industry consolidation, the state of the engineering profession in radio, **RW's** annual report on transmission, satellite radio and a close look at the Clinton FCC.

★ ★ ★

On page 6, we have once again published RBDS Roll-Call, an as-complete-as-possible list of radio stations that are on the air with the digital subcarrier as well as equipment manufacturers, receiver companies, distributors and service providers. **RW** intends to publish RBDS Roll-Call at least two more times in 1994.

★ ★ ★

Country music has been and continues to be a hot ticket. And with good reason. The industry boasts a wealth of talented musicians and a seemingly inexhaustible supply of fresh new voices and songwriters. Country radio stations, though, have always had it good when it comes to spreading the word about their format and getting together to brainstorm and strategize.

The Country Radio Broadcasters will present its 25th annual Country Radio Seminar, March 2-5, at the Opryland Hotel and Convention Center in Nashville, Tenn. Not only is the annual gathering a lot of fun (it is, I've been to a few) the level of support and friendship that exists between the artists and the broadcasters is unbelievable.

The four-day conference draws personnel from all sides of the business—stations, syndicators, networks, rep firms, suppliers, consultants and music industry executives. Both broadcasters and music industry-types know and understand each other's businesses and needs, and they are willing to work together. If yours is one of the large percentage of U.S. radio stations (23 percent, to be exact—see **RW**, Sept. 8, 1993 for complete format numbers) airing a country music format, you should consider attending the CRB and learning what synergy is all about.



James Goodman was named marketing manager and Lee Pomerantz was named national sales manager of Otari Corp. John Carey, vice president of sales and marketing, is leaving the company to take the post of vice president of marketing worldwide for E-MU Systems.

Goodman joined Otari in 1986 as regional sales manager and was promoted to national sales manager four years later. Goodman will oversee the company's marketing efforts. Pomerantz joined the company in 1989 as consoles product manager and later was named export sales manager. He will be responsible for managing North and South American sales.



Gowan

Tom Gowan was named vice president of marketing for Children's Broadcasting Corp. (CBC) and Radio AAHS. He formerly was vice president of new business development for the Minneapolis-based children's marketing company, Johnson Grossfield Strategic Planning Sales Promotion Agency.

Gowan will oversee the marketing and promotion efforts of the company and act as a resource to CBC affiliated stations.

James R. Collins was appointed ASCAP chief financial officer. Collins was formerly a vice president at the American Express Co.

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## READERS FORUM

If you have comments for Radio World, call us at 800-336-3045 or send a letter to Readers Forum (Radio World, Box 1214, Falls Church, VA 22041 or MCI Mailbox #302-7776). All letters received become the property of Radio World, to be used at our discretion and as space permits.

### Another look

Dear RW,

In your story on the new Emergency Broadcast System in the Oct. 13 issue, you referred to a technical memorandum by Dr. James L. Lansford of the Green Mountain Falls Group, prepared for Sage Alerting.

Dr. Lansford contends that near the FM receiver threshold an RDS signal would be superior to a similar signal in the main channel. Dr. Lansford says: "...if we want to use identical modulation schemes, such as BPSK to send data over an FM transmitter, and we had to choose whether to use the main channel or a subcarrier, a subcarrier would perform better in the fringe areas."

This appears to contradict TFT's findings that a main-channel signal is at least 20 dB (100 times) superior to a subcarrier signal.

Also in your article, (Sage President) Gerry LeBow claims that the Baltimore tests supported Dr. Lansford's findings.

After the Baltimore tests, Dr. Lansford visited TFT and observed first-hand TFT's tests which support our claim of 20 dB superiority over RDS. As a result, Dr. Lansford submitted a letter to the FCC to clarify his original Sage memorandum by stating the assumptions on which his analysis was based:

1. "Either a main-channel or a subcarrier signal is present, *but not both*."
2. "No pilot tone is present."
3. "For the equation that predicts post-detection SNR to apply, neither signal can have varying data modulation on it; in other words, the data stream must be all zeros or all ones."

Clearly these assumptions do not exist in actual FM broadcasting. Most stations do broadcast in stereo; have a 19 kHz pilot present along with L+R and L-R information, and have modulation constantly varying.

Not only has Dr. Lansford witnessed our findings that the TFT EIS in-band signaling is 20 dB stronger than RDS, but an independent engineering firm,

C.S.I. Telecommunications, has also observed and reviewed our test procedures and results.

In his letter to the FCC, Dr. Lansford states that his "study was very basic in its assumptions" and now refuses to endorse "a particular approach before a more complete analysis has been performed."

The evidence is clear: TFT's in-band signaling proposed for the new EBS is not only 100 times stronger than the RDS, but can be economically implemented by all media.

Joseph C. Wu, President  
TFT Inc., Santa Clara, Calif.

### Mailbag musings

Dear RW,

I can't believe this.

We signed up with the Electronic Industries Association (EIA) as interested in digital radio (DAR, DAB or what have you) so that we would receive their mailings, thereby keeping on the leading edge of this exciting new technology. We do not have anything significant to offer, but we want to know where the industry is heading.

This automatically made us members of the National Radio Systems Committee (NRSC) "DAB Subcommittee." We recently received a letter in the mail from the EIA's director of engineering, asking not for our ideas about digital radio, but for a contribution of between \$10,000 and \$40,000 (whatever we might have in petty cash?) to fund the EIA and/or the NRSC evaluation of proposed systems.

What does this say about digital radio in the U.S.?

James B. Wood  
President and Chief Engineer  
Inovonics Inc., Santa Cruz, Calif.

### Consider alternatives

Dear RW,

Due to the recent increase in LMAs and duopolies there has been a great deal of talk about how these changes in radio have affected all types of broadcasters, large- and small-market.

Many have lost sight of the fact that a lack in format originality is hurting radio, even in markets where there are no LMAs or duopolies.

Whether they are CHR, AOR or AC formats, there are just too many stations trying to emulate each other in the belief they will outdo their competitors. Too many station owners and programmers are afraid of originality.

Leaders take chances, followers abide by the norm and soon find themselves fighting for survival. I believe those who grasp change and run with it, whether it's adding sports or talk programming or taking a new view of the music they play, will be those leading successful radio stations in the future.

True, LMAs and duopolies are affecting the marketplace, but what better way for stations to differentiate themselves from the bigger operators than to be the leader with alternative programming.

Several years ago here in New York, a legendary radio station scrapped its format to become the country's first all-

## One Page Of a Long Story

Interested U.S. parties should not read too much into the latest news from the digital audio radio (DAR) front. Pioneer Electronics' decision to manufacture L-band digital receivers (see page 3), likely to be followed by similar announcements from other Japanese-owned consumer electronics companies, does not immediately affect efforts in this country to implement preferred in-band, on-channel (IBOC) technology.

On the surface, the Eureka coalition seems invincible: Japanese manufacturers building receivers for a European-developed system (Eureka 147) to be implemented first via satellite and terrestrial stations in Canada, forming an early North American toehold for out-of-band DAR.

It summons images of Canadians from downtown Toronto to the Yukon listening to clear, pure digital audio years before U.S. consumers give up cursing FM multipath and sundry forms of AM interference.

The reality is not that simple.

Pioneer says its first L-band receivers will be out, not tomorrow, not in six months, not next year, but within the next few years. In-band receivers could just as well be out simultaneously with L-band radios or soon afterward, assuming the current progress of in-band testing and development continues.

Also, just because Japanese companies build L-band radios does not necessarily mean that Japan and the rest of the Pacific Rim will all embrace Eureka for themselves. As of today, the world is still splintered on whether L-band, S-band or in-band (not to mention terrestrial or satellite) will be dominant.

That question will be answered when there are enough DAR receivers on the market to indicate consumer preference for one or more DAR approaches. Canada's 26 million consumers do not have the market power to affect global economies of scale, but 260 million in the U.S., still the world champions of consumer spending, do have that power.

With that said, U.S. broadcasters should not entirely close their minds to L-band for this country. In-band is not yet proven technology; Eureka is. L-band spectrum that was unattainable two years ago could be attainable two years from now. Political and technological realities change rapidly.

As this issue goes to press, the Electronic Industries Association/National Radio System Committee DAR tests are on schedule and set to begin in a few days. Eureka, two IBOC systems, an S-band and an in-band, adjacent-channel system will all be tested in 1994.

U.S. companies are free to run these tests at their own pace and decide which system or systems are best for this country without feeling undue pressure from outside.

—RW

sports station. Doves of programmers criticized the move and expressed extreme skepticism. Today WFAN(AM) is one of the top billing radio stations not only in New York, but the country.

The moral is obvious. Those who risk have more to gain than to lose.

Instead of complaining about how simulcast agreements and duopolies are

going to put some stations out of business, look for a way to be bigger without having to be as big. Alternative programming is not only what we as broadcasters need to survive, but it is what listeners are demanding as their choices become fewer and fewer.

Aaron Brodbar, Chief Engineer  
WEHM(FM) East Hampton, N.Y.

### Data Compression Survey

Many of the latest digital products—such as recording and storage systems, digital audio workstations, STLS, telephone links and satellite program services—are programmed to reduce the amount of data sent over channels routed within the studio or between studios before airing. **RW** invites station managers and engineers to share their experiences with these digital "compression"—sometimes called "data reduction"—systems.

1. How many digital products using compression systems (such as MUSICAM, SEDAT, apt-X) do you currently use? (Please list them.)

2. Some studies suggest that noise and audio distortions are created when two incompatible compression systems—often referred to as "dueling algorithms"—are linked in the studio chain. Have you or other station personnel ever detected noise you believe was caused by dueling algorithms?

3. Have you ever received listener complaints about noise you believe to be caused by dueling algorithms?

4. If you had it to do over, would you purchase your current compression equipment and services again? Why or why not?

5. How do you perceive the problem of dueling algorithms—Very serious? Somewhat serious? Not very serious? No problem at all?

Also feel free to offer comments on any other aspect of digital systems and data compression.

Responses may be used in an upcoming "In-Depth" **RW** report. Please indicate whether your name and/or station affiliation should be used in the report.

Send responses by Jan. 28, 1994, to the attention of Randy Sukow, **Radio World**, 5827 Columbia Pike, #310, Falls Church, VA 22041; or fax 703-998-2966 or 998-8505.

# Radio World

Vol. 18, No. 1

January 12, 1994

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Radio World (ISSN: 0274-8541) is published bi-weekly by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. Copyright 1994 by Industrial Marketing Advisory Services, Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of  
**Radio World**  
January 26, 1994

# RBDS ROLL CALL

The following is **Radio World's** quarterly listing of RBDS stations, equipment and receiver manufacturers, and service providers. If you would like to be included in the next listing, contact John Gatski at 703-998-7600.

## RBDS Equip. Manufacturers/Distributors

### AEV

Via Saviolo I/E  
40017 Le Budrie  
Di S. G. Perisceto  
Bologna, Italy  
+49-51-95-02-01/95-02-49

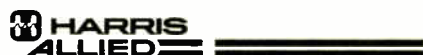
### Broadcast Electronics

4100 North 24th St.  
P.O. Box 3606  
Quincy, Illinois 62305  
Contact: David White  
217-224-9600  
Circle Reader Service 18



### Harris Allied

3712 National Road West  
Richmond, Indiana 47374  
Contact: Scott Beeler  
800-622-0022  
Circle Reader Service 211



### Modulation Sciences

12A World's Fair Drive  
Somerset, New Jersey 08873  
Contact: Art Constantine  
908-302-3090  
Circle Reader Service 126

modulation sciences

### RDS Diagnostix

74 Hanover Road  
Mountain Lakes, New Jersey 07046  
Contact: Boyd Baker  
201-334-7858

### RE America, Inc.

31029 Center Ridge Road  
Westlake, Ohio 44145  
Contact: John Casey  
216-871-7617



### Circle Reader Service 101

### Rohde and Schwarz

4425 Nicole Drive  
Lanham, Maryland 20706  
Contact: Chris Porzky  
301-459-8800



### Circle Reader Service 25

### SCA Data Systems

Suite 350  
225 Arizona Avenue  
Santa Monica, California 90401  
Contact: Corinne Weber  
310-576-0655



### Circle Reader Service 201

### Tectan

Box 27157  
Concord, California 94527  
Contact: Judi Pendleton  
800-TECTAN-1



### Circle Reader Service 137

### Teli AB

14980 Nunashamn  
Sweden  
Contact: Marc Roman  
+46-8749-6600

### VG Electronics

Theaklen Drive Hastings  
East Sussex TN34 1YO  
England  
Contact: Bev Marks  
+44-424-446888

## RBDS Receiver Manufacturers

### Access (Paging)

6620 Riverside Drive, Suite 200  
Metairie, Louisiana 70003  
Contact: Bobby Adams  
504-889-9800

### Denon (Car/Home)

# DENON

222 New Road  
Parisppany, New Jersey 07054  
Contact: Stephen Baker  
201-575-7810

### Circle Reader Service 98

### Grundig (Portable)

3520 Haven Ave.  
Unit L  
Redwood City, California 94063  
415-361-1611

### Onkyo (Home)

200 Williams Drive  
Ramsey, New Jersey 07446  
Contact: Fred Maxik  
201-825-7950

### Terrapin (GPS)

11958 Monarch Street  
Garden Grove, California 92641  
Contact: David Kelley  
714-898-8200

## RBDS Service Providers

### Access (Paging)

6620 Riverside Drive, Suite 200  
Metairie, Louisiana 70003  
Contact: Bobby Adams  
504-889-9800

### DCI (Global Positioning)

20045 Stevens Creek Boulevard, Suite 2A  
Cupertino, California 95014  
Contact: Ron Haley  
408-446-8350



### Circle Reader Service 131

### Coupon Radio (Information Services)

10 Rockefeller Plaza  
New York, New York 10020  
Contact: David Alwadish  
212-595-1313



### Circle Reader Service 204

### Sage Alerting (EBS)

700 Canal Street  
Stamford, Connecticut 06902  
Contact: Gerry Lebow  
203-357-1464

### Specialized Communications

(Music Billboard)  
1638 153rd Ave. SE  
Bellevue, Washington 98007  
Contact: Allen Hartle  
206-641-9043



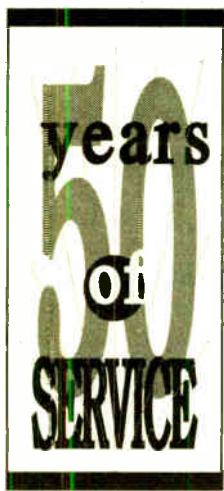
### Circle Reader Service 141

# RBDS Stations

Station	Frequency	City
<b>California</b>		
KLON-FM	88.1	Long Beach
KTWV-FM	94.7	Los Angeles
KNPR-FM*	88.1	Ridgecrest
KSFM-FM	102.5	Sacramento
KPBS-FM	89.5	San Diego
KEAR-FM	106.9	San Francisco
<b>COLORADO</b>		
KMJI-FM	100.3	Denver
<b>FLORIDA</b>		
WTMI-FM	93.1	Miami
<b>GEORGIA</b>		
WSTR-FM	94.1	Smyrna
<b>ILLINOIS</b>		
WXRT-FM	93.1	Chicago
WLS-FM	94.7	Chicago
WFMT-FM	98.7	Chicago
<b>INDIANA</b>		
WSHW-FM	99.7	Frankfort
WZPL-FM	99.5	Indianapolis
WZWZ-FM	92.7	Kokomo
WWKI-FM	100.5	Kokomo
<b>LOUISIANA</b>		
WGGZ-FM	98.1	Baton Rouge
KFXV-FM	96.7	Morgan City
WLMG-FM	101.9	New Orleans
WMYZ-FM	95.7	New Orleans
KCIL-FM1	07.5	Houma
<b>MASSACHUSETTS</b>		
WGBH-FM	89.7	Boston
WBOO-FM	104.9	Gloucester
<b>MARYLAND</b>		
WHFS-FM	99.1	Annapolis
<b>MICHIGAN</b>		
WIOG-FM	102.5	Bay City
WLLZ-FM	98.7	Detroit
WKQI-FM	95.5	Detroit
WJLB-FM	97.9	Detroit
WORS-FM	105.1	Detroit
WKAR-FM	90.5	East Lansing
<b>MINNESOTA</b>		
KBEM-FM	88.5	Minneapolis
<b>NEW MEXICO</b>		
KKOB-FM	93.3	Albuquerque
<b>NEVADA</b>		
KKLZ-FM	96.3	Las Vegas
KNPR-FM	89.5	Las Vegas
KNPR-FM*	88.7	Boulder City
KNPR-FM*	91.7	Beatty
KOMP-FM	99.3	Henderson
KNPR-FM*	88.7	Indian Springs
KNPR-FM*	89.5	Laughlin
KNPR-FM*	88.7	Moapa Valley
KNPR-FM*	88.7	Pahrump

Station	Frequency	City
<b>NEVADA CONT'D</b>		
KNEV-FM	95.5	Reno
KNPR-FM*	88.1	Scotty's Junction
KNPR-FM*	105.1	Searchlight
KLUC-FM*	98.5	Las Vegas
KFMS-FM	101.9	Las Vegas
KEYV-FM	93.1	Las Vegas
KRRI-FM	105.5	Las Vegas
KOMP-FM	92.3	Las Vegas
KEDG-FM	103.5	Las Vegas
KFBI-FM	107.5	Las Vegas
KYRK-FM	97.1	Las Vegas
KLNR-FM*	91.7	Panaca
KTPH-FM*	91.7	Tonopah
KEYV-FM*	103.5	Laughlin
<b>NEW YORK</b>		
WHTZ-FM	100.1	New York
<b>OHIO</b>		
WOUB-FM	91.3	Athens
WVXU-FM	91.7	Cincinnati
WWNK-FM	94.1	Cincinnati
WGAR-FM	99.5	Cleveland
WENZ-FM	107.9	Cleveland
WLTF-FM	106.5	Cleveland
WKKO-FM	99.9	Toledo
WGTE-FM	91.3	Toledo
WOUZ-FM	90.1	Zanesville
WGLE-FM	90.7	Lima
<b>PENNSYLVANIA</b>		
WRTI-FM*	97.1	Allentown/Bethlehem
WNCE-FM	101.3	Lancaster
WFLN-FM	95.7	Philadelphia
WRTI-FM	90.1	Philadelphia
WPLY-FM	100.3	Philadelphia
WDUQ-FM	90.5	Pittsburgh
WRTI-FM*	97.7	Reading
<b>TENNESEE</b>		
WYPL-FM	89.3	Memphis
<b>TEXAS</b>		
KNLE-FM	88.1	Austin
KAYD-FM	97.5	Beaumont
KQXY-FM	94.1	Beaumont
KKMY-FM	104.5	Orange
KYKR-FM	93.3	Port Arthur
<b>UTAH</b>		
KSOS-FM	106.9	Ogden
KSOS-FM*	92.1	Salt Lake City
KSOS-FM*	96.7	Salt Lake City
KSOS-FM*	98.3	Utah County
<b>VIRGINIA</b>		
WLTY-FM	95.7	Norfolk
WNVZ-FM	104.5	Norfolk
WKOC-FM	93.7	Virginia Beach
WCDX-FM	92.7	Richmond
<b>WASHINGTON</b>		
KUOW-FM	94.9	Seattle
KMPS-FM	94.1	Seattle
KRPM-FM	106.1	Tacoma

\*translators



NATIONAL RELIGIOUS BROADCASTERS

# National Religious Broadcasters Preview

## Convention Returns to Washington

by Randy Sukow

### WASHINGTON

The National Religious Broadcasters (NRB) annual convention returns to Washington later this month (Jan. 29-Feb. 1, at the Washington Sheraton Hotel) after holding its 1993 show in Los Angeles.

By choosing Washington as the most frequent site for its conventions, NRB has been able to attract U.S. presidents and several other prominent politicians to speak at its gatherings.

(Former Iran-Contra figure and possible 1994 Virginia Senator Oliver North and

Colorado Republican Senator Dan Coats are among this year's speakers).

For a handful of radio equipment companies, however, NRB's attraction is access to a hard-to-reach niche of small-market radio broadcasters that do not regularly attend the National Association of Broadcasters spring convention and the fall NAB Radio Show.

Less than a dozen radio equipment exhibitors are on this year's NRB exhibition as of mid-December. (See list below.) Most companies attending are traditionally program distributors, especially for religious programming.

But those equipment exhibitors that are attending tend to be long-time participants in the show, which has been held annually for 50 years.

"Some of the big (religious broadcast) players are at NAB, but 95 percent of

these people are not," said Jonathan Clark, marketing manager, Shively Labs, Bridgton, Maine. In fact, Shively found it worth spending the extra money to exhibit at last year's West Coast convention, "which to us was a big deal," Clark said.

(Next year's NRB show will be held in Nashville and the 1996 show will be in Indianapolis. The first International NRB convention in Jerusalem is set for 1996.)

Other regulars from the East Coast, such as QEI Corp., Williamston, N.J., bowed out of last year's show because of the distance. But whenever it can, QEI makes NRB a priority.

"Many facilities are no longer owned by people who are interested in just being in radio. They have bought radio stations as investments," QEI's Jeff Detweiler said. "At the NRB, there are still the old-guard broadcasters who are in it because they love it."

In fact, NRB may become a higher priority for QEI than the NAB Radio Show. Beginning next fall, the annual Radio Show exhibition will be folded into the new "World Media Expo," in cooperation with the Society of Motion Picture and Television Engineers (SMPTE), Society of Broadcast Engineers and Radio-Television News Directors Association.

QEI will send representatives to attend the 1994 Radio Show sessions and related activities, but might not set up a booth, Detweiler said: "Attendance from SMPTE does nothing for us."

Buying patterns among religious broadcasters do not differ greatly from the rest of the radio industry, most companies say, although they sometimes do need especially high-quality, durable equipment, said Bill Ammons of Circuit Research Labs (CRL), Tempe, Ariz., which does

significant business with religious broadcasters.

"They tend to buy things that work very well because they often locate their transmitter sites in interesting places like Sri Lanka, Nigeria or Botswana. They need quality gear that's not going to break down," Ammons said.

Most exhibitors will be showing their basic lines at NRB, with emphasis on a few specific items.

**NRB's attraction is access to a hard-to-reach niche of small-market broadcasters.**

Shively will show its line of FM translator antennas. "A lot of the (religious station) groups, like American Family Association, are the biggest users of translators in the country right now," Clark said.

Broadcast Electronics, Quincy, Ill., will feature the AudioVAULT 100 digital audio storage system; the AirTrial 90 console, and various FM transmitters.

QEI's AUTO-MOD automatic gain control system, introduced in prototype form at NAB 1993, has just become available for shipping. NRB will be the first showing of the finished product. The system lists for \$1,295, but is currently being sold at an introductory price of \$1,000.

ATI—Audio Technologies Inc., Horsham, Pa., will show its NANOAMP Series, which includes a three-channel mixer and four-input companion expanders.

CRL will have its radio broadcast data service (RBDS) generators and AM-FM stereo processing equipment. Ammons predicted that RBDS sales to broadcasters will jump noticeably in the second half of 1994 after

## NRB Exhibitor List

Acrodyne Industries Inc.	1815	Dayspring Greeting Cards	922
American Bible Society	1126	Destiny Image Publishers	623
American Center for Law & Justice	217	Disc Makers	1820
American Church Lists	2203	The Domain Group	721
American Life League	123	Dream Fund Outreach	1718
AMI Publishing/Religion Magazine	603	ECFA	1400
Arrowhead Springs		EFT Corp.	1900
Christian Conference Center	1905	Encyclopedia Britannica N.A.	1908
ATI—Audio Technologies Inc.	627	Exodus International	2114
B.A.C. & Associates	915	Factory Direct Sales	2108
Baker Book House	1118	Faith Printing	2100
Barbour & Co.	1214	Family Entertainment Network	1605
Benefund Inc.	1916	Family Net	203
Bethany House Publishers	706	Family Research Council	718
Breakthrough with Rod Parsley	300	Fellowship for the Performing Arts	621
Bremner-Davis		Fetal Teaching Systems	720
Educational Systems	1717	First American Monetary Cons.	1115
Brentwood Music	1711		
Bridge Publishing	1712		
Broadcast Electronics	2007		
Broadman & Holman Publishers	1915		
Cablewave Systems	2105		
Cambridge University Press	704		
Campus Crusade for			
Christ International	1905		
Candle Network	1818		
CBN International	250		
CBN Travel	509		
CBSI (Custom Business Systems)	714		
C&D International			
Pocket Pak Albums	1806		
CDR Communications	529		
The Central Message	423		
Children's Sunshine Network	525		
Christ for the Nations	507		
Christian Aid Mission	1219		
Christian Brotherhood Newsletter	1226		
Christian Coalition	2013		
Christian Duplications			
International	1327		
Christian Legal Society	1317		
Christian Television Network	229		
Circuit Research Labs	2112		
City Alive Productions	525		
Computer Prompting Corp.	2001		
Concerned Women for America	323		
Cornerstone Financial Services	601		
Cornerstone TeleVision Inc.	1221		
Crossway Books	1115		
Crown International	1319		
CRT Custom Products	200		
Dataworld	2106		

continued on page 8 ►

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# NRB Returns to East Coast

► continued from page 7

more consumer receivers begin appearing in stores. "We've had a lot of inquiries, but we haven't had a lot of orders," he said. "Most people I've talked to are going to wait until this summer to start purchasing."

Over 7,000 are expected to attend the convention, about the same as last year in Los Angeles and other recent Washington conventions. Estimates are based on attendance on the exhibit floor as well as the concurrent sessions, dinners and Christian music concerts connected with the convention.

Radio sessions will deal with sales, promotion, programming, personnel and other topics for commercial religious stations. Two sessions will also focus on non-commercial station needs, and one will deal with Spanish-language religious stations.

A session on emerging broadcast technologies will be held Monday morning, Jan. 31.

There also will be sessions on legal issues, including music licensing litigation and the latest FCC actions. Among the hot legal issues expected to be raised is the latest Congressional effort to codify the "fairness doctrine." Religious broadcasters have been among the most vigorous opponents of the doctrine over the past year.

# NRB Exhibitor List Continued

► continued from page 7

Founders Inn & Conference Center	217	KMA Companies	402	Southern Baptist Convention	1603
Fowler Productions		LATCOM/EPLABOL	1227	Radio Systems Inc.	609
General Electric	1612	LeSea Broadcasting	115	Rainbow Study Bible Ltd.	1321
Friendship/Lion of Judah Tours	1902	Liberty Counsel	1014	Rapha Treatment Centers	1813
Gentronix	1913	L.I.F.E.	617	Redeeming Love Christian Center	1805
Gold Eagle Financial Services	825	Life Issues Institute	1114	Regency Communications	1912
Good News Radio Network	2014	Lifeline Communications	1814	Regent University	217
Gospel Light/Regal Books	1906	Light Warrior Press Ltd.	2111	Response Unlimited	1506
Harrison House Publishers	1700	The Lockman Foundation	1023	Rick Amato Ministries	1913
Hartline Marketing	619	Maranatha! Music	1218	The Rutherford Institute	700
Harvest House Publishers	1311	Maranatha Tours Inc.	1911	SAIC-Information	
He Intends Victory	503	Marketing Solutions	1816	Displays Systems	1601
Hendrickson Publishers	1714	Master Software Design	1716	Salem Communications	103
High Adventure Ministries	517	The Masters Planner	2113	The Salvation Army	815
Historical Reproductions	2012	Max Greiner Jr. Designs	513	Samaritan's Purse	921
Home Entertainment Network	217	Mercy Ships	919	Shively Labs	2109
InfoCision Management Corp.	1705	Messenger	917	Soma Communications	1023
Inspiration Cruises & Tours	1421	Messianic Minutes	513	Sound of Life Communications	607
Integrity Music	521	Metro Magnetics	2011	Spectrotape Corp.	600
International Bible Society	1811	Micro Technology Unlimited	201	Spoken Word of God	1222
International Cassette Corp.	1617	Mighty Eagle Travel	825	Straight Talk from Teens	1121
International Press Association	1812	Moody Press	2210	Strang Communications	2211
International Russian Radio/TV	505	Morningstar Radio Network	429	Superior Electric	1514
InterVarsity Press	1215	Mountain Lake Ranch	2209	Thomas Nelson Publishers	816
Israel Bonds	1010	MSE Video Tape Services	1914	The Timothy Group	1713
Israel Ministry of Tourism	703	The Name People	1223	Three Angels Broadcasting	1512
Israel National Parks Authority	1510	National Day of Prayer	1217	Trans America Marketing Services	501
Jeremiah Films	1812	National Supervisory Network	2208	TransAmerica Video	1719
Jesus Cares Ministries	1016	NavPress	611	Tri-West Insurance Services	1400
JESUS Film Project	1905	New Heritage USA	1315	Turning Point Productions	2005
Jews for Jesus	726	New Inspirational Network	309	Tyndale House Publishers	1210
John Hagee Ministries	417	NewLife 2000	1905	United Christian Broadcasters Ltd.	1619
Jubilee Ministries	511	N.F.T.A. Publishing	1715	Upward Way Publications	2206
Keith Austin Enterprises	2205	NORRA Communications Group	1622	USA Radio Network	209
		NORSTAR/Keystone		VCY/America Network	629
		Insp. Network	1505	Victor Books	821
		NPR Satellite Services	1702	Vida/Life Publishers	1611
		NTS Corp.	2116	Video Plus	1517
		POC Broadcasting	1508	VU Videos Inc.	1615
		Prompt Mailing Service	819	WACX TV Super Channel 55	223
		PROvisions	1212	Walk Thru The Bible Ministries	1020
		QEI Corp.	2107	WGGG TV 16	2100
		Questar Publishers	715	Women Today International	1905
		Radio & TV Commission of the		Word Inc.	826

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# Pioneer's DAB Radios

► continued from page 3

(SFN) concept, which, in its simplest form, checks the capability of the Eureka-147 receiver to "pick and choose" from same-frequency signals broadcast from different sites. The second station will be in Toronto.

Pioneer hopes to have prototypes available for use with these test sites sometime in 1995. Then, said Dy, "within two years' time from the prototype, we should be able to come up with some kind of consumer-related product."

## Traditional looking

Dy predicted that the Pioneer consumer digital radio will at first look like a traditional AM/FM radio, only enhanced with a digital band. He based his assumption on the fact that the transition from analog to digital isn't going to be instantaneous.

## NEWSWATCH

► continued from page 2

money. The EIA estimates that the subcommittee members, made up of various companies, need to contribute \$10,000 to \$40,000 each.

The subcommittee members' contribution would total about half of the estimated \$600,000 needed to conduct the test at the NASA Lewis Research Center in Cleveland. The rest is supposed to be shouldered by the five system proponents, the NAB and EIA itself.

According to the EIA, the NAB already has agreed to pay its share as have the five systems proponents.

## Spectrum Allocated For MSS Services

**WASHINGTON** The FCC has allocated 33 MHz of spectrum for the mobile satellite service (MSS), allowing for development of several new services including personal locators, data messaging, and expanded cellular telephone service.

The frequencies, 1610-1626.5 MHz and 2483.5-2500 MHz were allocated for MSS at the 1992 World Administrative Radio Conference (WARC). The allocation makes no distinction between geostationary and non-geostationary satellite services.

## SBE Seeking Conference Papers

**INDIANAPOLIS** The Society of Broadcast Engineers (SBE) is accepting engineering abstract papers for the 1994 Engineering Conference to be held Oct. 12-15 during the World Media Expo in San Francisco.

The SBE technical conference is designed to address the hands-on needs of engineers and technical managers at radio and television stations, post production facilities and corporate video centers.

Those interested in preparing a technical paper for presentation at the conference should submit the abstract no later than March 1. Interested parties also should relay their interest in being participant on any sessions panels.

Send correspondences to: SBE Engineering Conference Chair, SBE, 8445 Keystone Crossing, Ste. 140, Indianapolis, IN 46420

Interestingly, Dy said that "digital" definitely means L-band and L-band only. As for other frequencies being added, "it's too early at this stage" to tell. Although Pioneer's strength is in car audio, it is not yet clear whether its consumer digital receivers will be mobile, stationary or both.

Reaction from Canadian L-band proponents has been nothing less than ecstatic.

"Broadcasters laud Pioneer's early move to digital radio," said a press release from the Canadian Association of Broadcasters (CAB), which represents Canada's private stations.

"This is a major breakthrough for the

Canadian initiative," said another release by the publicly owned CBC.

"Everybody has been looking to see what the Japanese are going to do in terms of moving into digital radio," said CAB Technical Advisor Wayne Stacey, who has been involved with the Canadian DAB effort from the start. "Having an endorsement like this certainly helps the position that Canada has been pushing."

## Rumors abound

Rumors abound, meanwhile, that Kenwood is going to be next, and that Sony also is interested. "I think there's probably a chance that other Japanese companies will come onside now that the Pioneer move has taken place," Stacey said.

Dy agreed: "I think there are other

Japanese manufacturers who will soon become members of the Eureka consortium."

Still, a key question remains: How will Pioneer's move affect the U.S. in-band initiative, one which Canadians like Stacey would admittedly like to see supplanted by L-band?

"I think that it can only have a beneficial effect in that regard," he said. "We think that we're on the right track here, and that when the broadcasters there see what can be done using this kind of technology and what can be accomplished in the way of coverage at L-band, they will see it to their advantage to take that approach."

□ □ □

*James Careless reports on radio in Canada for RW.*

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# Where Radio Production Is Heading

by Ty Ford

**BALTIMORE** Predicting the near future of the technical state of audio production for radio stations and independent facilities is easy. Having reached the middle of the "digital decade" (1988-1998), you can expect the next five years to be paved with digital audio (24 bit or higher), computer chips that get faster and faster, increased storage and networking capabilities.

Analog and digital proponents will remain in a mutual death grip, each one bad-mouthing the other. Companies, in addition to Apogee which already has a

head start, will bring A/D converters to the market with circuits that will more closely simulate analog sound.

The staunchest of analog followers, however, will continue to cling to Dolby SR and other noise reduction systems. The largest growth, however, will be in the number of people who use both digital and analog equipment. To them, combining tube mics and analog preamps with digital recorders and editors offers the best of both worlds.

## Cross-platform

Cross-platform and cross-application digital audio file compatibility will be

one of the more interesting developments to watch. The over 260 organizations that have pledged allegiance to Avid's Open Media Framework (OMF) will find out if they really can adhere to a singular file standard. My bet is that there will be degrees of compatibility, especially among the larger manufacturers who have already invested a lot of time and money in the development of their own file specifications.

The funny thing is, while everyone agrees that compatibility is a proper goal, there aren't that many situations in a production studio where this kind of file transfer is really that important. The exception being those situations in which you might need to send a multi-track production to another studio with a different system, or if you're doing some sort of multimedia production which requires that you move files from one application to another to get the job done.

At present, the former problem can be solved by using any of the proven digital multi-track linear tape formats. As for the latter, my hunch is that, as the field of multimedia matures, the software developers will add features to their applications so that you won't have to use multiple applications to get the job done.

Peavey's Mediamation software configurable DSP cards, LoneWolf's Media-Link and further development of the General (MIDI) Musical Instrument Digital Interface spec will also offer the potential to greatly increase the interconnectivity of production studio equipment.

We're headed back to studio equipment with more dedicated controls, but since I know we're going to see an increase in the number of adjustable parameters, the ratio of controls per parameter will either stay the same, or decrease. We'll see even more of the complex systems offering several access levels. The first level allows control of 50-60 percent of the parameters with the dedicated controls.

As a safety precaution, additional "expert" levels require a password before their parameters can be altered. Once access is gained, the dedicated controls become "soft" and change depending on the design.

## Workstations

You would think that with over fifty-two different devices calling themselves digital audio workstations (DAW), there wouldn't be room for more, but there will be more. Old and revered manufacturers of linear multitrack recorders and cart machines will either adapt or continue to lose ground. Just as the Alesis ADAT and Tascam's DA-88 are cutting the bottom out of the market, random access video/audio systems like the ImMix Videocube with one hour of video and two hours of eight-track digital audio, configured as four stereo pairs for only \$38,500, will make audio buyers think twice or even three times about what they buy.

Look for audio workstations in the \$30,000-\$40,000 range to tumble down to the middle and upper twenties, with similar reductions in other ranges.

Will this be the year that cart machines die? No. They'll be around as long as parts, cart shells and tape stock are available at a cost lower than that of their dig-

ital replacements. Remember there are still pick-up trucks with eight-track tape machines out there.

## Cart machines

Digital cart machines offering a combination of better price, performance, media-cost and no data compression will continue to eat away at the cart machine market. Fostex, Panasonic and Sony, each of which has an instant start feature on their DAT machines, will be slugging it out for supremacy.

In the re-recordable disk quadrant, someone will come up with a data reduction scheme that begrudgingly will be accepted by 80 percent of the market. At about the same time, however, someone else will bring to market a cart system with acceptable price/storage figures that doesn't require data reduction or compression. Another marketing war will ensue.

Larger multistation digital systems capable of handling entire play lists, commercials, promos and production will seek more ways to satisfactorily demonstrate fail-safe redundancy, audio quality and ease of maintenance along with the right price in order to push the older heavily-entrenched studio hardware out of the way.

## Digital codecs

Hopefully, the manufacturers of digital codec systems will wake up to the fact that they would all be selling a lot more units if all makes and models were compatible with each other. Until then, or until the prices come down, this technology will be bought by studios that have clients willing to pay for the extravagance of the line charges and tying up two studios.

Another application of this technology is the ability of a recording studio to send finished spots via modem and without data compression to stations. This would be a tremendous time saver for account executives who now spend a good percentage of their time picking up dubs. These transmissions could be programmed to be sent during the day or overnight. Where multiple markets are bought for a spot run, a system of service bureaus would be setup, one in each market.

The originating studio would modem the spot to each service bureau outside of the local calling area, which would modem the spot to the appropriate stations in its own market. If all codecs were compatible, this could happen very quickly. TV and FM audio subcarriers could also be used to form a distribution system.

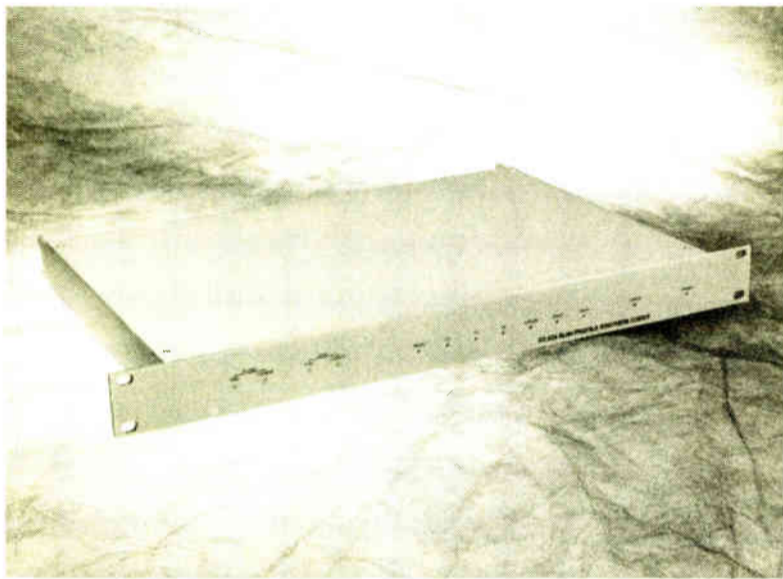
Finally, having planted the seeds for the Virtual Reality Studio during last year's NAB engineering sessions, I'm waiting for signs of life. Instead of going into a control room full of noisy, heat-generating equipment, you'll be able to put on the studio visor and a pair of techno-gloves to operate the console of your dreams.

Imagine a console that you can literally walk through to get to the knob you need to tweak. No more console reflectance problems, just you and your visor and gloves in an acoustically perfect room.

If the last half of the digital decade is anything like the first, we're all in for a wild ride. Put on another pot of coffee and don't forget to fasten your safety belt.

□ □ □

Ty Ford's "Advanced Audio Production Techniques," is available by calling 800-366-2665.



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The MODEL 300, workhorse of the broadcast industry for thirty years, this cartridge is intended for monophonic use at standard recording levels.

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### Magnetic Erasers

The DYNAMAX ESD10 uses dual full-track erase heads to ensure deep cart erasure of 75 dB or more. The patented splice detector which requires no sensitivity adjustments rapidly locates the splice and positions it perfectly before recording.

The BLANK-IT hand held eraser is molded of rugged plastic for light weight, easy to handle, quick and accurate tape erasing in any setting.

The MODEL 400 table-top eraser features a hardwood case, scuff resistant laminate top and removable aluminum pivot pin permitting erasure of audio, video or computer tape reels up to 11 inches in diameter x 1 inch wide.

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Fidelipac offers CARTRIDGE STORAGE SYSTEMS in numerous configurations including a 25 slot vertical wall rack, a 200 slot mobile carousel rack mounted on heavy duty casters, and table-top units which hold 96 cartridges or up to 48 cartridges (as shown above).

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In addition, other useful accessories (not shown) include alignment cartridges and precision gauges for head insertion and right angle zenith calibration.

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# San Francisco Symphony Recording

► continued from page 1

prefer a different converter for a more formal recording session with a quieter empty house.

## Multiple edits

Vad has one day to prepare the final radio program each week, which he said generally will contain between 60 and 90 edits. The conductor gives him a paper edit of what aspects of which performances he or she wants to use for the final composite radio show and he works from that.

"So for example, if you need to sneak a different ambience under your voice

track to facilitate a segue to different material, you can adjust the rate of fade-in at the joint to be much greater than the fade out. This, of course, would be impossible with razor blade editing since what you are really doing is an edit without mixing."

Vad sits with a score and puts the show together while he's monitoring the rehearsal for the following week's performance. If he hears something interesting in the rehearsal, he stops producing so he can listen more closely. "That's another thing that's neat about the Sonic system. It has a text function for all your edits, so if you stop you can

figure out where you were just by looking at the text, because the text tells you the last edit you did was from Friday

**The Sonic Solutions digital audio workstation has become an integral part of the path between live symphony performances and distribution over the radio.**

from this point to this point."

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variable crossfade points with curves that are adjustable. Vad said this aspect of the program is very important for making seamless transitions.

"So, for example, with material coming in, you can have a slow fade of about 12 seconds while the voice track material is

going out in about six seconds. The reason is because the ambience from one mic to the other is different so this slowly brings in the ambience underneath the voice, but your ear can't detect it.

"So by the time it gets here, you're basically hearing this ambience—not the ambience that's in the original track. That particular area of the software is by far the best that I know of. My feeling right now is that if you are involved in serious music editing, probably the Sonic software is unbeatable."

## Archiving to DAT

Vad said the new setup also is more efficient for storage space. "It finally archives on DAT, so we are saving incredible storage space. I think the ratio is somewhere about 37 to 1 if you look at two reels of analog 1/4 inch at 7.5 ips. So they like that a lot. The tape cost is cheaper obviously than analog."

Drive noise presented a potential problem with the system because the drives are kept in the control room. Vad designed a cabinet with baffles to contain them. The cabinet is vented at the back and brings air in at the bottom. This dramatically reduces the noise.

Vad said the electrical layout needed to be planned carefully. They use a Topaz line conditioner to protect the system from external AC problems. "This room has a complex amount of wiring for the size of the room and the amount of the material that's in it, and you just have to be careful about airborne electromagnetic problems," Vad said. "You have to be careful about layout and grounding. In the digital world I've found that you do have to be careful about shielding. It's not as foolproof as many of us thought it was initially, but once you pay attention to those things it's okay."

After a year of working with the Sonic Solutions system, Vad said he can confidently recommend it. "When I think of analog I think of our recordings when they were 7.5 ips Dolby SR. So we weren't worried about noise, but I would be sitting there on headphones and all of a sudden I'd hear a slight little drop out or something on one channel because of whatever oxide thing was happening at that particular time. Maybe some shedding was occurring on the tape. I'd think 'I am going to have to go back and dub that over and the time that was involved.'

"Now I don't have to worry about any of that stuff," Vad added. "That's not to say that I don't anticipate that at some point we'll have some digital disaster, but that just goes with the territory. At some point, something will crash and then we'll have gotten it out of our system and we'll have a vast stretch of problem free time again."

# Running Radio

Your Resource for Business, Programming & Sales

**1994 Wish List  
for Managers.  
See Tech Talk,  
page 31.**

## MANAGER'S NOTEBOOK

# Recruitment Rules Help Make the Fit

by Sue Jones

**BURKE, Va.** If you ask a colleague what is the most difficult problem he or she has in running a radio station the most common answer will be "dealing with people/staff." The most important part of your station is the people who work there. How well they perform their tasks and work with each other can make the difference between a successful station with the highest local ratings or a mediocre one.

Since your staff can be the pivotal point of success, logic would dictate that a significant effort be put into recruiting and interviewing potential staff members.

However, recruiting, interviewing, and selecting the best candidate for the position is often done "on the fly" or judgments are made by gut feel.

These approaches can lead you to hiring someone who is not a good fit for your position and who can become a potential problem. Asking illegal questions in an interview can result in a lawsuit. Proper recruiting training for you and your managers will be essential for selecting the best candidate and assuring your compliance with employment laws.

Before you even think about recruiting and interviewing someone for a position at your station, you will have some homework to do. Make sure that you have completed these steps.

### A method in mind

Recruit only for vacant positions. A lot of time can be spent on talking with eager applicants who want to discuss opportunities at your station. We have all received unsolicited resumes, tapes and phone calls from job seekers. If you do not have a vacant position, do not waste your time or the applicant's time with an interview that cannot result in a position. If your position will not be open for a year to six months into the future, the candidate that you interview will most likely have found a position elsewhere by the time that you can offer the position.

You should, however, keep resumes and related interview materials for your second and third choice for the position. This is especially true for positions that require more than one staff member such as DJs or Sales Representatives. You may have a second vacant position within a short frame of time. Having this information available can shorten your recruiting time considerably.

Use a position description. Properly written position descriptions describe the scope of the position, the level of responsibility, and includes a list of job responsibilities. This position description will be an invaluable guide to develop appropriate

interview questions to determine the candidate's related skills, experience and ability to do the job that you need to have done. It can help keep you focused on the position's duties and the candidate's qualifications instead of personality traits.

### Describe the job

If you have not developed position descriptions for the station's positions, it is well worth the time and effort. It is easy to rationalize that everyone who runs a radio station knows what a DJ does and therefore it is not necessary to take the time to develop position descriptions. They have continuing value because they

tion growth will be limited.

