

Radio '89 Preview
begins on page 11

Radio World®

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Radio's Best Read Newspaper

September 6, 1989

FCC Proposes Higher Fees

by John Gatski

Washington DC The NAB believes a plan to hike FCC fine limits for broadcasters from \$20,000 to approximately \$250,000, recently approved by Senate and House committees, could pose a hardship to small stations.

The proposed fine increases are the result of committee actions to raise more revenue to meet FY 1990 budget targets, based on the Gramm-Ruddman-Hollings deficit reduction law.

The Senate and House also approved similar measures that would raise FCC fees about 12%.

The fines, which cover broadcasters, common carriers and others, would be increased for the first time in 55 years, according to congressional sources.

A huge increase

The maximum FCC forfeiture penalty for broadcasters and common carriers would increase from \$2000 to \$25,000 maximum for each violation and from \$20,000 to \$250,000 maximum for a continuing violation, according to the Senate measure.

The potential increases are in a proposed amendment to the general forfeiture section of the Communications Act

of 1934.

NAB Executive VP for Legislative Affairs Jim May said the fee increases are in line with today's economic conditions, but the fines are a different story.

"The fines, I think, are a potential problem," he said. "That could take a hell of a bite out of a little station."

Many fines have not increased since the Communications Act of 1934 was enacted, and fee increases will be in line

with inflation over the years, according to the House and Senate committees that have jurisdiction over the FCC.

A Senate Commerce, Science and Transportation Committee press release said that a fees/fine increase could raise \$43.6 million for the committee's budget. The House Energy and Finance Committee plan would raise \$50 million.

FCC Bar Association President Richard
(continued on page 25)

Real Estate Values Tempt AMs to Sell

by Charles Taylor

Washington DC Less than a year after paying \$34 million for classical stations WGMS-AM/FM here, VerStandig Broadcasting earned back nearly 40% of its initial investment.

But the rapid proceeds have nothing to do with time sales.

John VerStandig, president of the group that already held six stations, made the estimated \$14 million by selling a 51-acre plot on which the AM station's transmitter and four antennas are located in posh Potomac, MD, to a real

estate developer.

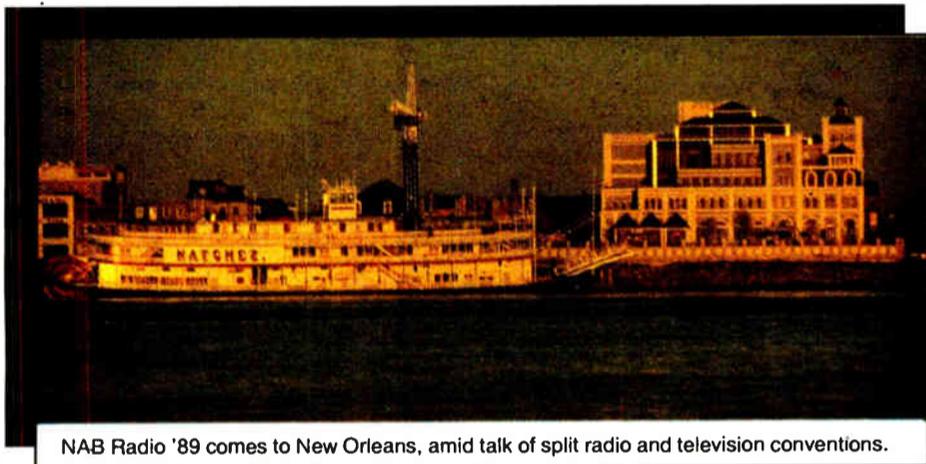
By year's end, pending FCC approval, the AM will transmit from a 132-acre site in a less lucrative Maryland suburb.

The developer reportedly intends to use the Potomac site to build more than 200 detached and town houses on the land adjacent to a major retail mall.

Get a move on

It's not the first time an AM station's land has been sold and the transmitting gear moved.

When Capital Cities/ABC bought At-
(continued on page 24)



NAB Radio '89 comes to New Orleans, amid talk of split radio and television conventions.

NAB Convention Split?

by Frank Beacham

New Orleans LA The NAB Radio Board—faced with a split opinion of membership on whether or not there should be a single annual convention devoted exclusively to radio—will "let the marketplace decide" the much-debated issue.