Salary ranges can be as wide as you wish to define them. They should be equitable with the other positions in your station. In addition, their levels need to be related to the position responsibilities and relevant experience requirements for the position. See the sample ranges in Figure 1.

**With the right tools and policies in place, you are ready to begin a successful recruiting effort.**

SALARY RANGES			
	Entry	Median	Ceiling
Administrative Assistant	\$15,000	\$20,000	\$25,000
Promotions Director	30,000	40,000	50,000
Asst. Promotions Director	20,000	25,000	30,000

are management tools that communicate responsibilities, expectations, and become an objective guide in evaluating performance. For example, do you want your DJs to be available for personal appearances for special promotions? How many personal appearances will be required? Will they receive additional compensation for the appearance or will it be covered by the salary? There will be no misunderstandings if these issues are clearly described in the position description and discussed in the interview. You should give a copy of the position description to a new employee on his or her first day.

Establish salary ranges for each position. Completing this task ahead of time will give you a clear understanding what the current market rates are for your positions. The National Association of Broadcasters (NAB) as well as many state broadcasting associations commission studies on compensation. Check with these groups for their recommendations and to develop your salary ranges appropriate for your market and area.

### Set salary ranges

Good salary ranges should have an entry level salary, a median level, and a ceiling for the position. Most organizations hire at the entry level, if possible, so there is salary growth opportunity. You may have a need to hire experienced staff who will command higher levels of compensation. However, you should not hire above the median level. Otherwise, the compensa-

There are several advantages to salary ranges. They balance salary compensation among positions. Salary inequities can quickly be pinpointed among the position types and qualification levels such as junior and senior levels. They can be used as a guide in conjunction with the budget allocations for salaries for existing staff and new hires. Salary ranges prevent managers from over compensating high performers or prevent them from offering a starting salary above the levels of current staff members in the same category.

Develop an Interview Rating Form. A rating form should be completed for every candidate who is interviewed for a posi-

tion. In addition, a rating form should be completed by each person who interviews a candidate. Using a rating form for each candidate will force the interviewers to evaluate certain characteristics of each candidate with the same criteria. It is easier to compare qualifications if all candidates have been evaluated on the same topics by different interviewers.

Effective rating forms should include ratings for attitude, motivation, appearance, general industry knowledge, technical ability (if applicable), education qualifications, communication ability, analyti-

cal skills, writing ability and growth potential. Each category should be rated on a scale of 1 to 5. No. 1 would represent unacceptable and No. 5 would be outstanding.

When you have these tools and policies in place, you have completed the necessary homework to begin a successful recruiting effort. They will not guarantee that you will choose the correct candidate each time, but you will be well on your way to a more systematic and objective approach to recruiting. Look for interviewing techniques in my next column.

□□□


Sue Jones is a senior manager for Computer Data Systems, Inc., in Rockville, Md. She can be reached at 703-323-0491.

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Circle (179) On Reader Service Card

World Radio History

# Regular Practice Hones Sales' Skill

► continued from page 1

training and sales practice time for the new package, then the professional salesperson must do it for himself. But why take a new package to your best prospects first?

If you are going to present (never use the word "pitch") a new package to someone without first rehearsing or practicing, then why stumble in front of your best prospects? Why not at least present it a few times to your worst prospects so you can perfect your presentation before it really counts.

Radio station sales management should devote a significant amount of time to practice selling. Unfortunately, many stations call it "role playing," which creates the wrong impression to begin with. Selling is not an act, it is real. And sales is certainly not play, although it should be fun.

## Make it a habit

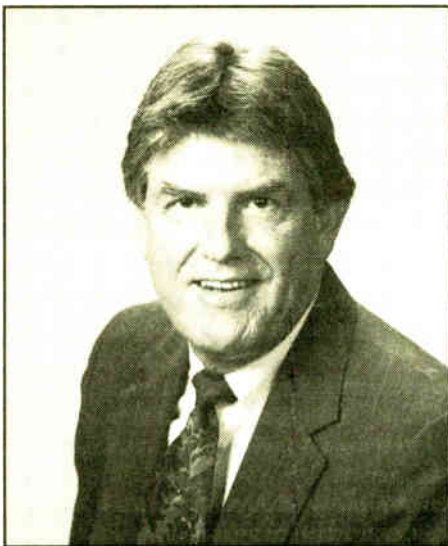
Practice selling should be on the agenda at least once a week for every radio sales department. I know most salespeople don't like it, or feel uncomfortable with it, but that's too bad. Practice does make perfect, or at least better, and it should be a way of life for every successful salesperson.

Even if the "old pros" in the department have their sales presentation down pat, the rookies can learn from them. Each salesperson must develop his or her own style and own words, but we all can learn

from others and how they do it.

To improve my golf game, I go to the driving range and hit a bucket of balls. The next time I go out on the course I feel better about my drives, and my confidence level is much higher.

It is essential to do the same thing in sales to improve performance and per-



Bob Harris

sonal confidence levels. You must practice your vocation to improve yourself and to increase your income. The great thing about the sales process is the repetition factor. You are selling the same package or the same product over and over again so you do improve your pre-

sentation as you go.

But you really should not practice on your prospects. The practice should

**If the station doesn't practice selling in meetings, then professional salespeople must take it upon themselves to practice.**

come before the presentations. If the station doesn't practice selling in meetings, then professional salespeople must take it upon themselves to practice.

Rehearse in your mind or, better still, out loud so you hear the actual words you are going to use. Use this technique while you are driving to your next appointment or in the shower (instead of singing), or even in front of the TV set.

## Know the answers

Practice answering the objections you know you are going to get: "It's too expensive"; "Your rates are too high"; "I just want my ads in drive time"; "Can I get a smaller package?"; "You don't have any ratings"; "I want a promotion if I buy your station."

Prepare a response in advance to every objection you know you are going to hear and then practice saying the words so they become familiar to you. Don't present new packages to your best prospects without ever having thought through the obvious

objections and your response.

And finally, to be a pro you must prepare as well as practice. Do you read Advertising Age and Ad Week to know what's going on with the big boys in advertising? Do you read books on sales training and marketing? Do you study

your ratings book to really understand your market and your competition?

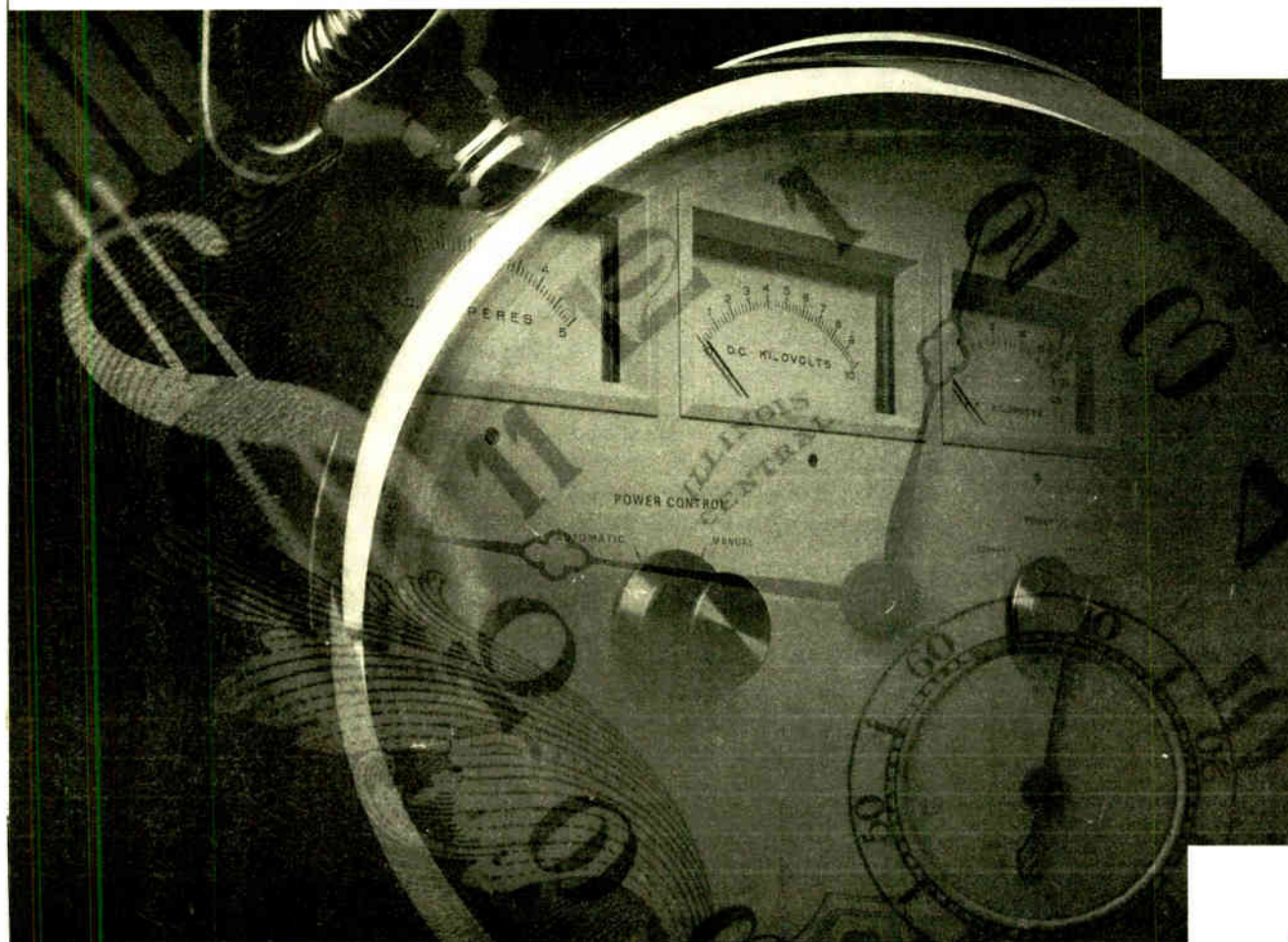
By gaining knowledge about your profession, you are adding ammunition to use in your sales presentations. You appear more confident and professional to your prospects when you are armed with accurate and timely information. Your sales presentations become easier because you are prepared.

Practice and preparation do make perfect and will make you more money in 1994!

□ □ □

*Bob Harris is a Dallas-based sales and marketing consultant to the food manufacturer, food broker and radio industries. His 30-year career includes: radio sales, promotion and management; radio syndication sales; newspaper sales; TV promotion; ad agency owner; sports, event and grocery marketing. He can be reached at PSM, 900 East Park Blvd., Suite 130, Plano, TX 75074; 214-424-9660; or fax: 214-578-7084.*

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## AccuWatch

USAirplay

# CHR's Evolution Continued in 1993

by Charles Taylor

**WASHINGTON** In a year highlighted by the relentless bellowing of lyrics like, "Hip hop hooray!" and "Whoomp! there it is," the past 12 months of radio might be viewed as adolescent at best.

More than anything, 1993 represented a

between its youth-driven urban leanings and the more traditional flavors of pop, rock and ballads. "CHUrban"-niced stations garnered "gangsta" rap its first mass radio approval, along with strains of rap so inane that Hammer's earlier offerings began to sound intellectual. Sir Mix-A-Lot's "Baby Got Back" proffered perhaps the most solid testimony, as the lyric, "I like big butts" became a top 40 staple for months.

Silky love songs from black male ensembles also inundated the airwaves ad

**Country music continued to rope in a rich team of new talent, while elevating many of its established heroes to superstar status.**

young decade in search of its definitive sound. Like the growing pains of any creature exploring untested or newfound options, contemporary hit radio (CHR) appeared awkward and scattered.

A look at the album chart showed its potential: No. 1 discs were as diverse as Cypress Hill and Barbra Streisand; Stone Temple Pilots and Garth Brooks; "The Bodyguard" and U2.

## Rap domination

Rap, however, continued to govern the airwaves, further fragmenting top 40

nauseam, in response to last year's agonizing "End of the Road" from Boyz II Men. By year-end, the list of sound-alike success stories was staggering: Shai, Hi-Five, Silk, H-Town and Jodeci were all but indistinguishable.

Mainstream radio, often now labeled "Hot AC" (adult contemporary) focused on the familiar for its audience. Tina Turner, Rod Stewart, Gloria Estefan and Jon Secada were focus artists for many stations. The top song of the year was about as traditional as it gets: Whitney Houston's "I Will

Always Love You" held down No. 1 for 14 weeks, making it the biggest pop hit in history.

## Top 40 pundits

Despite the extremes between rap and safe, established artists, pundits of traditional top 40 radio fought hard to instill belief that the format could still work with intense market research and the right mix of songs.

In an effort to send music back a bit to the center, Rick Dees, the nation's leading DJ, took out a full-page ad in trade publications decreeing that rap songs would simply be omitted from his "Rick Dees Weekly Top 40," syndicated around the world.

Competitor Shadoe Stevens' "American Top 40," meanwhile, now counts down Billboard magazine's "Mainstream" radio airplay chart instead of the rap-ruled Hot 100.

By year end, CHR ratings in some major markets began to turn upward after several years of nationwide decline, as programmers similarly dedicated to top 40's re-alliance, offered a cautiously devised sampling of the best pop, rock, dance and alternative suited to their market.

It was country radio, however, that benefited the most from top 40's fragmentation.

continued on page 23 ►

## The Hits List

Following are 10 worthwhile reasons in 1993 for turning the radio up LOUD enough to bother the neighbors:

1. **"Tell Me Why"** - Wynonna. On her second solo disk, "Tell Me Why," Wynonna Judd further conquered new territory, skillfully tearing through everything from traditional country to blues and gospel, pop and earnest ballads. If top 40 radio programmers opened their ears, they would find the definitive mainstream artist.

2. **"I Don't Wanna Fight"** - Tina Turner had a monumental year. Not only did she triumph with the cinematic biography, "What's Love Got to Do with It," but its soundtrack prompted this, her biggest hit in years. Even better though, was a cut-loose romp through "Disco Inferno." I break a sweat from the driver's seat.

3. **Tasmin Archer** - The year's premiere newcomer offered thoughtful lyrics in accessible songs just left of mainstream. She was named best new artist at the 1993 Brit Awards. In the U.S., her debut, "Sleeping Satellite," barely cracked the chart. How embarrassing for us.

continued on page 23 ►

*It's Here ...*

## THE NEW GENERATION OF FM TRANSMITTERS.

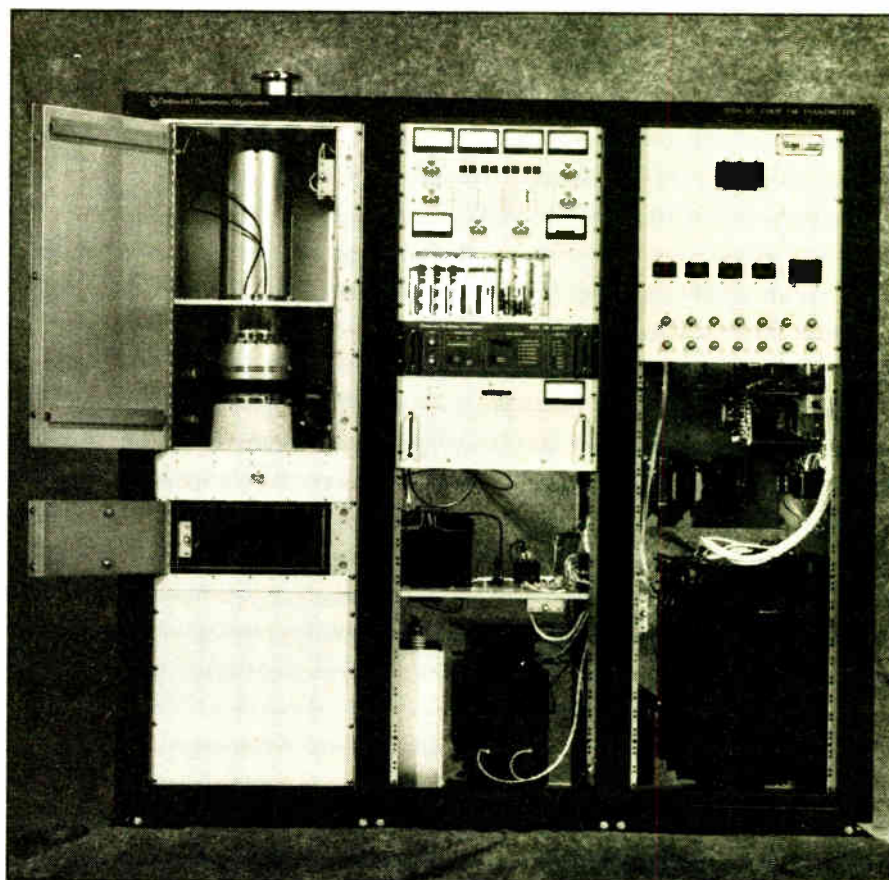
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PROMO POWER

# The Perils and Plusses of Concerts

by Mark Lapidus

**FAIRFAX, Va.** The year was 1980. To supplement my meager radio income, I was working part-time in the concert business. The venue was outdoors. I was making stage announcements in front of 7,000 people bringing on The Outlaws when hundreds of people suddenly started running to the area directly behind me. At first I wondered if it was something I said and because of a huge backdrop, I could not see what was happening.

Then I heard the first explosion. During the next thirty minutes, twenty-two cars went up in smoke. The promoter, who also owned the farm/venue, had parked the cars on straw and a hot catalytic converter had caused the fire.

Luckily, nobody was hurt. Along with learning never to park my car on straw, I discovered that many things can go wrong with concerts. When stations align themselves closely with shows, they get the positive credit, but they also get the blame if something goes wrong. Let's explore ways to make your concerts a positive experience for your audience and for you.

**Why do it?**

Why promote concerts? The best reason: You should make an attempt to own the image for the key artists in your format. If the artist matches your format, it is great for your image. Other reasons include: exposing your station to people at the show who may not be familiar with your product; making money through ticket sales; vendor rights and sponsorship programs, and having lots of product for on-air contesting.

There also are many reasons not to promote concerts. Never put your station heavily behind an act you do not play. It is a confusing message to your listeners and can be damaging to time spent listening (TSL) because it is a tune-out whenever you talk about the show on the air.

Do not promote a show you know will not perform well. This may be a gut judgement on your part. Perhaps you would do well to check around with others in the music business to see if your hunch is right. If a mediocre act is booked into a huge venue, you will be blamed for the failure.

Should you invest? Most promoters will be happy to take you on as a financial partner. This is not due to their particularly magnanimous nature. It is simply because they know something most people do not: The concert business is an extremely risky one. Many shows not only do not make money, they lose money. While there may be some concerts worth the investment, unless you are willing to write a loss off as a promotional expense, I do not recommend breaking open your wallet.

**Make money**

How do you make money? By committing to a heavy on-air promotional push for a concert, you can still negotiate certain rights from the promoter. Ask permission from the promoter to sell sponsorship packages to advertisers that include on-air mentions. For example:

K\_ \_ \_ Holiday concerts is brought to you by Smith Brothers Toyota, Mel's Muffins and the New Oldies 108. See if the promoter will also grant you: signage rights for you and your sponsors at the venue; a sponsor line on the ticket; a sizeable block of tickets for clients, and a private area for a client party.

Put together several tiers of sponsorship levels. Clients must purchase a given amount of spot time to receive the concert promotion. For example, Level One—title sponsors receive 200 on-air mentions, logo in any print you buy or trade, signage at the venue, on-stage credit, 100 tickets with registration contest at the location of their choice, and an invitation to the private party.

**Sponsorship**

Level Two title sponsors receive 100 on-air mentions; signage at venue; 50 tickets, and an invitation to the private party. Level Three title sponsors receive 25 tickets and an invitation to the private party. For outdoor shows you may be able to negotiate vendor rights with the promoter. Perhaps you split the vendor fee with him for any vendors you bring on board.

How do you execute the on-air promotion? Because this concert is for a key artist in your format, your listeners will be interested in hearing all about the show.

*Tease.* Start with a few days worth of teasing about a big concert announcement you are going to make on the morning show. Do not mention the artist until the actual announcement. While you are making the big announcement, make certain to illustrate with a montage of the artists greatest hits. Along with details of the show you are also plugging the on-sale date for the tickets—just a few days away.

*On sale.* For the rest of the week, promote the on-sale information. The first day of the sale, have one of your DJs go to the box office with the biggest line and do a few on-air breaks. If it's morning, free coffee and donuts is a nice bonus.

*Daily maintenance.* Now comes the

tough part, promoting this on-air without getting dull and repetitive. Keep it spicy by completely changing the recorded promos and live announcements every day. Try getting an artist endorsement, on the phone if necessary that you can use in the promos.

Also attempt a few short interviews. Recorded promos will be especially effective if they are brief and air into the artists music. The most common mistake of on-air promotion is presenting too many facts. This dilutes the effectiveness of the message.

If a listener is interested in the show, he or she will get details either on the phone or through print ads. If you have a listener database, consider offering a special discount coupon available to these special listeners.

*Contests.* Give away a lot of tickets on-air. Arrange for a grand prize, backstage visit. Consider a "promoter for a day" contest, where the listener who creatively promotes the concert best, wins a promoters prize. They get their name on the ticket, get a limo to the venue, eat with the band and bring on the show.

What do you do at the show? Put your signage up just prior to the performance so nobody can tamper with it. Consider a live remote leading up to the concert. Put the event staff in station t-shirts. Pre-record tapes of your station, without commercials, to play through the sound system prior to the concert and between acts.

Have your DJs bring on each act, with short introductions. You should walk away from the show with the feeling that everybody knew it was your concert. Some tools you should take include: walkie-talkies (to communicate with all stage announcing DJs and remote broadcast) banners, extra cassette deck, earplugs, a cellular phone, and last but not least, a great deal of patience.

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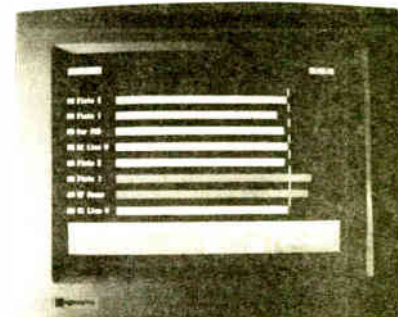
*Mark Lapidus has worked in radio for more than 20 years as a DJ, program director and promotion director in Ohio, West Virginia, North Carolina, Texas, and most recently, Washington.*

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# STATION SERVICES

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## JSN National Commercials

**DENVER** Jones Satellite Networks (JSN) will begin running national commercials as part of the network programming on its six live 24-hour radio formats.

JSN will offer a two-tier commercial structure. Affiliates running two commercial minutes per hour will pay a smaller monthly fee than affiliates running only one commercial minute per hour.

For information, contact Jones Satellite Networks at 800-876-3303; fax: 303-799-0966, or circle **Reader Service 207**.

## Traffic and Transportation Station

**NORTH HAVEN, Conn.** Instant Traffic 1150, a station devoted to traffic and transportation information, has begun broadcasting from the facilities of WCNX(AM).

Travelers and commuters in Middlesex, Hartford and New Haven counties can listen to the information gathered from the Instant Traffic's network of video cameras, dedicated mobile units, emergency frequency monitoring, CB, and cellular phone callers.

The station is on the air from 6 a.m. to midnight seven days a week, with traffic and transportation information from 6 a.m. to 6 p.m. Monday through Friday.

For information, contact Richard F. Kirkland at 203-234-0839, fax: 203-347-2565, or circle **Reader Service 73**.

## IMSA Radio Network

**TAMPA, Fla.** The International Motor Sports Association (IMSA) and Paxson Broadcasting have formed the IMSA Radio Network for the 1994 racing season. Paxson Broadcasting joins IMSA in its inaugural year of the Exxon World Sports Car Championship competition.

The network will broadcast nine races in 1994, including the 12 Hours of Sebring International Grand Prix of Endurance, Road Atlanta, and Lime Rock Park.

For information, contact Rick Green at 407-661-1900, or circle **Reader Service 3**.

## A Minute With The Beatles

**DALLAS/FORT WORTH** "A Minute With The Beatles" is a new radio feature/production tool from Radio Potato that includes 60 one-minute montages of music and interview clips with the Beatles.

Covering a different aspect of the history of the Fab Four in each show, the program can be sponsored and hosted locally, or edited into station sweepers.

For information, contact Radio Potato at 800-468-6874, or circle **Reader Service 2**.

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# Talk Shows Demand Continuous And Efficient Communications

by Tom McGinley

**WASHINGTON** The growth and success of talk radio, even in small markets, has built demand for special studio communications capabilities.

Continuous efficient communication is needed between talk show hosts, board operators, show producers and call screeners. A good audio intercom/IFB headphone circuit is, of course, a must.

But talk shows often need much more. The host also may need a visual display of line numbers, the names of callers on hold, their locations and the topics or questions about to be raised.

## Budget screening

Some stations shuttle this extra information to the host with personal computers and expensive custom software, or at least use basic word processing programs to echo the entries from the screener PC to the host via a slave monitor or to another PC via a serial port interconnect.

minal via a "null modem" connection. All terminals contain transmit/receive modems and communicate with ASCII serial data (RS-232).

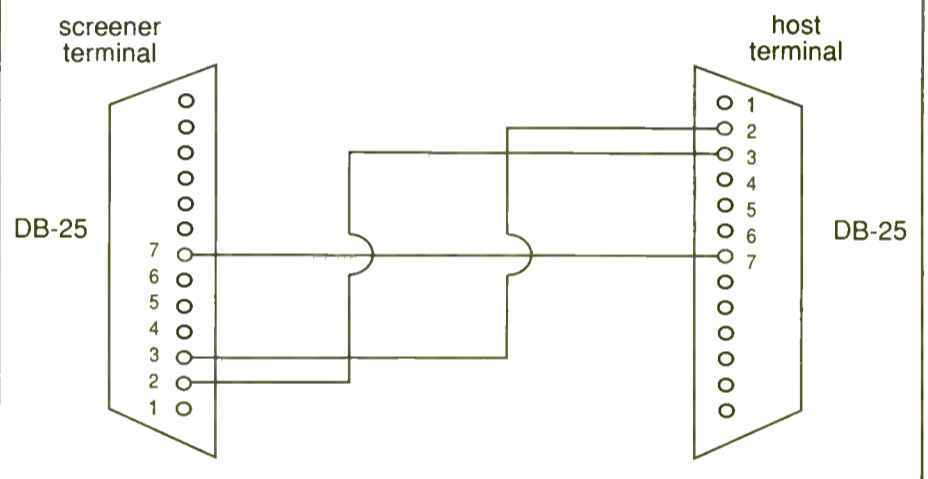
Only three wires are needed, so shielded audio pair connections work nicely. Wire the DB-25 plugs as shown in the diagram for null modem. Note that pin 7 is common signal ground, and pin 2 (transmit) from one end sends to pin 3 (receive) at the other end.

## Setup tips

All dumb terminals have a setup button, usually one of the F keys. All attributes are selected in setup mode and use another key to toggle between enable and disable. At a minimum, you have to enable half-duplex or local echo, line-feed and new line or carriage return.

Other useful functions you may want to enable are caps lock or large font select, screen saver (sleep mode), destructive edit for backspace and high speed select (usually 9600 baud).

Figure 1.



If you don't have the budget for all that, and are tired of scratching information down on a card and holding it to the window for the host to read (some stations still do this), then find yourself a pair of matched retired dumb terminals, two DB-25 connectors and a piece of shielded-pair wire.

From the early 1970s until the late 1980s there was a boom in mainframe computer systems connected to "dumb" terminals, which consisted of keyboards, ASCII generators, modems and video monitors. PCs and LANs eventually replaced these systems for small business computer needs.

These terminals can now be found in good working condition at ham fests and computer flea markets and purchased for about \$10 to \$50 a unit. Sometimes they are given away, just so their former owners can make room for new equipment.

I've had some "computer experts" tell me that two dumb terminals cannot possibly communicate with each other because they are void of any intelligence or language-based software. Actually, these terminals often have a fair amount of intelligence on board.

All we really need is enough intelligence to enable the half-duplex or local echo mode via a keyboard connected to one terminal and to connect its output serial port to that of another identical ter-

After setup, the desired entries are usually saved to firmware so you can shut off the power after use and have it return to the same mode when you switch it on again.

Try to use identical or matched terminals because different manufacturers use different setup protocols. Install both terminals identically. You will only need the one keyboard at the screener's position.

Most of the time, dumb terminals fail for the same reasons all video monitors fail: power supply regulator chips, horizontal output transistors and flyback transformers, which cause 90 percent of the failures.

If you only find one working terminal and several dead ones of the same kind, you can usually get the dead bodies thrown in for free. With any luck, you can cannibalize as needed to get another one working. We've had great results with the Wyse 50/60 and the Lanpar terminal sets.

When you get your not-so-dumb-after-all terminals set up and working, your talk show hosts will be convinced you spent big bucks to install an expensive-looking, high-tech computer communications system.

□□□

**RW Technical Advisor Tom McGinley also serves as chief engineer of WPGC-AM-FM in Washington, D.C.**

UPLINK

# Pump up your Staff for Improved Sales

by Karl Baehr

**ALBUQUERQUE** How do you begin to navigate the piles of books, videos, audio cassettes and seminars for improving sales? What can be done to breathe new life into your sales department? Is the problem the product? The people? The presentation? The price?

There are at least 10 things you can do right now to improve your sales and sales department, including:

**Get psyched**

- Get psyched about selling radio. I have written about it before. Get excited about selling your radio station and sell it. If you are not excited about it, how do you expect anyone else to be?

Radio is, dollar for dollar, the fastest way to get a business or product into the minds of the consumers.

Radio can program listeners to think of a business or product first when a buying decision is made.

You get the most business when you appear to the client as a person who wants the business, but does not need it to survive.

- Be motivated about yourself, your station and selling your station.

Do not go and enroll you or your sales staff in the first motivational seminar you find. Do not start ordering tapes and books. Do take a sincere look at yourself. Here is what you do:

Work on your belief in radio. Radio works, but if you start selling single week flights and grabbing any and all business radio will not work for you or your clients. Write a proposal to a big advertiser for big bucks.

**Actualize**

Write down your personal goals and carry them with you. This is something that several motivators preach. It is a fact that many people do not really know what they want from a career or out of life. Write your goals down, carry them in your wallet or daytimer and look at them often. Figure out what your own motivations are. It may not be the money but rather the security that those dollars represent. Be honest with yourself.

Write down a list of things that you want and the steps necessary to getting them. Take action on one of those steps today.

These last two items will help you actualize as opposed to simply visualize those things that are important. Sitting around daydreaming will not get it done. My friend, Walter Hailey, author of "Breaking the No Barrier" maintains that it takes 21 days for something to become a habit. So stay with it. A final note on the importance of motivation. As a manager, ask yourself, when a problem arises, do I turn *to* or *against* my people?

Remember that a team works together no matter what the circumstances. Create that sense of team interaction and draw strength from it.

- Know thy station and thyself. I have written about this before. It is very important that people working for the station understand its mission, and where they fit on the team. If you have three different sales people working blindly in the marketplace each selling something different,

the effort will not work for you or them.

Standardize the parameters for selling and for accurately presenting what the station is, who the target audience is, the strengths of your station's programming, coverage and people.

- Evaluate your station's presentation materials. How is your station's look? Is it slick, colorful and effective? Or is it a bunch of copies and pages of data that may confuse a potential client? How does your material compare with your competition's? Whoever said "You only get one chance to make a first impression" was

correct. First impressions are important, not only from the people, but from the materials they present. A few suggestions:

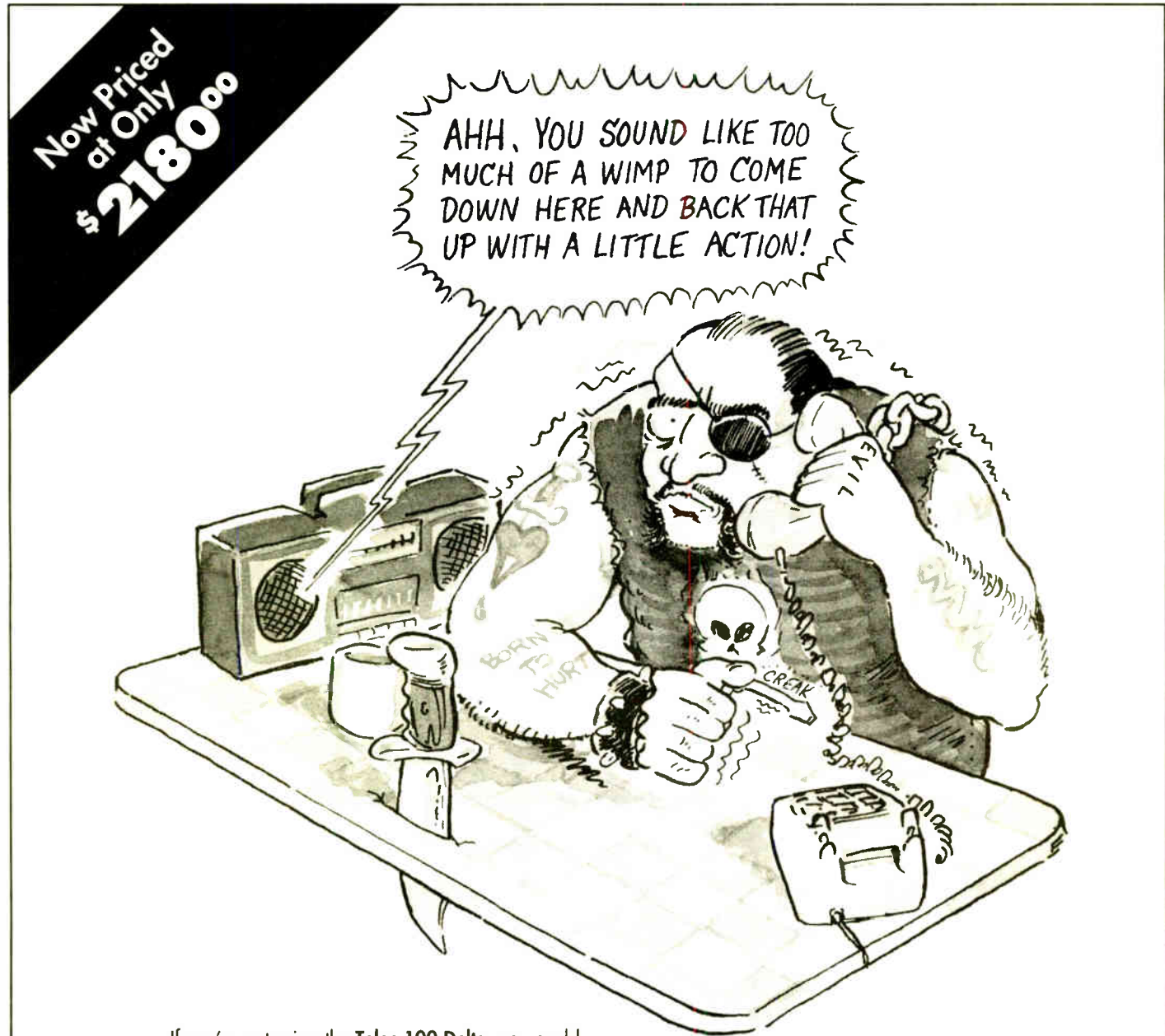
- Get a desktop publisher for your computer. This will allow you to produce good looking, easily updated printed material. If you want to print up pamphlets or brochures you can print one side only and then update the insert material as needed.

Make sure your sales material are easily managed. A dozen or so copies, business card and aircheck can easily get separated. A folder with the station logo will work. We use a cassette brochure that has every-

thing, printed material, contact information and cassette attached in a single package. If you include airchecks, design them for the purpose of presenting the sales strengths of the stations, not just the music.

Introduce the highlights of the programming, the personalities, production quality, sure, but also include testimonials from other advertisers, sponsorship opportunities, etc. Remember that these potential clients do not want to hear just your station, but they need to hear what it can do for

continued on page 24 ▶



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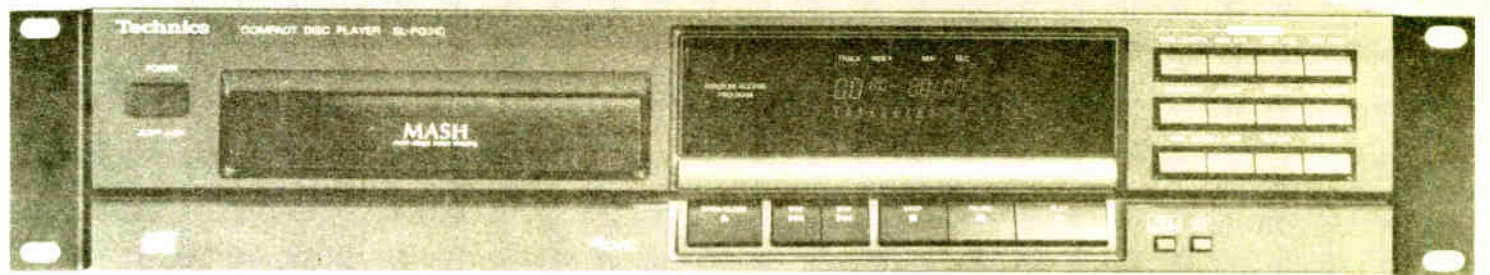
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## TECH TALK

# A New Year's Wish List for Stations

by Judith Gross

**NEW YORK** The beginning of the year is usually the time to make resolutions for self-improvement, or in a radio manager's case, station improvement. But let's be honest. Why list a bunch of rigorous no-nos that fall by the wayside by Groundhog Day?

This year, let's keep the taboo list short and, instead, look ahead to some additions or enhancements that would make a station more productive and our lives (and that of the station engineer) easier.

First, before addressing the list, it might be helpful to peer into the crystal ball and try to predict what the infant year has in store for radio.

## Peering ahead

Just judging by the past few years, I think I can be safely optimistic about the steady upward trend in revenues and the continuing efforts to streamline station operations to take advantage of those revenues.

In short, consolidation has proven prosperous for the industry, and there's no reason to doubt that it will be seeing a lot more of it as owners find that a couple of years of frugality has yielded the capital to continue the recent spate of acquisitions and duopolies.

With that in mind, let's take a look at some savvy equipment and technical enhancements that can be added to the actual planning budgets throughout the remainder of this year as the economy allows.

## Better RF

**Clean STL path:** They're digital now, you know. If you're part of a duopoly or LMA arrangement where consolidating studios helped save a bundle, you might already know that digital STLs can serve two sites from a single studio.

If you're setting up a new site, especially one with multiple STL "hops," you can keep the path clean over long distances. Digital STLs have also sparked the formation of many more regional networks in the past few years, which wouldn't even have been financially feasible without the ability to "piggy-back" signals.

**Low maintenance, high performance transmitter:** For AM and now FM, this has come to mean solid state, although for many FMs, it will mean a new transmitter, solid state and otherwise. The newer models save maintenance and costly downtime, and if your model is on its last legs, it's worth investing in a new transmitter now even with the prospect of DAB looming over the industry.

**New EBS gear:** No matter what the FCC requires, you're going to have to include this one in not just your desires, but in your actual budget soon. You owe it to yourself to get the facts on product offerings, compare prices and set aside the funds now.

**Remote equipment:** Have you kept up with the latest in T1, ISDN and other phone gear, satellite and microwave gear? Even stations in small markets know that remotes mean big bucks and community support (which can translate into ad dollars down the road). Costs have come down on technology that was out of reach just a few years ago, and any engineer worth his or her salt can give you a rundown of the remote set-up that fits your needs best.

**Cleaner processing:** Haven't you heard? The loudness wars are over! Cleaner processing is the hallmark of '90s radio. Some of the music being released today is so heavily crunched and techno-grunged that you have to clean up your processing. But even if you have a talk format, recent advances in processing gear are dramatic and you owe it to yourself to get in-plant demos and hear for yourself.

**Class A upgrade:** If you haven't taken the steps to get one, go for it. If you have and there are obstacles, maybe you can work out something with the stations that object. Cooperation is the new world

order, after all. If the FCC is just being obstinate, may they have a merciful change of heart.

**AM Stereo:** The commission has (finally, feebly) spoken, the radios are out there (believe it or not) so if you've been putting it off, you no longer have an alibi.

## Audio Chain

**Hard disk system:** I know your carts are still reliable, but if you haven't included a computerized system of at least playing spots in your budget, you are not considering the other economic benefits of partial (or complete) automation. Do your home-

work by working closely with your engineer and considering reliability and ease of operation when you shop. There has been a proliferation of companies marketing hard disk systems, and you need this—it is the computer age, after all.

**Digital editing station:** The increase in productivity and quality and the reduction in costs put this wish-list item in the affordable range for stations for whom production means the competitive edge. You can lure new accounts and sometimes better talent with it. And if you're refurbishing a room, there's probably a way you can squeeze it into the budget.

**New phone hybrid:** I hope you listen to your station's call-ins. Most managers don't realize how bad a good many of them sound, and on stations whose quality is otherwise impeccable. The speaker

continued on page 24 ►

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World Radio History

# Global Radio Voices in the Capital

by Dee McVicker

**WASHINGTON** The capital of the free world opened a new line of communication to the rest of the globe in May 1993, using 20 kW at 1120 on the AM dial.

WUST(AM), dubbed by its operators as "New World Radio," broadcasts directly to the ethnic populations of the Washington/Baltimore area, where a foreign language is spoken in an estimated one in four homes.

No other area station has attempted to serve this global village of immigrants, international dignitaries and foreign civil servants, said communications attorney Jim Weitzman, founder and president of New World Radio. "There are many foreign government missions seated here, with embassies and government agencies staffed by thousands whose native tongue is not English," he said.

## Global reach

"When people come from faraway places, whether they are second generation or third generation, there is still something in their heart that draws them back to the culture and language of their country of origin," Weitzman said. "I don't care if they live in the lap of luxury in America, they still feel the bonds to their homeland and want to be involved with it. That's the service and link we provide."

Weitzman and his partner Edwin Tornberg believed in this concept strongly enough to buy then-bankrupt 1 kW WUST for \$1.5 million in 1992, and turn it into a 20 kW powerhouse. Engineers Gary Cavell and Bill Suffa of Suffa & Cavell Inc., designed posh, new studios now in operation in Falls Church, Va.

**"When people come from faraway places, whether they are second generation or third generation, there is still something in their heart that draws them back to the culture and language of their country of origin."**

— Jim Weitzman

The partners' instincts were right on the money. Business has been brisk from the first time-brokered foreign-language program from Radio France International, aired on May 17. Similar programs followed from all parts of the world, including China, Korea, Haiti, Spain, and Nigeria.

WUST is booked by the hour by foreign broadcast organizations, some of which use the station's studios to do their broadcasts or feed their programs from across the Atlantic or Pacific to their countrymen in America. Program

sources literally change by the hour, depending on who has purchased a given hour of air time.

Satellite technology and Comrex frequency extenders are the key elements to the operation. "To get a satellite circuit is prohibitively expensive for a one-shot deal," said Weitzman. "What the

time on local AM and FM stations in various countries overseas to reach its target listeners. Weitzman said Washington's large foreign-born population is another fitting audience for VOA programs.

## Subject matter

How much of WUST's programming is political in nature?

"Some of it is political, but most of it is cultural," Weitzman said. Political broadcasting for sometimes-sensitive international audiences can be tricky business, but "there's room for everybody," he said.

For example, WUST airs four Amharic-language political programs for Ethiopian listeners. "When the first Ethiopian group came on, they expressed a certain view on current events going on back home," Weitzman said. "A second group came to us and said that they didn't agree with the first group, and that they would like to have time too. Then groups from the provisional government came on to broadcast their view."

Other programs originating from the national broadcast services of overseas countries provide news and perspectives often overlooked by the American news media.

Comrex does is let us use dial-up telephone lines." The station currently has more than a dozen frequency extenders in use in the U.S. and overseas to retrieve broadcast-quality over typical telephone lines.



L-R: Gember Bernal, a radio program producer from Central America; Gary Cavell of Suffa and Cavell, Washington; WUST GM Alan Pendleton, and WUST president Jim Weitzman.

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WUST recently began receiving live broadcasts over Comrex from China Radio International (formerly Radio Beijing), airing 4 p.m.-5 p.m. daily.

Two hours of Radio France International are carried daily via satellite, mostly devoted to French and world news items. Some coverage is tailored for the former French colonies in Western Africa, homeland to a significant population in the Baltimore/Washington area as well.

More recently, WUST began broadcasting the Voice of America (VOA). VOA broadcasts predominantly over short-wave, but recently has started leasing

Most WUST programs, however, have more of a cultural theme with a mix of news, information and music. "They give information on how to get health care, how to find out what programs are being given in the community, what stores are having sales, all the things that you and I rely on radio for," said Weitzman.

□□□

Dee McVicker has been covering the broadcast beat for five years as a regular contributor to **RW** and as a freelance writer for the broadcasting industry. She can be reached at 602-545-7363.

# SUPPLIER SOURCE BOOK

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Bldg 223-55-01, 3M Center, St Paul, MN 55144-1000  
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Contact: Leslie Halpern

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Contact: Gene Bidun, President

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Contact: Allan P Proctor  
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602-431-0334 FAX: 602-431-0497

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716-436-2720 FAX: 716-436-3942

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Contact: Jack Dailey  
612-832-3232 FAX: 612-831-0791

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316-263-4231 FAX: 316-263-4245

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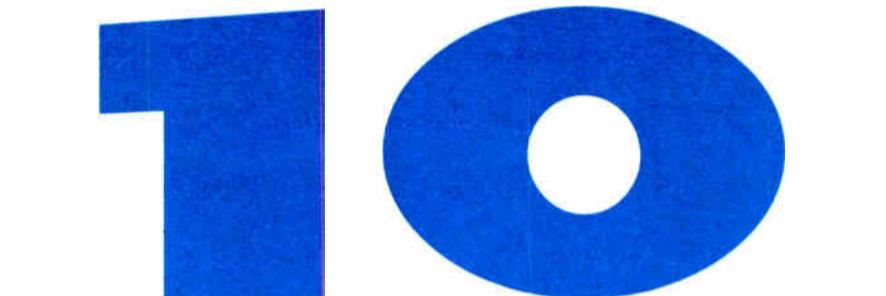
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VP US Sales & Customer Service  
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Contact: Richard Gross, VP Sales  
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818-968-4100 FAX: 818-968-1703

**Anything Audio**  
63 Melcher St, Boston, MA 02210  
Contact: Dave Malekpour, President  
617-426-2875 FAX: 617-426-2763

**Aphex Systems Ltd.**  
11068 Randall Street, Sun Valley, CA 91352  
Contact: Crissie McDaniel, Sales Coordinator  
818-767-2929 FAX: 818-767-2641  
*Product Lines and/or Services: 4-channel logic-assisted Gate Model 105 - 4-channel noise gate features the exclusive Aphex VCA 1001 for perf w/o clicks or pops. Easyrider 4-Channel Compressor Model 106 - a 4-channel compressor using the Aphex VCA 1001. Expander Gate Model 622 - new version of the Expander Gate 612—the 622 features Logic Assisted Gate circuitry. Model 323 enhanced compellor/aural exciter - w/ enhancements to the compellor & the aural exciter circuitry.*

**Apogee Electronics Corp**  
3145 Donald Douglas Loop South, Santa Monica, CA 90405  
Contact: Jon Wesslen, Marketing/P.R. Manager  
310-915-1000 FAX: 310-391-6262

**Applied Micro Technology**  
3116 Merriam Lane, Kansas City, KS 66106  
Contact: Steve Hathaway, Engineer  
913-362-9422 FAX: 913-362-9477

**Applied Research & Technology, Inc.**  
215 Tremont Street, Rochester, NY 14608  
Contact: Phil Betette, President  
716-436-2720 FAX: 716-436-3942  
*Product Lines and/or Services: Manufacturer of signal processors, professional mixing consoles and guitar amplifiers.*

**Arben Design**  
600 W Roosevelt Rd, W Chicago, IL 60185  
312-231-5077

**AR Import/Export Inc.**  
3100 NW 72 Ave #127, Miami, FL 33122-1335  
Contact: Amalio Rodriguez, President  
305-471-1180 FAX: 305-471-1182  
*Product Lines and/or Services: "Everything in Broadcasting"*

**Armstrong Transmitters**  
4835 North Street Road, Marcellus, NY 13108  
Contact: Bob White, President  
315-673-1269 FAX: 315-673-9972

**Arrakis Systems Inc**  
2619 Midpoint Dr, Ft Collins, CO 80525  
Contact: Jon Young, Vice President Sales  
303-224-2248 FAX: 303-493-1076  
*Product Lines and/or Services: Supplr of cntrl & prod rm mixing consoles. Supplr of studio furn. Mfr & supply of hard disk-based radio automtn w/ in excess of 500 Digilink wrkstns in place & on-line throughout the U.S. & around the wrld.*

**Artel Communications Corp**  
22 Kane Industrial Dr, Hudson, MA 01749  
Contact: Judith Flynn, Marketing/Communication Manager  
508-562-2100 FAX: 508-562-6942

**ASACA/SHIBASOKU CORP. OF AMERICA**  
12509 Beatrice St., Los Angeles, CA 90066  
Contact: Teresa Baker, National Sales Mgr./ Marketing Mgr.  
310-827-7144 FAX: 310-306-1382  
*Product Lines and/or Services: Founded in 1975, supplies the TV & commercial industries w/ aud & vid test, monitoring & sys products. Products include: audio analyzers, aud & vid routing switchers, auto set-up monitors, closed captioning equip, decoders, dig aud generators, dist amps.*

**Ashly Audio, Inc**  
100 Fernwood Ave, Rochester, NY 14621  
Contact: Robert French, Sr VP Mktg  
716-544-5191 FAX: 716-266-4589

**Associated Press**  
1825 K Street NW, Washington, DC 20006-1253  
Contact: Jim Williams, VP/Director  
800-821-4747 FAX: 202-736-1107  
*Product Lines and/or Services: NEWS WIRES: State, nat'l & intl news, bus, sports, weather, entrtmnt news & features. RADIO NETWORKS: Breaking coverage 24hrs/day, hourly newscsts, news/sports/business & entrtmnt actualities, regional news. SOFTWARE: Captures, sorts & edits wire copy.*

**Associated Production Music**  
6255 Sunset Blvd., Ste. 820, Hollywood, CA 90028-9804  
Contact: Connie Red, Broadcast Sales Director  
800-543-4276 FAX: 213-461-9102  
*Product Lines and/or Services: Six libraries, personalized broadcast packages, KPM SFX Library (700+ effects), music search service, 10 new releases monthly and market size pricing.*

**Associated Radio Resources**  
171 Church Street, #300, Charleston, SC 29401  
Contact: Ron McKay, President  
803-723-9686 FAX: 803-849-6154  
*Product Lines and/or Services: FCC applications; FCC technical research; FM rule making engineering; technical consulting-radio; programming consulting; marketing; management.*

**Athan Corporation**  
50 S Linden Avenue, #10, S San Francisco, CA 94080  
Contact: George Athanasios, VP  
415-589-5206 FAX: 415-742-9091

**Atlantic Research Corp**  
5390 Cherokee Ave, Alexandria, VA 22312  
703-642-4000

**Atlas/Soundoller**  
1859 Intertech Drive, Fenton, MO 63026  
Contact: Nora Steele, Mktg. Comms. Specialist  
314-349-3110 FAX: 314-349-1251  
*Product Lines and/or Services: Loudspeakers (commer, prof, envmt-resist, siren, sound masking); compression drvrs; baffles; enclosrs; soundoller brand integrated home electronics (inwall loudspeakers, subwoofers, multi-room dist sys); electrncs; life safety prod; signal & alarm dev; intrcm & telecom prod.*

**Audico Label Corp**  
8343 West Grand Avenue, River Grove, IL 60171-1434  
Contact: Barbara Deletzke, President  
708-456-0003 FAX: 708-456-0418  
*Product Lines and/or Services: Mfgs and sells audio/video labels - pin feed/laser, audio cass. tape, video accessories, audio timer/rewinder/ exciser (200-9 series) machine*

**Audi-Cord Corporation**  
1845 West Hovey Avenue, Normal, IL 61761-4315  
Contact: Andy Rector, President  
309-452-9461 FAX: 309-452-0893  
*Product Lines and/or Services: DL Series NAB Cartridge Machines.*

**Audio Accessories Inc**  
Mill St, Marlow, NH 03456  
Contact: Timothy J Symonds, Operations Manager  
603-446-3335 FAX: 603-446-7543  
*Product Lines and/or Services: Audio jack panels & jacks; pre-wired audio patch panels; patch cords; patch cord holders; Polysand; video panels; RS-422 patching; EDAC connectors & accessories.*

**Audio Animation Inc.**  
6632 Central Avenue Pike, Knoxville, TN 37912  
Contact: James M. Ruse, Product Development & Mktg Mgr  
615-689-2500 FAX: 615-689-7815

**Audio Broadcast Group Inc**  
2342 S Division Ave, Grand Rapids, MI 49507  
Contact: Dave Howland, VP Sales/Mktg  
800-999-9281 FAX: 616-452-1652  
*Product Lines and/or Services: Desgnr & mltgr of pro bdcst studio furn sys. studio pkgs & install, including most major lines of on-air & prod studio equip, FM/AM transmitter pkgs & install, as well as digital technology & sys. Three offices nationwide.*

**Audio Bdcst Grp Inc/Western US**  
PO Box 1638/36856 Desert Willow Dr, Palmdale, CA 93550  
Contact: Tony Mezey, Sales Representative  
800-858-9008 FAX: 805-273-3321

**Audio Bdcst Grp/S Eastern US**  
200 Fareway Dr. Ste. 2, Smithfield, NC 27577  
Contact: Cindy Edwards, Sales Representative  
800-369-7623 FAX: 919-934-8120

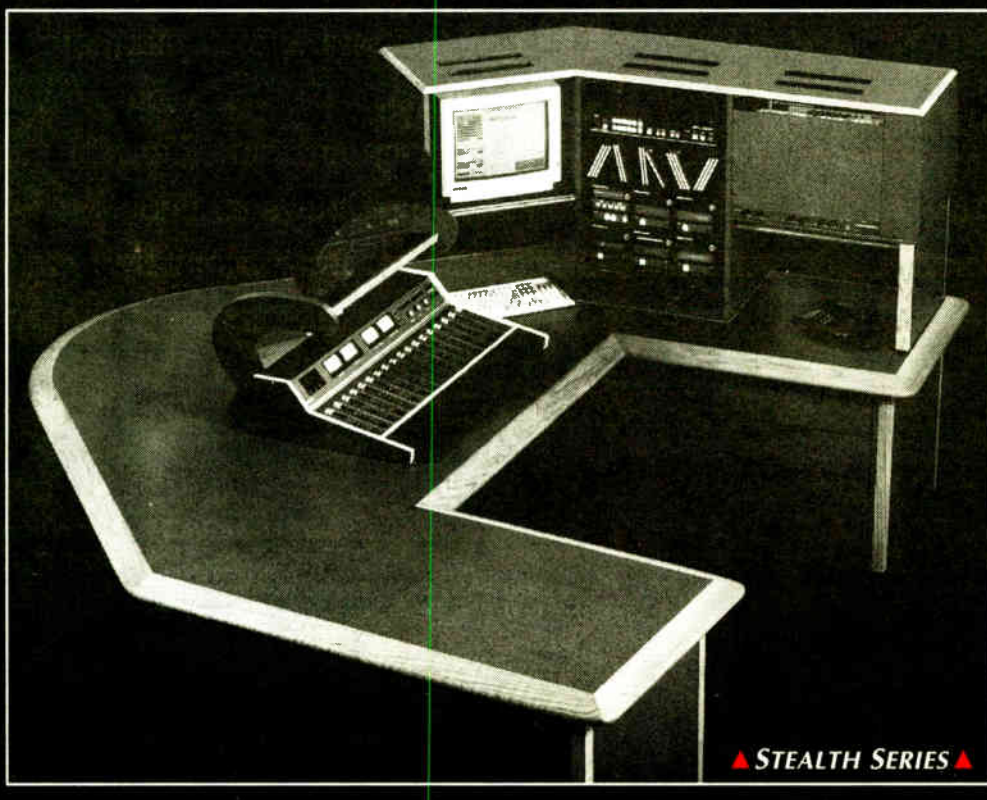
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**Broadcast Devices, Inc.**  
5 Crestview Avenue, Peekskill, NY 10566  
Contact: Bob Tarsio, Product Manager  
914-737-5032 FAX: 914-736-6918

*Product Lines and/or Services: Retrofit electronics for audio consoles made by Harris, McMartin, McCurdy, & RCA. Other products include the UTA-200 Utility Amp System & the CDS-200 Composite Audio DA/Switcher. Our newest product offering is the HSA-200 Headphone Amp System.*

**Broadcast Direct Marketing**  
2041 SW 3rd Ave., Miami, FL 33129  
Contact: John Doscher, Jr. Dir., Mktg/Sales  
305-858-9524 FAX: 305-859-8777

*Product Lines and/or Services: Complete target marketing, sales & promo campaigns. Direct mail, database & list mgmt., market research, telemarketing, sales consulting, sweepstakes, media placement, integrated campaigns, creative & design serv, printing & print production.*

**Broadcast Electronics Inc**  
4100 N 24th St., Quincy, IL 62301  
Contact: Bill Harland, Director of Domestic Sales  
217-224-9600 FAX: 217-224-9607

*Product Lines and/or Services: AV-100 dig aud storage device, CORE & Sentry automation equip, FM trsmtrs from 1KW - 70KW, FM solid state trsmtrs from 100 watt - 1KW, AM trsmtrs, consoles, and cart machines (both analog & digital).*

**Broadcast Equipmnt Sales & Egr**  
PO Box 20331, Jackson, MS 39289-1331  
Contact: Jeffery Corkren, President  
601-857-8573 FAX: 601-857-2346

*Product Lines and/or Services: CCA transmitter rep for MS, LA, AR, TX & OK. Complete line of transmission & audio equipment available. Specialize in system design & installation. Used equip listing. Serv, repair & refurbishing of all makes & models of RF & audio equipment.*

**Broadcast Microwave Services**  
5795 Keamy Villa Road, San Diego, CA 92123  
818-560-8601

**Broadcast Programming**  
2211 Fifth Ave., Seattle, WA 98121  
Contact: Edith Hilliard, President  
800-426-9082 FAX: 206-441-6582

*Product Lines and/or Services: Provides over 1,000 radio stations worldwide w/ a variety of services & products, including radio music formats available on CD & reel tape, station & format consulting, digital delivery & audio storage sys & Chartbreakers music libraries.*

**Broadcast Products Inc**  
P.O. Box 2500, Elkhart, IN 46515  
Contact: Doug Clark  
219-293-4700 FAX: 219-295-1711

**Broadcast Results Group**  
PO Box 202, Bryn Mawr, PA 19010  
Contact: Vic Kaspar, President  
800-280-1984 FAX: 919-387-3939

*Product Lines and/or Services: Offers production libraries, sta-*

*tion IDs, comedy services & station software on an all-barter, no cash basis. Call to qualify your station.*

**Broadcast Services of Colorado**  
12211 West Alameda Parkway, #101,  
Lakewood, CO 80228  
Contact: Paul Montoya, Owner/Manager  
303-968-4733 FAX: 303-987-2735

**Broadcast Services/EME**  
284 Reedy Creek Road, Four Oaks, NC 27524  
Contact: Neal Davis, President  
800-525-1037 FAX: 919-934-1537  
*Product Lines and/or Services: Radio and video equipment distributor.*

**Broadcast Systems Inc**  
8601 Sixforks Road, #403, Raleigh, NC 27615  
800-531-5232

**Broadcast Software Ltd.**  
1076 Sixth Avenue North, Naples, FL 33940  
Contact: Gary Schmidt, President  
813-649-5978 FAX: 813-649-1933

**Broadcasters General Store**  
2480 SE 52nd St., Ocala, FL 34480-7574  
Contact: Dave Kerstin, President  
904-622-7700 FAX: 904-629-7000  
*Product Lines and/or Services: Dealer and wholesale distributor for over 250 manufacturers of audio, video and RF equipment.*

**Broadcasting & Elect. Srvc Lab**  
P.O. Box 178, Newton, UT 84327  
Contact: John Griffin, Owner  
801-563-3088

**Broadcasting Systems**  
One West Lone Cactus Drive, Phoenix, AZ 85027  
Contact: Kenneth Casey, President  
603-582-6550 FAX: 602-582-8229  
*Product Lines and/or Services: New/used TV trsmtrs, ant, cable, microwv sys, sat equip, STL gear, high/low pwr, from 1W-110KW, dealer for Acrodyne, Bogner (used), Cablewave, Emcee, ITS, Scala & TTC. Also sells TV scrmbng sys, new/used w/decdrs & UHF recvr antennas.*

**Broadmark Capital Corporation**  
1420 Fifth Avenue #3030, Seattle, WA 98101-2333  
Contact: Gerald Dennon, Vice President  
206-623-1200 FAX: 206-623-2213

**Brown Bag Productions**  
4134 S Eudora Street, Englewood, CO 80110  
Contact: Mike Lee, Managing Partner  
303-756-9949 FAX: 303-759-8213  
*Product Lines and/or Services: Programming-based production libraries for radio.*

**Brown Spots, Inc.**  
1703 N Main, N Little Rock, AR 72114  
Contact: Bob Brown, President

800-890-8908 FAX: 501-791-2329  
*Product Lines and/or Services: Voice over talent and production, for radio station IDs, sweepers, and promos.*

**Bruel & Kjaer Instruments**  
185 Forrest St, Marlboro, MA 01752  
Contact: J A Pelz, Adv Mgr  
508-481-7000 FAX: 508-485-0519

**Bryston/Bryston Vermont Ltd**  
979 Franklin Ln, Maple Glen, PA 19002  
Contact: Martin Bartelstone, VP  
800-673-7899 FAX: 215-668-2970

**Bud Industries Inc**  
4605 East 355th St, Willoughby, OH 44094  
Contact: Blair K. Haas, VP, Marketing  
216-946-3200 FAX: 216-951-4015

**Bumper Productions**  
905 Whiteheath Ct., Nashville, TN 37221  
Contact: Bumper Morgan, President  
615-646-8800 FAX: 615-646-2867  
*Product Lines and/or Services: Provides fully produced sweepers & promos for radio stations worldwide. Overnight del on reel-to-reel or DAT. State-of-the-art studio with digital editing. Can deliver in all formats.*

**Burk Technology**  
7 Lomar Dr, Pepperell, MA 01463  
Contact: Phil Halter, Sales Manager  
508-433-8877 FAX: 508-433-8981

**Burlington Audio/Video Tapes**  
106 Mott St, Oceanside, NY 11572  
Contact: Rudy Schwartz, Vice President  
800-331-3191 FAX: 516-678-8959

**Business Radio Network**  
5025 Centennial Blvd., Colorado Springs, CO 80919  
Contact: Richard G. Grisar, President/CEO  
719-528-7040 FAX: 719-528-1438  
*Product Lines and/or Services: 24-hour, 7-day/week business radio network, including market reports and features for the business of living.*

**CBSI/Custom Business Systems, Inc.**  
PO Box 67, Reedsport, OR 97467  
Contact: Stephen D. Kenagy, VP/Sales & Marketing  
800-547-3930 FAX: 503-271-5721  
*Product Lines and/or Services: Station management software for the broadcast industry designed to consolidate traffic, billing & accounting procedures. Product line includes Classic & Elite traffic & billing systems, Interact accounting/general ledger, plus music management, payroll & Digital Universe digital audio systems.*

**CCA Electronics, Inc.**  
Box 428 360 Bohannon Rd, Fairburn, GA 30213  
Contact: Steve McElroy, VP Sales  
404-964-3530 FAX: 404-964-2222  
*Product Lines and/or Services: AM, FM, short wave broadcast transmitters to 100 kW.*

**CEA Newsroom System**  
3922 Vero Road, Baltimore, MD 21227  
Contact: Bill Baker, National Account Executive  
800-888-3922 FAX: 410-247-5407  
*Product Lines and/or Services: CEA Newsroom System is a PC-based system that automates all aspects of newsgathering and production. Radio News System is a low priced system specifically designed for radio news operations.*

**CED**  
2500 NW 39th Street, Miami, FL 33142  
Contact: Augusto Arevalo, Vice President of Engineering  
305-633-8020 FAX: 305-633-6188

**CNET Media Payment Systems**  
971 Stuyvesant Avenue, Union, NJ 07083-6908  
Contact: Henry Kavett, President  
908-964-7111 FAX: 908-964-5046

**C.R.N. Media**  
124 West 60th Street #33F, New York, NY 10023  
Contact: Tom Shovan, President  
212-765-2587 FAX: 212-586-8797  
*Product Lines and/or Services: Full service consulting firm specializing in syndication development and marketing, radio programming and marketing strategy.*

**C.S.I. Telecommunications**  
P.O. Box 29002, San Francisco, CA 94129-0002  
Contact: Michael S. Newman, Vice President of Engineering  
415-751-8845 FAX: 415-387-7201  
*Product Lines and/or Services: Consulting engineers, specializing in radio engineering.*

**CTI Audio, Inc. dba CAD**  
PO Box 120, 341 Harbor St., Conneaut, OH 44030  
Contact: Mike Ketchell, National Sales Manager  
800-782-9266 FAX: 216-593-5395  
*Product Lines and/or Services: Design & mfg of high qual microphns, mixing consoles & automtn products for the rcrdg, bdcf & sound reinforcement mkts. CAD mic line includes servoed studio condenser, Equitek E-200 & E-100.*

**CTI Installations Inc**  
5688 Prospect Dr, Newburgh, IN 47630  
Contact: Steve Rhinerson, President  
812-853-6374 FAX: 812-853-6652

**Cal Casey, Radio Prgrmmg Cnslt**  
1910 Kensington Drive, Carrollton, TX 75007  
Contact: Cal Casey, President  
214-492-1753 FAX: 214-492-1753  
*Product Lines and/or Services: 1) Custom program consulting for all formats, and 2) Format set-up & music programming for digital automation systems.*

**Cablewave Systems**  
60 Dodge Avenue, North Haven, CT 06473  
Contact: Larry Briggs, Mgr. Inside Sales & Contract Admin.  
203-239-3311 FAX: 203-234-7718  
*Product Lines and/or Services: Flexwell coaxial transmission line, elliptical waveguide RF connectors, rigid line, associated components & pressurization equipment. A wide variety of low-, medium- & high-power FM antennas are also available.*

**Cahn Capital Corp**  
230 Park Avenue #1910, New York, NY 10169  
Contact: W. Stewart Cahn, President  
212-922-0015 FAX: 212-922-1786  
*Product Lines and/or Services: Raise senior debt, subordinate debt and equity capital for corporations in the media and entertainment industries.*

**Caig Laboratories, Inc.**  
16744 W. Bernardo Drive, San Diego, CA 92127-1904  
Contact: Diane James, Advertising Assistant  
619-451-1799 FAX: 619-451-2789  
*Product Lines and/or Services: Mfrs envrmntly-safe cntrs & access. Wide variety of products to improve condctvty & maintain optimum signal qual on elect contacts & connctrs. Prod avail: gold condtnrs, deoxidizers, presrvtns, lubrcnts, cutting oils, greases & anti-static sprays.*

**California Amplifier**  
460 Calle San Pablo, Camarillo, CA 93012  
Contact: Dennis Schwab, Vice President Marketing  
805-987-9000 FAX: 805-987-8359  
*Product Lines and/or Services: Satellite reception equip for digital radio & other related applications. Product line includes: LNAs & LNBs in C-band, phase lock LNBs, feedhorns and accessories.*

**California Digital**  
P.O. Box 120, Moorpark, CA 93020-0120  
Contact: Caryn Beemer, Operations Manager  
805-523-2310 FAX: 805-523-0480  
*Product Lines and/or Services: Digital audio transmission systems via Ku- or C-band satellite or telco ISDN/Sw56. Ku fly-away systems, custom network control & Ku power control software. Featuring ComStream & CCS audio products.*

**Callper Human Strategies**  
741 Mount Lucas Rd, PO Box 2050, Princeton, NJ 08540-2050  
Contact: Roberta Drago, Consultant  
609-924-3800 FAX: 609-683-8560  
*Product Lines and/or Services: Personnel assessment, pre-employment testing, and human resource development counseling.*

**Calzone Case Co**  
225 Black Rock Ave, Bridgeport, CT 06605  
Contact: Joseph Calzone, III, President  
203-367-5766 FAX: 203-336-4406  
*Product Lines and/or Services: Mfrs a complete line of shipping case for all industries. Escort Series, Titan Series, LD Series, Proline, Convoy II, Ultima, DJ Series, CZ Series, Studio Series.*

**Canadian Portable Structures**  
3091 Harrison Court, Burlington, Ont M1H 2X1 CANADA  
Contact: Tony Clift, VP Sales  
416-335-5500 FAX: 416-335-1492

**CANARE**  
511 5th St. #G, San Fernando, CA 91340  
Contact: Barry Brenner, C.O.O.  
818-365-2446 FAX: 818-365-0479  
*Product Lines and/or Services: Professional audio interconnect products. AES/EBU digital audio transformers, converts 110 ohm balanced to 75 ohm BNC. BCJ-XJ-TRA.*

**Cancorm**  
1249 Virginia Ave, Campbell, CA 95008-6808  
Contact: Eric Lane, President  
408-376-3700 FAX: 408-376-0777  
*Product Lines and/or Services: Dealer & manufacturer's representative specializing in broadcast, audio and video products for television and radio.*

**Capital Electronics Inc**  
425 Glenwood Avenue, Raleigh, NC 27603-1287  
Contact: David Marlette, President  
919-832-2811 FAX: 919-856-0421

**Capitol Production Music**  
6922 Hollywood Blvd, Ste 718, Hollywood, CA 90028  
Contact: Ole Georg, Managing Director  
800-421-4163 FAX: 213-481-1543

**Carl T. Jones Corporation**  
7901 Yarnwood Court, Springfield, VA 22153-2899  
Contact: Herman E. Hurst, Jr., Sr. Engineer  
703-569-7704 FAX: 703-569-6417  
*Product Lines and/or Services: Cnslt engineers speczng in broadcasting & CATV tech design & reglry filings. Service incl allocn studies, site planning, FAA coordination, engineering in supprt of FCC rulemaking, & prep of applications for construction permit/lic. Maintains completelab for EMC/EMI testing.*

**Carle Associates Inc**  
1425 Chartwell Drive, W Vancouver BC V7S 2R7 CANADA  
Contact: Don Carle, President  
604-928-6128 FAX: 604-928-8768

**Carolina Global Maps, Inc.**  
PO Box 8026, Greenville, NC 27835  
Contact: Melinda Wall, General Manager  
800-248-6277 FAX: 919-752-9155  
*Product Lines and/or Services: Sources topographic & other map products on expedited basis. Research & retrieval of aerial photography using extensive database. 100% current & historical national coverage, wide int'l coverage. Extensive digital terrain databases.*

**Carpenter & Associates Inc**  
4204 Deer Park Drive, Little Rock, AR 72212  
Contact: Jack Carpenter, President  
504-764-6610 FAX: 504-764-7170  
*Product Lines and/or Services: In the equip leasing business, financing equip for radio, TV & the cable ind for 10 yrs. Finance through a lease purchase option new or used equip as well as put together lease sale backs for broadcasters.*

**Carter Consulting**  
2429 Seventh Avenue, Pueblo, CO 81003  
Contact: Jack Carter, President  
719-545-8202  
*Product Lines and/or Services: Music scheduling software, "MusicMix."*

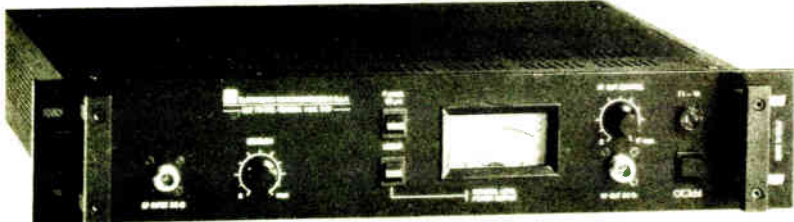
**Cartridge Express**  
14845 Van Avenue, SE, Monroe, WA 98272  
Contact: John Jackson, Owner  
714-591-0944

**Carvin Corp**  
1155 Industrial Ave, Escondido, CA 92025  
819-747-1710

**Catal Telecommunications Inc**  
4050 Technology Blvd, Fremont, CA 94537  
Contact: Nanci Blackwood, Customer Svc  
415-659-8988

**Caveco**  
1121 Bellamy Rd N Unit 10, Scarborough ON, M1H 3B9 CANADA  
Contact: Bob Burger, Technical Sales Mgr.  
416-438-6230 FAX: 416-438-1065

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- Demodulated AF output
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Fax (214) 377-4625

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Importer  
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Hialeah, Florida 33012  
(305) 822-1421  
(305) 362-8717

**DB**

**Elettronica Telecomunicazioni**

**CoCo Communications Broadcast**  
2115 Ave X, Brooklyn, NY 11235  
Contact: Tony Ianna, Ad Mgr  
718-646-6300

**Cellcast Communication Product**  
110 South Main, Owasso, OK 74055  
Contact: Gloria Staib  
1-800-852-1333

**Celwave**  
Route 79, Marlboro, NJ 07746  
Contact: Steve Oldinger, Ad Mgr  
201-462-1880 FAX: 201-462-6919

**Central Tower Inc.**  
2855 Highway 261, Newburgh, IN 47630  
Contact: Marvin Beasley, VP/ Sales/ Marketing  
800-264-0595 FAX: 812-853-6652  
*Product Lines and/or Services: Designs & mfrs ant support structures in company owned facilities in Newburgh, Ind. In-house staff egrs oversee the design & mfr of all towers & crews are avail to install & maintain your tower. Central prod line encompasses monopoles, guyed & self-supporting towers.*

**Chan & Associates**  
2217 Loma Verde Drive, Fullerton, CA 92633  
Contact: Curtis Chan, President  
714-447-4993 FAX: 714-578-0284  
*Product Lines and/or Services: High technology marketing & public relations agency specializing in strategic business development & marketing programs for the broadcast industry. Over 15 years experience in developing and implementing successful programs.*

**Charles J Givens**  
498 Delaney Avenue #408, Orlando, FL 32801-3851  
Contact: Shane Hackett, Vice President  
*Product Lines and/or Services: Programming, marketing consulting services & sales enhancements & development. All programs are guaranteed to produce profit. Specialists in direct response advertising & client development.*

**Charles Michelson & Sons**  
9350 Wilshire Blvd, Beverly Hills, CA 90212  
Contact: Charles Michelson, President  
800-648-4546 FAX: 310-278-7932

**Chester Cable Div Celwave Syst**  
PO Drawer D, Chester, NY 10918  
914-469-2141

**Chip Morgan Broadcast Eng**  
2340 Dartmouth, El Dorado Hills, CA 95762-5801  
Contact: Chip Morgan, President  
918-933-9330 FAX: 918-933-3903

**Chronrol Corp**  
9675 Business Park Ave, San Diego, CA 92131  
Contact: John C. Harter, Marketing Director  
619-566-5656 FAX: 619-566-0140  
*Product Lines and/or Services: Designs & mfrs highly accurate & dependable microprcsr-based timers for broadcasting, the scriftc lab & sensitive industrial aplctns. The XT line of timer automates AM directional ant pattern changing, tape deck control & most sequencing tasks. Free installation support.*



**Automating Antenna Pattern Changes**

Accurate to the second, the XT timer can be programmed a full year in advance to completely automate FCC-mandated antennae pattern changes—and more! Features include: 2 to 16 relays; programs switch on a daily or weekly schedule; for durations, for cycles. Automatic adjustment for leap year and DST. Supports external inputs and serial communications.

Contact John Harter at  
Phone: 800-854-1999  
FAX: 619-566-0140

Circle Reader Service 8

**Circuit Research Labs (CRL)**  
2522 W Geneva, Tempe, AZ 85282  
Contact: Valerie Hummer, Marketing Director  
602-438-0888 FAX: 602-438-8227  
*Product Lines and/or Services: A complete line of audio processors for AM, FM, SW & TV. Test and measurement equipment for digital audio. RBDS generators, timers. Dynaflex noise reduction systems, plus more.*

**CircuitWerkes**  
43 E. Blvd, N. Macclenny, FL 32083  
Contact: Kyle Magrill, President  
904-331-5999 FAX: 904-331-6999  
*Product Lines and/or Services: Manufacturers of single & rack mounted telephone auto couplers; DTMF (Touch-Tone) decoders; Audible & Subaudible tone decoders; TeleRadio-DTMF operated, remote controlled, dial-up listen-line radio.*

**Cirrus Technologies Inc**  
37 Main Street, Suite 4, Concord, MA 01742  
Contact: Howard M. Crow, Jr., President  
508-371-0483 FAX: 508-371-7360  
*Product Lines and/or Services: A privately owned company which acquires & manages mfrs of electronic & digital equip*

*for the telecommunication & broadcast industries. Cirrus owns Broadcast Electronics, Inc., Broadcast Programming, Sentry Systems & Bonneville Programming Systems.*

**Clark & Associates**  
P.O. Box 24268, Denver, CO 80224  
Contact: John Clark, Proudct Marketing Consultant  
309-837-2244 FAX: 309-833-5175

**Clark & Associates**  
318 E Calhoun, Macomb, IL 61455  
Contact: William J Clark, President  
309-837-2244 FAX: 309-833-5175

**Clark Wire & Cable**  
151 S Pflingsten Road #B, Deerfield, IL 60015  
Contact: Susan Clark, President  
708-272-9889 FAX: 708-272-9564  
*Product Lines and/or Services: Full serv suplr of custm bit aud & vid wire & cab prod. Bulk cab prod including: spkr wire, mic cab, aud snakes & consl cab. Also build harnesses, including aud snakes, ADAT-Tascam & Fostex hamss & patch crds. Full line connector distribution.*

**Clausen Communications, Inc.**  
23 Phillips Road, Nahant, MA 01908  
Contact: Chris Clausen, Vice President  
617-593-2437 FAX: 617-592-1150  
*Product Lines and/or Services: Custom network quality voice-overs for news/talk stations. Specializing in IDs, sweepers, promos & commercials. Overnight & same-day Switched 56 service available. Free custom demo per request.*

**Clayton-Davis & Associates**  
8229 Maryland Avenue, St Louis, MO 63105  
Contact: Irvin Davis, Partner  
314-862-7800 FAX: 314-721-5171  
*Product Lines and/or Services: Develop advertising, public relations & promotional programs for television & radio stations. Complete one-stop graphic and publishing service.*

**Clear-Corn Intercoms**  
945 Camelia Street, Berkeley, CA 94710  
Contact: Michael Goddard, National Sales Manager  
510-527-6666 FAX: 510-527-6699

**Clements Co**  
PO Box 1286, Carpinteria Beach, CA 93013  
Contact: Jerry Clements, Pres  
805-684-5415 FAX: 805-684-9316

**Cliff Gill Enterprises**  
POB 4599, Carlsbad, CA 92018  
Contact: Cliff Gill, President  
909-927-8397 FAX: 909-927-1083  
*Product Lines and/or Service: Consultants on acquisition or sale of broadcast properties. Also consultants on improvement of existing, station facilities (higher pwr, site improvements, etc.) on applying for new station authorization from the FCC.*

**Coaxtel Dynamics, Inc.**  
15210 Industrial Parkway, Cleveland, OH 44134  
Contact: John R. Ittel, Sales Manager  
216-267-2233 FAX: 216-267-3142  
*Product Lines and/or Services: Manufacturer of precision equipment for the measurement & termination of RF power. Coaxial maintains a line of: wattmeters & measuring elements; terminating RF load resistors; RF couplers.*

**Cohen, Dippell & Everist, P.C.**  
1300 L St, NW, Suite 1100, Washington, DC 20005  
Contact: Donald G. Everist, President  
202-898-0111 FAX: 202-898-0895

**Coherent Communications**  
13756 Glenoaks Blvd, Sylmar, CA 91342  
Contact: Ivan Kruglak  
818-362-9393

**Columbine Systems Inc**  
1707 Cole Blvd, Golden, CO 80401  
Contact: Mike Oldham, Director, Sales & Marketing  
303-237-4000 FAX: 303-237-0085

**Comed Communications Ltd**  
875 Kenyon Crescent, Cornwall, ONT K6H 6Z1 Canada  
Contact: Emil Adamyk, President  
613-937-0041 FAX: 613-937-0089  
*Product Lines and/or Services: Supply and installation of FM and TV transmitting antenna systems.*

**Comark**  
Rte 57 Feeding Hills Rd, Southwick, MA 01077  
Contact: K. R. Barkerney, RF SAles Manager  
413-569-5939 FAX: 413-569-0679

**COMET North America, Inc.**  
11 Belden Avenue, Norwalk, CT 06850  
Contact: Lance Scott, Manager for Industrial Products  
203-852-1231 FAX: 203-838-3827  
*Product Lines and/or Services: Worldwide supplier of high voltage/high vacuum bdcst capctrs for tmsmtrs, couplers, & phasers. Variable or fixed capctrs are avail in capacitance ratings.*

**Comex Worldwide Corporation**  
1645 NW 79th Avenue, Miami, FL 33126  
Contact: Jack Rickel, President and CEO  
305-594-0850 FAX: 305-591-7298

**Commercial Radio Co.**  
Duttonville School Dr., Cavendish, VT 05142  
Contact: Dan Churchill, GM  
802-226-7582 FAX: 802-226-7738  
*Product Lines and/or Services: Distributor of Mica transmitting capacitors, oil capacitors, resistors and transmitter parts.*

**Communications Data Services**  
6105-E Arlington Blvd, Falls Church, VA 22044  
Contact: Rich Biby, President  
703-534-0034 FAX: 703-534-7884  
*Product Lines and/or Services: Publisher of geogrpch data on CD-ROM. Most widely dist data is the 3Arc sec dig terrain data. Offers a wide var of data solutns to pros in the comm & geogrpch info sys industry. CDS currently offers 3 diff data sets on CD-ROM.*

**Communications Technologies**  
P.O. Box 1130, Marlton, NJ 08053  
Contact: Clarence Beverage, President  
609-985-0077 FAX: 609-985-8124

**Communications General Corp.**  
2685 Alta Vista Drive, Fallbrook, CA 92028-9683  
Contact: Robert Gonssett, President  
619-723-2700 FAX: 619-723-4000

**Communications Design Asoc. Inc**  
1410 Providence Highway, Norwood, MA 02062-5099  
Contact: Greg T. Vincent, Principal Consultant  
617-551-8490 FAX: 617-551-8491  
*Product Lines and/or Services: Complete fac desgn, documtn & mgmt serv for bdcst, prod & presentn. Serv including: overall sys plng & desgn, budgting, procurmnt specificatns & review, project mgmt & constructn supervisn.*

**Communication Graphics**  
313 North Redbud, Broken Arrow, OK 74012  
Contact: Donna Albright, Sales Manager  
800-331-4438 FAX: 918-251-8223  
*Product Lines and/or Services: Manufacturer of screen-printed bumper and window decals for long life exterior conditions. Logo design service available on request.*

**Communications Technologies, Inc.**  
PO Box 1130, Marlton, NJ 08053  
Contact: Clarence Beverage, President  
609-985-0077 FAX: 609-985-8124  
*Product Lines and/or Services: Broadcast egr serv to AM, FM & TV stations including facility improvement studies, population, analyses, application for construction permit & license & expert witness testimony for zoning & land use porposals. Radio frequency interference reduction studies for office & industrial sites.*

**Comprompter Inc**  
141 South 6th St, La Crosse, WI 54601  
Contact: Ralph King, Pres  
608-785-7766 FAX: 608-782-4674

**Compucan**  
251 West Renner Road, Richardson, TX 75080  
Contact: Michele Geopferick

**Compu Systems**  
103 Boyd Drive, Brunswick, GA 31520  
Contact: Larry Hickerson

**Computer Concepts Corp.**  
8375 Melrose Drive, Lenexa, KS 66214  
Contact: Della Northcutt, V.P.  
913-541-0900 FAX: 913-541-0169  
*Product Lines and/or Services: Visual Traffic is the all-new Windows-compliant broadcast traffic system. The Digital Commercial System (DCS) is a hard disk audio sys that makes possible the digital recording to a hard disk & subsequent playback of station produced audio. DCS Live!, a Windows-based graphical interface to DCS, makes live radio easier.*

**Computer Concepts - Intl Div.**  
P.O. Box 2826, College Station, TX 77841  
Contact: Stephen S. Sampson, Director  
409-268-7441 FAX: 409-268-7751

**Computer Sports World**  
1005 Elm Street, Boulder City, NV 89005  
Contact: Carl Lauterjung, President

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Radio World Tools of the Trade, P.O. Box 1214, Falls Church, VA 22041 USA			
*price includes air shipment worldwide			

**Comrex Corporation**

65 Nonset Path, Acton, MA 01720  
 Contact: Lynn Distler, Sales Manager  
 800-237-1776 FAX: 508-635-0401

*Product Lines and/or Services:* Manufactures frequency extenders - to transmit up to 8 kHz audio on standard dial-up telephone lines; digital audio codecs - a wide range of options for sending up to 20 kHz stereo on digital circuits such as Switched 56 & ISDN; telephone interface - telephone couplers & the Talk Console, a complete remote talk studio in a small, easy-to-use package; wireless cue system - ideal for van (or press box) - to - field communications.

**Comsat World Systems**

6560 Rock Spring Drive, Bethesda, MD 20817  
 Contact: Kay Norton, Service Development  
 202-863-6153 FAX: 202-863-4121

**Comsearch Inc**

11720 Sunrise Valley Dr, Reston, VA 22091  
 Contact: Jerry Schulman, Mktg Mgr  
 703-620-6300

**ComSpec, P.C.**

218 York Rd, Greenville, NC 27858  
 Contact: Rick Hollowell, Vice President  
 919-355-1456 FAX: 919-355-1456

**ComStream Corporation**

10180 Barnes Canyon Road, San Diego, CA 92121  
 Contact: Andy Paul, Vice President Sales  
 619-458-1800 FAX: 619-453-8953

**Comtech Antenna Systems**

3100 Communications Rd, St Cloud, FL 34769  
 Contact: Thomas C. Christy, VP of Marketing  
 407-892-6111 FAX: 407-957-3402

*Product Lines and/or Services:* Mfrs satellite ant sys frm 1.8 - 7.3m in diameter. The 3.8m E1/Az ant is the most popular downlink ant for network SCPC applicatio ns. The comtech Offsat is the smallest 'C' bank uplink SCPC ant that is routinely licensable for transmit by the FCC.

**Comtech Data**

350 N Hayden Rd, Scottsdale, AZ 85257  
 Contact: Ray Kelsey, Dir Mky

**Concept Productions**

120 Main Street, Roseville, CA 95678-2232  
 Contact: Dick Wagner, President  
 916-782-7754 FAX: 916-786-8304

**Conex Electro-Systems Inc**

PO Box 1342, Bellingham, WA 98227  
 Contact: Bill Hamelin, Sales Engineer  
 800-645-1061 FAX: 206-676-4822

*Product Lines and/or Services:* Audio switchers, sub-audible tone sensing & generating equip, programmable aud tone generator, telephone access remote control equip, multi-input aud speaker amplifiers & custom-designed equip & software

**Connector Distribution**

2985 East Harcourt St, Rancho Dominguez, CA 90221  
 310-632-2466 FAX: 310-632-5413

**Contemporary Group**

1401 S Brentwood Blvd, St Louis, MO 63144  
 Contact: Gregory Hagglund, Vice President  
 314-962-4000 FAX: 314-962-0445

**Continental Electronics Corp.**

PO Box 270879, Dallas, TX 75227  
 Contact: J.R. Faulkner, Marketing Manager  
 214-381-7161 FAX: 214-381-4949

*Product Lines and/or Services:* Specializes in the design & mfr of high-power RF sources used in broadcasting, communications, radar & scientific applications. Power levels from 50 watts to 2,000,000 watts.

**Control Concepts Corp**

PO Box 1380, Birmingham, NY 13902-1380  
 607-724-2484

**Control Technology, Inc.**

2950 SW 2nd Avenue, Ft. Lauderdale, FL 33315  
 Contact: James C. Woodworth, President  
 800-327-4121 FAX: 305-764-3298

*Product Lines and/or Services:* For consoles, recorders, mics, signal processors, transmitter remote controls & monitors, antennas, speakers, CD players, cart machines, AM/FM/TV optimods, cassette players, cable, turntables.

**Cool-Amp Conducto-Lube Co**

15834 Upper Boones Ferry Road,  
 Lake Oswego, OR 97035  
 Contact: Marian Bomber, Manager  
 503-624-6426 FAX: 503-624-6436

*Product Lines and/or Services:* Cool-Amp Silver Plating Powder deposits a coat of silver on copp, brss or bronze that will increase condctvty & protct against oxidtn. Conducto-Lube is an electrically conductive lubricant.

**Corporate Computer Systems**

33 West Main Street, Holmdel, NJ 07733  
 Contact: David Lin, Product Manager  
 908-946-3800 FAX: 908-946-7167

*Product Lines and/or Services:* CDQ1000 Digital Audio Codec. Sends 7.5, 8.2 and 10 kHz of digital audio (mono mode), over Switched 56 or ISDN lines using G.722 and MUSICAM data reduction modes. CDQ2000 Multi-Range Digital Codec. Sends up to 20 kHz of stereo audio over 2 switched 56 or ISDN lines using ISO standard MPEG MUSI-CAM data reduction mode.

**Cortana Corporation**

PO Box 2548, Farmington, NM 87499-2548  
 Contact: David Stockmar, Vice President, Sales  
 505-325-5336 FAX: 505-326-2337

*Product Lines and/or Services:* The Stati-Cat Lightning Prevention Sys protects bdcst twrs from lightning strikes by the principle of charge dissipation. The materials used are approved for corrosive atmospheres, are light-weight & have proved to be exceptionally rugged.

**Cortland Cable Co**

PO Box 330, 177 Port Watson St, Cortland, NY 13045-0330  
 Contact: John J. Dower, Vice President  
 607-753-8276 FAX: 607-753-3183

*Product Lines and/or Services:* Ant/twr guys made of high strength fibr kevlar 49 w/ extruded black polyethyln outer jackets. Non-conductive & non-corrosive, light-weight & easy to install. Eliminates the need for isoltrrs or insultrs. Factory installed end terminations are offered.

**Consulting Radio Engineer**

P.O. Box 1888, Carson City, NV 89702  
 Contact: D.C. Williams, P.E.  
 702-885-2400 FAX: 702-885-8705

**Countryman Associates Inc**

417 Stanford Ave, Redwood City, CA 94063  
 415-364-9988

**CouponRadio, Inc.**

10 Rockefeller Plaza, New York, NY 10020  
 Contact: David Alwadish, President & CEO  
 212-595-1313 FAX: 212-956-7959

*Product Lines and/or Services:* Patented bdcst data system which enables a radio bdcstr to transmit special data messages (infomessages), to future radio receivers, which display these messages as well as allowing them to be saved for later reference, at the touch of a button.

**Creative Services Group**

2200 Pacific Coast Highway, #103,  
 Hermosa Beach, CA 90254  
 Contact: Andrew Batkin, President/Creative Director

**Creative Support Services**

1950 Riverside Dr, Los Angeles, CA 90039  
 Contact: Mike Fuller, Owner  
 800-468-6874 FAX: 213-660-2070

**CreeYadio/ One to One**

Box 9787, Fresno, CA 93794  
 Contact: Jay Trachman, Publisher  
 209-226-0558 FAX: 209-226-7481

*Product Lines and/or Services:* Publishers of One to One, the Journal of Creative Bdcstng, Wkly topical humor, one-liners, "Talent Tips," calndr info, artist bios, focused, etc. Also: Talent Development smnrns for air staff, promcos on being a "real personality" in all formats.

**Critical Mass Media Inc**

4242 Airport Road, Cincinnati, OH 45226-1646  
 Contact: John Martin, President  
 708-501-4644 FAX: 708-501-3969

**Cross The Road Productions**

269 W Alameda Avenue Suite 0, Burbank, CA 91502  
 Contact: Ron Lewis, Owner  
 818-954-0214 FAX: 818-255-6015

*Product Lines and/or Services:* Radio programming consultant & producer of 24hr. daily formats including "Top 40 Oldies," "A.C.," "40s, 50s, 60s," "Country Hits." Company also produces custom jingles for commercial & station use in addition to voice IDs & spots.