"It now appears that many group operators, networks and station reps prefer one NAB convention a year—and they prefer the fall all-radio event," NAB Senior Radio VP Lynn Christian wrote in the association's radio newsletter. "Meanwhile, many small and medium market owner-operators enjoy, as do their engineers, attending the annual convention."

Looking to members

While Christian was unavailable for comment, an NAB spokesperson said feedback from membership is "not overwhelming in either direction." Based on response thus far, the board declined to make a change. "They will continue to evaluate the matter," she continued, "and see what happens at the September (Radio '89) convention."

The debate over splitting TV and ra-

dio into separate conventions intensified this year when CBS, Westwood One and Capital Cities/ABC radio networks decided to forego traditional hospitality suites at the spring annual convention and concentrate on the fall Radio '89.

The nets claimed the spring show has taken on a TV and engineering perspective with less emphasis on radio management.

In spite of the radio networks foregoing the usual hospitality suites—and "many" group radio operators not encouraging stations to attend—Christian maintained radio participation grew at the spring show. NAB has a policy of not releasing a breakdown of attendance.

Supporting the position for a separate radio-only show is Allied National Marketing Director Dave Burns, who serves on the NAB exhibitors advisory committee.

"In my opinion, radio has not become a second-class citizen at the spring NAB. It's become Third World," he said. "I favor a very strong fall radio show. We now go to both shows to see radio people. We get engineering talent at the spring show and we get management and, primarily, programming people at the fall show."
(continued on page 11)

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Jack Kulp
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NEWS BRIEFS

Grand Jury Investigates Root

Washington DC A federal grand jury is investigating whether communications attorney Thomas Root, or a member of his law firm, falsified an FAA document last year to obtain a construction permit for a new FM station, *The Washington Post* reported.

The grand jury is looking into a document in which the FAA "purportedly" said a broadcast tower proposed by one of Root's

clients would not endanger passing aircraft, the Post said.

The FCC eventually granted a construction permit to Northern Missouri Christian Broadcasting Inc., Kirksville, MO, based on the document. (See related story this issue.)

Fritts: Spectrum Management

Sun Valley ID NAB President and CEO Eddie Fritts called on the FCC to end regulation by marketplace economic theory

and return to its basic mission of responsible spectrum management and timely processing of applications.

Fritts gave that message before the Idaho State Broadcasters Association.

He said FCC regulation the past few years has harmed the competitiveness of AM radio, crowded FM and AM bands and led to harmful interference.

Cap Cities Buys Music Network

New York NY Capital Cities/ABC has completed the acquisition of Satellite Music Network with the purchase of SMN's remaining 86% of outstanding common stock for ap-

proximately \$48 million.

The ABC Radio Networks became the exclusive marketer of advertising time on SMN in December 1987 and subsequently acquired 14% of its common stock for about \$5.5 million.

SMN, which will be a separate division of the ABC Radio Network, broadcasts live music formats via satellite on more than 1000 AM and FMs.

FCC Amends Commercial Translator Rules

Washington DC The FCC has tightened opportunities for non-commercial stations to create networks, by adapting a March 1988 ruling affecting how stations may

use translators.

The action adopted 4 August, determined within reconsideration of MM docket 86-112, ruled that a translator must be within 50 miles of the 1 millivolt contour of its primary station or more than 100 miles from any full-service non-commercial station, said the Commission's Scott Roberts.

Previously, stations were allowed to feed programming to a translator wherever a free non-commercial frequency was available.

The order, which was instituted for three years, excepts stations that can show that implementation of a translator would not use the last available noncommercial channel in their market.

NAB Institutes Radio Telemarketing

Washington DC The NAB effective 1 November will establish a radio membership telemarketing program, eliminating its five regional offices.

NAB said that a telemarketing program, rather than regional managers, will allow the organization to more efficiently target sales efforts, and allow it to be more responsive.

"A centrally based telemarketing service is the most effective answer to (members') needs and (association) objectives and represents the most efficient use of our resources," said Senior Radio VP Lynn Christian in a statement.

The regional managers will receive a severance package, NAB said, and an offer of outplacement counseling.