**Crouse-Kimzey Company**

P.O. Box 155999, Fort Worth, TX 76155-0999  
 Contact: Mark Bradford, General Manager  
 817-283-7700 FAX: 817-283-8133

**Crouse-Kimzey of Annapolis**

P.O. Box 6300, Annapolis, MD 21401-0300  
 Contact: Kathleen Karas, Branch Manager  
 800-955-6800 FAX: 410-643-8888

**Crown International Inc**

1718 W Mishawaka Rd, Elkhart, IN 46517  
 219-294-8000

**Center For Radio Information**

19 Market Street, Cold Springs, NY 10516  
 Contact: Maune Webster, President  
 800-359-9898 FAX: 914-265-2715

**Current Technology**

101 West Buckingham, Richardson, TX 75081  
 Contact: Martin Sandy Sandberg, Broadcast Sales Manager  
 214-238-5300 FAX: 214-238-0911

**Custom Business Systems/CBSI**

PO Box 67, Reedsport, OR 97467  
 Contact: Steve Kenagy, VP Mktg  
 800-547-3930 FAX: 503-271-5721

**Custom Publishing & Mktg Group**

PO Box 1150, Jupiter, FL 33468-1150  
 Contact: Dick Ownes, President  
 407-743-0548 FAX: 407-743-7842

**Cutting Edge Technologies**

2101 Superior Avenue E, 4th Floor Cleveland OH 44114-2101  
 Contact: Danielle Cline, Marketing  
 216-241-3343 FAX: 216-241-4103

*Product Lines and/or Services:* Cutting Edge's Unity 2000i, the best sounding FM processor in the world. Designed by Frank Foti the top rad prcssg exprt in the US, the Unity 2000i is appropriate for any format. Cutting Edge manufactures the Dividend Composite Filter, which protcts main & subcarr chnnls

**D&C Electronics**

3089 Deltona Blvd, Spring Hill FL 34606  
 Contact: Richard Gross, Owner  
 904-688-2374 FAX: 904-683-9595

**D&R Electronics USA**

Rt 3 Box 184 A Montgomery TX 77356  
 Contact: Paul Westbrook, President  
 409-588-3411

**dbx, a div of AKG Acoustics, Inc**

1525 Alvarado St San Leandro, CA 94577  
 Contact: JX Loeb, dbx Product Specialist  
 510-351-3500 FAX: 510-351-0500

*Product Lines and/or Services:* Manufacturers & distributors of compressors limiters, noise gates, noise reductions systems, equalizers & amplifiers

**D.L. Markley & Associates**

2104 West Moss Avenue, Peoria, IL 61604  
 Contact: D.L. Markley, President/Consultant  
 309-673-7511 FAX: 309-673-8128

*Product Lines and/or Services:* Design & construction of AM FM TV ITFS and microwave facilities: FAA & FCC applications: antenna field tuning for FM-TV microwave: non-ionizing RF radiation measurements

**D1 International, Inc.**

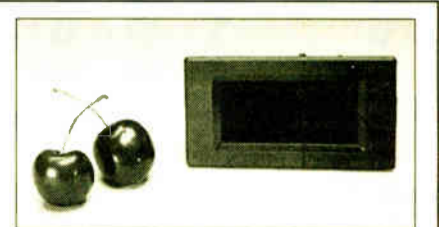
95 E Main St, Huntington, NY 11743  
 Contact: Bron Kutny, Sales Manager  
 516-673-6866 FAX: 516-673-6893

*Product Lines and/or Services:* Low-cost precisn dig panel mtr modls for accurate measrmt of voltg or currnt. Measuring ranges from  $\pm 199.9\text{mVDC}$  to  $\pm 199.9\text{VDC}$ . Incl are LED & low power LCD units. A 3-digit modl features adjustbl 0 offset. Prices start at \$29.50 in quantities of 1-49 pieces.

**DOD Electronics**

8760 S. Sandy Parkway, Sandy, UT 84070  
 Contact: Suzi Lortz, Marketing Coordinator  
 801-566-8800 FAX: 801-566-7005

*Product Lines and/or Services:* Mfr of prof dig & analog sig proc equip. Prod incl Digitech TSR-24 true stereo reverb & mult-effects, Digitech GSP-2101 studio tube guitar preamp & processor, DOD ser II graphic equalizers & sig proc & Audio Logic prof audio sig proc. Also incl DOD FX pedals.



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 Phone: 516-673-6866  
 FAX: 516-673-6893

Circle Reader Service 134

**DSI Communications Inc**

627 Boulevard, Kenilworth, NJ 07033  
 Contact: F. D'Alessandro, President  
 908-245-5801 FAX: 908-245-5305

*Product Lines and/or Services:* Specializing in the design and installation of broadcast facilities. Engineering, CAD, construction, maintenance and equipment sales.

**DYMA Engineering Inc**

Box 1535, Los Lunas, NM 87031  
 Contact: Qarrel Clement, Sales Manager  
 505-865-6700 FAX: 505-865-6776

*Product Lines and/or Services:* Broadcast systems integrator and equipment supplier.

**Dahlin Communication Service**

PO Box 231421, San Diego, CA 92194-1421  
 Contact: Randal W. Dahlin, Owner  
 619-277-0304 FAX: 619-277-6319

*Product Lines and/or Services:* Radio consultant for remodels and new studio designs. Also agent for Broadcasters General Store of Ocala, Fla., for the western U.S.

**Data For Small Systems**

2020 Pennsylvania Ave, Washington, DC 20006  
 Contact: Rich Pomeroy  
 703-276-9442

**Datacount**

2207 Anderson Rd., PO Box 3078, Opelika, AL 36801  
 Contact: Debbie Hamby, Sales Manager  
 205-749-5641 FAX: 205-749-5666

*Product Lines and/or Services:* DARTS - Datacount Accounts Receivable and Traffic Scheduling computer software for bdcstrs. DARTS is the choice of over 100 stations & over 65 national groups. DARTS is also a PC-based sys available in single & multi-user versions. DARTS encompasses all aspects of logging, traffic, co-op billing, accounts rec. & sales & mgmt reporting

**Datek Corp**

1121 Bristol Rd, Mountainside, NJ 07092  
 Contact: Rick Rainey, Sales Manager  
 908-654-8100 FAX: 908-232-6381

*Product Lines and/or Services:* Manufactures distribution amplifiers and routing switchers

**Dataworld**

P.O. Box 30730, Bethesda, MD 20824  
 Contact: Claude G. Grech, Vice President/Marketing  
 800-368-5754 FAX: 301-656-5341

*Product Lines and/or Services:* Int'l database of bdcst factly & map info: digitizin' demogrpchs, AM, FM, TV, LPTV & wireless cable. Directories, allocations & interference studies. Population counting. FM & TV area-to-locate stud. AM daytime & nighttime chnl studies. unused call signs & more

**Date! Corporation**

1515 North Court House Road, Arlington, VA 22201  
 Contact: William Meimel, Broadcast Consultant  
 703-276-9007 FAX: 703-276-9008

*Product Lines and/or Services:* Technical consulting for radio, TV & other communications services. FCC applications: channel searches coverage, interference & feasibility studies. cus tomized computer analysis & software development-experts in HDTV & DAB spectrum planning.

**Dave Gifford International**

1143 Taos Highway, Sante Fe, NM 87501  
 Contact: Dave Gifford, President/Owner  
 505-989-7007 FAX: 505-988-1981

*Product Lines and/or Services:* Sales turnarounds & troubleshooting; station & group owner sales training; sales effort & sales staff analysis; sales, management & advertiser seminars; new account sales & client dev; takeover counsel to 1st station owners; doing business in 10 countries.

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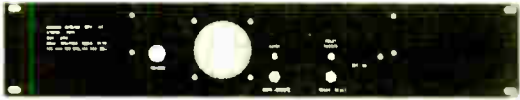
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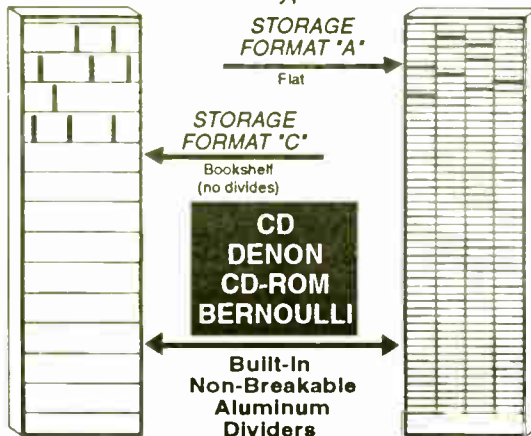
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Econco 1318 Commerce Ave. Woodland, CA 95695  
Phone: 916-662-7553 Fax: 916-666-7760 Telex: 176756  
Toll Free 800-532-6626 From Canada: 800-848-8841

READER SERVICE NO. 147

## CD Storage Systems

Rugged ABS cabinets designed for high density storage of CD's. Storage from 500 to over 1000 per cabinet, based on storage format and type of CD.



### Tape Storage Systems

Tripp Communications Sales • TCS  
P.O. Box 5267, Walnut Creek, CA 94596  
Tel: 510-256-6006 Fax: 510-256-6007

READER SERVICE NO. 177



## ZEPHYRUS

Quality, service,  
delivery, and reliability  
have come to SCPC

The Zephyrus 300 family of satellite subcarrier receivers is trusted by thousands of broadcasters.

Carrying on the tradition of excellence (at a fair price) is our 700 series analog SCPC line. Entry of all operating frequencies is done on a front-panel keypad. "Old fashioned" meters monitor RF and audio levels.

### ZEPHYRUS ELECTRONICS, Ltd.

171 S. 122 E. Ave, Tulsa, OK 74128  
918-437-3333 Fax 918-438-7322

READER SERVICE NO. 13

## CORNELL-DUBILIER MICA CAPACITORS

FROM STOCK

## JENNINGS VACUUM CAPACITORS

FROM STOCK

## JENNINGS VACUUM RELAYS

## SURCOM ASSOCIATES

2215 Faraday Ave., Suite A  
Carlsbad, California 92008  
(619) 438-4420

READER SERVICE NO. 128



I HAVE TO DRIVE TO  
THE TRANSMITTER?  
... AGAIN ?!?!

Why drive when you can call? Using Monroe's 6000 Series Remote Controls and your telephone, two-way radio, microwave link or other audio path you can have complete control over a remote site. For over 15 years Monroe Electronics has supplied the broadcast industry with reliable and affordable DTMF remote control systems.

Let us help reduce your driving time, call Monroe Electronics today.

Distributor and Representative inquiries invited.

**ME MONROE ELECTRONICS**  
LYNDONVILLE, NY 14098  
800 821 6001  
716 765 2254  
FAX 716 765 9330

READER SERVICE NO. 220

## EBS EQUIPMENT



Model CEB Encoder-Decoder .....\$540  
Model CE Encoder .....\$375  
Model CE with Stereo Option .....\$405  
Model CD Decoder Only  
(REQUIRED FOR LPTV) .....\$320  
Receiver can be supplied to drive Decoder.\$100

- Encoder FCC Type Accepted •
- Decoder FCC Certified •
- Exceeds FCC Specifications •

All interconnections to the EBS equipment are made through a barrier terminal block. No special connectors necessary. In stock—available for immediate delivery.

### GORMAN REDLICH MFG. CO.

257 W. Union St.  
Athens, Ohio 45701

Phone 614-593-3150 • FAX 614-592-3898

READER SERVICE NO. 170

**Dayton Industrial Corp**

2237 Industrial Blvd., Sarasota, FL 34234  
 Contact: Gary Williams, Sales Manager  
 813-378-5425 FAX: 813-351-6081

*Product Lines and/or Services: Manufacture FM/SCA receivers for voice, music & data as well as design & manufacture receivers for special applications.*

**DDS Sales Trng/Mgmt Consultg**

6904 W. Sagamore Circle, Sioux Falls, SD 57106  
 Contact: Darrell Solberg, President  
 605-361-9923 FAX: 605-361-1828

*Product Lines and/or Services: Radio sales training sessions that include one-time sessions for 1-5 consecutive days; annual sales training/management consultation plans which offer exclusivity in their town. Advertising workshops for retail & service businesses.*

**Delta Electronics Inc**

5730 General Washington Dr., Alexandria, VA 22312  
 Contact: Joseph S. Novak, Vice President Marketing  
 703-354-3350 FAX: 703-354-0216

**Denon America Inc**

222 New Road, Parsippany, NJ 07054  
 Contact: Michael Stelits, Product Manager  
 201-575-7810 FAX: 201-808-1608

*Product Lines and/or Services: Offers a complete line of CD players & cassette decks suitable for on-air & production. In addition to the established D N-951FA CD cart player, offers the drawer-loading DN-961FA for on-air playback. CD players designed for pro use.*

**Deremer Radio**

33 Main Street, Seward, NE 68434  
 Contact: William Hohnstein, Owner  
 402-643-3338 FAX: 402-643-3338

**DGS Pro Audio**

P.O. Box 170426, Arlington, TX 76003-0426  
 Contact: A.T. White, Assistant Manager  
 800-292-2834 FAX: 817-473-7712

*Product Lines and/or Services: Manufacturer of audio cable, connectors, plugs & jacks, and stage boxes.*

**DHK Group**

2535 Village Ln #C, Cambria, CA 93428-3428  
 Contact: Larry Baley, Partner  
 805-484-8260 FAX: 805-482-3268

**DIC Digital**

500 Frank W Burr Blvd, Teaneck, NJ 07666  
 Contact: Kevin Kennedy, Vice President Marketing  
 201-692-7700 FAX: 201-692-7757

*Product Lines and/or Services: Mfrs a complete line of DAT tape, the Prof MQ Ser & the HQ ser as well as a dry non-abrasive DAT cleaning cassette. Offers a recordable CD in 18, 63 & 74 min lengths & the BetaCam SP metal particle tapes. An enhanced vers of the microinlinity metal particle.*

**Dick Brescia Associates**

164 Garfield St., Haworth, NJ 07641  
 Contact: David P. West, Vice President  
 201-385-6566

*Product Lines and/or Services: Syndctd radio prgms- "Walter Cronkite's 20th Cent"-a look back at signifcant evnts on this date in hist: "When Radio Was"-hostd by Art Fleming-rad shows from 30s-50s: "Stan Freberg Here"-satrdl commentry for the 90's. All barter, delivery via SATCOM C-5.*

**Dick Summer Communications**

91 Talbot Court, Media, PA 19063  
 Contact: Dick Summer, President  
 215-566-2734 FAX: 215-566-5339

*Product Lines and/or Services: The Dick Summer Connection is 2hrs of "Talk AC" every night. Female frndly talk radio. Phones & features Nighttime numbers for AC stations & young adlts.*

**Dielectric Communications**

PO Box 949 - Tower Hill Rd, Raymond, ME 04071-0949  
 Contact: Jay Martin, Manager, FM Systems  
 800-341-9678 FAX: 207-655-7120

*Product Lines and/or Services: Mfr & supply all RF compnts from trnsmttr output through to the ant, incl fltrs, swtchs, ngid trnsmsn line, & ant. Supplier of the RCA FM ant prod line.*

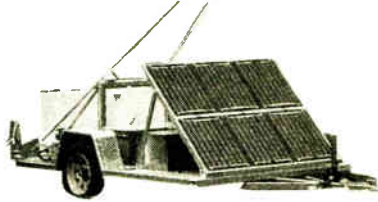
**Digidesign**

1360 Willow Road, Menlo Park, CA 94025  
 Contact: Eric Bonetti, Marketing Administrator  
 415-688-0616 FAX: 415-327-0777

**Digital Audio Info Sys, Inc.**

1200 Blalock, #202, Houston, TX 77055  
 Contact: Maurice Collins, President  
 713-465-1511 FAX: 713-465-1511

*Product Lines and/or Services: Develops software for voice mail, automated attendant, interactive voice response, automat-ed perceptual survey systems, info lines, fax store & forward.*



### Solar Max™ Emergency Mobile Broadcast System

- Broadcasts up-to-the-minute advisories to motorists on the standard AM radio band.
- Coverage is typically four to six miles.
- Messages can be checked and changed remotely through any touch-tone telephone.
- Can be installed as a single unit or as a network of multiple systems that can be operated from one or more control points.
- Turnkey installation by Digital Recorders assures maximum performance and output power allowed by the FCC.
- Solar power and cellular phone options allow system to be installed in areas where utilities are not readily available.
- Stationary system available.

Contact Digital Recorders Inc. at  
**Phone: 800-222-9583**  
**FAX: 800-849-2947**

**Circle Reader Service 150**

**Digital Recorders**

4900 Prospectus Dr., Ste. 1000  
 Resrch Triangle Pk, NC 27709-4068  
 Contact: Joanne Alpiser, National Account Manager  
 800-222-9583 FAX: 800-849-2947

*Product Lines and/or Services: Low pwr AM radio Travrs Into Str/Hwy Advrsy Rad Sys Avail to locl gvmntl agncies & licnsd in the AM band. These sns provide info on road condns, detours, constrcn, prjcts, tourism, histrcal & cultrl actvts in the immed bdcst area.*

**Dimension Music & Soundeffects**

POB 8495, Jupiter, FL 33468  
 Contact: Rex Bell, General Manager  
 800-634-0091 FAX: 407-575-3232

**Direct Marketing Results**

1463 E Galbraith Road, Cincinnati, OH 45215  
 Contact: Michael Eisele, President  
 513-761-1463 FAX: 513-761-0596

*Product Lines and/or Services: Complete telemarketing, direct mail & database management services.*

**Diversified Comm Systems**

9139 PA Rte 18, Cranesville, PA 16410  
 Contact: Richard Pogson, Owner  
 814-756-3053 FAX: Same

*Product Lines and/or Services: Provides maintenance & consulting services to broadcasters. Maintains an in-house service dept for repair of studio equipment, STL, RPU, etc. Perform custom design & fabrication of custom broadcast equipment.*

**Dolby Laboratories Inc**

100 Potrero Ave, San Francisco, CA 94103  
 Contact: Kevin Tam, Director of Marketing & Sales  
 415-558-0200 FAX: 415-863-1373

*Product Lines and/or Services: The DSTL digital STL system offers spectrm encncy, fade mrgn & immunity to intertrmc. Optns incl hot stndby & angk interc. Also avail: the Model 740 Spectrl Prcsr, allowing fine tune of station sound.*

**Don Kelly & Associates**

39 Mayberry Road, Chappaqua, NY 10514  
 Contact: Don Kelly, President  
 914-666-0175 FAX: 914-666-0286

**Donald K. Clark Inc**

P.O. Box 340617, Tampa, FL 33694  
 Contact: Donald Clark, President  
 813-949-9311 FAX: 813-949-2846

*Product Lines and/or Services: Brokers for the sale and acquisition of radio and TV.*

**Dorrrough Electronics**

5221 Collier Pl, Woodland Hills, CA 91364  
 Contact: Kay Dorrrough, Partner  
 818-998-2824 FAX: 818-998-1507

*Product Lines and/or Services: Mfrs of audio level meters uniquely displaying both peak & RMS. New in the line of meters is the AES/EBU digital reading meter & a 2nd model featuring the options of sum & diff. Also mfrd are audio processors for trnsmsn & audio line measurmnt sets.*

**Doug Vernier, Telecomm. Cons.**

1600 Picturesque Dr, Cedar Falls, IA 50613  
 Contact: Doug Vernier, President  
 319-266-8402 FAX: 319-266-9212

*Product Lines and/or Services: Tech telecomm consultg, AM, FM & TV, sys designs & FCC applicatns. Bdcst & comm software for the FCC, incl programs which perform freq searches for AM, FM & TV, draw FCC sig contours from completely dig U.S.G.S. linegraph maps, FCC AM, FM & TV databases.*

**duTrell, Lundin & Rackley, Inc**

240 N Washington Blvd, #700, Sarasota, FL 34236  
 Contact: L. Robert duTrell, Partner  
 813-366-2611 FAX: 813-366-5533

*Product Lines and/or Services: Pro firm providing tech serv for the comm industry, incl freq selection, sys design, propagation studies & supprt for FCC lic. Computer aided design & optmztn of AM, FM & TV bdcst facilities as well as aux comm serv ae the firm's areas of expertise.*

**Dynair Electronics**

5275 Market St, San Diego, CA 92114  
 Contact: Jesse Blount, Jr., VP, Sales & Marketing  
 619-263-7711 FAX: 619-264-4181

**Dynatech Broadcast**

6400 Enterprise Lane, Madison, WI 53719  
 Contact: Chuck Scholdt, Ad Mgr  
 FAX: 703-550-7560

**ECS International**

PO Box 330607, Ft. Worth, TX 76163  
 Contact: Dick Townsend, Manager, Broadcast Division

817-483-8497 FAX: 817-572-2242

*Product Lines and/or Services: Power quality specialists. Offering lightning surge protectors, UPS systems, voltage regulators, power conditioners. Now in 7th year of business.*

**EEV, Inc.**

4 Westchester Plaza, Elmsford, NY 10523

Contact: Greg Morton, Sales Manager

914-592-6050 FAX: 914-682-8922

*Product Lines and/or Services: 5 kW, 10 kW, 15 kW & 35 kW broadcast tetrodes for AM/FM transmitters. These power tubes, with improved mesh filaments, are designed to enhance the longevity & increase audio performance.*

**E Harold Munn, Jr & Associates**

P.O. Box 220/ 100 Airport Dr., Coldwater, MI 49036-0220

Contact: Wayne S. Reese, President

517-278-7339 FAX: 517-278-6973

*Product Lines and/or Services: Bdcst eng consulting serv for AM, FM, TV, LPTV & translator allocations & applications have been provided for over 40 yrs. Field work for proof-of-performance & spectrum analysis measurements, as well as ANSI compliance checks, available.*

**ENCO Systems, Inc**

1866 Craigshire Dr., St. Louis, MO 63146

Contact: Larry Lamoray, Vice President Sales & Marketing

800-362-6797 FAX: 314-453-0061

*Product Lines and/or Services: DAD486x Digital Audio Delivery System. DOS-based software, operating with industry standard hardware, providing complete audio recording, editing, scheduling, & multiple output reproduction capabilities for broadcast applications.*

**ERI Installations**

108 Market Street, Newburgh, IN 47630

Contact: Max Brown, Director, Installations

818-853-3318 FAX: 818-858-5709

**ESE**

142 Sierra St., El Segundo, CA 90245

Contact: Brian Way, Marketing Director

310-322-2136 FAX: 310-322-8127

*Product Lines and/or Services: Manufactures audio products, master clock systems, stand-alone clocks & timers, time code products, time code translators, distribution amps (audio & video), video products, PC card products. Design and custom build units to spec.*

**E-Z Up International**

5525 East Gibraltar, Ontario, CA 91764-5121

Contact: Marty Dotterweich, Natl. Sales Mgr.

909-466-8333 FAX: 909-944-2884

*Product Lines and/or Services: Instant Shelter used to keep cool on remote locations & grab attention w/ highly visible silk screened call letters. Set up in seconds, require no assembly, no ropes & are fully self-contained. Made w/hvy-duty fabric tops & dble-truss design.*

**Eastern Acoustic Works**

1 Main Street

Whitinsville, MA 01588

Contact: Sandy MacDonald, National Sales Manager

508-234-6158 FAX: 508-234-8251

*Product Lines and/or Services: Since 1978, Engineering & mfr of pro loudspkr sys for touring & perm sound. George Strait, Meat Loaf, Harry Connick, Jr. & other perfmrts to tour w/ Virtual Army systems. The Crystal Cathedral & the Lyon Opera are among hundreds of perm instns.*

**Econco**

1318 Commerce Ave, Woodland, CA 95776

Contact: Debbie Baker, Sales

800-532-6626 FAX: 916-666-7760

*Product Lines and/or Services: Rebuilds medium to high power vacuum tubes & low to high-power microwave devices for broadcast, industrial heating, medical equipment and defense.*

**Eddy Electric Inc**

60 Hannah Street, Stanton Island, NY 10301

Contact: Herb Reichart, President

718-876-9742 FAX: 718-816-8598

*Product Lines and/or Services: "Custom Tube Electronics." Preamps, filters and amplifiers.*

# Products & Services Showcase

For more information on the products shown below, circle the appropriate Reader Service No.(s) on the enclosed Subscription/Reader Service card or contact the advertiser directly.

## Zercom Gain Box



The "Gain Box" (Model #G-B-1) was designed and built as an audio boost amplifier for many applications around the broadcast station. Potential uses include:

- Digital compact disc audio deck to console input.
- Cassette audio deck to console input.
- Boosting telephone audio to console input.
- Boosting output of consumer phono preamp to console input.
- Converting unbalanced sources to active balanced.
- Converting balance sources to unbalanced.
- Distribution amplifier.
- Line amplifier.
- Boost low level audition console output to line level balanced output.
- DC meter amplifier.

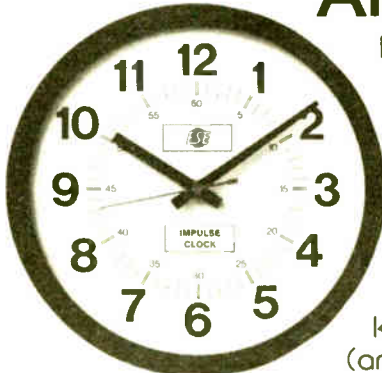
The gain box has two independent channels of gain which means it can be used for stereo or as two separate monaural amplifiers. The two channels can be wired in series for up to 60 DB gain. Internal options give an additional 8 DB or more gain per channel.

**ZERCOM**

Box 84, Merrifield, MN 56465 • 218-765-3151

**READER SERVICE NO. 210**

## WE KNOW THE VALUE OF TIME... AND SO DO YOU!



In 1971, a member of the Broadcast Community brought to our attention the importance of accurate time in the studio environment. Ever since then, other members of the Broadcast Community have shared their needs and each reiterated the growing importance for accurate, yet affordable time keeping equipment.

Especially important is the need for a Master Clock System. And as you are well aware, just one person knowing the correct time is not good enough! Everybody (and everything) must... be in sync!

If your present Master Clock System (or lack of) leaves something to be desired, call ESE and allow us to demonstrate what is of value to us... YOU and solving your timing requirements.



**CLOCKS AS ACCURATE AS TIME PERMITS!**

142 Sierro St., El Segundo, CA 90245 USA (310) 322-2136 / Fax: (310) 322-8127

**READER SERVICE NO. 123**

**EDI Radio Network**  
P.O. Box 4562, Carlsbad, CA 92018-4562  
Contact: Judy Hahn, President  
619-758-1963 FAX: 619-758-0386

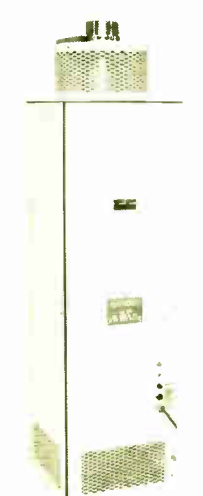
**Edwin Tornberg & Co Inc**  
P.O. Box 55298, Washington, DC 20011  
Contact: Edwin Tornberg, President  
202-291-8700 FAX: 202-829-1590  
*Product Lines and/or Services: Brokerage, appraisals, consulting.*

**Elcom Bauer**  
2211 E. Mesa #E237, El Paso, TX 79903  
Contact: Paul Gregg, President  
915-542-2969 FAX: 915-542-2958  
*Product Lines and/or Services: Service & parts support for Elcom Bauer transmitters. Manufacturer of specialized equipment for AM/FM radio stations.*

**Electrex Co**  
18620 NE 2nd Ave. Miami, FL 33179  
Contact: Ben Ostrovsky, Pres  
305-651-5752 FAX: 305-654-1386

**Electro Audio/Video**  
274 Flame Tree Place, Oceanside, CA 92057  
Contact: Mark O'Drobinak, Owner  
619-756-0888 FAX: 619-433-1590

**Electro Impulse Laboratory, Inc.**  
1805 Corlies Ave., PO Box 278, Neptune, NJ 07754-0278  
Contact: Mark Rubin, President  
908-776-5800 FAX: 908-776-6793



**ELECTRO IMPULSE LAB., INC.**  
**DPTC-25KFM**  
is our most popular dry, 25 kW rated FM dummy load for broadcasters, or choose from a complete range of loads from 500-500,000 watts; popular loads are in stock for immediate delivery. Contact Tom McNicholas at 908-776-5800.

**Electro Impulse Lab., Inc.**  
**Phone: 908-776-5800**  
**FAX: 908-776-6793**

**Circle Reader Service 35**

**Electro-Voice Bdct & Prod Pdct**  
600 Cecil St. Buchanan, MI 49107  
Contact: Rick Sanchez, Bdct & Prod. Marketing Manager  
800-877-1771 FAX: 818-444-1342

**Electronic Equipment Bank**  
323 Mill St., NE, Vienna, VA 22180  
800-368-3270 FAX: 703-938-6911

**Electronic Industries**  
19 E. Irving Avenue, Oshkosh, WI 54902  
Contact: Gordon Dailey, Bdct Sales  
414-235-8930 FAX: 414-235-4233  
*Product Lines and/or Services: Dealer/dist for various prod used in the broadcasting recording & sound industries incl microphones, audio consoles & processing, tape & cartridge recorders & support, STL equipment, tower lighting & lighting control prod. Call for product line card & catalogue.*

**Electronic Systems Integration**  
522 South Broadway, Gloucester City, NJ 08030  
Contact: Thomas Newman, VP Sales & Marketing  
609-742-1581 FAX: 609-742-0485  
*Product Lines and/or Services: Full service systems integrator. Services include system design, assembly wire & test, installation, satellite link installation, cable harness fabrication, program management, documentation.*


**Elenos Inc**  
73 Oak Street, Plymouth, MA 02360  
Contact: Renato Carpeggiani, Director  
508-830-0448 FAX: 508-747-4696

**Ellason Weather Radar**  
437 Dickens Avenue, St Louis, MO 63122-3810  
Contact: Bill Ellason, President  
314-532-3031 FAX: 314-532-3414

**Emcor Products/Crenlo Inc**  
1600 4th Ave. NW, Rochester, MN 55901  
Contact: Dan Estes, National Sales Manager  
507-289-3371 FAX: 507-287-3405  
*Product Lines and/or Services: Modular electronic enclosure system, EMI RFI emission control cabinetry, computer support furniture, chassis Slides, cooling devices & instant EMCOR quick-ship stock program.*

**Emergency Alert Receiver Inc**  
PO Box 20629, New York, NY 10025-1515  
Contact: Jack Bergman, President  
212-695-4767

**Energetic Music**  
P.O. Box 84583, Seattle, WA 98124  
Contact: Monty Smith, President  
800-323-2972 FAX: 206-467-6931



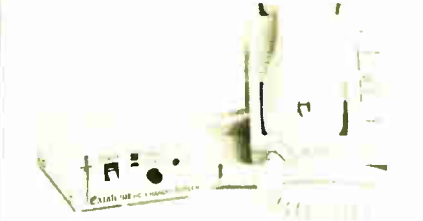
**CDA-1 Composite Distribution Amplifier**

This 1 in, 3 out distribution amplifier allows you to distribute stereo composite and/or subcarrier signals as easily as audio.

- DC-100 kHz frequency response
- 90 dB signal/noise ratio
- +6 dB to -20 dB gain range
- Individual 20-turn output trimmers
- 1 3/4-inch rack mount enclosure

**Excalibur Electronics**  
*Please circle our bingo number for data sheet and a dealer list.*

**Circle Reader Service 166**



**HC-1 Handi-Coupler**

Here is the simplest, quickest, most convenient way to connect audio to a telephone. The HC-1 connects in series with the handset of any phone using modular connectors. No connection to the phone line is needed. Press the front panel button and external audio is available on separate send and receive 1/4-inch TRS jacks on the rear panel. Release the button and the handset is once more connected for normal use of the phone. Nothing could be simpler! You can find many uses for the HC-1 around your station: on-air studio, production room, newsroom, sales office, field news kits, sports remotes, etc.

**Excalibur Electronics**  
*Please circle our bingo number for data sheet and a dealer list.*

**Circle Reader Service 53**

*Product Lines and/or Services: Providing buy-out mus for over 5 yrs. Musical styles avail in our 14 vol libr (CD or cass) incl: classical, indust, tech, logos, dramatic, romantic, variety, contemporary, sports & travel. 4 diff sound effects pkgs round out the libr.*

**Energy-Onix**  
752 Warren Street, Hudson, NY 12534  
Contact: Ernest A. Belanger, VP Marketing  
518-828-1690 FAX: 518-828-8476  
*Product Lines and/or Services: Manufacturer of FM, AM & shortwave transmitters. FM - Grounded grid triode transmitters, single tube 1.5 - 12kW, 2 tube 15kW - 35kW. Solid state 30W - 5KW, AM & SHORTWAVE - 1kW - 100kW. Single & dual freq shrtwv avail.*

**Enterprise Systems Group Inc.**  
5475 Tech Center Drive #300, Colorado Springs, CO 80919  
Contact: George T. Beattie, Senior Vice President  
719-548-1800 FAX: 719-548-1818

**Environmental Technology Inc**  
1302 High St. South Bend, IN 46601  
Contact: Kathleen Schrader, Marketing Administrator  
219-233-1202 FAX: 219-233-2152  
*Product Lines and/or Services: Design, manufacturer & market energy management controls for snowice melting systems (including antennas). Also dehydrators for providing pressurized, dry air for waveguides, coax, feed horns, etc.*

**Equipto Electronics Corp**  
351 Woodlawn Ave. Aurora, IL 60506-9988  
312-897-4691

**Equity Radio Network**  
14605 N. Airport Dr., Ste. 312, Scottsdale, AZ 85260  
Contact: Gary Nice, President  
602-483-8762 FAX: 602-483-8503  
*Product Lines and/or Services: Sell uplinking at a discounted rate on Satcom C-5, Transponder 15 DATS, and syndicate, on a barter basis, "Classic Radio Theater," 52-week series of the famous old time radio shows.*

**Erko Technologies**  
4541 South 88th St. Omaha, NE 68127  
Contact: Larry Marlin, Owner  
402-331-2632 FAX: 402-592-5320

**Eventide Inc**  
One Alsan Way, Little Ferry, NJ 07643  
Contact: Gil Griffith, Sales Manager  
201-641-1200 FAX: 201-641-1640  
*Product Lines and/or Services: Mfrs a variety of products for aud & bdct including the DSP4000, H3500-B & H3000-B Ultra-Harmonizer brand effects prcsrs; the BD980 Advanced Bdct Dly & BD941 BD942 Bdct Aud Dlys; & the VR240 Dig Bdct Logger & VP244 Dig Aud Log Player.*

**Event Marketing Inc.**  
9966 Alydar, Cincinnati, OH 45242  
Contact: Sara Backman, President  
*Product Lines and/or Services: Event marketing exclusively for radio stations. Turnkey major event production & sales consulting.*

**Excalibur Electronics**  
4604 Sand Rock Ln. Chantilly, VA 22021-2468  
Contact: Bill Ashley, VP

**Exchange National Funding**  
2425 N Central Expressway, #241, Richardson, TX 75080  
Contact: Charles Shore  
800-275-0185 FAX: 214-235-5452

**Executive Broadcast Services**  
Box 60327, Colorado Springs, CO 80960  
Contact: Skip Joeckel, President  
800-800-0107 FAX: 719-579-6664  
*Product Lines and/or Services: Markets and sells programs, products, and services to radio stations across the U.S.*

**The Express Group**  
3518 3rd Ave., San Diego, CA 92103  
Contact: Byron Andrus, President  
619-298-2834 FAX: 619-298-4143  
*Product Lines and/or Services: Modular & custom radio furniture. Seven complete lines of extremely high-quality modular studio cabinets, most of which can be shipped within two weeks of order. Specialize in custom designs for almost any broadcast application.*

**Express Tower Co Inc**  
PO Box 143, Big Cabin, OK 74332  
Contact: Dyke A Dean, Mktg Dir  
918-783-5129 FAX: 918-783-5590

**FEE, Fardella Eng Enterprises**  
264 El Portal Way, San Jose, CA 95119  
Contact: Anthony Fardella, Owner  
800-546-0898 FAX: 408-229-0432  
*Product Lines and/or Services: Features 2 multimedia cmpr giveaway game promo sys. CONTEST LOTTERY & MONEYS MACHINE. Touch screen & vid tech using your graphics & your clients vid. Line of custm value-added bus computer systems.*

**FMR Associates**  
6045 E Grant Road, Tucson, AZ 85712  
Contact: Jess DeVaney, Dir Research  
602-886-5548 FAX: 602-886-9307  
*Product Lines and/or Services: Perceptual, programming & music studies, using exclusive EARS testing system. The pioneer in programming music mix electronic listener response research. Advanced weekly callout Musictrac system.*

**CAT-LINK Digital STL :**

**TOP 25 MARKET SWEEP**


*It's no wonder 50 stations in the Top 25 markets are sold on QEI's CAT-LINK, the DIGITAL STL problem solver:*

- Uses T1 data circuits or 23 GHz radio
- The only digital FM composite link\*
- **NO COMPRESSION and NO DELAY**
- Full bi-directional capability
- Multiple discrete channel capability
- Ideal for LMAs

*And that's why more savvy stations in the Top 25 and markets of every size are turning to CAT-LINK. Call QEI toll-free at 800-334-9154 and be swept away.*

**50 STATIONS IN THE TOP 25**

\*U.S. Patent # 5,054,070



**QEI CORPORATION**  
One Airport Drive P.O. Box 805 Williamstown, N.J. 08094 USA  
800 334-9154 FAX: 609 629-1751 INTERNATIONAL: 609 728-2020

**Circle (85) On Reader Service Card**

**F M Systems Inc**  
3877 South Main St, Santa Ana, CA 92707  
Contact: Frank McClatchie, President  
714-979-3355 FAX: 714-979-0913

**Factory Direct Sales**  
17194 Preston Rd, #123-125, Dallas, TX 75748-1203  
Contact: Jimmie Joynt, President  
214-335-3425 FAX: 214-337-4625

**Fahnestock & Co., Inc**  
110 Wall Street, 10th Floor, New York, NY 10005  
Contact: John Palmer, Executive VP  
212-668-8175 FAX: 212-425-2028  
*Product Lines and/or Services:* Full-serv bank. Palmer specializes in bdcstg/comm transactions. Underwrite public offerings (both debt & equity), place private debt (both sr & mezz), advise on mergers & acquisitions & selectively invest equity in transactions.

**Far West Communications**  
120 N Victory Blvd #100, Burbank, CA 91502  
Contact: Paul Ward, President/CEO  
800-783-2946 FAX: 818-566-7086  
*Product Lines and/or Services:* Suppls 5 diff fulltime frmts for automtn or live-ass: TRUE COUNTRY, GOLD PLUS, 30 PLUS, MOD MOR, TRUE COUNTRY II. Avail on analog tape, DAT or CD. Also prod 2 custom audiophile song libraries w/cuts stn specific: AIR FORCE 1(DAT), & MASTERDISC(custom CD).

**Fairchild Data Corp.**  
350 N. Hayden Rd., Scottsdale, AZ 85257  
Contact: Jeff Hirsch, Manager Marketing Communications  
602-949-1155 FAX: 602-941-0023  
*Product Lines and/or Services:* Designs, mfrs & mkts hgh-spd dig modems & trnsmn equip for sat comm, RF microwv, groupband & ntwrk applctns. The leading domestic & international supplier of high-speed sat comm modem equip w/more than 15,000 modems in the field, w/ install wrldwide.

**Fiberbit Cases**  
601 West 26th St, New York, NY 10001  
Contact: Paul Lowman, Sales Mgr  
800-847-4176 FAX: 212-691-5935

**Fiber Options**  
80 Orville Drive, Bohemia, NY 11716-2533  
Contact: Fred Scott, Product Manager  
516-567-8320 FAX: 516-567-8322  
*Product Lines and/or Services:* Mfrs a complete line of fiber-optic transmission systems based on small-core optical-fiber technology - both multimode & single-mode. Systems readily interface with industry-standard bdcst, data-comm & telecomm fiber-optic networks.

**Fidelipac Corp**  
97 Foster Road, Moorestown, NJ 08057  
Contact: Scott Martin, Vice President, Sales  
609-235-3900 FAX: 609-235-7779  
*Product Lines and/or Services:* Mfrs analog & dig audio source equip for the radio & TV bdcst facility. The DCR1000 Ser is a dig cart mach replacmnt sys. The MX Ser modular console is a price/perf on-air console line. The Dynamax "Air Marshal" is a PC-based dig aud rec & play sys.

**Film House**  
230 Cumberland Bend, Nashville, TN 37228  
Contact: Curt Hahn, President  
615-255-4000 FAX: 615-256-3380  
*Product Lines and/or Services:* Broadcast marketing for over a decade.

**First Atlantic Group, Inc.**  
P.O. Box 941888, Maitland, FL 32794-1888  
Contact: Don Scheib, President  
407-578-2000 FAX: 407-290-1632

**Firstcom Broadcast Services**  
13747 Montfort Drive #220, Dallas, TX 75240  
Contact: Jim Long, Chairman  
800-858-8880 FAX: 214-404-9656  
*Product Lines and/or Services:* Offers prod music libraries, sound effects, jingles & music software. Choose from the Custom Prod Library. Techsonics Music Effects pkgs or Nashville - the promo library+. Newest prod lib—Sound Designer II—is shaped & desgnd for cpy support.

**First Light Video Publishing**  
8536 Venice Boulevard, Los Angeles, CA 90034  
Contact: Rosemary Guthrie, Vice President of Sales  
310-558-7880 FAX: 310-558-7891

**Flash Technology Corp of America**  
PO Box 1549, Brentwood, TN 37024  
Contact: Larry Montuori, Sales Representative  
615-377-0600 FAX: 615-377-2383  
*Product Lines and/or Services:* Manufactures strobe beacons designed to meet today's air traffic requirements & to enhance navigational safety. All products are professionally engineered to meet regulations set by the DGAC, ICAO, Transport Canada & FAA.

**Fluke Corporation**  
PO Box 9090, Everett, WA 98206-9090  
Contact: Debby Coyne, Product Publicity Mgr.  
*Product Lines and/or Services:* Compact, professional electronic test tools. Focuses on customers in service, manufacturing, test and quality functions in a variety of industries.

**Focal Press Broadcasting Pubs.**  
80 Montvale Ave, Stoneham, MA 02180  
Contact: Bill Lahey, National Sales Mgr  
800-366-BOOK FAX: 617-279-4851

**Force II Communications**  
750 B St Symphony Towers Ste #1910, San Diego, CA 92101  
Contact: Norm Feuer, President/CEO  
619-239-4242 FAX: 619-239-4270

**Format Productions**  
P.O. Box 466, Portland, OR 97207  
Contact: John Buck, President

**Record Highs  
This Summer**

7.5, 6.0, 5.3, 3.2, 7.3, 4.0, 5.3, 4.7, 3.7, 5.2, 6.1, 3.5, 4.7

**OLDIES**  
THE NEXT GENERATION  
from Format Productions

It's New, Hot, and Powerful. Stations from coast to coast are discovering that 25-46 year old demos are starving for music of the 70s. Over 2000 original songs of the era's superstars and one-hit wonders. All programmed into Selector & available on CD, DAT or MD.

**Contact John Buck at  
Phone: 503-223-4628  
FAX: 503-222-6408**

**Circle Reader Service 191**

**Formost Corporation**  
2025 Hamburg Turnpike, Wayne, NJ 07470  
Contact: Bill Formosa, President

**Mel Foster Tech Sales, Inc**  
7611 Washington Ave So, Edina, MN 55434  
Contact: Sales Mgr

**Fostex Corp of America**  
15431 Blackburn Ave, Norwalk, CA 90650  
Contact: Rick Cannata, Digital Applications Eng.  
310-921-1112 FAX: 310-802-1964  
*Product Lines and/or Services:* Full line of analog & digital recording products.

**Frankford Wayne Mastering**  
130 W 42nd #1000, New York, NY 10036  
Contact: Tom Steele, Sales Manager  
212-582-5473 FAX: 212-245-2309

**Freeland Products, Inc.**  
75412 Highway 25, Covington, LA 70433  
Contact: J. "Harry" Freeland, President  
504-893-1243 FAX: 504-892-7323  
*Product Lines and/or Services:* Rebuilders of high power vacuum tubes used in radio & TV transmitters. Also rebuilds some industrial types & UHF klystrons.

**Full Compass Systems**  
5618 Odana Rd, Madison, WI 53719-1208  
Contact: Jonathan Lipp, President  
608-271-1100 FAX: 608-273-6336

**Fuller Sound**  
1948 Riverside Dr, Los Angeles, CA 90039  
Contact: Mike Fuller, Owner  
800-468-6874 FAX: 213-660-2070

**Funke & Associates**  
908 Marilyn Dr, Campbell, CA 95008  
Contact: Sonny Funke, Applications Engineer  
800-748-6308 FAX: 408-866-1975

**Furman Sound Inc**  
30 Rich St, Greenbrae, CA 94904  
Contact: Joe Desmond, National Sales Manager  
415-927-1225 FAX: 415-927-4548

**Future Primitive**  
10850 Van Owen, N Hollywood, CA 91605  
Contact: Susan Michelson, President  
818-766-3700 FAX: 818-766-9669

**FWT, Inc**  
P.O. Box 8597, Fort Worth, TX 76112  
Contact: Roy Moore, Vice President Sales & Marketing  
800-433-1816 FAX: 817-429-6010  
*Product Lines and/or Services:* Mfr of comm twrs, shltts, equip cabinets & comm site wheels (COW). Custom design & build portable pwr restoration trlrs w/AC & DC outputs, portable generator trlrs. Turnkey installation of twr, shltt, foundations, site, civil services available.

**GC Electronics**  
125 Birch Street, Blountville, TN 37617  
Contact: Bruce Cooke, Owner  
615-323-2976 FAX: 615-323-2976

**GE American Communications**  
4 Research Way, Princeton, NJ 08540  
Contact: Andreas Georgiou, Dir. Bdct & Business Services  
609-987-4000 FAX: 609-987-4517  
*Product Lines and/or Services:* Operates 7 SATCOM dom sats (fire C band & 2 Ku-band) & provides trnspndr capacity on the Spacenet II hybrid sat. The SATCOM fleet serv the cable TV, broadcast radio & TV bus information & gymnt & maintains a sprgt netwk of Earth stns, ctrl trmln off and TT&C fac.

**GKM Mfg Corp**  
47 Bridgewater St, Brooklyn, NY 11222  
Contact: John D'Augelli, General Manager  
718-388-4114 FAX: 718-384-1325  
*Product Lines and/or Services:* 35 year manufacturing rack cabinets 22" wide, 20 1/4" wide and 20" wide with 45 heights and 6 depths.

**GL Enterprises**  
P.O. Box 99, Plantsville, CT 06479-0099  
Contact: Gregory Laporta, President  
203-238-0370

**GMI Media Group**  
2012 S 314th, Ste. 121, Federal Way, WA 98003  
Contact: Leslie Erak, Vice President  
206-839-9414 FAX: 206-839-5112  
*Product Lines and/or Services:* Creative IDs, sweepers, bumpers & promos, radio ID jingle pkgs, comm jingle pkgs for stn advtsrs, prgrmg & prod consultn. Also provide the GMI Talent Bank for stns' choice of ID or promo voice. All dig prod. Comm music & spec EFX libraries on CD.

**GML, Inc.**  
7821 Burnet Avenue, Van Nuys, CA 91405  
Contact: Mr. Cary Fischer, Vice President  
818-781-1022 FAX: 818-781-3828

**Gaines Audio**  
1237 E. Main Street, Rochester, NY 14609  
Contact: Jon Gaines, Owner  
800-442-0780

**Galaxy Audio**  
625 East Pawnee Avenue, Wichita, KS 67211  
Contact: G.L. Graves, Production Co-Ordinator  
800-369-7768 FAX: 316-263-0642  
*Product Lines and/or Services:* Mfrs the HOT SPOT (the orig compact loudspr) the HOT SPOT VC, the HOT SPOT PA III portble snd sys, the TRAVELER battry pwr snd sys, CHAMELEON series spkrs & access lor perm install, PRO SPOT ser 2 & 3-way ldsprks & the CRICKET POARITY TEST SET.

**Garner Industries**  
4200 N 48th St, Lincoln, NE 68504  
Contact: Brad Osthus, Product Sales  
402-464-5911 FAX: 402-464-6960

**Gefen Systems**  
6261 Variel Avenue, #C, Woodland Hills, CA 91367  
Contact: Hagai Gefen, President  
800-545-6900 FAX: 818-884-3108

**Geleco**  
2 Throncliffe Park Drive #28, Toronto, Ont, M4H 1H2 CANADA  
Contact: Gerald Lee  
416-421-5631 FAX: 416-421-3880

**General Broadcast Supply Inc.**  
HC 31 Box 128, Deer, AR 72628-9606  
Contact: T.S. Butler, President  
501-253-8127 FAX: 501-253-6151

**Generation Technologies Corp**  
6420 West 110th St, #100, Overland Park, KS 66211  
Contact: Mike Bennett, President  
913-345-1012 FAX: 913-345-0156  
*Product Lines and/or Services:* Designated Newstar 1 in the '70s. Now implementing highly-intgrtd, fully-redundant PC-based newsroom sys. Wires capture & database, text proc, lineups, Email & bureau comm, mach cntrl. Sys in use at CBS News, WGN Radio, Tribune Med Serv.

**Gentner Communications Corp.**  
1825 Research Way, Salt Lake City, UT 84119  
Contact: Elaine Jones, Marketing Director  
801-975-7200 FAX: 801-977-0087  
*Product Lines and/or Services:* Telephone products incl couplers, portable units, analog hybrids, digital hybrids & new super hybrids (w/ line & acoustic echo cancelling). VRC-2000 remote control sys & access. Dist amps. Patch pnls, both chass enclsd & custm wrld. On-air aud processor.

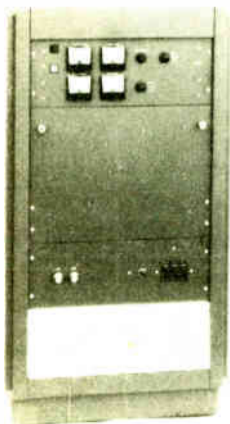
**Geppo International Inc**  
2225 West Hubbard, Chicago, IL 60612-1613  
Contact: Larry Smith, Sr., VP Technical/Marketing  
312-733-9555 FAX: 312-733-6416  
*Product Lines and/or Services:* Viedo & audio cables available in bulk or cut to custom requirmnts. Single pair & multi pair constrctns. Mic, coaxl, triaxl, video/audio compsite, digital audio & video & dual stereo cbles. Breakout boxes, cable reelers, cable assembl, custm pnls, rack mount chassis. Aud & vid cntrns.

**GBS-Giesler Broadcasting Sply**  
5914 Maple, Houston, TX 77074  
Contact: Bernie Giesler, President  
713-774-3314 FAX: 713-774-1306

**Golden Hare Media Bdt Serv Div**  
Rt 1, Box 28-D US Rt 19 South, Morgantown WV 26505  
Contact: Daniel Whitaker, President  
800-972-7043 FAX: 304-983-4653  
*Product Lines and/or Services:* Provides a complete aud vid prod fac. Prod radio & TV comm. Aud fac outfttd w/Mackie 24x8x2 board, Otari MX5050 Mark IV, Techniques & Tascam equip. Vid fac is equipd w/Panasonic MII equip, 2 Panasonic WV-F700 docked cams, Tempest DVE & Toaster 4000.

**Golden Hare Stage & Lighting**  
Rt 1, Box 28-D US Rt 19 South, Morgantown, WV 26505  
Contact: Daniel S. Whitaker, President  
800-972-7043 FAX: 304-983-4653  
*Product Lines and/or Services:* Provides stage/concert lting to primly sm to med size venues. Stocks Intellabeam 700HX, Emulators, & Color Pro Intelligent lting, Par 64s, effects & grnd supp trussing, "Flown" trussing & professional series sound sys w/full monitors also avail.

## FM Transmitters have never offered this much for so little!



### HENRY RADIO FM AMPLIFIERS offer these standard features:

- Single tube grounded grid output with solid state IPA
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Charlottesville, VA 22901

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Electronics**

## COMARK Antennas



FM Broadcast Antennas  
Circularly & Horizontally Polarized antennas available  
Multiple bays available

## Marti STL 15-C Composite STL System



Composite FM Stereo with 2 subcarriers  
140 - 960 Mhz freq. range available  
Digital Stereo Audio (with external Modems)

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RFC 1-B Dial Up Remote Control  
Automatic Transmitter power control  
Alarm dial out for 6 numbers  
Timed functions for day/night power levels etc  
Optional RS-232 computer interface  
Up to 64 channels of control and metering

## SINE SYSTEMS

### DAI-1 Dial up Audio Interface



**Aviod Heavy Fines for EBS Non-Compliance**  
Easily handles EBS requirements for "walk away" Operations  
Allows direct access to the air chain  
Remote Broadcasts (no one at the station)



**Gold Line**  
Box 500, West Redding, CT 06896  
Contact: Marj Miller, VP Sales  
203-938-2588 FAX: 203-938-8740

**Gordon Rice Associates**  
P.O. Box 20398, Charleston, SC 29413-0398  
Contact: Gordon Rice, President  
803-884-3590 FAX: 803-881-0358  
*Product Lines and/or Services:* Radio and television station brokerage, fair market value appraisals and media investment analysis.

**Gorman Media**  
19754 Tan Bark, Strongsville, OH 44136  
Contact: Michael Rose, Dir Ops  
216-572-1171 FAX: 216-572-6667  
*Product Lines and/or Services:* Radio consulting for the programming, promotion and marketing of the following formats: CHR, AOR, Oldies.

**Gorman-Redlich Mfg Co**  
257 W Union St, Athens, OH 45701  
Contact: Jim Gorman, Owner  
614-593-3150, FAX: 614-592-3898  
*Product Lines and/or Services:* Emergency bdcst sys equipement. Encoders, decoders & encoder-decoder model CRW weather radio for NOAA alerts, dig ant monitors, for AM directional array model CMR for locations that are remote controlled & model CM for locations where remote control is not required.

**Godwy Printcraft Press**  
22 N Serra Madre, Colorado Springs, CO 80903  
Contact: Michael Murt, Sales Manager  
719-634-1593 FAX: 719-632-0762  
*Product Lines and/or Services:* Goal Line Guide is a value-added feature to your commmer sched. Uses the interest in fbl to help sales reps sell clnts who are tradtnly non-rad users and help secure longer-term cmmntnts from presnt clients

**G Prime, Ltd.**  
1790 Broadway 8th Fl, New York, NY 10019  
Contact: Jerry Graham, President  
212-765-3410 FAX: 212-265-8459  
*Product Lines and/or Services:* Studio condensed microphones from Microtech Gefell, digital signal processing systems from Harmonia Mundi Acoustica, D.Weiss Engineering, audio & designs, EMT reverberation units.

**Graham-Patten Systems**  
13451 Colfax Hwy, PO Box 1960, Grass Valley, CA 95945  
Contact: Jim Prouty  
916-273-8412

**Ronald J. Grandmaison, P.E.**  
11213 Split Rail Ln, Fairfax Station, VA 22039  
Contact: Ronald J Grandmaison, President  
703-764-0513

**Grass Valley Group Inc**  
Box 1114, Grass Valley, CA 95945  
Contact: Jay Cook, Advertising Manager  
916-478-3000 FAX: 916-478-3187

**Graysonics**  
P.O. Box 1338, Evanston, IL 60204-1338  
Contact: John Grayson, Owner  
708-869-0001 FAX: 708-869-0017  
*Product Lines and/or Services:* Dists both new & used bdcst equip. Many customers trade in srpls gear for new equip. To receive a copy of the qtrly flyer contning used equip invntry & other info, send a written request on your stn letterhd. Welcome off lease inquiries.

**Group One Ltd.**  
80 Sea Lane, Farmingdale, NY 11735  
Contact: Jack Kelly, President  
516-249-1399 FAX: 516-753-1020  
*Product Lines and/or Services:* Exclusive U.S. distributor for Focusrite Signal Processing and Recording consoles, KRK Monitoring Systems, Uptown Moving Faders Automation, & XTA Signal Processing.

**James Grunder & Assoc Inc**  
5925 Beverly, Mission, KS 66202  
Contact: Amy Flickinger,  
Advertising Manager  
913-831-0188 FAX: 913-831-3427

**Guarantee Radio Supply**  
1314 Iturbide St, Laredo, TX 78040  
Contact: M Flores/A Robledo, Pres  
512-723-6913 FAX: 512-727-8458

**HM Electronics Inc**  
6675 Mesa Ridge Rd, San Diego, CA 92121  
Contact: Bruce Siemmer,  
General Sales Manager  
619-535-6060 FAX: 619-552-0139

**Hagen Media Research**  
P.O. Box 40542, Washington, DC 20016-0542  
Contact: Oon Hagen, President  
703-534-3003 FAX: 703-534-3073  
*Product Lines and/or Services:* Totally original, totally custom research. Hagen Media Research provides market-exclusive research services to broadcasters through out the U.S. and Puerto Rico. Among these are focus groups, perceptual studies and music tests.

**Halland Broadcast Services Inc**  
1289 E Alosta Avenue, Glendora, CA 91740  
Contact: Steve Steinberg, VP/ Sales Manager  
818-963-6300 FAX: 818-963-2070  
*Product Lines and/or Services:* CD Music libr at an affordable price. Oldies, Gold, AC, CHR, & new Contemptry Country libry in stock Over 3,200 songs avail on 160 CD's. All original vers by the original artists Digltly remstrd. Database on flpy provded at no charge.

**Hall Electronics**  
1305-F Seminole Trail, Charlottesville, VA 22901  
Contact: Jon Hall, President  
804-974-6466 FAX: 804-974-6450  
*Product Lines and/or Services:* Offer new & rebuilt equipment for radio stations & studios. Sell new components such as tapes as well. An Otari & Tascam service center & offer repair & rebuilding services for customer equipment in electronics shop.

**Mart Haller Inc**  
PO Box 140159, Coral Gables, FL 33114  
Contact: Pat Haller, President  
305-444-4617 FAX: 305-445-7551

**Hallikainen & Friends Inc**  
141 Suburban Rd, San Luis Obispo, CA 93401  
Contact: Harold Hallikainen, Pres  
805-541-0200 FAX: 805-544-6715  
*Product Lines and/or Services:* Mfrs prgmble multisite trnsmttr contrl sys. capable of auto contrl, limit checking, logging, & full scrn displly of sys paramtrs. Sites can be linked by voice grade circuits, subcarr, dedicatd rad links or pkt rad. Also mfrs telemtry update kits.

**Hamtronics, Inc.**  
65 Moul Rd, Hilton, NY 14468-9535  
Contact: Joan Vogt, Sales Manager  
716-392-9430 FAX: 716-392-9420  
*Product Lines and/or Services:* Mfrs & customz narrowband FM trnsmttr & rcvr modules for VHF & UHF bands, incl complete repeaters, data modms & access such as receiver pre-amps & helical front end fltrs. Bdcst stns often use these modules as low-cost voice & data links.

**Hammett & Edison, Inc**  
P.O. Box 280068, San Francisco, CA 94128  
Contact: William F. Hammett, P.E., Managing Director  
415-342-5200 FAX: 415-342-8428

**C.B. Hannay & Son, Inc.**  
600 East Main Street, Westerlo, NY 12193  
Contact: Edward A. Rash, Advertising Manager  
518-797-3791 FAX: 800-REELING

**Harnack Engineering**  
2561 Jenwood Street, Memphis, TN 38134  
Contact: Kirk Harnack, President  
800-366-7618 FAX: 901-377-6676  
*Product Lines and/or Services:* Provides cost-effective eng services to bdcstrs. Small studio improvements to transmitter facility design & troubleshooting. Audio work, STL, remote control, audio processing, proofs, trnsmttrs & digital automation.

**Harris Allied Florence**  
7920 Kentucky Drive, Florence, KY 41042  
Contact: Joe Mack/ Jay Adrick, Sales/ Systems Prod Line Dir.  
606-282-4800 FAX: 606-283-2818  
*Product Lines and/or Services:* Fixed facilities (studio, prodctn, post-prodctn, master control studios, regional cable networks, fiber optic links); comprehensive range of mobile prodctn, ENG & satellite comm systems. Extensive sys consultation; 24-hr support.

**Harris Allied Quincy**  
3200 Wisman Lane, PO Box 4290, Quincy, IL 72305-4290  
Contact: Gaylen Evans, Director, Field Sales  
Geoffrey N. Mendenhall, VP, Radio RF Product Line Director  
217-222-8200 FAX: 217-224-1439  
*Product Lines and/or Services:* Gates Series 1-5 kW solid state MW transmitters; DX Series 10-2100 kW digital solid state MW transmitters; phasing systems; shortwave 50 and 100 kW transmitters; Digit™ digital FM exciter; THE-1 FM exciter; Quest Series 100-1000W solid state FM transmitters; HT 1m 250-1000 W solid state transmitters; Platinum Series 2-20 kW solid state FM transmitters; HT Series 3.5-35 kW FM transmitters; FM antennas; complete broadcast/transmission systems. Extensive product/systems consultation; 24-hour technical assistance and parts; field service; factory repair; Broadcast Technology Training Center with regularly scheduled general RF and Harris transmitter training programs.

**Harris Allied Richmond**  
3712 National Road West, Richmond, IN 47375  
Contact: Scott Beeler, Manager, Broadcast Resource Center; Jeff Nordstrom, Manager, Satellite Sales; James Woods, Product Line Director  
800-922-0022 FAX: 317-962-8961  
*Product Lines and/or Services:* Comprehensive range of radio studio equipment and radio satellite equipment, with more than 10,000 products from over 350 manufacturers. Radio studio product line includes nearly 200 digital products. Distributes many products on an exclusive basis. Extensive product consultation; equipment exchange; factory-authorized service center for many products Harris Allied distributes.

**Harris and Associates**  
1907 Darby Road, Havertown, PA 19083  
Contact: George Harris, President  
215-789-0100 FAX: 215-789-2184  
*Product Lines and/or Services:* Consultant firm - AOR, Classic Rock, Modern Rock Programming, Marketing & Promotion, Management.

**Harrison by GLW**  
437 Atlas Drive, Nashville, TN 37211  
Contact: Tom Irby, VP/ Sales & Marketing  
615-331-8800 FAX: 615-331-8883

**Harry Nelson & Associates**  
17610 Midway Road, #134291, Dallas, TX 75287-6741  
Contact: Harry Nelson, President  
214-307-8773 FAX: 214-306-3961

**Hartmann Associates**  
5 Nestlingwood Dr, Long Valley, NJ 07853  
Contact: A David Hartmann, Pres  
201-850-3750 FAX: 201-850-3511

**Harvey Smith & Associates**  
1607 Palmer Ave, Pueblo, CO 81004  
Contact: Harvey Smith, Owner  
719-561-9535 FAX: 719-561-9555


**Charles A. Hecht & Assoc., Inc**  
16 Doe Run, Pittstown, NJ 08867  
Contact: Charles A. Hecht, President  
908-730-7959 FAX: 908-730-7408  
*Product Lines and/or Services:* Radio engineering services including allocation studies & prep of FCC application, directional antenna design, field work, facility inspections, expert witness testimony & prep of technical litigation. Specialists in audio processing optimization.

**HEDCO**  
920 Corporate Lane, Chesapeake, VA 23320  
Contact: Steve Miller, Vice President Sales  
804-548-2300 FAX: 804-548-4088

**Karl Heitz Inc**  
34-11 62nd Street, Woodside, NY 11377  
Contact: Esther Conde, Marketing Manager  
718-565-0004 FAX: 718-565-2582

**Henry Engineering**  
503 Key Vista Dr, Sierra Madre, CA 91024  
Contact: Hank Landsberg, Owner  
818-355-3656 FAX: 818-355-0077  
*Product Lines and/or Services:* The Matchbox & other 'problem solver' prod. New telephone info sys interactive multi-message caller info sys. New "Fast Trac II" voice-over aud wrkstn "Studio-In-A-Box" New "StereoSwitch" stereo aud switcher. Fax-on-demand: 818-355-4210,j5

**Hickman Associates**  
29 Manor Drive, Newton, NJ 07860  
Contact: Ron Hickman, President



**Telephone Information System**

"Press 1 for traffic, press 2 for sports, press 3 for concert info, press 4 for..."

The Telephone Information System is a caller-interactive system for radio station "information lines". The TIS stores up to 10 separate messages in its digital memory. The caller selects message(s) for instant playback by simply pushing the buttons on his phone! Messages are easily updated. Over 8 minutes of information can be stored in the TIS memory.

**Contact Henry Engineering at**  
**Phone: 818-355-3656**  
**FAX: 818-355-0077**

**Circle Reader Service 72**

**Hatfield & Dawson Consult Engr**  
4226 Sixth Ave, NW, Seattle, WA 98107  
Contact: Benjamin F. Dawson, President  
206-783-9151 FAX: 206-789-9834  
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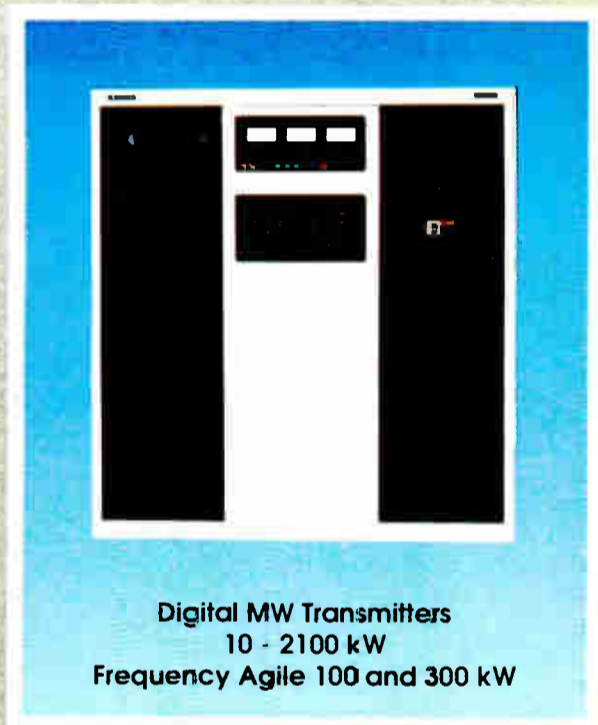
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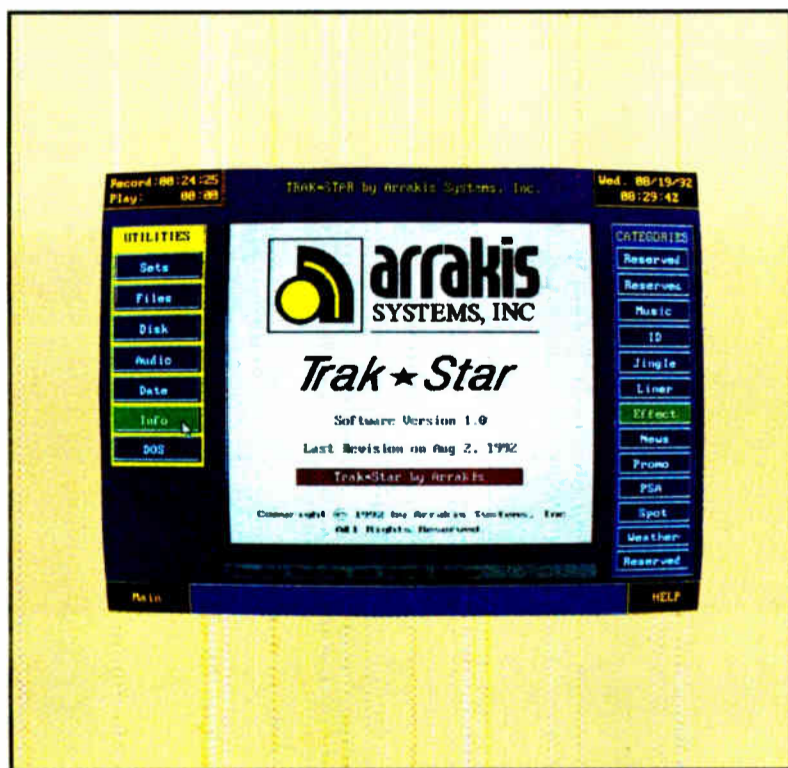
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Digilink is the #1 selling digital audio hard disk system in radio today. You can replace your cart machines for live On Air and have an automation system for walk away at the same time! Link over 15 workstations & scheduling computers on our digital network and transfer audio and schedules between your studios.



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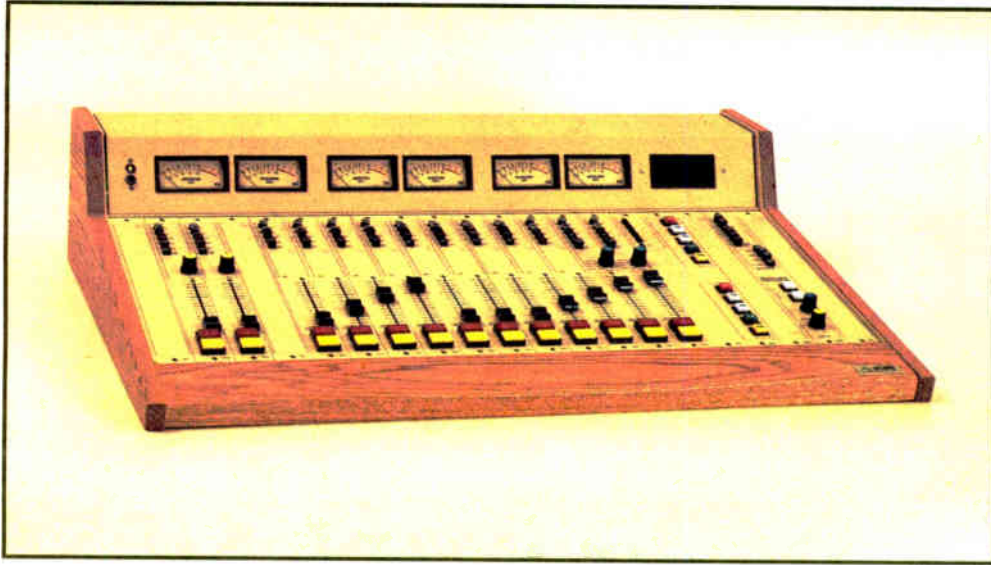
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Standard Tabletop Mainframe displayed above

- Totally Modular Console-Input-output-monitor
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- Talkback-two studios w/monitor dim
- Telephone interface-2 internal mix minus buses
- Timer-60 minute digital up timer standard
- Options-DA module, Remote selector module, Dual Machine Control Module

### Typical List Price

**\$4,000 - \$7,000**

From France...to Moscow...to Japan and Taiwan, and around the world...the 12,000 console is On the Air.

The 12,000 is the #1 selling Arrakis console line from the #1 console manufacturer. With three stereo output buses and two mix-minus buses for telephone interface, the 12,000 can fill any application. The 12,000 also supports a control room and two studios standard. Panning or Mode select are available on the four models of input modules, VCA control of audio delivers reliability and performance.

Quality, performance, and durability make Arrakis consoles the leader around the world.



Deluxe thru-table mainframe displayed below

14 1/4" x 20 3/4"

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Contact: David R. Benoit, Owner  
904-664-6492

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Contact: Robert A. Dock, VP Sales & Marketing  
914-793-5000 FAX: 914-793-5092

**Kintronic Laboratories, Inc.**  
PO Box 845, Bristol TN 37621  
Contact: Tom F. King, President  
615-878-3141 Fax: 615-878-4224  
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Contact: Allan Nichols, Director of Sales & Marketing  
800-695-1010 FAX: 616-695-0470  
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Contact: Richard L. Kozacko, President  
607-733-7138 FAX: 607-733-1212  
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Contact: Kris Erik Stevens, President  
818-981-8255 FAX: 818-990-4350

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800-522-4464 FAX: 919-757-0279  
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Contact: G.J. Wilson, President  
301-698-2200 Fax: 301-698-7952  
*Product Lines and/or Services: Supplies and installs FM master antennas & combiners, single frequency FM antennas. Broadcast towers in all height ranges. LDL is part of the LeBlanc Group & supplies towers manufactured by the LeBlanc Companies & antennas from the Alan Dick Co.*

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Contact: Bob Nelson, Branch Manager  
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*Product Lines and/or Services: AM, FM, TV, LPTV engineering services, field surveys, facility upgrade studies, coverage maps, arbitron radio audience studies, market evaluations.*

**Leader Instruments Corporation**  
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Contact: Joe Fisher, Product Marketing Manager  
516-231-6900 FAX: 516-231-5295

**Leaming Industries**  
15339 Barranca Pkwy, Irvine, CA 92718  
Contact: Kim Litchfield, Technical Sales  
714-727-4144 FAX: 714-727-3650

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Contact: Lee Bayley, President  
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800-231-9673 FAX: 804-548-4088  
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Contact: Larry Rich, Bdcst Sales Mgr  
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Contact: Ralph L. Auer, VP Marketing  
303-447-2828 FAX: 303-447-8122  
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Contact: Bob Lindahl, President  
503-644-9643 FAX: 503-227-3776

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Contact: Bud Lines, Vice President  
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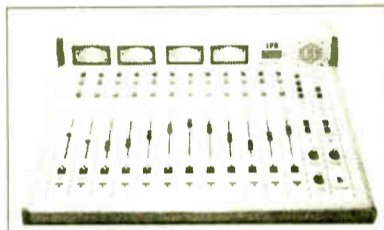
**MCL Inc**  
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Contact: Frank Morgan, Ad Manager  
708-759-9500 FAX: 708-759-5018

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703-620-0333 FAX: 703-620-0415

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Contact: Rick Sanchez,  
Bdct & Prod. Marketing Manager  
800-877-1771 FAX: 818-444-1342

**Marti Electronics**  
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Contact: Mike Hesser, President  
805-543-9214 FAX: 805-543-9243  
*Product Lines and/or Services:* Single-source turnkey consulting service for the acquisition, mgmt & financing of radio stations. We become a vital member of your team by offering high quality services for investors, GMs, station owners and/or lenders.

**Media Communications Partners**  
75 State Street #2500, Boston, MA 02109  
Contact: John G. Hayes, Associate  
617-345-7200 FAX: 617-345-7201

**Media Computing Inc**  
3506 East Meadow Dr, Phoenix, AZ 85032  
Contact: Larry L Baum,  
Manager Technical Operations  
602-482-9131 FAX: 602-992-6572  
*Product Lines and/or Services:* T.E.N. (The Electronic Newsroom) PC based automation software for news, PROtec PC-based technical equipment automation control software.

**Media Perspectives**  
606 Cooper Landing Rd, Bldg A St4B, Cherry Hill, NJ 08002  
Contact: Steven Apel, President  
609-482-7979 FAX: 609-482-0957

**Media Sales/ South**  
5609 Brooke Ridge Rd, Atlanta, GA 30338  
Contact: Nick Imbornone, President  
404-393-3393 FAX: 404-551-9285  
*Product Lines and/or Services:* Radio station brokerage - medium to small markets in the Southeast.

**Media Systems**  
1600 Fremont Lane, Vienna, VA 22182  
Contact: Anne Clougherty, President  
703-757-7070 FAX: 703-757-7974  
*Product Lines and/or Services:* SalesSCAN, a unique software prgm desgnd for the bdcst ind to track advtsg sales & provide

a complete acct mgmt sys. Use SalesSCAN to assign acctns to AEs, track sales & call hist & provide complete acct list-ings, phone directories & mailing labels.

**Media Touch Music**  
13450 Spring Grove Avenue, Dallas, TX 75240  
Contact: David Gerey, Director of Sales  
603-893-5104 FAX: 603-893-6390

**Media Touch Systems, Inc**  
50 Northwestern Dr, #11, Salem NH 03079  
Contact: Jim Waterman, Director of Sales  
603-893-5104 Fax: 603-893-6390  
*Product Lines and/or Services:* Supplier of MediaDISK digital audio systems & OpLOG automation/live assist studio control systems. Operating on standard IBM compatible 486 PCs & integrated on a Novell LAN, each system is modular to serve large to small stations including multiple programming for duopolies. MTS integrates with most traffic music scheduling systems. MediaDISK supports Dolby AC-2 & MPEG.

**Media Venture Partners**  
1650 Tysons Blvd #790, McLean, VA 22102  
Contact: Charles Giddens, President  
703-827-2727 FAX: 703-827-2728

**Metro Ratings**  
11543 W 83rd Terrace, Lenexa, KS 66214  
Contact: Bill Lochman, Marketing Director  
800-879-1729 FAX: 913-888-4423  
*Product Lines and/or Services:* Telephone-response audience measurement: On-Line service provides complete quantitative & qualitative data on listener behavior within 24 hrs from tabulation. Metro Ratings provides reliably large samples, measured in quarter-hour shares & ratings.

**Metro Weather Services Inc.**  
507-535 Rockaway Ave, STE 3, Valley Stream, NY 11581  
Contact: Pat Pagano, President  
800-488-7866 FAX: 516-568-8853  
*Product Lines and/or Services:* Customized forecasts for all areas by fax, audio taped or live reports via phone. Crop & farming forecasts, marine, ski resort area frcasts, bio-weather, 5-day & long-range weather forecasts.

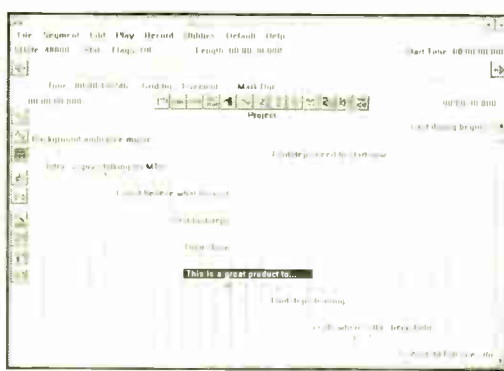
**Micro Controls Inc**  
228 NE Wilshire, Suite E, Burleson, TX 76028  
Contact: Jeff Freeman, President  
817-295-0965 FAX: 817-295-0965  
*Product Lines and/or Services:* Manufacturer and RF service center for Micro Controls' broadcast equipment line, consisting of audio microwave and remote control equipment.

**Micro Phase Communications Inc**  
999 C Edgewater Blvd, #138, Foster City, CA 94404  
Contact: Roger K. Parr, President  
415-368-8379

**Micro Technology Unlimited**  
P.O. Box 21061, Raleigh, NC 27619-1061  
Contact: Dave Cox, President  
919-870-0344 FAX: 919-870-7163

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**Microdyne Corporation**  
491 Oak Road, Ocala, FL 32672  
Contact: Thomas H. Kidd, International Sales Manager  
904-687-4633 FAX: 904-687-3392

**Micron Audio Products Ltd**  
410 Garibaldi Avenue, Lodi, NJ 07644-3710  
Contact: Paul Tepper, President  
201-777-7223 FAX: 201-777-5585  
Product Lines and/or Services: Complete line of wireless microphone sys for ENG, EFP, film & stage applications. Mobile & rack sys. UHF/VHF. Hand-held & pocket transmitters. Diversity multi-channel sys. SQN portable stereo/mono location audio mixers. TRAM electromics.

**Microtran Co**  
145 East Mineola Ave PO Box 236, Valley Stream, NY 11582-0236  
Contact: Janet Drobnicki, Advertising Dept.  
516-561-6050 FAX: 516-561-1117

**Microwave Filter Co**  
6743 Kinne St, E Syracuse, NY 13057  
Contact: Jean Downu, Technical Sales Supervisor  
800-448-1666 FAX: 315-463-1467  
Product Lines and/or Services: Passive electronic filters, traps & filter networks for interference suppression or signal processing. Line of "high Q" band pass filters and traps for suppressing intermodulation

**Microwave Networks Inc**  
10795 Rockley Road, Houston, TX 77099  
Contact: Michael Engle, Vice President of Marketing  
713-495-7123 FAX: 713-879-4728  
Product Lines and/or Services: Designs, mfrs & mkts digital microwave prod for use in wireless networks for telephone, video & local area netwo rk applications worldwide. Hdqtrrd in Houston, TX. w/offices in Mexico Cty, Singapore & Sydney, Australia.

**Mid-America Automation Corp**  
1822 Laramie, Manhattan, KS 66502  
Contact: Dave McFarland, Pres  
913-537-3289

**MidAmerica Electronics Service**  
410 Mt Tabor Road, New Albany, IN 47150  
Contact: Peter C.L. Boyce, President  
800-880-7234 FAX: 812-945-1859  
Product Lines and/or Services: AM & FM field engineering services, antenna measurements. AM stereo installation & proof-of-performance. AM & FM spectrum analysis. NRSC compliance measurements, new construction and re-builds.

**Midle Atlantic Products**  
PO Box 29, 8 North Corp Dr., Riverdale, NJ 07457  
Contact: Eric Demarest, National Sales Manager  
800-270-7225 FAX: 201-839-1976  
Product Lines and/or Services: Full line of 10" EIA racks & accessories. New AX-S ser rcks allow equip rcks to be installd against the wall. equip pulls out to 48" on serv trcks for ease in install, maintnc serv & optimzes flr space. RSH ser custm rckmmts for any nonrckmntble equip.

**Midlen & Guillot**  
3238 Prospect St, N.W., Washington DC 20007  
Contact: Greg Guillot, Partner  
202-333-1500 FAX: 202-333-6852

**Mid-State Comm & Electronics**  
One Clear Road, Oriskany, NY 13424  
Contact: David Stevenson, Project Management  
315-736-3061 FAX: 315-736-8250

**Miller, Kaplan, Arase & Co.**  
10911 Riverside Dr., North Hollywood, CA 91602  
Contact: George Nadel Rivin, Partner  
213-872-6171 FAX: 213-769-3100  
Product Lines and/or Services: Full service accounting and tax work and research services including market revenue reports, salary surveys and sales pacing reports.

**Miller Tower Company**  
60 West 57th street, Suite 5E, New York, NY 10019  
Contact: Keith Miller, Vice President  
212-582-2063 FAX: 212-262-2416

**Mirkwood Engineering**  
50 Park Avenue, Claremont, NH 03743  
Contact: Gary Savoie, President  
603-542-6784 FAX: 603-543-8930  
Product Lines and/or Services: A multidiscipline eng & plnng firm providing applictn & alloc serv; proj, eng & construct mgmt; site acquis; rural & remote install; field serv. Also providing telecom, util & timber ind w/computer composed terrain graphics in true perspective.

**Milam Audio Co**  
1470 Valle Vista, Pekin, IL 61554  
Contact: Ken Musselman, Sales Mgr  
309-346-3161 FAX: 309-346-6431

**Jay Mitchell Associates, Inc.**  
PO Box 1285, Route 2, Fairfield, IA 52556  
Contact: Jay Mitchell, President  
515-472-4087 FAX: 515-472-6457  
Product Lines and/or Services: Provides expertise in management, marketing, programming, sales, research, and personnel to radio stations in all market sizes.

**Mitsubishi International Corp**  
1597 McCandless Drive, Milpitas, CA 95035  
415-651-9931

**MJM Research Inc.**  
11539 W 83rd Terrace, Lenexa, KS 66214  
Contact: C.C. McCartney, President  
913-888-3366 FAX: 913-888-4423  
Product Lines and/or Services: In service to the radio industry since 1977. Provides hook-tape production, listener screening, fielding, & tabulation for all music testing, perceptual studies, focus groups & promotional telemarketing.

**Modulation Sciences Inc**  
12A World's Fair Drive, Somerset, NJ 08873  
Contact: Art Constantine, VP, Sales & Marketing  
800-826-2603 FAX: 908-302-0206

Product Lines and/or Services: Mfrs RDS/RBDS coders, RDS/RBDS data rcvrs, RDS/RBDS mntrs, "ModMinder" modltn mntr/analyser, "StereoMaxx" spatial image enlarger, model CP-803 composite proc, "Sidekick" aud & data subcar gntrrs, data SCA rcvrs, "Wired STL" sys.

**Moffet, Larson & Johnson Inc**  
5203 Leesburg Pike, Suite 800, Falls Church, VA 22041  
Contact: A. Richard Burke, President  
703-824-5660 FAX: 703-824-5672  
Product Lines and/or Services: A full-serv telecom eng cnslt firm. Advncd ntwrk dsgn supp, softwr dsgn tools & database serv to the telecom ind. Specialize in dsgn & dev of advncd mobile, bdcst & common car radio sys. MLJ has served the telecom ind for over 40 yrs.

**Monfort Electronics Mkt**  
8788 Robbins Rd, Indianapolis, IN 46268  
Contact: Sales Mgr  
FAX: 317-876-2384

**Monroe Electronics Inc**  
100 Housel Ave, Lyndonville, NY 14098  
Contact: Roland Phillips, Manager of Technical Sales  
800-821-6001 FAX: 716-765-9330  
Product Lines and/or Services: Manufactures and distributes remote control systems for standard dial-up telephone line or leased line applications. We also design and manufacture time/one/remote switching equipment, DTMF encoder, DTMF decoder & phone answr cards.

**Moody Broadcasting Network**  
820 N. Lasalle Drive, Chicago, IL 60610  
Contact: Bob West, Director of Network Development  
800-621-7031

**Morcom International**  
5130 Duke Street, Suite 6, Alexandria, VA 22304  
Contact: Manuel Ojeda  
703-750-3414

**Morning Show Consulting Group**  
239 Muirfield Ct., Columbia, SC 29212  
Contact: Jim Crossan  
803-781-6608 FAX: 803-781-7820  
Product Lines and/or Services: Morning and personality radio resource. Faxed comedy, ideas, and monthly newsletter. Personality radio coaching and air check review services.

**Morrie Trumble & Assoc., Inc.**  
139 Fulton Street, #917, New York, NY 10038  
Contact: Morrie Trumble, President  
212-233-1736 FAX: 212-571-1422  
Product Lines and/or Services: Recreation & leisure events short and long form programs, Christmas and holiday specials. News and political commentary features. Delivered by satellite. Switched 56 or tape/disc.

**Moseley Associates Inc**  
111 Castilian Dr, Santa Barbara, CA 93117  
Contact: J. Hamdani/D. Chancey, Exec. VP & COO/Natl Sales Mgr  
805-968-9621 FAX: 805-685-9638  
Product Lines and/or Services: Mfr of bdcst remote cntrl sys & aur micrvv links. Moseley equip telecntrls over 5,000 remote cntrl sys in the aviattn, utility, satellite, telecom & bdcst ind.

**Motorola AM Stereo**  
1216 Remington Rd, Schaumburg, IL 60173  
Contact: Steve Kravitz  
312-576-0554 FAX: 312-576-3258

**MRN Radio**  
1801 International Speedway Blvd, Daytona Beach, FL 32114  
Contact: John McMullin, President/GM  
904-254-6760 FAX: 904-254-6716  
Product Lines and/or Services: Provides live cover of NASCAR stock car racing from mjr spdwys across America, over 50 events i.e. the Daytona 500 from Daytona Int'l Spdwy. MRN Radio also produces "NASCAR LIVE" evry Tuesday nt, "NASCAR TODAY" M-F, & World of Racing M-F during drivetime.

**Mullaney Engineering Inc**  
9049 Shady Grove Court, Gaithersburg, MD 20877  
Contact: John J Mullaney, President  
301-921-0115 FAX: 301-590-9757  
Product Lines and/or Services: Consult eng serv to the radio & TV industry. Currently provides serv in AM, FM, TV, MDS/ITFS, LPTV, cellular & environmental radiation analysis.

**Multiphase Consulting**  
9001 Braddock Rd, #230, Springfield VA 22151  
Contact: John Bisset, Project Mgr  
703-323-7180 Fax: 703-764-0751  
Product Lines and/or Services: Planning, installation & maintenance of new & existing broadcast studio & transmission facilities. Contract engineering labor, rent an "extra pair of hands" for your next project. Broadcast test equipment rental. Studio & transmitter equip repair services either at your site or in our shop. SBE certified equipment engineers.

**Murphy Studio Furniture**  
4153 N Bonita St, Spring Valley, CA 92077  
Contact: Dennis Murphy, Pres  
619-698-4658 FAX: 619-698-1268

**Music Director Programming**  
PO Box 51978, Indian Orchard, MA 01151  
Contact: Budd Clain, General Manager  
413-783-4626 FAX: 413-783-3168  
Product Lines and/or Services: Complete Oldies libr for A/C.

Country, CHR, Christmas, sold as a buyout, with no monthly payments. Libr avail on CDs, DAT, or anlg reel-to-reel. Custom oldies from your "want list." A/C EXPRESS, A/C current hits twice mnthly.

**Music Service Associates**  
8706 S. 71st East Ave., Tulsa, OK 74133  
Contact: Robert Tomarkin, President  
918-492-7222 FAX: 918-492-2211  
Product Lines and/or Services: Oldies services for radio stations. FAX us your list of oldies needs. Hard-to-find and stereo hits.

**Myat Inc**  
380 Chestnut Street, P.O. Box 425, Norwood, NJ 07648-0425  
Contact: Philip Cindrich, President  
201-767-5380 FAX: 201-767-4147

**Nady Systems Inc**  
6701 Bay Street, Emeryville, CA 94608  
Contact: Howard Zimmerman, Director of Sales  
510-652-2411 FAX: 510-652-5075  
Product Lines and/or Services: Manufactures VHF and UHF wireless microphone systems for the broadcasting and live entertainment industries.

**Nakamichi America Corp**  
19701 S Vermont Ave, Torrance, CA 90502  
Contact: Kim Wilson, Natl Sales Coordinator, Pro Audio  
213-538-8150 FAX: 213-324-7614

**Nalpak Video Sales Inc**  
1937-C Friendship Dr, El Cajon, CA 92020  
Contact: Robert Kaplan, President  
619-258-1200 FAX: 619-258-0925

**National Audio Co Inc**  
Box 3657, G.S., Springfield, MO 65808  
Contact: Steve Stepp, President  
417-863-1925 FAX: 417-863-7825

**National Supervisory Network**  
PO Box 578, Avon, CO 81620  
Contact: Bill Sepmeier, Pres  
800-345-8728

**Nautel**  
201 Target Industrial Circle, Bangor ME 04401  
Contact: Bruce MacKenzie, Bdc Sales  
207-947-8200 Fax: 207-947-3693  
Product Lines and/or Services: Solid state AM radio transmitters that range in power from 1 kW to 50 kW, as well as solid state FM transmitters at 4 kW & 7 kW power levels with a 10 kW to be introduced in 1994.

**Nautel Electronic Laboratories**  
Hacketts Cove, RR 1, Taftallon, NS BOJ 3JO CANADA  
Contact: Jorgen Jensen, Manager Sales & Marketing  
902-823-2233 FAX: 902-823-3183

**NBA Radio**  
450 Harmon Meadow Blvd, Secaucus, NJ 07094  
Contact: Thomas Carelli, Executive Producer  
201-865-1500 FAX: 201-974-1146  
Product Lines and/or Services: Live coverage of the Game of the Week, NBA All-Star Game, playoffs, conference finals, NBA Finals and the NBA draft. Produced, cleared and sold by the NBA.

**Neotek Corp**  
1154 W Belmont, Chicago, IL 60626  
Contact: Tom Der, Sales & Support Manager  
312-929-6699 FAX: 312-975-1700  
Product Lines and/or Services: Mtrng pro aud mixing consoles since 1972. Prod lines incl consoles for multi-track rec, film & TV post prod & bdcst work. Specializes in customizing consoles to satisfy an individual's needs & specific applications

**Netcom**  
1465 Palisade Avenue, Teaneck, NJ 07666  
Contact: James Tronolone, President  
201-837-8424 FAX: 201-837-8384

**Netwell Noise Control**  
6125 Blue Circle Drive, Minnetonka, MN 55423-3835  
Contact: Mark Rustad, President  
800-638-9355 FAX: 612-939-9836

**Network Production Music Inc**  
16935 W Barnardo Drive, #100, San Diego, CA 92127  
619-451-6400

**Neumade Products Corp**  
200 Connecticut Ave, Norwalk, CT 06584  
Contact: Jeff Buchanan, Account Executive  
203-866-7600 FAX: 203-866-7522

**Neumann**  
6 Vista Drive, Old Lyme, CT 06371  
Contact: Jeff Alexander, Product Manager  
203-434-5220 FAX: 203-434-3148  
Product Lines and/or Services: Condenser microphones and accessories.