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INDEX

Recording Tips for Multitimbral Synths by Bruce Bartlett	28
DAT: After the Compromise by Mel Lambert	29
Manual Muffs and Misprints by Barry Mishkind	31
It Pays to Review the DCO Log by Harold Hallikainen	34
A Pressurized Line Saves Down-Time by Don Henderson	35
An Integrated Circuit Primer by Ed Montgomery	36
Revitalizing a Tired Console by Bill Higgs	39
A Quick and Easy Studio Phone by John Shepler	40
Wisconsin Willey & Rex of the Rockies by George Riggins	42
Stalking the AM Stereo Car Radio by George Riggins	43
KMOD Spoofs MTV's "Remote Control" by Dee McVicker	46
Computerizing Radio News by Phillip Keirstead	51
The Changing Face of Radio by Dave Hebert	53

FCC Grants Ownership Waiver

by Charles Taylor

Washington DC Two days after denying a petition of reconsideration by Great American Broadcasting to modify the FCC's one-to-a-market ownership rules, the Commission granted a waiver to the company, allowing it to maintain control of TV-radio combinations in two cities.

Passed 4 August, the waiver will allow Great American, owner of five TV stations, six AMs and 10 FMs, to continue ownership of WKRC-TV/AM and WKRQ-FM in Cincinnati and WDAF-AM/TV and KYYS-FM in Kansas City, MO.

Normally prohibit

The Commission's rules normally prohibit common ownership of TV and radio stations in the same market, though a December ruling determined that requests for waivers would be considered on a case-by-case basis, with favor given to combinations in the top 25 markets where there exist at least 30 separately owned licensees.

While neither Cincinnati nor Kansas City are top 25 market stations, the Commission said that Great American justified "with great specificity the substantial efficiencies derived from joint operation" of the common market stations.

The decision passed just two days after the Commission rejected two reconsideration petitions—one of them from Great American—that questioned waiver

policies for common ownership of TV and radio stations in the same market.

Cautious approach best

Great American questioned the merit of a top 25 market cut-off, instead preferring the single requirement of 30 separate O&Os within a market.

Chairman Dennis Patrick, in standing

by the top 25 cut-off, said, "A cautious approach limiting the ruling to the largest markets will allow the FCC to best monitor the new rule."

The second petition, from Holston Valley Broadcasting Corp., asked for a waiver of radio-TV cross ownership rules where common ownership of a UHF station and more than one radio station in

the same service is involved.

The FCC responded with a slight modification of rules, noting that a flat prohibition of ownership combinations of a TV station and more than one radio station in a market prevented the Commission from evaluating case-by-case combinations that might serve the public interest.

It emphasized, however, that it did not foresee approving any such combinations.

For information from the FCC, contact Tatsu Kondo at 202-632-6302.

Abuse Probe Widens

by Charles Taylor

Washington DC As he was vacating office, FCC Chairman Dennis Patrick called upon the Justice Department to determine whether a year-long Commission investigation into abuses of its application processes by a New York broadcast applicant warrants action.

Patrick said in a letter dated 4 August to the Justice Department that sufficient evidence exists to place Dr. Barnard Boozer of Central Square, NY, in violation of the Commission's rules and the Federal Criminal Code.

Fictitious persons

Boozer is alleged to have filed or assisted in filing with the FCC up to 100 applications in 73 communities containing fictitious names and forged signatures.

"In at least several instances, multiple applications appeared to have been filed using fictitious persons as principals and/or as consultants/advisors and that in several instances applications appeared to have been filed for the same community of license by applicants linked with each other," Patrick said in the letter to Assistant Attorney General Edward S.G. Dennis, Jr.

When the investigation began last August, the Commission said that most of Boozer's applications were filed to obtain settlement agreements, rather than actual construction permits.

Boozer was assisted in the filing of his applications by legal counsel, the FCC charged, and in some instances, the attorney was a principal in applications

that were apparently related to Boozer.

He first gained attention at the FCC as the sole stockholder and president of Paradise, which was the only remaining applicant for an FM construction permit in Illion, NY.

During the proceeding, the presiding judge determined that Paradise had misrepresented its financial qualifications to the FCC and denied the application.