**Neutrik USA Inc**  
195-53 Lehigh Avenue, Lakewood, NJ 08701-4527  
Contact: James Cowan, Vice President & General Manager  
908-901-9488 FAX: 908-901-9608  
Product Lines and/or Services: Mfr of aud XLR cnctrs in cable & panel mount vers, hard wiring or PCB mount; 1/4" plugs & jacks for hard wiring or PCB mount; aud adptrs:

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1-800-645-1061







**RMS Electronics Inc**  
41 Hartz Way, Secaucus, NJ 07604  
212-892-1000

**ROHN Inc**  
PO Box 2000, Peoria, IL 61656  
Contact: R.A. Klein, Vice President  
309-697-4400 FAX: 309-697-5612

**RPG Diffuser Systems, Inc**  
651-C Commerce Dr, Upper Marlboro MD 20772  
Contact: Troy B. Jensen, GM  
301-249-0044 Fax: 301-249-3912

*Product Lines and/or Services: Line of acoustical diffusing, absorbing & variable acoustic modules. Acoustic tools line of low cost, high performance molded two-dimensional Skyline diffusers, dedicated B.A.S.S. Trap absorbers & RFZ Abductor. Complete studios can be outfitted for approximately \$1000.*

**R.P.M. Associates**  
1612 Greenfield Drive, Richmond, VA 23235  
Contact: Bill James  
804-232-5197

**RPC, Inc.**  
24013 Ventura Blvd, 2nd Fl., Calabasas, CA 91302  
Contact: Robert Olshever, Managing Director  
818-222-7762 FAX: 818-222-0048  
*Product Lines and/or Services: Travel promotions company, specializing in worldwide entertainment marketing.*

**RPS Communications**  
3 Bittersweet Court, Centerport, NY 11721  
Contact: Randolph Savicky, President  
516-754-3300 FAX: 516-754-8168  
*Product Lines and/or Services: Public relations & marketing company specializing in professional broadcast, audio, video & related high-tech industries. We offer results-driven programs with our clients' needs and budget in mind.*

**RRN Inc**  
111 Fifth Avenue #1300, New York, NY 10003-1005  
Contact: A. S. Niskanen, President  
212-995-9800 FAX: 212-995-9848  
*Product Lines and/or Services: Provides licensed promotions for broadcast & print media including the 69 cent/dollar promotion, the Instant Auction System and the SMARTcash Incentive Shopper Program.*

**RTW Micrographics**  
207-B Leitersburg St., Greencastle, PA 17225  
Contact: Robert Wertime, Owner  
717-597-4785

*Product Lines and/or Services: Microfiche and microfilm readers, reader-printers, specialized A-V lamps, film, microform storage files and cabinets, imaging equipment resources.*

**Racom Products**  
5504 State Road, Cleveland, OH 44134  
Contact: David Williams, Product Manager  
800-722-6664 FAX: 216-351-0392

**Radio Amex**  
86 Trinity Place, New York, NY 10006  
Contact: Tom Mariani, Manager  
212-306-1637

**Radio Demo**  
905 Whiteheath Ct., Nashville, TN 37221  
Contact: Kim Beets, President  
615-662-5800 FAX: 615-646-2867  
*Product Lines and/or Services: An audio showcase featuring air talent, jingle, sweeper, music & sound effect companies, comedy ser & syndicated shows. To hear demo call 1-800-225-DEMO. \$1.00 per min. 18 & older, touch tone required. Callers are provided the opportunity to request add'l info after each demo. Talent call 1-800-705-DEMO. Radio Design Labs*

**Radio Design Group**  
PO Box 1286, Carpinteria, CA 93013  
Contact: Jerry Clements, Director of Marketing  
805-684-5415 FAX: 805-684-9316  
*Product Lines and/or Services: RDL provides a complete line of utility & systems oriented preamps, line amps, mixers, DA's, power amps, audio processors, VCA's & logic products. New items in the larger "Rack-Up" series as well as the recognized ACM-2 AM Noise monitor & AMX-84 audio router/mixer.*

**Radio Express**  
3575 Cahuenga Blvd W #390, Los Angeles, CA 90068  
Contact: Tom Rounds, President  
213-850-1003 FAX: 213-874-7753

**Radio Online**  
Box 50262, Amarillo, TX 79159  
Contact: Ron Chase, System Operator  
806-352-7503 FAX: 806-352-3677

**Radio Potato**  
1926 Stoneway, Grapevine, TX 76051  
Contact: Marshall Suth

**Radio Programming & Mgmt**  
4198 Orchard Lake Road, Orchard Lake, MI 48323  
Contact: Tom Krikorian, President  
800-521-2537 FAX: 313-681-3936  
*Product Lines and/or Services: CD music library & weekly current hits. Consulting & programming services. Formats include all forms of AC, CHR/Top-40, Solid Gold, classic rock, AOR, Nostalgia & Christmas. Sony multi-CD players modified for broadcast automation. Taped-music users can convert to CD, maintaining most existing equipment.*

**Radio Properties/ Mt. Vaca**  
PO Box 192, Elmira, CA 95625  
Contact: Skip May, Engineer  
707-446-3419 FAX: 707-422-1456  
*Product Lines and/or Services: Communications site/property owners, managers equipment suppliers & service. Tower work and site service.*

**Radio Systems Engineering**  
3031 Dogwood Lane, Florence, SC 29505  
Contact: Gale Gilbreath, Owner/President  
800-399-1501 FAX: 803-661-2933  
*Product Lines and/or Services: Broadcast engineering consulting: FCC applications, property evaluations, systems designs, and installations.*

**Radio Systems, Inc.**  
601 Heron Drive, Bridgeport NJ 08014  
Contact: Daniel Braverman, President  
609-467-8000 Fax: 609-467-3044  
*Product Lines and/or Services: Line of professional broadcast products including a complete line of audio mixing consoles, audio distribution amps. DAT recorders & a line of master clocks & timing systems.*

**Radio Time Sales/Intl**  
559 Pacific Avenue, San Francisco, CA 94133  
Contact: Sam Posner, President  
415-391-1984 FAX: 415-788-3844  
*Product Lines and/or Services: Representation of Radio and TV stations-worldwide.*

**Radio Today Entertainment**  
1776 Broadway, 4th Floor, New York, NY 10019  
Contact: Ramona Rideout, VP/Affiliate Relations  
212-581-3962 FAX: 212-459-9343

**Radio/TV Commission, SBC**  
6350 W Freeway, Fort Worth, TX 76150  
Contact: Bette Boston, Radio Distribution Manager  
800-433-5757 FAX: 817-737-9436  
*Product Lines and/or Services: We distribute radio programs to station free of charge as a public service. Produce six radio programs. Baptist Hour, Country Crossroads, Master control, On Track, Powerline and Streams.*

**Radioactivity**  
1043 Jefferson Avenue, #1200, Atlanta, GA 30344  
Contact: Dain Schultz, President  
404-767-1840 FAX: 404-767-1840  
*Product Lines and/or Services: A full-service consultancy with particular emphasis on novice owner services, acting as a buyer's agent. "Rent-A-Chief Operating Officer" services and drastic turnarounds.*

**Radiotechniques**  
P.O. Box 367, Haddon Heights, NJ 08035  
Contact: Edward Schober, President

609-546-8008 FAX: 609-546-1841

**Raines Electromagnetics**  
13420 Cleveland Dr, Potomac, MD 20850  
Contact: Jeremy K Raines, President  
301-279-2972

**Ram Broadcast Systems Inc**  
P.O. Box 3100, Barrington, IL 60011-3100  
Contact: Ron Mitchell, Pres  
708-382-7575 FAX: 708-382-8818

**Ramko Research**  
3501 Sunrise Blvd, No. 4,  
Rancho Cordova, CA 95742  
Contact: Mike Pardue, National Sales Coordinator  
916-635-3600 FAX: 916-635-0907

**RANE Corporation**  
10802 47th Ave W, Mukilteo, WA 98275-5098  
Contact: Larry Winter, VP Mktg  
206-355-6000 FAX: 206-347-7757

**Rattigan Radio Services**  
3409 Wilshire Road, Portsmouth, VA 23703  
Contact: Jack Rattigan, President  
804-484-3017 FAX: 804-484-0336  
*Product Lines and/or Services: Consults radio station management & sales depts. Provides sales training for individual stations, groups, local & state associations. Specialized guidance for transition from salesperson to sales manager.*

**RCA Bdcsl/ GE Support Services**  
158 Gaither Drive, Mt. Laurel, NJ 08054  
Contact: Ron Ettinger, Manager  
609-866-3070 FAX: 609-866-3021  
*Product Lines and/or Services: Support organization for RCA broadcast studio transmission equipment & stage/studio lamps. Services include: field maintenance service, parts support through a 35,000 line item inventory, technical assistance, manuals, seminars & 24 hour emergency service.*

**Redco Audio Products**  
300 Long Beach Blvd, Stratford, CT 06497-7116  
Contact: Andy Friend, Sales Manager  
203-378-8045 FAX: 203-378-8478  
*Product Lines and/or Services: Northeast distributor for Mogami multipair oxygen free audio, video cables & patch-cords. Redco custom cables - snakes. ADAT, TAS DA-88, SVHS, studio wiring, custom panels & boxes.*

**Redwood Marketing**  
1036 Benwick Tr, Madison, TN 37115  
Contact: Claude Hill, President  
615-254-7400 FAX: 615-242-5774

**Reef Industries**  
P.O. Box 750245, Houston, TX 77075-0245  
Contact: Phil Drake, Sales Promotion Manager  
800-231-2417 FAX: 713-947-2053  
*Product Lines and/or Services: Roll-a-sign disposable plastic banners are printed on high quality, unstabilized plastic film.*

**Register Data Systems**  
PO Box 1246, Perry GA 31069  
Contact: Lowell Register, President  
800-521-5222 Fax: 912-987-7595  
*Product Lines and/or Services: Manufactures digital audio automation systems & traffic & billing accounting software packages. The Phantom digital audio automation system is a complete self-contained digital audio automation system for use with radio station automation of satellite program sources & live assist.*

**Renkus-Heinz, Inc.**  
17191 Armstrong Avenue, Irving, CA 92714  
Contact: Frank Ostrander, Chief Engineer  
714-250-0166 FAX: 714-250-1035

**Research Associates Inc**  
230 S Sierra Madre, Colorado Springs, CO 80903  
Contact: Bill Cook, President & GM  
719-636-1688 FAX: 719-687-2835  
*Product Lines and/or Services: Acoustic materials, amps, cart machines, cassette recorders, codecs analog & digital, CD players, CD recorders, consoles, Consulting engr & design, exciters, headphones, heads refurbishing, mics AM/FM monitors, NRSC equip, noise reduction equip, patch panels.*

**RTI Research Technology Intl**  
4700 West Chase, Lincolnwood, IL 60646-1689  
Contact: Tom Tisch, Vice President Marketing  
708-677-3000 FAX: 708-677-1311  
*Product Lines and/or Services: Manufacturer & worldwide marketer of TapeChek line of professional videotape cleaning, rewind, erasing, recycling & evaluation equipment. Dropout counters for all analog & digital tape formats. A broad line of video/audio tape erasers for cassette & reel metal & oxide tape formats.*

**Richard Hirschmann of America**  
Industrial Row/Box 229, Riverdale, NJ 07457  
Contact: Harry Ekelund  
201-835-5002 FAX: 201-835-8354  
*Product Lines and/or Services: A manufacturing, distribution & R&D co for antennas, including cellular (mobile, cell site & base station), panel antenna for point-to-point, link & control station use, & mobile antennas for land mobile applications. Antenna engineering services providing custom solutions for specialized communications applications.*

**Richardson Electronics**  
40W267 Keslinger Rd. LaFox, IL 60147  
Contact: Bob Birkeneder,  
Division Manager - Broadcast  
800-348-5580 FAX: 708-208-2550  
*Product Lines and/or Services: Distributor/manufacturer of electron tubes, sockets, mics, audio equipment, RF transistors & capacitors. Off-the-shelf delivery for most electrical components manufactured by companies such as: Varian, Burle, Philips, Amperex, National, SGS-Thomson, Motorola, RF Products, Jennings, Shure and Sennheiser.*

**Riley Representatives**  
14330 Midway Road, #216, Dallas, TX 75244  
Contact: Jack Riley, Owner  
214-788-1630 FAX: 214-490-6438  
*Product Lines and/or Services: Station broker.*

**Ritz Audio Visual Associates**  
6620 Virginia Manor Road, Beltsville, MD 20705  
Contact: Robert Dvorak,  
Executive Vice President  
301-206-3101 FAX: 301-206-3105

**River City Sound Productions**  
P.O. Box 750786, Memphis, TN 38175  
Contact: Bob Pierce, Operations Manager  
800-755-8729

*Product Lines and/or Services: Buy-out production music library \$59.00 per CD. "Broadcast Series" and "Specialty Series".*

**Robert Michelson Inc**  
127 W 26th Street, New York, NY 10001  
Contact: Susan Scharf, Vice President  
212-243-2702 FAX: 212-691-5531  
*Product Lines and/or Services: Custom and syndicated television campaigns.*

**Robert's Broadcast Equipment**  
3501 Sunrise Avenue, Casper, WY 82604  
Contact: Dan Roberts, Owner  
800-755-4885 FAX: 307-235-1800  
*Product Lines and/or Services: Radio broadcast equipment manufacturer's representative serving the Rockies. Exclusive Nautel AM/FM rep for Colorado, Wyoming and Utah. Competitive prices on all radio equipment needs. Affiliated with RF Specialties of Missouri.*

**Rockwell International**  
1220 N. Alma Road (406-110), Richardson, TX 75081  
Contact: David Orr, VP/GM  
214-996-5999 FAX: 214-996-5409

**Rohde & Schwarz, Inc**  
4425 Nicole Drive, Lanham, MD 20706  
Contact: Scott Elkins  
301-459-8800 FAX: 301-459-2810

**Roland Corporation US**  
7200 Dominion Circle, Los Angeles, CA 90040-3647  
Contact: Al Dugus, Advertising Manager

**Ron Krob**  
4910 Four Star Court, Fort Collins, CO 80524  
Contact: Ron Krob, Technical Consultant  
303-484-2704  
*Product Lines and/or Services: A wide range of broadcasting field service, specializing in transmitter installations and AM directional antenna work.*

**Rosati Acoustics**  
3 Hanson Street, Boston, MA 02118-2120  
Contact: Robert Rosati, President  
617-423-5546 FAX: 617-423-5884

**Roscom General**  
P.O. Box 129, Deer, AR 72628  
Contact: Tom Butler  
501-253-8127 FAX: 501-253-8567

**Rose Engineering**  
P.O. Box 68, Armonk, NY 10504  
Contact: Don Rose, Principal  
914-273-1820 FAX: 914-273-1820

**Ray H. Rosenblum**  
PO Box 38296, Pittsburgh, PA 15238  
Contact: Ray H. Rosenblum, Media Broker/Station Appraiser  
412-963-6311

*Product Lines and/or Services: A media broker, consultant & appraiser for radio & TV stations, who specializes in small & medium markets.*

**Roslin Radio Sales**  
515 Madison Avenue #1104, New York, NY 10022  
Contact: Marvin Roslin, President  
212-486-0720 FAX: 212-486-1958  
*Product Lines and/or Services: A radio and TV national advertising representative.*

**RP Communications**  
11 Main Street, Bristol, VT 05443  
Contact: Bob Cham, President  
802-453-4369 FAX: 802-453-4369

**RRadco Group**  
1218 Winners Cup Circle, St Charles, IL 60174  
Contact: Steve Kravitz, President  
708-513-1386 FAX: 708-513-1386  
*Product Lines and/or Services: C-QUAM AM stereo receivers, processors, exciters, monitors.*

**Ruslang Corp**  
320 Dewey St, Bridgeport, CT 06605  
Contact: Paul D. Ruskey, President  
203-384-1266 FAX: 203-384-1267  
*Product Lines and/or Services: Studio & control room furniture, custom & stock, Cart, CD, tape storage systems, electronic equipment racks, custom computer work stations, custom cabinetry for all types of electronic equipment.*

**Russco Electronics Mfg Inc**  
3330 E Tulare Ave #3280, Fresno, CA 93702-2727  
Contact: Vickey Turley, Sales Manager  
209-291-5591 FAX: 209-291-9601

**SCMS Inc**  
10201 Rodney Blvd, Pineville NC 28134  
Contact: Bob Cauthen, President  
704-889-4508 Fax: 704-889-4540  
*Product Lines and/or Services: Sale of new & rebuilt broadcast equipment.*

**SCA Data Systems Inc**  
225 Arizona Ave, Suite 350, Santa Monica, CA 90401-1203  
Contact: Corinne Weber, Operations Manager  
310-576-0655 FAX: 310-576-0566

**SCS Radio Technology**  
5742 Fairoak, Springfield, MO 65810  
Contact: Dave Jackway

**SSAC Inc.**  
PO Box 1000 Baldwinsville, NY 13027  
Contact: Gary L. Weeks, Director of Marketing  
315-638-1300 FAX: 315-638-0333  
*Product Lines and/or Services: Manufacturer of solid state controls: beacon & obstruction lighting controls, phase loss monitors, phase sequence relays, 3 phase voltage monitors, AC current sensing controls, time delay relays, encapsulated timing modules, all in stock for immediate shipment*

**S.W.R. Inc.**  
PO Box 856, Cambria Cty Ind Park, Ebensburg, PA 15931  
Contact: Ed Edmiston, President  
800-762-7743 FAX: 814-472-5552  
*Product Lines and/or Services: Manufacturer of rigid coax transmission line, Waveguide, HP/LP TV/FM antennas, combiners & switches. We provide field inspection repair service. Ask about our 5-year parts and labor warranty.*

**Sage Alerting**  
700 Canal Street, Stamford, CT 06902

In fact, with over 60% of our line new in the last few years, we can probably offer you same day delivery on products the competition hasn't even heard of. All developed in cooperation with leading equipment manufacturers to guarantee compatibility, and assure you of Belden's renowned reliability and signal integrity.

No wonder we're a match for the maestro! Call 1-800-BELDEN-4 for your FREE copy of our catalog, and see for yourself. Because, if it sounds too good to be true, it's probably Belden.

**Belden**

wouldn't you want Belden here?



Circle (140) On Reader Service Card







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**OPTIMOD-AM** produces maximum loudness, consistency and clarity on all types of AM radios, using every last watt of your authorized power to extend your listenable area and increase your billing opportunities.

**A powerful six-band limiter** and patented distortion-canceling multi-band peak controller deliver deep, tight lows and clean, transparent highs. You get the closest thing to FM sound, with maximum intelligibility in the essential voice frequencies.

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allow you to easily fine-tune your sound, keeping it distinct and aggressive in a changing marketplace.

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A Division of AKG Acoustics, Inc.  
1525 Alvarado Street, San Leandro, CA 94577 USA  
Tel: (1) 510/351-3500 Fax: (1) 510/351-0500

Contact: Thomas Valentino, President  
914-347-7878 FAX: 914-347-4764

#### Valley Audio Products, Inc.

9020 West 51st Terrace Merriam, KS 66203  
Contact: Michael Joseph, Marketing/Sales Director  
913-432-3388 FAX: 913-432-9412

Product Lines and/or Services: Markets proprietary audio signal processing devices - microphone processors, compressors, expanders, gates, limiters. The product line includes analog & digital devices.

#### Vallie Consulting

14016-B Sullyfield Circle, Chantilly, VA 22021  
Contact: Dan Vallie, President  
703-802-0700 FAX: 703-802-0714

#### Vanner Inc

4282 Reynolds Drive, Hilliard, OH 43026-1297  
Contact: Jay Bowling, National Sales Manager  
614-771-2718 FAX: 614-444-1304

#### Vega, a Mark IV Company

9900 E. Baldwin Pl., El Monte, CA 91731-2294  
Contact: Kenneth M. Bourne, Vice President, Marketing  
818-442-0782 FAX: 818-444-1342

#### Vertigo Recording Services

12115 Magnolia Blvd, Ste 116 North Hollywood, CA 91607  
Contact: Charles Bolois, Owner/C.E.  
818-907-5161 FAX: 818-784-3763

Product Lines and/or Services: Vertigo Patch Bay Cleaning Tools manufacturer & sell for both TT (Bantam) & 1/4" TRS

jacks. Each priced at \$34.95. Burnisher type cleans main contact, injector type cleans breaking contacts. Direct sales.

#### Voice At Large

5080 Bainbridge Ct., Lilburn, GA 30247  
Contact: Randy Reeves, Owner  
404-925-8868 FAX: 404-279-7653

Product Lines and/or Services: Freelance voice talent...specializing in customized IDs, sweepers, & promos for adult-formatted stations. Elements may be ordered voice-only or produced with all the bells & whistles. Heard nationally.

#### Vuolo Video Air-Chex

PO Box 219, Ypsilanti, MI 48197  
Contact: Art Vuolo, Jr., Producer  
810-355-0022 FAX: 810-353-0660

Product Lines and/or Services: We produce entertaining & informative videos of some of America's top-rated stations. Talk hosts & DJs in the studio live on the air from Rush Limbaugh to Cousin Bruce.

#### Walters-Storyk Design Group

262 Martin Ave, Highland, NY 12528  
Contact: John Storyk, Vice President  
914-691-9300 FAX: 914-691-9361

#### Ward-Beck Systems Ltd

841 Progress Ave, Scarborough, ON M1H 2X4 Canada  
Contact: Eugene L. Johnson, Managing Director  
416-438-6550 FAX: 416-438-3865

#### WaveFrame Corporation

755 Ravendale Dr., Mountain View, CA 94043-5219

Contact: Chuck Grindstaff, President  
818-981-9235 FAX: 818-981-9239

#### Weather Services Corporation

131A Great Rd, Bedford, MA 01730  
Contact: Deborah Turner, Sales Manager  
617-275-8860 FAX: 617-275-9624

Product Lines and/or Services: Provides timely, informative weather info for broadcast media. Our forecasts, live & tapes, are customized to fit each station's format, personality & market.

#### Wegener Communications

11350 Technology Cir, Duluth, GA 30136  
Contact: Mickey Hudspeth, Sales Manager  
404-623-0096 FAX: 404-623-0698

Product Lines and/or Services: Manufacturer of digital and analog audio, data communications, and Network control products for use in satellite or terrestrial networks.

#### Welwood Intl Film Productions

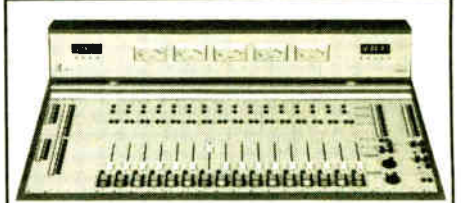
160 Washington SE, #138, Albuquerque, NM 87108  
Contact: Bill Swortwood, President  
505-242-5644 FAX: 505-242-5661

Product Lines and/or Services: Produces television commercials exclusively for the radio industry. Services include custom commercial production on either 35mm film or video from initial design of concept to final production. Also offer high testing, market-proven syndicated campaigns.

#### Westgate Laboratories

478 Westgate Dr., Edison, NJ 08820  
Contact: Bob Kendall, Sales Manager  
908-561-1573 FAX: 908-757-7480

Product Lines and/or Services: We are worldwide distributors to the broadcast industry of electron tubes by EIMAC, RCA, Varian, Ampere, GE, Burle, Sylvania, National, etc. We also carry RF transistors for replacement in all transmitters in the general market. We stock the above mfrs & give same day shipping.



### Renaissance Series Radio Consoles

"New Age" approach to the design and function of Radio Broadcast Consoles.

Features: illuminated electronic switching and VCA's throughout; digital shaft encoder controlling monitor VCA's; modular with extensive choice of modules; 8/16/24 channel mainframes; Legendary Ward-Beck quality, design and construction. Value priced to fit contemporary budgets.

Contact Ward Beck at  
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FAX: 416-438-3865

Circle Reader Service 43

#### Westwood One Companies

9540 Washington Blvd, Culver City, CA 90232  
Contact: Thom Ferro, Executive VP/General Manager  
310-204-5000 FAX: 310-840-4052

#### Wheatstone Corporation

7305 Performance Drive Syracuse, NY 13212  
Contact: Ray Esparolini, Director of Sales  
315-452-5000 FAX: 315-452-0160

Product Lines and/or Services: Manufacturers of built-to-order audio consoles that deliver digital quality audio for television production & broadcast, radio broadcast station on-air & production consoles, built to order sound reinforcement audio consoles, multitrack recording studio consoles, rack-mounted audio signal processing, broadcast control room furniture sys.

#### Wide Range Electronics Corp

174 Chesterfield Industrial Blvd., Chesterfield, MO 63005  
Contact: Gail Stecker, Manager  
800-728-4017 FAX: 314-532-5492

#### Will-Burt Company

P.O. Box 900, 169 South Main Street, Orville, OH 44667  
Contact: Steven Pinkley, Accounts Manager  
216-682-7015 FAX: 216-684-1190

#### Wind River Broadcast Center

117 E. 11th St., Loveland, CO 80537  
Contact: Jim McDonald, GM/CE  
303-669-3442, 800-669-3993 FAX: 303-667-0047

Product Lines and/or Services: Wind River Bdcst Center offers the following: The Bigbook Project - a complete 4-vol guide & workbook for FCC compliance & broadcast education for licensees, employees & interns. Consulting Services - technical & regulatory; FCC compliance mgmt services.

#### Winning Edge Prod. & Software

Route 2, Box 163-02, Beaverdam, VA 23015  
Contact: Corey Deitz, President  
804-227-3390 FAX: 804-227-3390

Product Lines and/or Services: Design and distribute show prep oriented software including "Airware" and "The Producer."

#### Winsted Corporation

10901 Hampshire Ave South, Minneapolis, MN 55438-2385  
Contact: G.R. Hoska, Vice-President  
800-447-2257 FAX: 612-944-1546

Product Lines and/or Services: Modular consoles, vertical equipment racks & cabinets. Also available, wood trim decorator panels for a custom-designed new look. A full-line of console accessories.

#### Wireready Newswire Systems Inc

31-H Union Avenue, Sudbury, MA 01776  
Contact: David M. Gerstmann, President  
800-833-4459 FAX: 508-443-5988

#### Wohler Technologies

1349 Kansas St, San Francisco, CA 94107  
Contact: Will C. Wohler, President  
415-285-5462 FAX: 415-821-6414

#### WSI Corporation

4 Federal Street, Billerica, MA 01821  
Contact: Don Freeland, Media Market Manager  
508-670-5000 FAX: 508-670-5100

Product Lines and/or Services: WEATHER for Windows & WEATHER for Mac software pkgs give you access to WSI's worldwide weather database from your home or office PC. All the forecasts & real-time weather radar imagery you need to give your audience up-to-the-minute weather conditions.

#### Yamaha International Corp

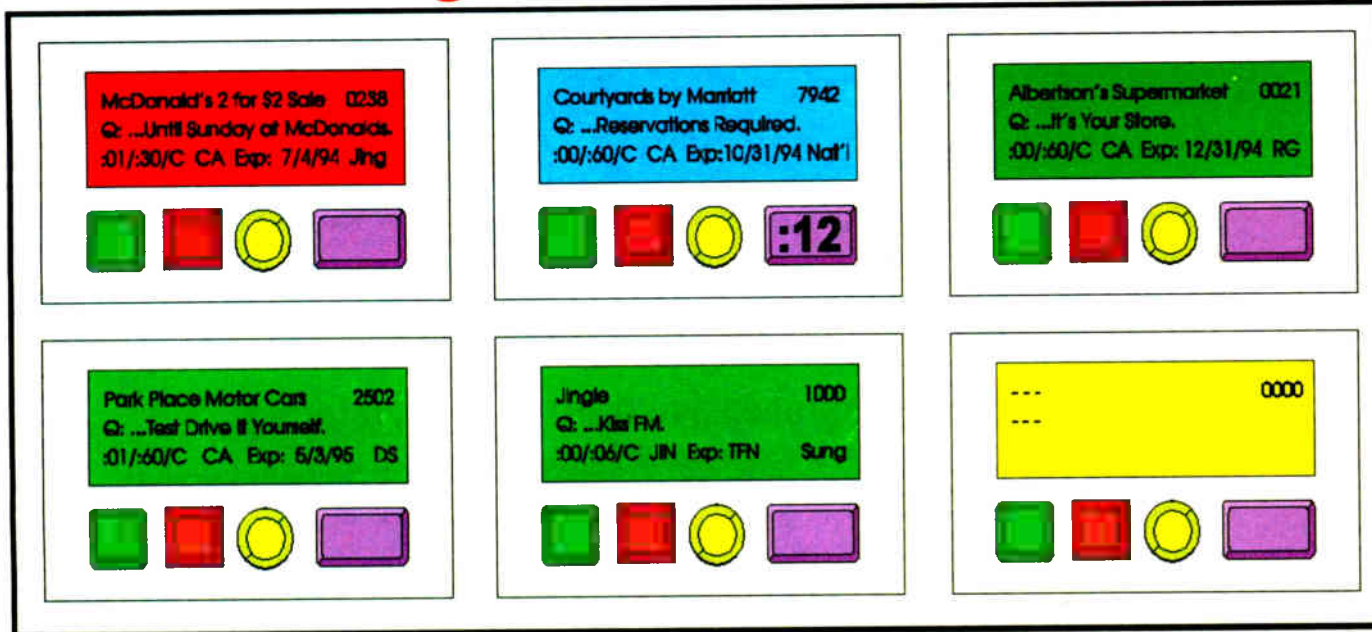
PO Box 6600, Buena Park, CA 90622  
Contact: Bob Shomaker, 714-522-9011 FAX: 714-739-2680

#### Zercom Corporation

Zercom Way, Merrifield, MN 56465  
Contact: Missi Martin, Broadcast/ Customer Service  
218-765-3151 FAX: 218-765-3900

Product Lines and/or Services: Zercom Corp, a mfr of radio broadcast equipment, specializes in remote consoles, telephone hybrids, tone processors, & audio boost amplifiers. Other products include a 19" rack mountable Patch Switch unit & a portable "Mini" console broadcasting studio.

## The First Digital Audio that Jocks Like!



## Awesome High Quality - Amazing Low Cost

Make your move to stunning sound with CompuCarts cart machine replacement. It's an easy-to-use PC system with Scott Studios' software for digital hard disk audio. You see six "cart players" on screen in your air studios and a "cart recorder" in production. Account name, lengths, start and end dates, categories, outcues, initials and countdown timing displays clearly on screen. Or, at a touch you can see your program log, live copy, or pick from any spots, jingles or music.

Touch any of six start buttons (or our optional touch screen) and your commercials, jingles and liners are instantly on-the-air from hard disk. There's no clutter or confusion in your air studio: no computer keyboard, no mouse, no trackball, no stacks of floppy disks and no racks of cart tapes. CompuCart automatically receives each day's log from your traffic PC, and updates can be made by "10-key".

When new production is done, all commercials are instantly playable in every CompuCarts air studio. Nobody has to redub spots or retype labels for additional stations. Your people will also save time because nobody has to walk anything down the hall from production to air studios. CompuCarts cost less than analog gear, and no expensive "file servers" are needed for Multi-Studio Digital. CompuCarts can also control CD juke boxes, automate certain shifts, or run a satellite format. Call, FAX, or write for details.



(214) 620-2211 FAX: (214) 620-2707  
(800) 330-3004

**Scott Studios Corp**  
13375 Stemmons, Suite 200  
Dallas, TX 75234-5774





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under \$7,300 list

# The Dynamax MX Series

## With Enhanced New Feature Set

### Now Available in up to 18 Channels

- True modular design
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- Active balanced line inputs, transformer isolated mic inputs
- Active balanced main and monitor outputs
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- Opto-isolated remote module on/off
- Selectable fader start
- Two inputs per module, mic/line or line/line – line inputs may be mono or stereo, consumer or professional format
- Four assignable outputs – two stereo plus two mono
- Available in 10, 12, 14, 16, or 18 channel models
- Independent level controls for each "A" and "B" input
- Separate audio and logic power supplies
- Sturdy, all-steel construction
- Durable Lexan overlay control surfaces
- Count-up event timer standard
- Two input expansion switches standard
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Canada 1-800-268-6817 • Toronto 416-731-3687

 **HARRIS  
ALLIED**

Circle (174) On Reader Service Card

# There's a Right Way



**"I did it right from the start with Computer Concepts' DCS."**

*I don't sweat* when it comes to our spot-heavy morning drive or complicated LMA formats. The reason is simple: First I did my homework. And then I bought a DCS hard disk system from Computer Concepts. In fact, I bought several.

I smile at the thought of multiple program formats and satellite automation, live and live assist. I laugh at complex spot rotations, two-channel crossfades with simultaneous recording and networking to traffic—they're no problem for the DCS.

And Computer Concepts customer support is terrific. Their software experts can even troubleshoot my DCS and upgrade the software remotely, via modem.

No wonder Computer Concepts DCS has turned hundreds of stations into happy customers. I'm glad I'm one of them. Oh, I almost forgot. The price was right, too.



*I thought* I'd impress HQ by buying the cheapest hard disk system I could find. After all, they all look the same! Their promises sounded good and I wanted to believe.

I found out promises come cheap. But their system wasn't really cheap—not once you added up the little "extras" it took to do the bare minimum. And it still couldn't do all the things our station really needed.

I found out the hard way, at 3 AM when the system we bought crashed. And in morning drive, when missing spots meant dollars down the drain. When I finally reached customer support, they said they were working on software they thought would fix my problem, but they weren't sure when it would be done. Guess what I told them?

Now I know better. We're getting a Computer Concepts DCS. I learned a costly lesson: Get it right the first time. Call Computer Concepts first.



**"I should have bought a DCS in the first place."**

# and a Wrong Way

**DCS by Computer Concepts**  
CORPORATION

Computer Concepts Corporation  
8375 Melrose Drive, Lenexa, KS 66214  
Phone: (913) 541-0900 Fax: (913) 541-0169

# CHR's Evolution Continued On-Air in 1993

Country music continued to rope in a rich team of new talent, while elevating many of its established heroes to superstar status. Among the primary victors: longtime favorites Vince Gill and Mary-Chapin Carpenter; the now-solo Wynonna, Alan Jackson, Brooks & Dunn and Mark Chesnutt.

Other media took notice of country's increasing impact, even going so far as to make Billy Ray Cyrus and Garth Brooks frequent tabloid targets. CBS Television, meanwhile, granted the fall Country Music Awards telecast three hours instead of its traditional two. For the first time, all of country music was

being offered shamelessly to the mainstream—and succeeding.

Mainstream radio, curiously, held country as taboo, refusing to sample from artists as mainstream as Wynonna and Carpenter on top 40. A sore blunder.

Where country faltered, modern rock made surprisingly significant inroads. Over the past couple years, R.E.M., Red Hot Chili Peppers, Nirvana and U2 paved the way for "alternative" artists to find a place among creatively programmed top 40 stations.

1993 offered a profusion of such artists who attained enough mainstream success to intimidate progressive purists: 4 Non Blondes, Pearl Jam, Soul Asylum, Gin Blossoms, Blind Melon, Lemonheads, The Cranberries, Stone Temple Pilots,

Shaggy, Radiohead and Belly.

As the decade progresses, I maintain the belief that modern rock will likely become the next wave. Rap, no doubt, is integrated into society, and will remain a fixture.

However, I dare say it is close to peaking as listeners begin to tire of what has, in some cases, become self mockery—a silly, shameful shadow of what originally ignited rap on the airwaves. Hard-core artists, on the other hand, offer a viewpoint that is too radical for radio to support.

Modern rock artists also will help keep CHR from becoming too soft. Face it, there's not a lot of passion left in Rod Stewart, and Gloria Estefan isn't one to flaunt youthful angst. The high-energy emotion and live action antics of modern rock acts will satiate the youth audience, while invigorating top 40 airwaves as the format pushes onward toward 1990's adulthood.

## The Hits List

▶ continued from page 16

4. **"Praying for Love"** - Donna DeLory. While the weekly hue of Madonna's hair appears worthy of media exploitation, it's curious that DeLory, a back-up singer in both the highly publicized "Blonde Ambition" tour and current "Girlie" tour didn't merit similar hype. DeLory offers sprightly songs she often writes herself, and a strong video presence. "Praying" is a perfect pop song.

5. **"Ol' Country"** - Mark Chesnutt. 1993 was country's hottest year ever. Forget Garth and Billy Ray. Here's an artist who, without the hype, consistently warmed the airwaves with pure, rich classic country. He'll be with us long after the gimmickry of others has subsided.

6. **"What's Up"** - 4 Non Blondes. In allegorical terms, this would equate the high tide of modern rock's new wave of artists.

7. **"Supermodel (You Better Work)"** - RuPaul. The best video of the year and a surprisingly solid disc. Not only can he wear pumps, this girl can sing. Queen (the group) about finished off its career in the U.S. with its "I Want to Break Free" video in women's frocks. Drag queen RuPaul is a star because of it. Could America be opening its mind?

8. **"Hat Full of Stars"** - Cyndi Lauper. A casualty of the rap-obsessed airwaves

of 1993, Lauper offered some of her best work on this introspective work and yet gained little notice. Find it, buy it, feel it.

9. **"What Is Love"** - Haddaway. The best premiere song makes me dance. Hard. Best groove of the year. Boy, he makes it sound easy.

10. **"I Will Always Love You"** - Whitney Houston. Even after hearing it a billion times, I respect "I Will Always Love You," the biggest pop hit in history, as one of the era's great performances.

**Honorable Mentions:** "The Crying Game," Boy George; "If I Can't Have You," Kim Wilde; "Runaway Train," Soul Asylum; "Rain," Madonna; "Love Should Have Brought You Home," Toni Braxton; "Tell the Truth," Jude Cole; "Song for a Vampire," Annie Lennox.

**Major Miss:** Rod Stewart's microphone is the only thing that should have been "Un-plugged." Sentimentality failed to disguise the fact that Stewart is only a whisper of what he once was. Totally unlistenable.

**Major Hiss:** SWV (Sisters With Voices) may have finished the year with three top 10 hits, but all this female trio really proved is that image and attitude can override ability when MTV is involved. SWV does not sing, it whines. Radio's biggest offense in 1993.

do you want it to do?

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The Dividend Composite Filter reduces noise often generated by audio processing and STLs in the upper composite spectrum from 53kHz to 99kHz. Now you can protect your subcarrier signals, regain lost modulation, reduce multipath related distortion, signal integrity for only \$1195.

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# Pump Up your Staff for Better Sales

▶ continued from page 19

them. One other note, if you do produce airchecks, have labels printed to complement your letterhead. Be sure and include contact information on the label.

- Evaluate and practice presentation skills. Once everyone has a handle on what they are selling, how are they presenting it. A few tips on presentation.

Ask yourself, "How do I want the client to react?" You want them to buy. First they need to understand your station, so you need to understand their needs in order to put them in the context of your station. Keep it short, hit the highlights and give them enough information to

answer their questions, but do not kill them with storytelling or detail.

Practice in front of a mirror or your colleagues. Objective input is helpful.

Do not fidget and stare at the floor when talking to someone. Look them square in the eyes. Show them confidence and openness. Eye contact denotes trust. Chances are they got enough fish stories from the other guys. Be honest. Be confident. Do not be overbearing and pushy. No matter how proven some of the power selling programs claim to be, if you walk into a mom and pop pet store and try and formula-force results you are outta there.

- Get organized. Easier said than done with some people. I have found that a day-timer works best for me. I have one place that I write down everything from appointments to ideas, tasks and phone numbers. Several associates prefer a computer desktop program that will display the days events when it is turned on. The bottom line is you must get organized if you are to be successful. Try these ideas:

Put all sales materials in one location in the sales office. Also consolidate any research and reference materials in one location. Make sure they are returned to the same place.

Meet with your sales people for a few minutes each morning. Briefly hit the day's highlights. What is on the agenda for the day? Maintain it later with, "How did it go with XYZ Corp.?" This reinforcement does two things, it conveys interest on your part and forces organization and schedule maintenance.

Have your sales people handle their own correspondence directly. You too. Set parameters for correspondence. Initial inquiry, call back, follow up, etc..

- Take another look at your sales goals and projections. Are they realistic? Are they best case or worst case? Use the sales team to develop a yearly, quarterly and monthly set of goals.

- Ask questions. What do you need to be more effective? What can I provide to sup-

port a stronger sales effort at this station?

- Start selling results for clients. Not spots and packages based on your needs. Create sponsorships, promotions. You can generate local versions of health, music, entertainment, lifestyle programming and have them sponsored locally. Why barter when with a little effort you can keep it all?

- Listen to your sales staff. Let them know that your door is open and that you are open to ideas, not just putting out fires. Remember that sometimes the best idea can

come from the most unexpected source.

I do feel strongly that stations should have reference material aside from ratings and research made available to employees and have a list of books, publications and programs that I can suggest. Feel free to give me a call if you are interested in these.

□ □ □

*Karl Baehr is president of KBE "Broadcasting By Design" a radio consulting firm that provides support services for satellite radio stations and produces the Actual Radio Measurement (ARM) electronic survey system. He can be reached at 505-828-0488; fax: 505-821-4226.*

## A New Year's Wish List

▶ continued from page 21

phone might do for a 20-second contest answer, but if call-ins are a part of your format, why annoy your listeners? Phone hybrids are digital now too, along with a corresponding improvement in their quality. That "pumping" is gone, and the control on the levels is good.

**Sound effects:** Signal processing would be the more correct term. Digital advancements over the past year or two have made these boxes affordable. Some have broadcast versions with streamlined access to quick effects. A good production rat can do everything from spice up a spot to compose music.

**Software:** Now that the station has entered the computer age, you have to think like a computer maven and consider software upgrades. One major area is in traffic and billing. With a direct impact on your revenue stream, you need to look at the new offerings (hint: this is a category that looks to be hot at this year's NAB convention in Las Vegas).

A second area is music. Music libraries have gotten more customer conscious and their formats are more tailored.

**Satellite formats:** Also offering a

greater diversity of formats, these are money savers and for some LMAs they are the only way to go.

### General Wishes

Ok, you now have a guide to at least begin looking at ways to make your station more profitable and to sound terrific at the same time. You may not have the funds to take advantage of all that's out there right away, but there's no harm in wishing, is there?

Now there are a few dream-inducers you won't find at convention booths or in any catalog. But it wouldn't hurt to wish for them anyway:

A production director with 1,000 voices, 500 ideas and an eye on the bottom line; national agency accounts that call you; an LMA or duopoly that doubles your revenues; job security; an FCC with a "hands-off" policy; a DAB standard; a great first quarter (and second and third and fourth).

□ □ □

*Judith Gross is vice president/head copywriter for Media/Scan, a New York City-based advertising and marketing agency specializing in broadcast and pro-audio. She can be reached at 212-929-6108.*



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AM 5 mV/m and FM 3.16 mV/m City Grade contours are shown in full color, including transmitter site indicator. The map is supported with a printout showing all of the stations which appear on the map.

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- ZIP CODE BOUNDARIES
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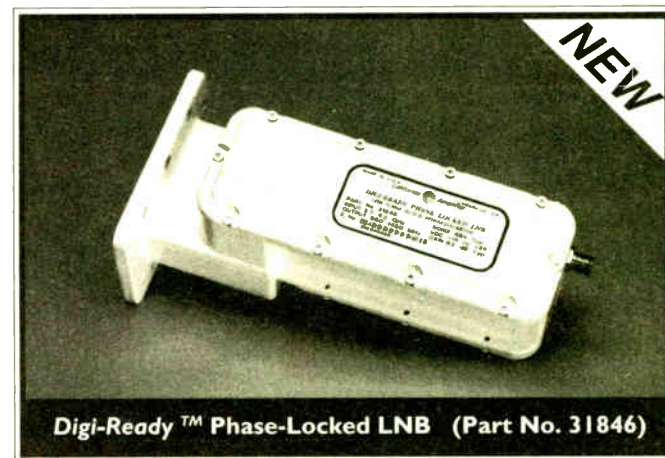
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### New DIGI-READY™ Phase-Locked Commercial LNBS from Cal-Amp

These new *Digi-Ready™* LNBS fulfilled the need for phase-locked downconverters necessary to receive digitally compressed satellite programming signals. Although some digital compression formats are undefined, phase-locked commercial LNBS, which maintain low Bit Error Rates, are recommended to ensure proper reception of digitally compressed signals. *Please call your commercial distributor for additional details.*

#### DIGI-READY™ LNB Specifications:

- Input Frequency 3.7-4.2 GHz
- Output Frequency 950-1450 MHz
- 45° K Noise Figure, Typical
- Phase Noise -80 dBc / Hz @10 KHz
- PLL Oscillator Stability ± 2.3 ppm (± 12 KHz)
- Input VSWR 1.5:1 (Isolated Model: Part No. 31814)
- 2 year Warranty
- Made in the USA



Digi-Ready™ Phase-Locked LNB (Part No. 31846)

California Amplifier, Inc.

460 Calle San Pablo Camarillo, CA 93012

Phone (805) 987-9000 Fax (805) 987-8359

California  Amplifier

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# Products & Services Showcase

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## Shively Labs

A Division of Howell Laboratories, Inc.

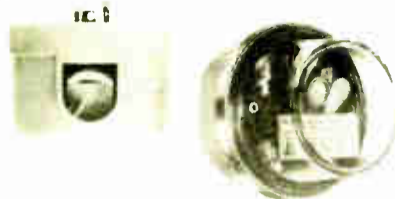
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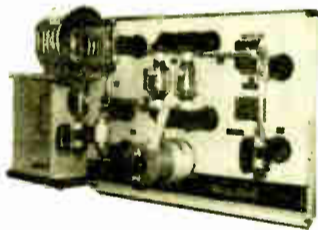
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**\$550**



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In a half wide, 1RU high chassis, the Jr. Plus has two input switch banks which allow left and right outputs to select between eight sources. Additional switches provide a Mono Mix, with adjustable gain reduction of 3 to 6 dB, and a Right Channel Polarity reversal. LEDs indicate switch action. Inputs may be passively mixed ahead of the input amp by depressing two or more buttons.

Installation is "instant" with a No-Mod™ Rack Mount adapter and plugable Euro-Style barrier strips.

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1. Because Format Sentry is radio's most station-proven digital automation, with over 500 systems delivered. It works.
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# Create a Network, Even with Old IBMs

by Richard Mertz

**WASHINGTON** Great news! The local sales manager at the station has been able to trade out for a new computer.

There it sits: a brand spanking new 486 DX, 33 MHz, eight meg of RAM, super VGA board, 450-meg hard disk storage, a 1024-by-748 VGA multisync monitor and a laser printer.

Where does this dandy piece of high-speed computing power sit?—in the sales office, of course. The sales department's old IBM XT may have ended up in the program director's office, or, if you're lucky, in your office or on your workbench.

## Coexistence

The new computer gets a great deal of use from 8:30 a.m. until 10 a.m. and again from 4 p.m. until 5:30 (assuming that your station's aggressive sales staff is "on the street" selling from 10 to 4). While sales is out of the office doing what they do best, the new machine sits idle.

install some version of DOS above version 2, a word processor and spreadsheet and some real technical programs.

There you are, typing remote-control instructions, writing letters to equipment suppliers, preparing your budget and even tracking transmitter performance. Press the print button and the dot matrix printer whips into action. The hard copy produced looks OK, but it doesn't compare to the hard copy the sales department is getting.

If the sales office computer has the same word processing program installed in it as your engineering computer, you can walk into the sales office with a floppy disk and load a file into the sales computer's word processor. Press the print button, and you have a finished professional-looking document.

I forgot to mention that while you were on the way to the sales office, the PD stopped you to discuss audio processing, the GM wanted his phone moved to the other side of his office, and the AP machine needed a new ribbon. The document took about a hour to print.

## Net set

It sure would be nice to press print on your own XT and have the finished product appear at the sales office computer. This calls for a computer network.

## Net set

If you and your co-workers are hand carrying diskettes from one computer to another, you already have a network of sorts—an inefficient "sneaker net."

Your connectivity problem can be solved with a small local area network (LAN).

The building blocks of all PC-based networks are the server, workstations and cabling. The server is a PC with a large-capacity hard disk drive which shares its hard disk storage (directories) and printers with the other users (workstations) on the network.

A workstation is another PC that uses the

resources of the server but does not share any of its storage space. The cables may be twisted pair, coax (like RG-58), twinax or the special cables used in IBM token ring networks.

There are several standards for sending packets (blocks of data) between the

station can use the files on the server.

Your "rights" to use files (programs and data) are restricted by limits set by the network administrator. You enter (log on) to the network from your workstation by typing your name or initials and then a password. The server knows who you are and what networked programs and files you are permitted to use.

One problem with this network is that it requires a single computer to act as a serv-

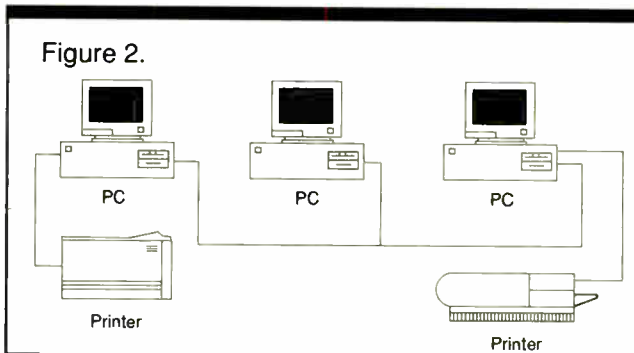
er. It is not practical at many radio stations to have a computer tied up for a single function. Figure 2 shows the basic layout of a peer-to-peer LAN, which permits sharing of resources on several computers. One or all computers on the network can act as a "non-dedicated" server. The

PC, while acting as a server, can also be a workstation and more than one printer can be made available to the workstations on the network.

I am presently installing such a network and will be recounting my experiences to you as the months progress. The next several columns will continue with peer-to-peer LANs, as well as actual LAN design, specification, installation and operation of such a LAN.

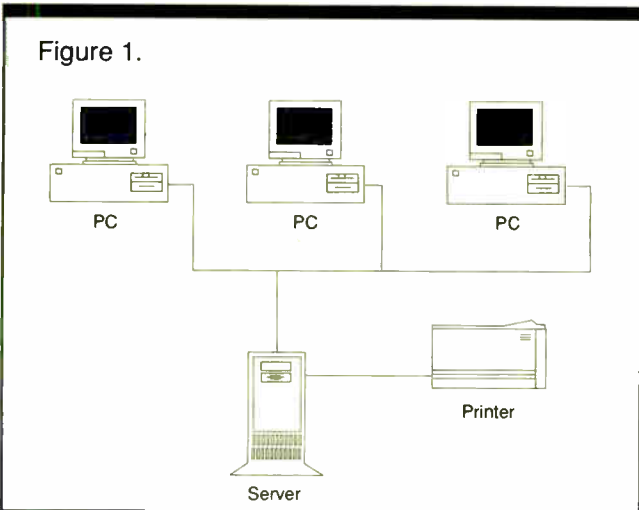
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Richard Mertz is senior engineer at Jules Cohen & Associates, P.C., 1725 DeSales St., N.W., Suite 600, Washington 20036. He can be reached at 202-659-3707.



server and workstations, including IBM Token Ring, Arc Net, Ether Net (both thick and thin wire) to name a few. More information in these systems is available at your local library or computer books stores. Many colleges offer courses covering the basics of computer network installation, specification and administration.

Figure 1 shows a basic computer network with three workstations, a server and a printer. Each workstation is connected to the server with a cable system specified for a particular network system. The printer is connected to the server by the usual printer cable. Each work-

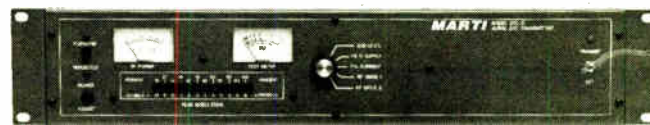


Other staff members from programming, promotions or news may use it, but must leave their desks and roam into the sales office.

For our exercise, assume programming, promotions and news have their own computers and you—the engineer—are the proud owner of a vintage IBM XT or XT clone. Your next order of business is to format the 20-meg hard drive, properly

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Don't wait 8 weeks to get your new STL system. We've been selling FCC approved STL systems since 1970, and we've got them in stock, ready to ship.



## STL-15C Composite Transmitter

Frequency synthesized \* Unexcelled narrow band performance \* Digital ready (with external modems)

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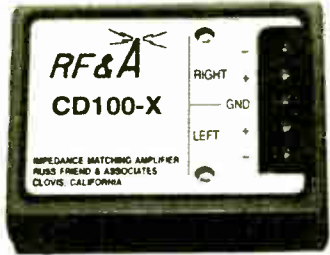
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Matches any consumer compact disc player or cassette deck to broadcast console input. Only \$89.00 FOB factory or from any broadcast dealer.

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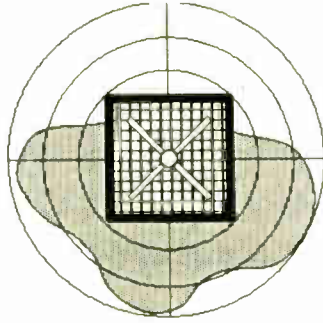
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**ADC (USA) INC.**

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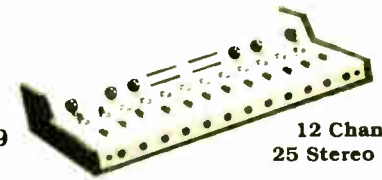
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Used by hundreds of TV stations for van-to-field cueing in ENG & SNG applications. Transmitter provides mix of program and instructions to rugged, pocket receivers.

- 100% duty cycle
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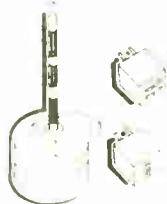


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READER SERVICE NO. 199

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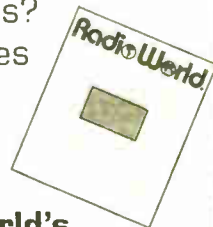
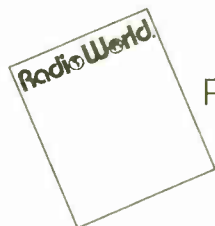
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READER SERVICE NO. 40



## FEEDLINE

# Sundown, AM Stations Better Take Care

by W.C. Alexander

**DALLAS** It seems that just about every year at this time, someone asks me, "What's wrong with our nighttime signal?" Our company operates eight AM stations, all but one of them fulltime, and, unfortunately, each must share its frequency with other stations.

Non-engineers have a hard time understanding why things change at night. Many radio people know enough about it to be really confused. I'll do my best to answer the most commonly asked questions on nighttime AM propagation in layman's terms.

**Q:** Our station transmits the same power non-directional both day and night. In fact, we don't change anything at night. Why does the signal get so bad after dark?

Not only do station managers and salespeople ask this question, but clients also

often want to know what the deal is. The answer to the question, in a word, is interference. All AM stations must share frequency at night with several other stations.

Once the sun goes down, an ionized layer of the upper atmosphere called the "D layer" disappears. The D layer absorbs wave signals before they pass through to the "E layer," the ionized atmospheric layer above D. Only the groundwave signal the signal—that travels from the station's antenna over the surface of the earth—produces useful coverage. As the sun goes down, the D layer gradually disappears.

The E layer causes AM signals to reflect back to Earth at great distances from the point of origination. These reflected signals are called "skywave" signals. At first glance, you might think this would be great for coverage. It would, if there weren't dozens of stations sharing each frequency. When the D layer disappears, the signals from all these other stations begin appearing inside your coverage area.

The effect is almost the same as if several other low-power stations suddenly began transmitting on your frequency right in the local area. Your station may not change anything at sundown, but the environment changes dramatically. Interference that did not exist during the day pours in from all over the country at night, wiping out much of your coverage.

## RSS night limit

**Q:** What is this RSS night limit figure that our consulting engineer keeps throwing at me? We have a high night limit, he says. Isn't that better than having a low night limit?

This is perhaps one of the most misunderstood parameters of AM broadcasting. At a given location within a station's coverage area, numerous skywave signals arrive from distant points at night. Each of these signals together produce an aggregate interfering signal that can be calculated. The mathematical formula engineers use to measure aggregate skywave signals is called the root-sum-square

(RSS) method.

Each signal contributes to the aggregate, with the strongest signals contributing a lot and the weaker ones a little. This process would go on ad nauseam if we did not cut it off at some point.

For years, the FCC and industry used 50 percent as the cutoff point. If the signal from a station contributed less than 50 percent of the aggregate interference at a given point, the interference from that station was not considered in the calculation.

The 50 percent cutoff wasn't very realistic, however, and over the years we all found that aggregate interference levels were often much higher than our calculation indicated. New FCC AM technical rules that went into effect in 1991, specify 25 percent as the new cutoff point.

## 50 kW giants

**Q:** We can't be talking about much in the way of signal from these distant interfering stations. I listen to distant clear channel stations sometimes, and even these 50 kW giants don't have really great signals at night. How can these weak skywave signals tear up our coverage so badly?

While we're talking about interference, we must touch on protection ratios. There is a point, expressed as a ratio, at which co-channel and adjacent-channel interfering signals become objectionable to listeners.

The National Association of Broadcasters hired B. Angell & Associates, Chicago, in 1987 to conduct a series of listening tests to determine what listeners would tolerate. The results, which were used in the formulation of the 1991 AM technical rules, were 20:1 for co-channel and 2:1 for first-adjacent-channel interference.

In other words, an average person listening to a station will find it objectionable at the point where a co-channel interfering signal is 1/20th of the level of the desired signal, or an adjacent-channel signal is half the level of the desired signal.

A simple example: Station B is 137 kilometers from station A, and Station C is 259 kilometers from station A. The signal from station B at station A's site is only 0.645 mV/m, and the signal from Station C is only 0.613 mV/m.

These interfering signals are co-channel, so we must multiply them by 20 to find out what signal strength would be required to provide interference-free service. Station B's contribution then becomes 12.9 mV/m, and Station C's becomes 12.26 mV/m. If you apply the RSS formula to these two interfering signals, the aggregate interfering signal has a level of 17.79 mV/m, a whopping signal to overcome.

## Double whammy

You can see that it doesn't take much in the way of interfering signal to really chew up a station's coverage. There are often many more than two contributing stations both co- and adjacent-channel. Interference quickly adds up.

**Q:** We get hit with a double-whammy at night. Not only do we get clobbered by interference from distant stations, but the FCC makes us cut our power way back and change our directional pattern. Why?

A majority of AM stations that operate at night must cut their power back, use or change a directional pattern, or both, after sundown. In the same way that other distant stations' signals propagate into your area at night and cause you interference, your signal propagates into distant areas at night as well.

A power reduction and/or directional pattern is often needed to control the amount of signal that a station sends in specific directions at night to limit the amount of interference caused to one or more distant stations.

**Q:** Why don't those stations have to cut their powers or reduce their signals in my direction at night? It doesn't seem fair that my station has to give up so much for their benefit.

The FCC and its predecessor set up the AM allocation scheme to establish different levels of service. There were clear channels, where dominant stations operated with a high degree of protection and consequently large coverage areas. There were regional channels that afforded stations less protection but still had fair sized coverage areas.

Local channels were also established with

no nighttime protection for small coverage areas. As more and more stations came on the air, the FCC operated on a first-come-first-served basis. The earliest stations had the least amount of interference initially, and newcomers had to protect them so that the resulting RSS night limit did not exceed FCC limits. Newcomers, on the other hand, had to accept whatever amount of interference they received at night.

This trend continued until the AM Freeze of 1987, when the FCC cut off all AM applications. New stations must now protect all other co- and first adjacent-channel stations to a much higher degree.

Chances are, your station is a relative newcomer. Stations that went on the air as early as the 1940s can have a relatively high night limit. It doesn't seem fair, but that's the way it is.

There are a lot of other questions about nighttime coverage that are, no doubt, floating around out there among the ions, such as why nighttime coverage changes from year to year and season to season. I could go on and on. For now, I'll stop and wait to see what you have to say. If you have specific questions, send them to me and I'll address them in a future column.

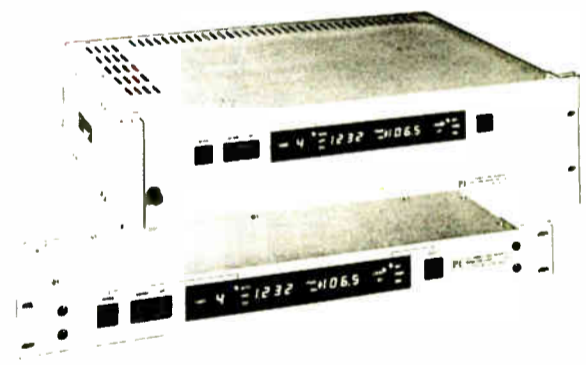
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*Cris Alexander is director of engineering for Crawford Broadcasting. He can be reached at Box 561307, Dallas, TX 75356.*

**Non-engineers have a hard time understanding why things change at night.**

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by Ed Montgomery

## Part I of VIII

**ANNANDALE, Va.** There are two classes of electronic devices: passive

designed voltage and current limits.

Passive devices will operate for years without incurring any damage. Resistors, capacitors, coils, and transformers are included in the family of passive devices.

Active devices are designed to change their operating parameters as current or voltage varies through or across the component. An active device can respond to voltage or current changes, restoring it to a previous level or changing it to a new level.

An active device can also be used as a switch, turning a circuit off or on. The first active electronic device used was probably the relay, which Morse used in the design of the telegraph.

Another active device developed in the 19th Century was the carbon-button microphone (or transmitter). This device converted sound waves into an electric current in the image of the sound wave, and was used in the development of the telephone. The current travelled at nearly the speed of light through the wires. The receiver used a coil to convert the current variations back into sound waves (See Figure 1).

the vacuum tube diode, based on Thomas Edison's experiments with the light bulb. Fleming's diode allowed current to flow in one direction only.

Lee de Forest capitalized on Fleming's invention in 1906 with the invention of the "audion," a vacuum tube (now known as the triode) that could switch a circuit on and off or amplify voice and music.

## Transistor development opened the door to today's era of IC technology.

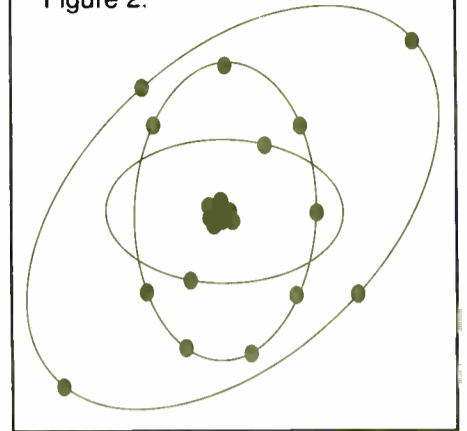
Vacuum tubes were key to the development of practical electronic communications during the first half of this century. Bell Laboratories sparked a new era in 1947 with the development of the transistor, which would eventually replace vacuum tubes in most applications. Transistor development opened the door to today's era of integrated circuit technology.

Solid state equipment operates with semiconductors. As the name implies, semiconducting material does not permit current to flow as easily as a conductor, yet at the same time it does not act as an insulator.

Understanding semiconductor devices requires some knowledge of the atomic structure of semiconducting materials. Silicon is widely used in transistors and diodes today.

All atoms consist of a nucleus (protons and neutrons) and electrons orbiting around the nucleus. Protons have a positive charge; electrons have a negative charge (See Figure 2).

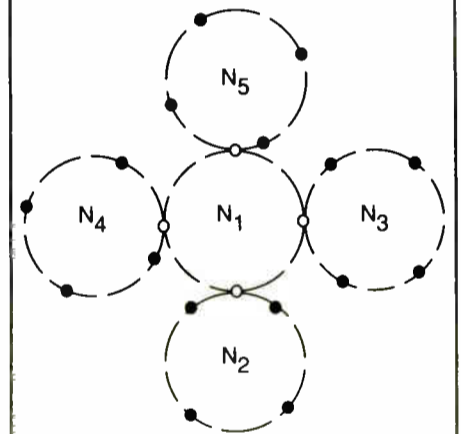
Figure 2.



The most important part of the atom as it relates to semiconductors is the last, or outer orbit (also known as the outer shell). Silicon atoms have only three electrons in this orbit. It is, therefore, considered an unstable element.

Silicon atoms combine with other silicon atoms by creating covalent bonds. Electrons from neighboring silicon atoms are shared with each other to stabilize the outer orbit. The result is a crystalline material (See Figure 3).

Figure 3.



Pure silicon is classified as a semiconductor because it contains free electrons that will support a flow of current when a voltage is applied to it.

Both silicon and germanium (another semiconducting element used to make solid state devices) react to temperature changes. As the temperature of the crystal rises, the amount of current it can conduct increases. Silicon is preferred because it is not as greatly affected by temperature change.

However, a device's response to temperature change can be used advantageously since heat must be considered when designing solid state circuits.

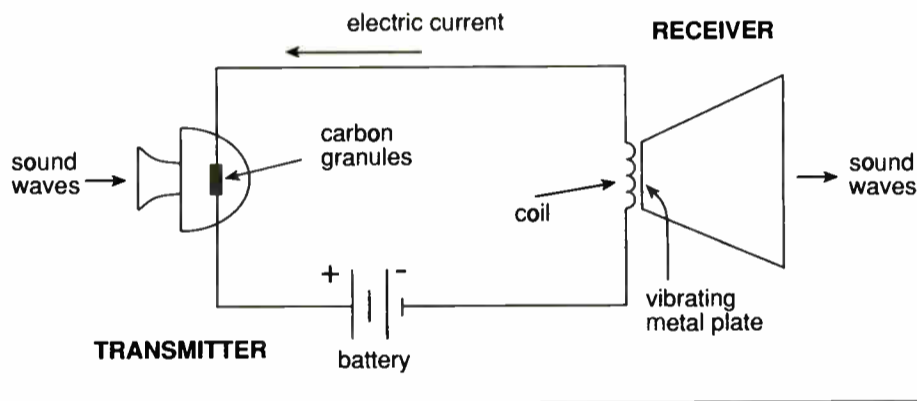
A negative temperature coefficient (a rise in temperature resulting from a decrease in the material's resistance) is not all bad. A device can be designed to sense these changes and correct the circuit that has had its current increase or decrease because of temperature change.

Solid state devices can do this rapidly and as often as needed.

□ □ □

Ed Montgomery is a communications teacher at Thomas Jefferson High School for Science and Technology. He has taught broadcast engineering at Northern Virginia Community College and worked as a broadcast engineer for several radio stations. He can be reached at 703-750-5090.

Figure 1.



and active.

A passive device has a fixed value or operating parameter and will not change from this specification when used within

The first non-mechanical electronic active devices were introduced in the early part of the 20th Century. In 1905, British engineer J.A. Fleming invented

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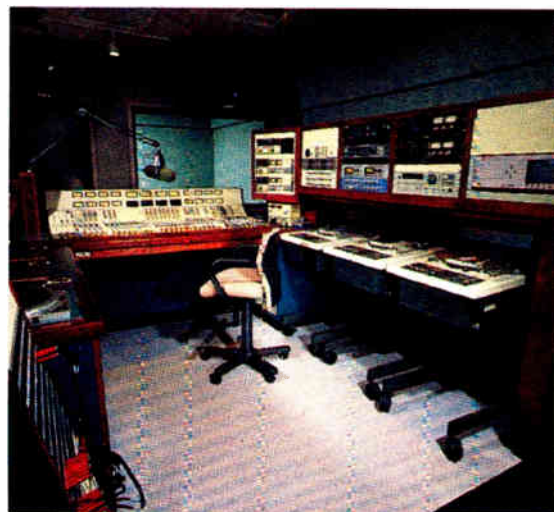
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# Low-Power Radio Is an Idea to Consider

by Harold Hallikainen

**SAN LUIS OBISPO, Calif.** I've received several phone calls on my articles on low-power broadcasting (see last one in *RW*, Dec. 8, 1993), so I thought I'd answer some questions and expand on my earlier statements.

As this column is being written, the U.S. Court of Appeals in San Francisco is considering *William Dougan v. FCC*, a case raising several constitutional questions about the FCC's current method of licensing broadcast stations.

## No LPFM

Ideally, the licensing policies should provide the population with the greatest number of program choices without interference, and at the same time restrict freedom of speech to the least possible degree.

**Prohibiting local programming on authorized FM translators does not, I believe, serve the listening public.**

The Dougan case could define how the FCC makes such choices in the future. Current regulations do not allow for low-power FM service, and those who attempt to operate such stations—the offense Dougan is charged with, along with refusing an FCC inspection—risk severe fines. Dougan was fined \$17,500.

The FCC recently rewrote its FM translator regulations, and decided not to establish low-power FM. Dougan and related court cases are testing whether that decision unduly interferes with freedom of speech.

If the court finds in favor of LPFM supporters, sometimes called "microbroadcasters," I'd expect the FCC will allow local origination on FM translators, just as they did for TV translators starting the LPTV service.

If FM translators were granted local origination, they would still be required to be licensed by the FCC and to protect other licensed stations against interference.

Prohibiting local programming on authorized FM translators does not, I believe, serve the needs of the listening public. It is government regulation of broadcast program content without justifiable governmental interest.

But many in the microbroadcasting movement claim that even licensing to prevent interference violates their free-speech rights.

## Exceptions

Setting aside a few channels on a national basis for unlicensed broadcasting might be worth considering. Stations operating on these channels would not have to pay fees for use of the spectrum and would

not receive any interference protection. It could be a sort of broadcast citizens band.

There is some precedent for limited unlicensed FM broadcasting. FM stations sometimes run using "leaky transmission lines." The signal is only heard at very short distances from the radiator, but the radiator is wired over a specific area.

This system is typically used to run an unlicensed college FM station in dorm rooms. It works like cable FM, except that the cable is a meter or two away rather than directly connected to the receiver.

Applying this type of broadcasting to wider areas with FM translators is another matter. It could be quite a mess. But it

could also be quite interesting. As long as the mess is restricted to a couple channels, it might be worth it.

Another alternative might be AM microbroadcasting. The FCC is still working on allocating the expanded AM band. Perhaps a couple of those channels could be set aside for unlicensed microbroadcasting.

Ironically, several in the microbroadcasting movement favor program restrictions while at the same time using free-speech arguments to justify low-power, unlicensed broadcasting.

I see no need for program restrictions on local content or commercial content.

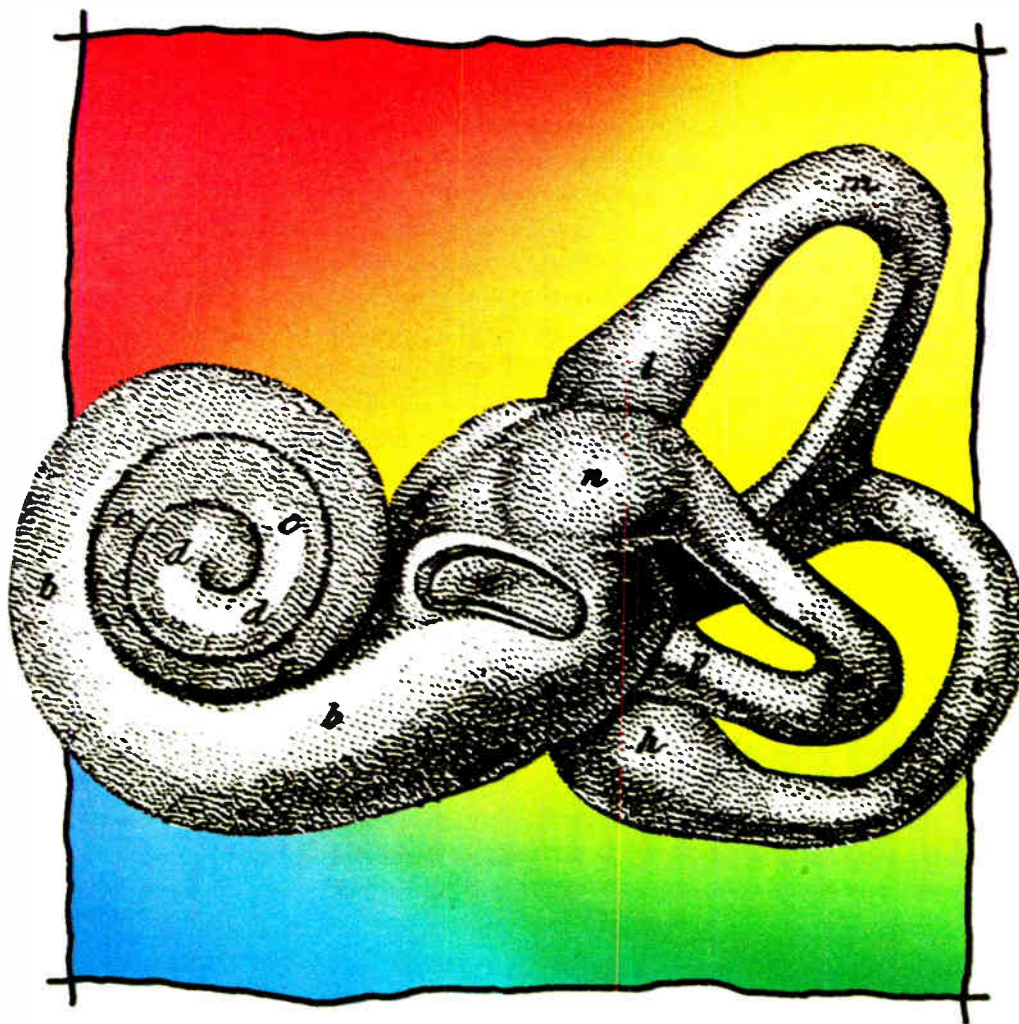
Local content is nice, but there are programs of national interest that would be appropriate on such stations as well.

Why should microbroadcast stations be prohibited from running paid announcements? No such restrictions are put on any of the print media.

□□□

*Harold Hallikainen is president of Hallikainen and Friends, a manufacturer of transmitter control and telemetry systems. He also teaches electronics at Cuesta College, San Luis Obispo, Calif. He can be reached at 805-541-0200. He can also be reached on Internet at ap621@cleveland.freenet.edu.*

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# WORKBENCH

## Strive for Clean Air in your Digital Studio

by John Bisset

**FALLS CHURCH, Va.** If you're running any digital medium in your studios, you ardently want clean air. It's amazing how airborne contaminants can wreak havoc with CD, DAT or digital cart machines.

If you are using digital cart machines, plan on getting a disk-drive cleaning system. In a 24-hour-a-day studio the drives on these cart machines are getting quite a workout. Even though they are usually of a higher quality than consumer disk drives, they still need attention, especially when the heads become contaminated.

Have you ever heard the R-rated version of "Barbara Ann" by the Beach Boys? We broadcast it one day, thanks to contaminants on the drives that caused 0s to be read as 1s and vice versa.

Contrary to the PD's opinion, it was actually pretty humorous. The song reached the point where the lyrics went something like: "Tried Mary Lou, tried Betty too, but I knew she wouldn't do." What actually broadcast was a repeating loop of: "Mary tried Betty too, Sue tried Mary, Mary tried Sue..."—and the FCC complains about Howard Stern.

After discussing it with the manufacturer,

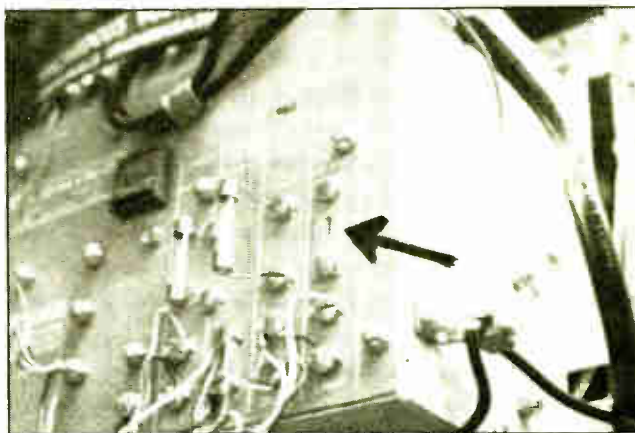
the problem was quickly diagnosed as dirty disk drives. We were told to clean the drive with a wet disk drive cleaning disk at least once a month. These particular machines had run for four months with no cleaning. (You can bet that maintenance tip will find its way into the next technical manual update.)

A procedure we found useful was to clean the machine on the bench, which included dusting with a can of 70 psi compressed air, taking it into the production room and running a disk-track diagnostic test. This will assure you that the machine will read all tracks on the disks, and guarantee that you didn't do anything wrong with the machine.

The cleaning fluid will probably evaporate in the time it takes to carry the machine from the shop to the production room. Don't reuse the machine until all the fluid has evaporated. If you use the machine too quickly you can contaminate the disks.

The operative word here is "careful." An overzealous jock at another station tried moving his digital workstation to reach

something behind it and crashed the hard drive. I guess we're all learning new procedures as we enter the digital age.



Flat, telco-type fuses (black arrow) can be replaced inexpensively by soldering pigtails onto a standard fuse of the same amperage.

★ ★ ★

Alan MacIntyre calls himself a "retired old timer, first-class license issued in 1938." Prior to his retirement, Alan was director of engineering for the University of North Carolina Public Television group in Chapel Hill. He wrote in response to the Oct. 13 issue of *RW*, where we

showed consultant Richard Mertz's transfer-switch-in-a-drawer system.

Alan says he first saw this technique used in the mid 1960s by Raytheon, which packages several of its 7 GHz STL/intercity microwave units this way. The drawers contained several aluminum boxes with slide-on connectors and removable lids for ease in troubleshooting.

It's interesting to see several of today's STL manufacturers adopt the same block-diagram design approach.

★ ★ ★

The photo shows a quick and dirty method of getting a key system back up and running. Spare telco-type flat fuses used on the system were not available, so buss wire or resistor leads were soldered to the ends of a standard fuse of the same amperage. The "pigtails" formed by the wire leads are then tightened under the retaining screws.

□ □ □

John Bisset is a principal in Multiphase, a contract engineering and projects company. Workbench submissions can be mailed to *RW*, or faxed to his attention at 703-998-2966. Published submissions qualify for recertification credit for all levels of SBE certification.

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#### Want To Sell

Audiometrics PA-1 phono preamp, balanced outputs, BO. B Harris, E&B Services, 2950 S Birch St, Denver CO 80222. 303-756-4843.

Stanton 310 pre amp, BO. J Kesler, WOBZ-TV, POB 220, Livingston KY 40445. 606-843-2209.

Audiometrics TP-84 turntable preamps (2), both in exc cond, \$100/ea. H Cotterill, WZAD, POB 978, Wurtsboro NY 12790. 914-888-0077.

Perma-Power S-102 amp w/S1420 batt pack, mobile/portable PA unit, 12 W out, exc cond, \$4100. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

GE A1-320 (2) 20 W amp uses 6L6HIGB output tubes, \$25 each; Eico ST-70 stereo amp, \$50. J Daniels, WRAV, 333 Delaware Ave, Delmar NY 12054. 518-439-0945.

MacIntosh MC-2300 pwr amp, 300 W RMS stereo, 600 W RMS mono, exc cond, factory box, schematics, \$1000/firm, FOB Austin. J Block, The Prod Block, 906 E Fifth St, Austin TX 78702. 512-472-8975.

Crown DC 150 amp, silver face, \$250. Wilsound, 4400 Old Lebanon Rd, Campbellsville KY 42718. 502-789-1505.

Belar FM RF amp, tuned to 107.1, \$400. R Wynne, KFLS. 503-882-4656.

New 10 W solid state amp, \$24,000. Call for details. Bill Hoffman, 518-743-1601.

#### Want To Buy

### WANTED:

Pultec EQ's; Fairchild, Teletronix, dbx, UREI, Sontec Limiters. Neumann, Telefunken, AKG and RCA mics. MacIntosh or Marantz Gear; Lang, Neve and API gear. Misc old tubes and guitars.

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### ANTENNAS/ TOWERS/CABLES

#### Want To Sell

Dura tower, 265', 26" face, 13-20' sections & one 5', needs paint, otherwise in good condition, with wires, \$1500. Sue Schmitz, WABT, POB 249, Dundee IL 60118. 708-551-3450.

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Belden RG-59 duo band II 75 ohm coax cable \$75/100' box. Wilsound, 4400 Old Lebanon Rd, Campbellsville KY 42718. 502-789-1505.

4-bay FMD scale translator antenna, on 95.3, good condition, \$800; Jampro Class A 1 bay FM antenna on 94.3, good condition, \$600. R Phipps, Griffin Broadcasting, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

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#### Want To Buy

Low power CP FM antenna on or near 95.9 MHz. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

ERI Rototiller-type low power antenna, 3 or more bays, must be at 107.1 or higher. P Delaney, KKRK, 212 S Division, Stuart IA 50250. 507-895-2065.

Part or complete Phelps Dodge CFM HP antenna on or near 93.3; also need ctr feed section from Phelps Dodge CFM-HP antenna system, freq does not matter. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

1-5/8" rigid transmission line, unflanged. Elbows, bullets, couplings. 305-757-9207.

### AUDIO PRODUCTION

#### Want To Sell

Digidesign Sound Tools digital editing system w/sound accelerator card, DAT I/O digital interface, Pro I/O analog interface, Sound Designer II software, JL Cooper CS-1 controller, Sound Tools utilities, manuals, cables, \$2800 plus shpg. D Glasser, Airshow, 7021 Woodland Dr, Springfield VA 22151. 703-642-9035.

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UREI parametric EQ, \$300; BBE Sonic Maximizer 822, stereo/balanced, \$250. R Payne, Song Sketches Prod, 15112 Totten Pl, Shelby Twp MI 48315. 313-786-1767.

dbx 157 NR (4), simul type-1 encode/decode, indiv level controls ea chnl to match -10 thru +8, 2 units need repair, manual, \$350 for all/BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

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Bloomington, IL 61704



dbx 165X (2), over easy limiter compressor, \$150 ea. R Phipps, Griffin Bdcg, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

Barcus-Berry 202R (2), \$200 ea, FOB Austin. J Block, The Prod Block, 906 E Fifth St, Austin TX 78702. 512-472-8975.

Pacific Recorder LS-4 switcher, LSM-10 mon switcher, Audiometrics 8-2 dist amps. P James, 414 Washington, Deiance OH 43512. 419-782-8591.

Eventide BD-941 bdc delay line w/3, 6, or 12 sec delay, \$975; UREI BL-40 Modulimter, mono compressor limiter SN 632, \$250. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

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#### Want To Buy

AT-299 audio cards (2) for McCurdy SS-7500 board. Jonas Hunter, 814-238-5085.

**Straight Wire Audio MTX-2** audio matrix. R Burton, Audio Rents, 7237 Santa Monica Blvd, Hollywood CA 90046. 213-874-1000.

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Otari MTR-10 reel w/CB-109 autolocator	\$ 2,995
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Tascam 133 stereo cassette w/cue track	\$ 495
Valley 610 stereo compressor/limiter	\$ 395
Ramko RS-1616 routing switcher	\$ 595
BE FX-30 FM exciter (2)	\$ 2,596
ITC Delta 3D stereo cart player -	NEW \$ 1,995
ITC Delta stereo record amplifier -	NEW \$ 495
Urei equalizers - most models available	CALL
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Eventide H-3000B harmonizer - (1 only)	NEW \$ 1,995
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Fairchild 600 conac or 602 Conex high freq limiters. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

**AUTOMATION EQUIPMENT**

**Want To Sell**

IGM Basic A automation system w/(4) Otari 1000 R-R, (2) 48 Instacarts, 24 Go-Cart, time announce, 950 micro-disc, remote control unit, \$3200/BO. T Fast, KKOW, Routh 5 Box 45, Pittsburg KS 66762. 316-231-7200.

Sono-Mag 22A w/RS option, BO. M Stover, KASI, 415 Main St, Ames IA 50010. 515-232-1430.

SMC ESP-1 controller (Brain), DS-20 switcher, pwr supply, rack, digital clock, encoder, monitor, remote control, spare cards, 2 dual audio cart mono machines, printer cables, (4) 452 stereo Carousels, call for price. RL Statham, WHLG, 1000 Alice Ave, Stuart FL 34994. 407-692-1000.

SMC 350 RSB (2) random access Carousels, excel cond, \$300 ea/BO. J Schloss, KICO, 2600 N Hiway Blvd, Spencer IA 51301. (no phone # given)

Smartcaster hard drive storage system set up for Wegener sat rcvr, latest software, excel cond, R/P plus more, \$7K/BO. J Schloss, KICO, 2600 N Hiway Blvd, Spencer IA 51301. (no phone # given)

Harris 9002, (5) ITC 750/770 PBs, 48 tray mono Instacart, (3) cart deck PBs, (2) VDT's, manuals & schematics, in use. J David, KMPL, POB 907, Sikeston MO 63801. 314-471-1520.

BE Control 16 automation system in excel cond, w/7 IGM Go-Carts, (2) Otari reels & more, priced to sell. M Young, WJON, St Cloud MN, 612-251-4422.

Automated Broadcast 1600S, 1600X sequencer (2) rack mount units, thumb-wheel style controller, no documents, operates up to 9 sources using 2 rows of 16 thumbwheels, \$250. S Horner, KLAX, 5700 Sunset Blvd, Los Angeles CA 90028. 805-654-0577.

Harris System 90 automation systems (2) w/(4) IGM 42-tray Go-Carts; also have misc boards, cards & parts; (2) IGM 42-tray Go-Cart machines used for parts, all in excel cond. Paul Tinkle, WCMT, 901-587-9526.

Schafer 900 Series 901 control unit, 902 switch mem, (4) R-R PB only w/PBA-1 interface 900 system pwr supply, (3) Scully PB R-R mdl 255, (3) Sound Mag Car mdl 252RS, BO. J Konicek, KBZZ, 116 Dalton Ave, LaJunta CO 81050. 719-384-5456.

IGM RAM automation controller, stereo 6 source switcher, line, que amps, VU meters, silence sensor & update clock w/source cables, live assist remote box all manuals, BO or will trade for FM exciter suitable for standby, preferably on 99.7. C Gennaro, WJMS, 222 S Lawrence, Ironwood MI 49938. 906-932-2411.

Harris 9000, (4) Otari ARS-1000 reels, (3) SMC 350 mono Carousels, input terminal, printer & manuals, 3 racks, recently removed from service, \$2500. A Chatman, WXCW, POB 1408, Crystal River FL 34423. 904-795-9595.

Carousels 250 Series (3), \$250 ea; Carousels 350 Series (2), \$400 ea; Audiofile A2, \$400; Cetec 7000 automation, terminal, 5046 event memory, several source cards, \$1200; ITC 760 R-R decks (2), \$300 ea. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

Harris 9002 (5) ITC 750/770 PBs, 48 tray mono Instacart, (3) cart deck PBs, (2) VDTs, manuals & schematics, in use. J David, KMPL, POB 907, Sikeston MO 63801. 314-471-1520.

SMC 350 stereo Carousels (6), will sell one or all, you pay shipping, \$300 each. J Leutzinger, KFSB, 2620 Dogwood Rd, Joplin MO 64821. 417-624-1310.

SMC MSP-1 automation controller w/all cables, works, BO. B Ladd, WNRR, 108-1/2 E Main, Bellevue OH 44811. 419-483-2511.

Conex CG25A 25 Hz tone generator, adjustable tone levels, timing intervals. P Bailion, KMCM, 1218 Pioneer Bldg, St Paul MN 55101. 612-222-5555.

Harris 9001 automation w/(2) Otari ARS-1000, (2) IGM 24 Go-Cart, (2) single play ITC carts; also second system for spares or standby w/Brain, switcher, pwr supply, terminal keyboard & manuals, \$4000/BO. R Wynne, KFLS. 503-882-4656.

IGM Instacarts/Go-Carts, (2) stereo 48 tray Instacarts touch pad on front panel, \$100 ea; (2) stereo 42 tray Go-Carts, good condition, \$500 ea, buy any two, get rack free. D Greer, WDZZ, 1830 Genesee Twrs, Flint MI 48502. 313-238-7300.

ITC 750 play only reels (4) for automation, \$150 ea/\$500 all, get rack free & 10 music reels free for AC format. D Greer, WDZZ, 1830 Genesee Twrs, Flint MI 48502. 313-238-7300.

SMC MSP-1 automation system complete w/(4) Otari ARS-1000 R-Rs, (3) 350RSB stereo Carousels, SMC 712 dual cart player, all in 3 matching SMC custom deluxe racks, manuals, currently in use, \$6000/BO. R Wynne, KFLS. 503-882-4656.

IGM EC auto-nation system, new, 12 stereo inputs, mono outputs, line amps, VUs silence sensor, etc, has live assist control package, also capable of satellite programming, all software manuals, source cables included, BO. C Gennaro, WJMS, 222 S Lawrence, Ironwood MI 49938. 906-932-2411.

**CART MACHINES**

**Want To Sell**

ITC-3D stereo triple deck PB, great cond, new heads, cables & motor, rebuilt cards, \$1100. B Gable, Reunion Ent, 804 Mt Vemon Pkwy, Alta Springs FL 32701. 407-646-6827.

BE 5300 triple deck mono, excel cond, in use w/sec & tertiary tones, \$1000/BO. K Carpenter, Sleeman/Fietz Prod, 40 Fourth St #217, Petaluma CA 94952. 707-763-0191.

Audicord S Series R/P & play only machines in gd cond, \$800/BO for play, \$1000 for R/P. J Schloss, KICO, 2600 N Hiway Blvd, Spencer IA 51301. (no phone # given)

Audicord PB only (2) in gd cond, \$350 ea. R Phipps, Griffin Bldg, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

BE 5302 & 5310 triple cart R/P, good condition, BO; IGM 10A single deck player, good condition, BO; Delta stereo R/P, BO. R Fries, WVSY, POB 7932, Charlottesville VA 22901. 804-973-2200.

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BE 5300C tripledeck, stereo, PB, mint less than 50 hours, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

**Want To Buy**

Ramko or BE cart rewinder. D Sorenson, Sorenson Bldg, 604 N Kiwanis, Sioux Falls SD 57104. 605-334-1117.

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Tascam 48 1/2" 8 track with SMPTE compatibility & remote control, \$2500/BO. B Robinson, Robinsons Studios, 2 Longview Ct, Norwalk CT 06851. 203-849-1314.

Ampex 440C-8 1" 8 track, mint condition, manual, alignment tape, roll-around, some spare parts, \$3250. B Ganstlen, Ganstlen Audio, 1250 Valencia, Lewisville TX 75067. 214-436-2206.

Pioneer RE701, new heads \$300; Teac A3340S, like new, low hrs, \$700; Tapecons TR70 1/2 trk stereo, \$250. J Parsons, Parsons Snd, 2781 Fayson Circle, Deltona FL 32738. 904-532-0192.

Uher 4200 Report Monitor, R-R stereo 1/2 trk portable, 3 hrs, 4 speeds, new in box, \$500. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-968-8894.

Tascam 1" 16 trk w/integral dbx, excel cond, one owner, factory stand, fancy remote/locator, \$4200 FOB Austin. Joel, 512-472-8975.

MCI JH 110B-1 1/4" FT (2), \$2500; MCI JH 110B-2 1/4" 2 trk, \$3000; MCI JH 110C-1 1/4" FT & 2 trk, \$3000. All in gd working cond. B Schwab, Audiocraft, 915 W 8th St, Cincinnati OH 45203. 513-241-4304.

Tascam 38 8 trk deck, 1/2", excel cond, low hrs, \$1500. S Winthrop, Winthrop Prod, 257 Warren Ave, Fort Lee NJ 07024. 212-629-6293.

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Tascam 22-2 2 trk, 15 & 7.5 ips, 7" reels, like new, \$550. J Ellingson, J Ellingson Voice-Overs, 913 Warwick Dr, Cedar Falls IA 50613. 319-277-8535.

Ampex 200 (2) vintage 1947 recorders, serial nos 10 & 79, \$1800/pr. Dr P Chance, Imperial Analog, 925 Clinton St, Philadelphia PA 19107. 215-574-8147.

## EMPLOYMENT

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Experienced GM w/proven track record of turnarounds, hands on mgmt style, workaholic, driven to succeed, former major mkt sportscaster, avail immed. Ed Edwards, 813-366-0732.

Personality plus production, 12 yrs exper, BA/BS, talk/CHR/AOR. Steve, 704-372-8128.

Recent broadcasting graduate seeks an on-air position, gd prod skills, fast learner, will relocate. Chris, 405-631-6758.

Experienced engineer, directionals, RF, studios, computers, seeking maintenance position w/board shift, Southwest mtn area preferred, but not limited, write: Engineer, 7894 Palm Grove, Indiana-polis IN 46219.

Experienced news reporter/anchor, worked w/NY/NJ medium market stations, great writing & announcing skills, news hound, seeks midwest opportunity. MC, 908-940-9179.

Experienced GM-OM w/unbeatable track record is fired up to make your station the community's most well known, former major mkt sportscaster. Big Ed Edwards, 4009 17th St, Sarasota FL 34235. 813-366-0732.

Hands on Engineer w/over 30 yrs of AM/FM/TV. MF/HF/UHF background, desires position w/international SW bldg facility, FCC Gen SBE Cert, IEEE, AE Degree. Lou, 904-383-1002.

CE w/big production voice & over 15 yrs hands-on eng exper seeks CE position w/production, strong troubleshooting, RF & computer skills. G Morgan, 704-563-8676.

General Manager, 15 yrs experience, sks similar position w/US radio station. Send replies to J Fiordan, c/o D. O'Hara, 1 Kimball Ave, Yonkers NY 10704.

Experienced GM w/proven track record of turnarounds, hands on mgmt style, workaholic, drive to succeed, former major mkt sportscaster, available immediately. Ed Edwards, 813-366-0732.