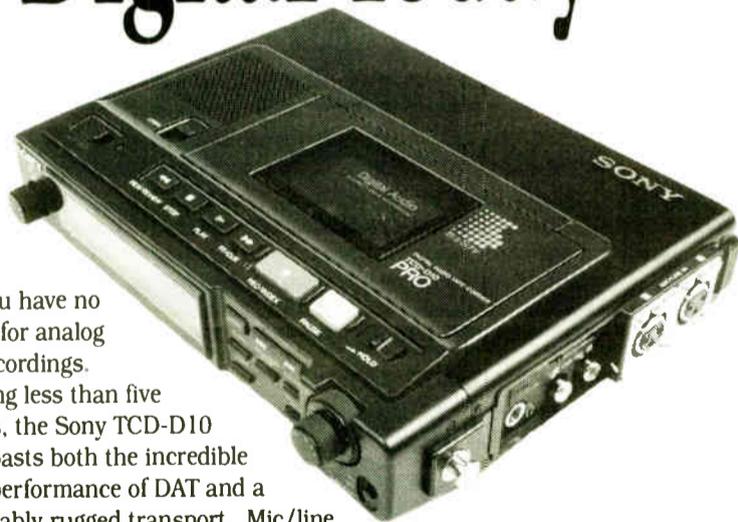
Friends and relatives

According to the FCC, Boozer then began filing applications using pseudonyms and the names of various friends and relatives.

In addition to FCC sanctions such as losing licenses, comparative renewal abuses are punishable with fines up to \$100,000 and five years in prison for each violation.

For more information, contact the FCC at 202-632-5050.

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Up A Lazy River To Radio '89

by Judith Gross

Falls Church VA Radio, radio, radio. We never get tired of talking about it, listening to it, finding out everything we can about it.

I liken it to a vampire . . . once you've gotten bit by the **radio bug** it has a hold on you forever.

Even TV has the "bug"—with new shows such as *FM* and *Knight & Daye*, both on NBC this summer.



At least some of us will get our requisite dose of **radio fever** in N'Awlins next week.

Three years ago the show was held there and I remember the view of the **mighty Mississippi** from a room in the French Quarter. The first thing you saw over the purple river in a pink sky at dawn was the friendly blinking red light of a **radio station tower**.

Don't know if it was AM or FM, but there it was, greeting the brand new Louisiana day.

In between the jambalaya and crawfish pies and filet gumbo there will be a whole lot of interesting **equipment exhibits**. Now's your chance to actually stroll the aisles of the convention and **take a good look** at the products—unlike the spring convention where time is at a premium.

The NAB's new **Marconi Awards**, to be presented at the show, are an interesting phenomenon. I see that New York's WNBC is up for the award for **legendary station** even though it doesn't exist any-

more and parent NBC is out of the radio business.

Then there are awards for personality of the year, station of the year, etc. Aren't we forgetting something? How 'bout an award for **engineer or technical achievement** of the year?

See where the **network/syndicated** personality of the year boasts some big names: Paul Harvey, Larry King, Sally Jesse Raphael and Charles Osgood. Sorry, but for my money the other three are **outclassed by Osgood**. The poet laureate of CBS has got to be in a class all by himself.

Then there's the entertainment. **Paul Shaffer and the World's Most Dangerous Band** (can't wait to see what's so dangerous about them) will be performing, appropriately, their hit *When the Radio Is On*.

But they won't be the final word. Just added to the gala show closing is singer **Donna Summer**. No one can outdo her when it comes to radio songs. *On the Radio* was her 1979 disco hit and no other radio song comes close.

Lookin' forward to the show and all that jazz on Bourbon Street. As NAB Radio VP **Lynn Christian** said, "If you're in radio, Babe, this is where you have to be."

So here's a very original "chorus line" bopping to the sounds of some **New Orleans' jazz**. Ten points if you can figure out what piece of radio gear they really are.

And if you aren't going to be at the

show in person, Babe, not to worry. Let RW be your eyes and ears. Stay tuned for all the particulars . . .

☆☆☆

New FCC Chairman **Al Sikes** decided to introduce himself to Commission staff en masse, so the staff trekked to the nearby K-B Fine Arts theater on 19th Street. The film on the marquee? *The Abyss*. Hmmm.