AAS Grad, 3 yrs on-air, seeks FT announcing, CHR, AC, AOR, Light Talk, CHR PD potential. Brian, 1104 Park Circle, Conyers GA 30207. Atlanta area only.

The skills and talents of some broadcasters have been known to unravel, invest your trust in this poetic announcer who is ready to travel. Mike, 405-733-7859.

Nationwide Communications Inc's newly acquired WCOL-FM, Columbus, OH, has an opening for a chief engineer. Experience is necessary in high power FM, studio maintenance, and remotes, applicant must be familiar with PC based computer network systems. Mgmt skills are necessary and SBE cert. a plus. Reply to Robert Reymont, Director of Radio Engineering, POB 5159, Mesa Arizona, 85211-0500. (602) 964-4000 for more details. EOE.

General Manager - FM station needs sales driver with community involvement. Only station in mkt. Digital state of the art. Living space avail.. Carolina mountains. Contact President, Box 547309, Orlando, FL 32854.

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Massachusetts AM/FM, seeking news, sports, announcing & production talent. Send resume, tape to: Corydopn L. Thurston, Berkshire Broadcasting, Box 707, No. Adams MA 01247. EOE.

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PO Box 1214, Falls Church, VA 22041  
Attn: Simone Mullins

## CASSETTE &amp; R-R...WTS

Revox A77 1/4 trk in cabinet w/speakers, low hrs, vgc, \$500/BO; Sony PCM 2500 DAT w/new heads in gd cond, \$1000. HR Fair, Ealing Rec Ltd, 4906 N Taiman Ave, Chicago IL 60625. 312-784-1558.

Otari MX-5050 2 trk, R/R 1/4" w/over-bridge, \$400. L Houck, Rollin Recording, 210 Allgelt, San Antonio TX 78201. 210-736-5483.

Scully 280 1/2" 4 trk, vgc, 7.5/15 ips, \$650. M Gore, 415-469-0136.

Ampex MM 1100 16 trk 15/30 ips in superb cond, heads gd, all electronics checked out, updates, counter, MDA fans, AC stabilizer card, mods, BO. M Gore, 415-469-0136.

Ampex 350/440 transport/electronics parts, some new, most used in super cond; also parts for Scully 280s & complete Inovonics electronics for 350s & 440s, all reasonably priced. M Gore, 415-469-0136 noon to 5PM west coast time.

## REVOX PARTS/SERVICE

Cassette-CD-Open reel  
Rebuilt A77s, \$800  
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**JM TECHNICAL ARTS**  
30 Music Sq. W. #156  
Nashville, TN 37203 (615) 244-6892

Otari ARS 1000 (4) interfaced to operate on SMC automation system, will sell one or all, \$450 ea. J Leutzing, KFSD, 2620 Dogwood Rd, Joplin MO 64821. 417-624-1310.

Berlant-Concertone 23 custom stereo Series 20, circa 1959, mostly working w/schematics, free, just pay shpg. C Dunnam, Linear Research, 5244 Perry City Rd, Trumansburg NY 14886. 607-387-3411.

Tascam 2640-25 cassette duplicator 16:1, high quality, BO. P James, 414 Washington, Defiance OH 43512. 419-782-8591.

Tascam MS-16 1" 16 trk w/integral dbx, excel cond, factory stand, fancy remote/locator, \$3750, FOB Austin. J Block, The Prod Block, 906 E Fifth St, Austin TX 78702. 512-472-8975.

Ampex AG-440-B, 2 trk, 7.5-15, add'l 1/4 trk PB head w/both scrape flutter idlers, synchronous capstan, spare hold-downs & pinchroller in Ampex roll-around, manual, excel cond, \$1400/BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

Scully 250 2 trk R-R in homemade cabinet, seems to work, BO. J Wells, Sound Arts, 8377 Westview, Houston TX 77055. 713-464-4653.

Revox G-36 Mark III tube recorder, excel cond, BO; Tandberg 6000X, 3 speed, excel cond, BO. R Rhodes, Roger Rhodes Music, POB 1550, NY NY 10101. 212-245-5045.

METROTECH  
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SERVICESEQUOIA  
ELECTRONICS4646 Houndshaven Way  
San Jose, CA 95111  
(408) 363-1646  
FAX (408) 363-0957

Otari MK-III 8 trk, \$1995; Eventide H3500 Ultra-Harmonizer, \$2495; Audiotronics 110A 18 chnl Grandson, \$495; Kurzweil K1200 Pro-88 keyboard, \$1595. St John Productions, 504-464-8881.

Revox PR99, gd cond, BO. R Fries, WVSY, POB 7932, Charlottesville VA 22901. 804-973-2200.

Tascam 32 (2) in excel cond, low hrs, \$600 ea. K Thomas, Rebel Recdg, 5555 Radio Ln, Jacksonville FL 32205. 904-388-7711.

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North Hollywood, CA 91607 fax 818-784-3763

Tascam 112B, excellent condition, \$520; MCI JH1624, 16 track, 2" analog recorder, mint condition, 100 hours on new lapped heads with auto-locate type 3, manual, call for details. R Payne, Song Sketches Productions, 15112 Totten Pl, Shelby Twp MI 48315. 313-786-1767.

Sony 770-2 portable, 2 trk, 7.5-15, add'l 1/4 trk PB head, variable speed DC servo capstan, manual, needs some work, \$350/BO plus shpg; Revox 700, 2 trk, 15-7.5-3.75, rackmount, DC servo capstan, constant tension transport, works but tough shape, 1 VU meter dead, manuals, \$200/BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

Pioneer RT-1050, 2 trk & 1/4 trk head-blocks, 15-7.5, balanced mic inputs, edit/cue lever mod, needs rewind switch, manuals, \$200/BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

Otari Mark II-HV 1/2" 4-track, multi-track, mint, less than 50 hours, Best Offer. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

Recorder heads, used Scully mono & 2 trk, \$25-50, ATR100's, 3M M79-16 & 8's, Otari 1/2" 8 trks, \$495. W Gunn, 619-320-0728.

Otari MX-70 16 channel, 1", clean low hours, \$7500. Call 201-798-2745.

16 trk 2", \$3450; Otari 1" 8 trk, \$2450; 5050 III-8, \$1950; Ampex ATR800 mono, \$750; Tascam 25-2, \$750; Tascam 52 mint, \$1200; MCI Locator III, \$1195; Ampex AG350 solid st electr, \$100/ch. W Gunn, 619-320-0728.

## Want To Buy

Fostex PD-2 portable 4-head time code DAT recdr. G Warren, 3715 N Lakewood, Chicago IL 60613. 312-327-4785.

Sony TC-105 motor in gd cond. D Neish, Mobile Radio Comm, Box 100, Chester SD 57106. 605-489-2497.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Spotmaster TP-60B tape timers from cart tape winders (TP-1A or TP-1B). Mel Crosby, 408-363-1646.

Scully '100' recorders, record/play amps, 8, 16, 24 track heads. Sequoia Electronics, 4646 Houndshaven Way, San Jose CA 95111. 408-363-1646.

## CD PLAYERS

## Want To Sell

Tascam 701 (3), plus RC 701 remote ctrl, \$1000, plus A701 in a basket free. S Karwan, KPSI, 2100 E Tahquitz Way, Palm Springs CA 92262. 619-325-2582.

## COMPUTERS

## Want To Sell

Franklin 8086 IBM compatible computers (2), floppy drive & 20 meg hard drive, mono monitor, \$300 ea. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

## Want To Buy

Radio Shack TRS-80 model 4 wanted for back up, no junk, must in gd cond. Jack or Shirley, WENT Radio, Harrison St Ext, Gloversville NY 12078. 518-725-7175.

## CONSOLES

## Want To Sell

Russco 505 mono, \$300; Ramko DC5AR 5 chnl mono, \$300. J Parsons, Parsons Snd, 2781 Fayson Circle, Deltona FL 32738. 904-532-0192.

Gates Gateway 10, 10 chnl, removed in 1989 in gd working cond, \$250. C Giannettino, KCPS, 408 N Main, Burlington IA 52601. 319-754-6698.

Gates Executive 10 chnl stereo console, gd cond, \$1000. T Toenjes, WREN, 201 NW Hwy 24, Topeka KS 66608. 913-437-6549.

Yamaha RM-1608 studio console, 16x8x2, excel cond, low, mid & high EQ, phantom power on all chnls, full talkback & tones, \$2200/firm, FOB Austin. Joel, 512-472-8975.

Gates Executive 10 chnl stereo board w/manuals, some modules missing, removed from service in 1/93, \$500. R Miller, WTIM, Taylorville IL 62568. 217-824-3395.

Yamaha MR 1642 16 input prod console, 4 outputs, 3 band EQ, talk-back, less than 1 yr old, must sell, \$1000. E Reinhold, WGRC, 150 Buffalo Rd, Lewisburg PA 17837. 717-523-1190.

Tascam 5 w/R-R 12-4, Tascam 40-4 w/dbx R-R, Tascam 25-2 1/2 R-R, Otari 5050, BO. P James, 414 Washington, Defiance OH 43512. 419-782-8591.

Tascam M216 16 chnl mixer, \$825; Audio Technica 4 trk 6 chnl mixer, \$825. G Fitzgerald, Fitzmusic, 37-75 63rd #B29, Woodside NY 11377. (no phone # given)

Tascam 5B mixer, 8x4, 2 band EQ, 2 sends, talkback module, spare Master Module, spare blank, wood shipping crate, documentation, PB-64 patchbay w/cables, gd cond, \$800/BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

Microtouch 5 chnl stereo, \$500. G Erway, KKS, 1330 Cacique, Santa Barbara CA 93103. 805-563-1444.

Audiotronics 110-B special 48 trk plus dual foldback mixing board, as is, BO. U George, 840 8th Ave, NY NY 10019. 212-969-0240.

Sparta 8 pot, works, but better as parts source, will trade. S Callahan, Talking Info Ctr, Enterprise Dr, Marshfield MA. 617-834-4400.

Shure FP-31 3 chnl mono mixer/case, used in gd cond, \$500. Raider Prod. 215-889-9565.

CAD Maxcon mixing console, 16 input, C frame, 36 panel w/add'l ribbons, stereo buss, 8 monitor buss panels, PS-2 supply w/separate for meter bridge, Type 1 master modules, mint cond, call for details, \$6200. R Payne, Song Sketches Prod, 15112 Totten Pl, Shelby Twp MI 48315. 313-786-1767.

## Want To Buy

Harris/Gates Executive 10 chnl stereo solid state, must be in operating cond. F Napurano, WDVR, POB 191, Sergeantsville NJ 08557. 609-397-1620.

WE 23-C 5 chnl. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Neve BCM 10, or any small bdct console made by Neve. J Wells, Sound Arts, 8377 Westview, Houston TX 77055. 713-464-4653.

DISCO-PRO SOUND  
EQUIP

## Want To Sell

Yamaha REY7 dig reverb/flange chorus/phasing etc, \$350. S Karwan, KPSI, 2100 E Tahquitz Way, Palm Springs CA 92262. 619-325-2582.

Roland DEP 5 sound processor, \$400. Wilsound, 4400 Old Lebanon Rd, Campbellsville KY 42718. 502-789-1505.

Ampex 620 amp/speaker pair, 10 W tube amps, portable in original Samsonite cases, gd cond, \$275/pr or BO plus shpg. J Mehne, Clearwater Audio Recdrs, 611 E Miller Rd, Ithaca NY 14850. 607-277-0540.

## Want To Buy

Altec 604's, Altec/WE 755s, WE speakers & systems. RW Studio, Larson Rd #4, N Reading MA 01864. 508-664-0174.

Altec 604, Altec/WE 755s, WE speakers & system. L Blackmon, RQ Studio, Larson Rd #4, N Reading MA 01864. 508-664-0174.

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## LEASING AVAILABLE

1-900 # lines available. Great for opinion lines, contest and information lines. Call Bill at 916-344-2504.

## LIMITERS

## Want To Sell

Aphex 320 Compellor, excel cond, used once, \$900 plus shpg. D Glasser, Airshow, 7021 Woodland Dr, Springfield VA 22151. 703-642-9035.

BBE 862, sonic maximizer, 6 mos old, perfect cond, \$300. S Karwan, KPSI, 2100 E Tahquitz Way, Palm Springs CA 92262. 619-325-2582.

Harris MSP-90 audio processor, BO. M Stover, KASI, 415 Main St, Ames IA 50010. 515-232-1430.

Universal Audio BL-40 Modulimiter, CBS Volumax FM II stereo peak level controller, \$200. L Houck, Rollin Recording, 210 Allgelt, San Antonio TX 78201. 210-736-5483.

Allison Kepex 8 chnl in 19" powered rack, can fix 8 more chnls in rack, BO. J Wells, Sound Arts, 8377 Westview, Houston TX 77055. 713-464-4653.

Aphex 250 Aural Exciter III, as new cond, original crate, manual, \$675. J Ying, 140A, Bellevue Ave, Newport RI 02840. 401-846-9743.

Optimod 8000A, 8100, 8200, gd cond, \$1500-\$6000/BO. S Michaels, GMN Inc, Box 2205, Cincinnati OH 45201. 606-572-9446.

Solid Statesman AGC and limiter; Audimax 4440A & 4450A, discriminate audio processor & 2 older Volumax's, will trade. S Callahan, Talking Info Ctr, Enterprise Dr, Marshfield MA. 617-834-4400.

Optimod 8000A, gd cond, \$1200/BO; Aphex 300 Compellor, stereo, \$500/BO; Aphex Aural Exciter, stereo, \$500/BO. D Mussell, Bdct Eng Svcs, POB 2542, Aptos CA 95001. 408-688-5209.

Orban Optimod 8100 A/1 w/Texas card 5 & original card 5 in excel cond; Texas Audio Prisms (2), excel cond; MSI CP-803 composite clipper in excel cond, all equip complete w/manuals, to be sold as complete processing system, \$6000/all. T Jenkins, KNFM, 2911 La Force Blvd, Midland TX 79711. 915-563-5636.

dbx 160X comp/limiter, Fostex digital delay, Orban 672A EQ, Tapco 4400A stereo reverb, BO. P James, 414 Washington, Defiance OH 43512. 419-782-8591.

## Want To Buy

CRL PMC-450 AM processor. T Noordyk, WTIC, 1561 Deer, Box 220, Manistique MI 49854. 906-228-4702.

Dolby SR 280 CAT cards (2) for Dolby SR NR. G Warren, 3715 N Lakewood, Chicago IL 60613. 312-327-4785.

Fairchild 670 or 660 tube compressor/limiter, Teletronics LA-2A tube compressor/limiter or UREI LA-3A solid state compressor/limiter, call after 3PM CST. 214-271-7625.

PHONE: 703-998-7600 FAX: 703-998-2966



Call Simone Mullins, Classified Ad Manager, to reserve space in the next issue. Use your credit card to pay, we now accept VISA and MASTERCARD.

# Radio World

5827 Columbia Pike, 3rd Floor

Falls Church, VA 22041

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Acoustics	Consoles	Software
Amplifiers	Disco-Pro Sound Equip.	Stations
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Audio Production (Other)	Leasing	Tapes, Carts & Reels
Brokers	Limiters	Tax Deductable Equipment
Business Opportunities	Microphones	Test Equipment
Cart Machines	Miscellaneous	Transmitter/Exciters
Cassette & R-R Recorders	Monitors	Tubes
CD Players	Receivers & Transceivers	Turntables
Computers	Remote & Microwave Equip.	Positions Wanted
	Satellite Equipment	Help Wanted

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	1x	3x	6x	12x
1-9 col inch (per inch)	\$60	58	54	49
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Distributor Directory	100	95	90	85
Professional Card	65	60	55	50
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2215 Faraday Ave., Suite A  
Carlsbad, California 92008  
(619) 438-4420

MICROPHONES

Want To Sell

Audio-Technica AT813 condenser mics (3), gd cond, \$65 ea or \$180/all. H Cottenill, WZAD, POB 978, Wurtsboro NY 12790. 914-888-0077.

Shure SM-81 (2), \$190 ea; (2) Shure SM-57, \$70 ea; (2) Beyer M-201, \$115 ea, all in excellent cond w/cases, plus shpg. D Glasser, Airshow, 7021 Woodland Dr, Springfield VA 22151. 703-642-9035.

Neumann KM-53 omni (2), classic tubes w/pwr supply & cables, in excel cond, \$100/ea. HR Fair, Ealing Rec Ltd, 4906 N Talman Ave, Chicago IL 60625. 312-784-1558.

EV 103 like 365A, good condition, XLR mount, many avail, \$35 ea. U George, 840 8th Ave, NY NY 10019. 212-969-0240.

AudioTechnica 811 bi-directional, new, \$150; Gilzo 14' fishpole/internally wired w/AT mic mount, used, gd cond, \$125. Raider Productions, 215-889-9565.

AKG The Tube mic, \$2600; AKG 421, \$275; (2) Beyer M160 ribbon mics, \$550. G Fitzgerald, Fitzmusic, 37-75 63rd #B29, Woodside NY 11377. (no phone # given)

Sennheiser 441, new, never used with all papers & response curves, \$420; Neumann U87Ai, new, never used with all papers & Gotham box, \$2400; Beyer M-201 cardioid dynamic (pr), mint condition, \$180 each/\$350 pair; Sennheiser 421, excellent condition, \$320; CAD condenser mic, mint condition, box & all papers, \$580. R Payne, Song Sketches Prod, 15112 Totten Pl, Shelby Twp MI 48315. 313-786-1767.

Neumann NKMU power supply for KM56 mic, never used, \$225; Neumann U-67 w/power supply, like new, \$2895. F Virtue, Virtue Recdg, 8811 Rising Sun Ave, Philadelphia PA 19115. 215-763-2825.

Shure SM 82 unidirectional mic, \$275/BO. J Daniels, WRAV, 333 Delaware Ave, Delmar NY 12054. 518-439-0945.

Gefell Neumann UM57 tube mics, New capsules for SM2 & many others, New AC701 tubes for Neumann mics, \$275. W Gunn, 619-320-0728.

AKG 414's, \$695, original D12 like the Beatles used, \$295, Sony ECM54, \$150, Beyer M500 lk new, \$300, Demeter 4-ch tube DI rack mt lk new, \$875. W Gunn, 619-320-0728.

Want To Buy

Shure & EV metal mic cases, SM-7 or RE-20 style. R Burton, Audio Rents, 7237 Santa Monica Blvd, Hollywood CA 90046. 213-874-1000.

Neumann U-89 in vgc, will pay up to \$1100. HR Fair, Ealing Rec Ltd, 4906 N Talman Ave, Chicago IL 60625. 312-784-1558.

RCA, WE, etc, ribbon velocity mics, most models. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Valley 400 mic processor in good condition. S Michaels, GMN Inc, Box 2205, Cincinnati OH 45201. 606-572-9446.

77-DX's, 44-BX's, KU-3A's On-Air lights. Top price paid. Fast response. Bill Bryant Management, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131.

RCA 77DXs/44BXs ribbon, chrome/TV grey, good condition, BO. R Kaulman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

MISCELLANEOUS

Want To Sell

ADC Pro-Patch, 1/4"-19" patchbay, new, \$100; SPX-90 Yamaha reverb. \$350. B Ganslen, Ganslen Audio, 1250 Valencia, Lewisville TX 75067. 214-436-2206.

Rotron Blowers for Elcom, Harris, CCA, CSI, McMartin, rebuilt & new. Goodrich Enterprises Inc. 11435 Manderson St. Omaha, NE 68164 402 493 1886 FAX 402 493 6821

Altec 1579A equalized transistor amp for magnetic phono pickup, octal 8 pin base, \$25. S Lawson, KAK Prod, 928 Hyland Dr, Santa Rosa CA 95404. (no phone # given)

Triad A-10-J input transformer (2), 150/600 ohm input, 60K ohm output, \$40/pr. S Lawson, KAK Prod, 928 Hyland Dr, Santa Rosa CA 95404. (no phone # given)

McMartin TBM-2000A, \$100. L Houck, Rollin Recording, 210 Altgelt, San Antonio TX 78201. 210-736-5483.

10 Double row, 48 jack, tip-sleeve patch panels wired to Xmas trees, \$25 ea/BO; WE 19645 recorder connector, provides 15 sec beep tone & output for recording telephone calls, needs relay, \$35. M Muderick, Muderick Recdg, 101 Earlington, Havertown PA 19083.

FOR SALE: Giant boom box, red in color, \$1750. Audio package, six months old, \$7500. 26 foot tandem axle trailer w/brakes, six months since total refurb/paint, air in control room, great for remotes, fairs, events & high visibility, \$17,500. BE 4100 series console, new from factory, \$2500. Harris SX1A 1990 1kw AM transmitter, you tune & ship, \$9500. Harris BC500H 500 watt AM, as is, \$2500. Potomac AA51 distortion analyzer, new w/book, \$1500. Mosely MRC 1600, 2 studio/1 transmitter unit telco cards & subcarrier cards included, \$2000. Gates dualux, refurb/paint, \$1500. Call Dan Bryan or Chuck Porter at 217-357-3128 or fax 217-357-6610.

ProComm 48-position audio patch bays, many avail, BO U George, 840 8th Ave, NY NY 10019. 212-969-0240.

Altman 12" pan style lights w/o bulbs, \$25 ea. Wilsound, 4400 Old Lebanon Rd, Campbellsville KY 42718. 502-789-1505.

Tube output transformers by UTC, Triad, Freed, WE, Acrosound, Peerless. L Blackmon, RQ Studio, Larson Rd #4, N Reading MA 01864. 508-664-0174.

Want To Buy

Pioneer control switch assembly, RSG-025-0 or control board RWG-047-0, gd cond & complete, will consider used Pioneer R/P RT-1011L. M Hoffman, KNCK, 913-743-1414.

Radio transformers by Chicago, UTC, Triad, Peerless, Freed, Sola, send list. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recordings, 228 East 10th, NYNY 10003. 212-674-3060.

Ampex tube recorders and mixers. W Gunn, 619-320-0728.

MONITORS

Want To Sell

Peerless 4580116-20 input transformers, 600 ohm input, 60 K ohm output (8), 8 pin octal base, \$15 each. S Lawson, KAK Productions, 928 Hyland Dr, Santa Rosa CA 95404. (no phone # given)

MODULATION MONITORS

Will repair and calibrate all makes and models. Mike Patton PATTON & ASSOC. 504-292-4189

Circle (83) On Reader Service Card

Want To Buy

EBS encoder/decoder, not too old, working. P Swartz, WXJC, 6831 Holiday St, Homosassa FL 34446. 904-621-0402.

McMartin (buy & sell) any model. C Goodrich, 11435 Manderson, Omaha NE 68164. 402-493-1886 or fax 402-493-6821.

RECEIVERS & TRANSCEIVERS

Want To Sell

McKay Dymek AM-3 solid state AM tuner wide or narrow band, nice condition, \$250; McKay Dymek AM loop antenna with RF amp, tunable w/RF gain control. L Snyder, Madera Bdcgt, Box 182, Floral Park NY 11001. 718-347-2940.

Regency Micro Comm 401R UHF 2 way repeater with combiner, all in rack, BO. M Aldridge, RSE, POB 616, Deltawah TN 37363. 615-855-1624.

Professional SCA demod card with excellent crosstalk rejection, \$20; Superadio III with SCA, \$85, performance guaranteed. 1-800-944-0630.

Lafayette LT 100 AM/FM tuner, tube set, \$25; Eico St-96 tuner, tube set, \$50; Eico 2200 FM stereo tuner, tube set, \$50; Harmon-Kardon AM/FM stereo tuner, T300X, \$50. J Daniels, WRAV, 333 Delaware Ave, Delmar NY 12054. 518-439-0945.

SCA RECEIVERS—ALL TYPES

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DAYTON INDUSTRIAL CORP. (Manufacturer) 2237 Industrial Boulevard Sarasota, FL 34234 Tel: 813 351 4454 FAX: 6081

Sony SRF-A1 AM stereo Walkmans, new, several left, \$89. C Fox, WOLF, 4853 Manor Hill Dr, Syracuse NY 13215. 315-468-0908.

AM STEREO RECEIVERS

From \$34.95 Portable, Home, Auto RRADCO Phone/FAX 708-513-1386

McMartin TBM1000 FM, rack mounted crystal controlled single chnl FM receiver not at 91.5, will trade. S Callahan, Talking Information Center, Enterprise Dr, Marshfield MA. 617-834-4400.

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Hammarlund HQ 140 X, like new cond w/matching speaker & internal crystal calibrator, w/Q multiplier w/manuals, Best Offer; Kenwood TR 2400 HT, good operating cond w/Ni-Cad batteries, DTMF pad, battery charger & manual, 1.5 W, 2 meters, Best Offer. T Spencer, Rt 1 Box 224, Bassett VA 24055. 703-629-1161.

Want To Buy

Standard w/antennas receiving equipment for MDS channel I. K Diebel, KTJC, 1207 Louisa St, Rayville LA 71269. 318-728-5852.

Marti SCG-8 SCA generator in good shape, preferable set up for 67 kHz; Johnson portable SCA analyzer. S Callahan, Talking Info Center, Enterprise Dr, Marshfield MA. 617-834-4400.

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Gentner VRC2000 dial up remote, 2 yrs old. John, 409-724-1292.

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1, 2 and 3-Line Extenders Switched 56 Systems  
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(516) 623-6114 FAX: 377-4423

Moseley TRC-15AW xmtr remote control unit in gd cond w/manuals & many spare parts, upgrading & must sell, \$500. M Meyer, KLQP, POB 70, Madison MN 56256. 612-598-7301.

Harris Sentinel 16 remote control w/manuals, just removed, \$500 as is. R Miller, WTIM, Taylorville IL 62568. 217-824-3395.

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Frank Grundstein 215-642-0978  
Audio/Video Consultants

Comrex single line rcvr, like new, BO. M Leshner, ML Audio, 117 W Riding Rd, Cherry Hill NJ 08003. 609-428-5177.

Moseley PBR-15AD remote control system, gd cond, just removed from service, \$500. B Ketchersid, WYXI, POB 1390, Athens TN 37371. 615-745-1390.

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Gentner SPH-3A telephone interface system, excel cond w/manual, \$325. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

Burk TC8 remote ctrl w/Burk FM sub-carrier rcvr, less than 2 yrs old, \$2000. K Paul, WKXD, 259 S Willow Ave, Cookeville TN 38501. 615-528-6064.

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Marti STL-10 system w/xmtr, rcvr, (2) 4' dishes & 700' 1/2" coax, 2 yrs old, \$3000/pkg. E Finley, WLBB, POB 1289, Laurens SC 29360. 803-984-3544.

Marti STL-8 type approved system, (2) xmtrs, (2) rcvrs on 949.375 & 949.625, gd operating cond, \$3200. B Harris, E&B Services, 2950 S Birch St, Denver CO 80222. 303-756-4843.

Mark Product 8' grid dish (2), aluminum, trans/recv, \$1800/BO. M Grubbs, NTI, POB 1047, Lufkin TX 78648. 210-875-2555.

Belar RFA-2, 1 yr on AM, goes in remote studio location to operate mod monitor, \$500. K Paul, WKXD, 259 S Willow Ave, Cookeville TN 38501. 615-528-6064.

Comrex 2XP 2-line send unit, \$2100. M Saxton, WAUK, 1801 Coral, Waukesha WI 53186. 414-544-6800.

**SATELLITE EQUIP****Want To Sell**

Macom/Prodelin 161-6 10' sat dish w/mount & feed, 8 fiberglass sections, \$350. B Dickerson, WEAG, 1421 S Water St, Starke FL. 904-964-5001.

Microdyne 1100-FFC(X1)R(DC)L 70 MHz down converter, \$1200; Wegener 1601 SPCP rcvr w/cards. J Mueller, Family Stations, 240 Hegeberger Rd, Oakland CA 94621. 510-568-6200.

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Scientific Atlanta DAT-32, 7.5 kHz audio card, fits all SA DAT 32 rcvrs to rcve Mutual, NBC, Talknet & much more, \$500. C Giannettino, KCPS, 408 N Main, Burlington IA 52601. 319-754-6698.

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Avcom SCS-200 satellite receiver, 4 preset crystal selection or tunable, has crystal for USA Network News, just serviced & new crystal by Avcom, \$200/Best Offer. J Standefer, KYLR, 1018 12th St, Huntsville TX 77340. 409-293-1400.

Adcom/SA 7550 sat rcvr on Unistar ACII format, ready to go, removed 12/1/93, stereo block down converter, full set of manuals, \$3500. J Leutzinger, KFSB, 2620 Dogwood Rd, Joplin MO 64821. 417-624-1310.

**Want To Buy**

Fairchild Dart 384 digital rcvr w/LNA down converter, 7.5 kHz audio card, demod & cue chnl card needed, 15 kHz audio card a plus. Morgan, KSGI, 341 S Bluff St, St George UT 84771. 801-628-1000.

Fairchild or Scientific Atlanta sat rcvrs (2) equipped for 7.5 & 15 kHz DATS and 20 kHz Sedat chnls. R Parker, 309-263-0102.

Fairchild Dart 384 w/4 freq control demod card, one 15K card, one 7.5K card, one 3K cue card. R Bullard or D Allan, KTYD, 5360 Hollister Ave, Santa Barbara CA 93111. 805-967-4511 X121.

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**STATIONS**

FT 5000 W AM in 136th market, rebuilt from ground up in 1992, includes real estate, \$170,000. S Southern, Southern Comm., 118 Philpott Ln, Beaver WV 25813. 304-252-6452.

700 W 90.5 FM Educ w/7 room home on 1 acre located 1-3/10 mi out of city, \$75,000 firm. 314-686-1663 or 314-785-0006.

Strong 5000 watt AM in Richmond, Virginia for sale. Owner would like to retire. Great potential, growing market. Studios, land and tower. Send inquiries to: Radio World, POB 1214, Falls Church, VA 22041. Attn: Box #94-01-01RW.

FT 1 kW AM near Lynchburg VA, well equipped, ready for Talk, Gospel or Country, less than annual gross for cash, plus lease or buy real estate, BO. GL Jones, WODI, 1230 Radio Rd, Brookneal VA 24528. 804-376-5534.

10,000 W non-directional days, 500 W directional nights in Nashville TN, MSA, capable of being moved directly into Nashville TN & increase pwr possibly to 50 kW days, price negotiable, BO. P Severy, WQZQ, 4706 Hazelwood Circle, Nashville TN 37220. 615-832-4653.

**SURPLUS PROPERTY SALES**

U.S. Information Agency, Office of Contracts, MRC, Room 1611, 330 C Street, SW, Washington, DC 20547

DISPOSAL OF THE VOICE OF AMERICA'S (VOA) MEDIUM WAVE RADIO STATION BROADCASTING FACILITIES AND PERSONAL PROPERTY LOCATED IN PUNTA GORDA, BELIZE, CENTRAL AMERICA POC. Contracting Officer, James W. Durban, FAX 202 205 5466. Medium Wave Radio Station The USA Bureau of Broadcasting's Voice of America (VOA) intends to sell or lease the Voice of America's (VOA) installed radio broadcasting facilities and personal property located in Punta Gorda, Belize (CA). The Belize Radio Station is located at Orange Point on the Gulf of Honduras immediately to the southwest of Punta Gorda, Belize. It transmits programs to Honduras and Guatemala. The station, occupying approximately 240 acres leased from the Government of Belize, is equipped with two 100 kilowatt Harris medium wave (amplitude modulation), transmitters, two directional antenna arrays, an on site diesel power plant consisting of five 275 kilowatt Caterpillar generator sets, satellite terminal equipment, ancillary control and monitoring equipment, five support vehicles, tools, and spare parts. Leasehold improvements consist of radio transmitters, antennas and ancillary equipment, buildings and fences, power generating and distribution systems, water systems, telephone exchange, test equipment, and spare parts. Unless otherwise identified by USA, all property presently on site is offered. Offerors are advised that this offer does not include the land itself nor any right or license to broadcast radio signals from this site. A successor agreement must be concluded between the Government of Belize and a new occupant for land lease, broadcasting license, frequency authorizations, etc. USA intends to issue a solicitation document for this proposed disposal action by January 1994 with a proposal response date 30 days thereafter. Qualified offerors may request a copy of the forthcoming solicitation by submitting a written request to the USA Contracting Officer at the above listed address. All responsible sources may submit an offer which will be considered. (337)

Eastern Utah 10 kW AM, 3 kW FM, \$350,000, cash sale. Mike, 801-637-1080.

Power 104 FM must sell, growing market, great opportunity, owner must move. Brand new 1993 automation, satellite capabilities, clear 3000 kW signal, only station in county. Asking \$175,000 w/terms. 314-564-2275.

Small Market 2500 Watt AM Daytimer for sale. Perfect for first station or retirement. Priced to sell quick at \$75,000. Includes 3 acres of land. Call 919-694-1540 or 919-234-7689.

**Want To Buy**

Nonprofit organization seeks AM or FM stations in the Des Moines IA area. J Hayes, 515-283-1867.

**STEREO GENERATORS****Want To Sell**

Dorrrough 80B, \$200; Gates/Harris stereo gen for TE-3 exciter, \$200/BO. J Daniels, WRAV, 333 Delaware Ave, Delmar NY 12054. 518-439-0945.

**Want To Buy**

CCA SG-1E stereo comp module, wanted dead or alive. C Dunnam, Linear Research, 5244 Perry City Rd, Trumansburg NY 14886. 607-387-3411.

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**Want To Sell**

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Collection of AFRTS LPs, gd cond, \$25. D Pulwers, Dave's Price Audio, 310 N Howard #103, Alexandria VA 22304. 703-751-9346.



Ampex 407 mastering tape, 10.5" reels, 1/4" x 3600', new in box, \$10/reel, \$90/box of 10; 3M/Scotch #20 1/2" x 1000', 2.5 mil uncoated white paper on 7" reel, \$4/reel, \$3/reel/quantity. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

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3M Scotchcart IIs, like new 4.5 & 5.5 min, \$1.89 ea for 100 qty, smaller qty's call for price. D Nuechterlein, WULM, 6130 S Dehmel Rd, Frankenmuth MI. 517-652-6863, leave message.

Gold Mastercards, several hundred in excellent condition, in various lengths, \$1 ea plus shpg. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

Brown plastic cart holders (60), holds 20 per rack, \$5 ea. R Phipps, Griffin Bldg, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

AOR production facility deleting classic rock collection, all on 7" reels, \$300. D Pulwers, Dave's Price Audio, 310 N Howard St #103, Alexandria VA 22304. 703-751-9346.

Pams Jingles ref tapes, 1951-1976, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-217-7625.

**Want To Buy**

Hard to find oldies, especially one-hit wonders from the 70's on 45, LP, R-R tape or CD, must be in mint condition. D Brown, KKMI, POB 832, Burlington IA 52601. 319-752-5402.

Transcriptions, 16", any type; disc recorders & needles, disc blanks & amps, Presto, RCA, etc. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Audiopak AA-4 or AA-3 needed, dead or alive. H Colterill, WZAD, POB 978, Wurtsboro NY 12790. 914-888-0077.

Instrumental CD library; also want Life AC library. E Moody, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

Radio Programming Mgmt tone encoded CD's AC, CHR & oldies libraries. B Ladd, WNRR, 108-1/2 E Main, Bellevue OH 44811. 419-483-2511.

Fidelipac/Audiopak Mastercart II gold or AA-4 light blue in 2:30 through 4:00 lengths, must be in vgc, call after 3PM CST. 214-271-7625.

Spotmaster TP-60B tape timers from cart tape winders (TP-1A or TP-1B). Mel Crosby, 408-363-1646.

**TAX DEDUCTIBLE****Want To Sell**

Technical dept of small private college needs test equipment, can provide letter of receipt. M Reven, WVBC, POB 135, Bethany WV 26032. 304-829-7511.

**501 C-3 ORGANIZATION**

Seeking bdest equip incl console, cart machines, & other bdest-related equip. Will pay freight & give receipts.

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Vision Min. 501-646-6700

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Bird 3128 watcher alarm/RF power monitor, up to 10 kW, 450 kHz to 2300 MHz, mint condition with manual, \$350. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

Tektronix 529, mod 188D waveform monitor, multi-standard version with PAL frame selector, excellent condition, \$525; Tektronix 520A NTSC vector scope, measures amplitude & phase of color video signal, excellent condition with manual, \$1495; Tektronix 454A portable 150 MHz dual trace oscilloscope, calibrated sweep delay, excellent condition with manual, \$495. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

Bird 4410-025 RF wattmeter test set with elements 4410-4, -5, -6 & -7, reads 2-520 MHz w/CC-1 case, like new, \$595. R Sumner, CAVU Corp, 3322 Applegate Ct, Annandale VA 22003. 703-960-8894.

**Want To Buy**

Any AM field strength meter. P Ryan, KYMC, 2122 Marconi Ave, St Louis MO 63110. 314-664-7080.

**TRANSMITTERS**

**Want To Sell**

CSI 3 kW in excellent condition, \$12,900 R Michaels, KQFX, POB 7762, POB 7762, Amarillo TX 79114. 806-355-1044.

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Transmitters, AM-FM-TV. Used and new. Great prices. 305-757-9207.

Gates BC-1G 1000/250 W, with manual, needs minor work, PCB caps have been reduced, will consider parting-out, BO. M Stover, KASI, 415 Main St, Ames IA 50010. 515-232-1430.

AEL 1978 25KG 25,000 W FM, very clean, excel cond, \$14800. R Michaels, KQFX, POB 7762, Amarillo TX 79114. 806-355-1044.

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Catel FM Modulator, as new condition, \$500; WE 111C repeat coils w/diagrams, \$85.50 each. L Snyder, Madera Bldg, Box 182, Floral Park NY 11001. 718-347-2940.

Sparta/Bauer 601-A 1.3 kW tuned to 98.3 in excellent condition with new tube, manuals & stereo generator, \$4000/Best Offer. B Christie, Grande Radio Group, POB 907, La Grande OR 97850. (no phone # given)

QEI 695 FM exciter, 4 years old, excellent condition, in use, available immediately, \$3500/Best Offer; CSI FM-3000E rebuilt 1976, available as single phase or 3 phase, will do 3.5 kW 3 phase or 4 kW as single phase, includes delivery east of MS, on air, excellent condition, \$12,000 single phase, \$11,000 3 phase/Best Offer. K Fitzgerald, WKGB, 495 Court St, Binghamton NY 13904. 607-723-2925.

Gates FM5H 5 kW on 95.9 w/McMartin BFM8000 exciter, just removed w/harmonic filter, \$10K for package. R Miller, WCNL, Taylorville IL 62568. 217-824-3395.

Gates BC250GY 250 W AM, good condition, \$1000; Gates BC-5B 5 kW AM, good condition, in operation, \$5000. T Toenjes, WREN, 201 NW Hwy 24, Topeka KS 66608. 913-437-6549.

TTC 2500B, 2.5 kW AM in original crate, \$12000/BO. Jessica, Newport Bldg, POB 6430, Orange CA 92613. 702-246-9292.

CSI 20 kW 1981 FM in excellent condition, recently upgraded by CCA factory, will do 23 kW comfortably, now available, \$16,800. R Michaels, KQFX, POB 7762, Amarillo TX 79114. 806-355-1044.

Collins-Bauer 707A 1 kW at 1490, just removed, you pick up, \$2400. T Noordyk, WTIQ, 1561 Deer, Box 220, Manistique MI 49854. 906-228-4702.

GE 4BT22A1 1956 5 kW, call for info, BO. P Brown, KVIP, POB 49, Redding CA 96049. 916-222-4455.

Collins-Bauer 707 1000 W AM, good condition, \$2500/BO. T Noordyk, WTIQ, 1501 Deer, Manistique MI 49855. 906-341-8444.

TTC 300J with Model X exciter, solid state FM with full remote control, like new condition, replaced due to power upgrade, \$4500/BO or trade for Optimod 8100/XT2. D Mussell, Bdct Eng Svcs, POB 2542, Aptos CA 95001. 408-688-5209.

Rockwell/Collins 828E-1, 5 kW AM w/500 W option, lots of spares, on 1440, clean & runs great, removed from service 11/22/93. M Martindale, KVON, 1124 Foster Rd, Napa CA 94558. 707-252-1440.

1 kW AM 1H, on 1230, worked when removed, \$3000. R Phipps, Griffin Bldg, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

Spare parts for CCA AM50,000D, including, HV transformer, mod. transformer, mod. reactor, HV filter choke, tube sockets and more. Call Transcom Corporation 800-441-8454 or 215-884-0888.

**Want To Buy**

Harris TE-3 exciter with stereo generator needed, car. repair if necessary; Tepco/Jones J-317 single or dual output 10 W translator needed, need not be operational. J Stromquist, WNCB, 2828 Piedmont Ave. Duluth MN 55811. 218-722-3017.

FM xmtr of any size, call me before you trade it in. R Michaels, S.C.B. Inc, POB 7762, Amarillo TX 79114. 806-355-1044.

FM 3-7 kW. used in good condition. Gentner VRC or Sine Systems remote control & TFT EBS receiver. call or fax info. C Tiemann, WAIV, POB 103, Spring Valley IL 61362. 815-663-0103.

Continental or Harris 10 K FM with or without exciter. M Tracy, KMOR, POB 532, Scottsbluff NE 69363. 308-632-5667. FAX 308-632-1905.

AM transmitters up to 2.5 kW. prefer solid state Harris. Nautel or similar. Also want Optimod AM 8100B and AM Potomac FIM. Contact Maxfield by faxing: 011-44-892-66-8118.

McMartin AM/FM transmitter, any model. exciter or stereo modules. Goodrich Ent. 11435 Manderson. Omaha NE 68164. 402-493-1886.

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Circle (97) On Reader Service Card

**Want To Buy**  
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**VACUUM POWER TUBE REBUILDERS SINCE 1940**  
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"If you don't need TO SAVE MONEY we can't help you."  
However, if saving money interests you... WE CAN REBUILD YOUR DUDS (used tubes) for about 1/2 the cost of new tubes!  
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Technics SP-10-MKII direct drive TTs w/bases & AT tonearms (2), gd cond, \$450 ea. M Humphrey, WPLY, 1003 Baltimore Pike, Media PA 19063. 215-565-8900.  
Gates TTs, several vintage mdl in vg working cond, w/newer arms & stylus, \$75 ea. C Giannettino, KCPS, 408 N Main, Burlington IA 52601. 319-754-6698.  
Technics SP-25 TT, RTS mdl 405 phono preamp, Audiometric phono preamp, \$75 ea. S Karwan, KPSI, 2100 E Tahquitz Way, Palm Springs CA 92262. 619-325-2582.

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**TURNTABLES...WTS**

Radio Systems TT preamp (2), gd cond, \$85. M Humphrey, WPLY, 1003 Baltimore Pike, Media PA 19063. 215-565-8900.

JVC 4-DD-5 disc demodulator, low hrs, \$85/BO. D Pulwers, Dave's Price Audio, 310 N Howard #103, Alexandria VA 22304. 703-751-9346.

Presto 6N lead screws (3) & 1-C head; Audio Disc 36 audio disc's, \$100. J Parsons, Parsons Snd, 2781 Fayson Circle, Deltona FL 32738. 904-532-0192.

Several Russco & Gates quick-cut TTs w/ or w/o tone-arms, as is, \$50 ea. R Miller, WTIM, Taylorville IL 62568. 217-824-3395.

Technics SP-10 MK II (6), 4 with SL1000 base & tone arm, 2 TT only, fair condition, must pick-up, BO; Technics SH-15B3 large heavy base & dust cover for SP-15/25 TT, new, unopened, will ship, \$75. M Bymes, WAMU, 4400 Mass Ave NW, Washington DC 20016. 202-885-1200.

Technics TT blockbase, \$100. G Erway, KKSB, 1330 Cacique, Santa Barbara CA 93103. 805-563-1444.

Neumark TTs with cover (2), \$100 ea; (2) BE TTs, \$100 ea. R Phipps, Griffin Broadcasting, 301 Jct Hwy #3333, Kerrville TX 78028. 210-896-1230.

JVC 4-DD-5 CD-4 disc demodulator, low hrs, \$85. D Pulwers, Dave's Price Audio, 310 N Howard St #103, Alexandria VA 22304. 703-751-9346.

Scully VP131 customized by Haeco, Westrex 3-IIAH stereo head, in operation, call for details, \$30,000. F Virtue, Virtue Recdg, 8811 Rising Sun Ave, Philadelphia PA 19115. 215-763-2825.

**Want To Buy**

WE 109AA/B reproducer group, 9A cartridges, repeat coils, arms, EQs. L Blackmon, RQ Studio, Larson Rd #4, N Reading MA 01864. 508-664-0174.

Technics SL1200 MK 2 (2) complete w/bases. F Napurano, WDV, POB 191, Sergeantsville NJ 08557. 609-397-1620.

Gates TA-1 cartridge head; RCA 16" am, head & network. B Rose, Program Recdgs, 228 E 10th St, NYNY 10003. 212-674-3060.

**ACTION-GRAM**

**Equipment Listings**

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

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 Title \_\_\_\_\_  
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I would like to receive or continue receiving Radio World FREE each month.  
 Yes  No

Signature \_\_\_\_\_ Date \_\_\_\_\_

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- E. Network/group owner
- F. Recording studio
- G. TV station/teleprod facility
- H. Consultant/ind engineer
- I. Mfg. distributor or dealer
- J. Other

**II. Job Function**

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WTS  WTB  Category: \_\_\_\_\_

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\*Closing for listings is the first and third Fridays for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

**Broadcast Equipment Exchange**

PO Box 1214, Falls Church, VA USA 22041  
 Phone: 703-998-7600 FAX: 703-998-2966

To advertise in



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**Phone:  
 800-336-3045**  
**FAX:  
 703-998-2966**

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Circle (57) On Reader Service Card

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Our model A-500 is a thoroughly engineered on-air console: it delivers the level of performance your clients now expect, and DAB demands. All components are selected for long life—gold bus connectors, gold I/O connectors, all gold contact switches, gas-filled relays, triple burned-in integrated circuits, solid state ON/OFF lamps, and precision laminated Lexan control surfaces for a lasting, wearproof finish. And we back that up with a 3-year parts and labor warranty, complete with

factory support from a technically competent and responsive staff.

We've also handled your special requirements as well with a super family of accessories, including a choice of three different telephone modules, an intercom module, an off-line mixer module for your remote feeds, talent control stations, accessory panels, failsafe power supplies, and auto cart and CD sequencing options.

**So take a close look:** we've got the quality, we've got the innovations, and you've got our commitment to top-notch support.



# *The Better We Look!*

*A-500*