Sikes told the staff he was surprised to see that except for a few offices, they were **still using rotary phones**—and this, at an agency dealing with HDTV and digital STLs.

Sikes promised Touch-Tone phones by the end of the year and was greeted by a loud cheer.

Some **NAB exhibitors** are wondering how the heck to af-

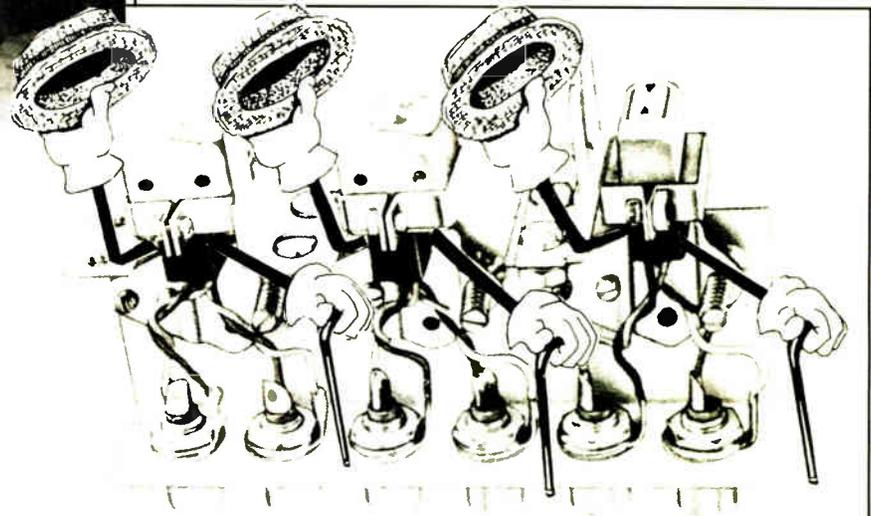
ford the high cost of a preliminary visit to Atlanta and tour of the **Georgia World Congress Center** in anticipation of next year's NAB spring convention.

The trip is scheduled for **November 13th** and NAB has booked rooms in the nearby Omni hotel. A tad too steep, some exhibitors are saying. But there's still hope. Seems the nearby Comfort Inn and American Hotel can offer **cheaper sleep**. Check with them or your trusty travel agent for the visit and the show . . .

Well it had to happen. **WCVG-AM** in Milford, OH, the first station to go with an **all-Elvis** format, has pulled the plug on the King. Seems all the King's fans couldn't generate the necessary advertising revenue.

But, gee, you could have chosen a **better date**, WCVG. The station abandoned Elvis on 16 August, the 12th anniversary of his death. Elvis fans could have told them *Don't Be Cruel* but I guess they felt it was *Now or Never*.

Heard something interesting? *Spill your guts to Earwaves*. Write PO Box 1214, Falls Church VA 22041, or call me at 703-998-7600. Best tidbit of the month wins a coveted 1989 edition **Radio World mug**.



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Loudness does not equal ratings

Dear RW:

I enjoy reading *Radio World* (when ever I can get it away from our station's engineering department), and as Program Director of a contemporary music FM I'm sensitive to the loudness vs. quality struggle that often exists between PDs and engineers.

Perhaps your readers would like to know a little secret: After programming FM stations for fifteen years, I'm not aware of any correlation between modulation, loudness and ratings!

Last August, I became PD of WHQT in the Miami-Ft. Lauderdale market. We implemented a new contemporary music format shortly thereafter. From the beginning, we made the decision *not* to participate in a loudness battle. We set the processing for *competitive* loudness—loud enough to be in the same general ballpark with everybody else—but (we) had no interest in sharing the pursuit of *ultimate* loudness.

Instead, we strove for the most listenable sound possible within competitive realities, a sound distinguished by its relative quality, dynamics and absence of distortion and artifacts. While the stations surrounding us constantly fiddle with their processing, we haven't touched our audio chain since the original setup.

You know what happened? In only six months, WHQT soared from #14 to #1 in

the Arbitron ratings, with a commanding four-point lead over our closest contemporary competitor (in a major market where each point translates into \$1.1 million in annual revenue)—number one among teens and 18-34 and 25-54 adults. We also delivered the market's largest weekly cume, which should dispel the notion that the loudest station attracts the biggest cume.

Ratings success involves numerous factors, and processing is but one of them. Excellence in audio quality will not compensate for intrinsic deficiencies in product and marketing. I firmly believe, though, that we could not have attained our present level of success with a signal that's squished, squashed and clipped.

I can't think of any intelligent reason for the compulsion for loudness at any expense. It's a myth, and it strikes me as loony that the same PDs who are agonizing over the new Arbitron "soft" diary (which places a premium on longer listening spans) are the ones who are satisfied only by processing that is unlistenable by people with normal hearing. WHQT's time spent listening figure in the last book was nearly double that of our most heavily crunched competitor.

Successful stations give the listeners what they want. I've yet to see a research study that shows an audience preference for lower quality. Audio consumers don't buy home compressors and limiters to give their CDs and cassettes that grungy "radio sound."

To reverse the overprocessing/excessive clipping trend, more PDs must take leadership positions in favor of quality. If you're the only station in town programming music from CDs while everyone else plays scratchy, cue-burned 45s on belt-driven turntables with worn needles, then you have a dramatic competitive edge that the rest of the market will eventually be forced to duplicate. The same scenario applies to the loudness vs. quality compromise.

On second thought, maybe there *is* a correlation between loudness and ratings. In Miami, at least, two of the "quietest" stations on FM own the biggest shares (WHQT and WLYF) ... while the others rank roughly in inverse order to average modulation!

Keith Isley, PD
WHQT-FM
Miami, FL

Answer on super-power FMs

Dear RW:

The letter from Sheldon Daitch of San Francisco, CA (26 July RW) asks about super-power FMs. At this time I am unable to lay my hands on a book that listed all the FM stations in the United States and Canada by frequency and power (vintage 1970) put out by Sherwood, a receiver manufacturer.

It listed WMTW-FM as a super-power station. It broadcasts from the top of Mount Washington, NH. the station has now changed its call to WHOM-FM.

The NAB's fall radio convention is enjoying unprecedented interest, thanks in part to the support of the radio networks and others who are feeling the squeeze at the NAB's spring convention.

The success of the spring show, especially in attracting video and non-broadcast interests, has made it more important than ever for radio to have a show of its own.

This year, the momentum of Radio '89 appears to parallel the growth of the radio industry in general.

Equipment vendors are reporting steady growth and station financial activity is still strong. Many stations which have been adopting a wait-and-see attitude toward new technologies are poised to begin buying.

At the same time, managements which have put off purchases because of heavy debt service now seem ready to recommit resources toward a strong technical plant.

A Toast To Radio

And recent regulatory actions are expected to fuel station upgrades and further industry growth.

Within the radio industry itself, there has continued to be a crossover between the lines of manage-

ment, programming and engineering.

Equipment vendors are finding ways to redirect their messages toward non-technical staffs attending the radio show even as GMs and PDs have come to realize the importance of the integrity of their technical plants.

And while it's satisfying for engineers to have a show of their own in the SBE national convention, the interests of radio and TV continue to diverge and CEs are becoming aware that they can no longer afford the luxury of self-imposed isolation within their stations.

A seminar such as "Management for Engineers" being offered at Radio '89 give engineers a chance to assert themselves as an integral part of their companies at the same time they learn about state-of-the art technologies in the other technical seminars being offered at the show.

But finally, Radio '89 offers attendees from all parts of the industry a chance to celebrate radio. In so doing, it's a sure sign of a medium which, although it's been around for more than six decades, is still going strong.

—RW

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Next Issue
RW
September 27

Mt. Washington is over 6000 feet in elevation. Its height above average terrain is 3760 feet with 43 kW H/V. The station can be heard in Maine, New Hampshire, Vermont, Massachusetts and Quebec with a very strong signal. The frequency is 94.9 MHz.

The station has had a number of owners including Jack Paar. That's about all I know from memory. Hope this is of help.

David R. Crosby, Sales/Engineer
WSKI
Montpelier, VT

PS—We are AM stereo (C-QUAM) and NRSC-1.

More on super-power FM

Dear RW:

Your letter from Sheldon Daitch regarding super-power FMs (26 July RW) struck a *big* nerve with me. I researched this when I was a kid, and the list of about 25 or so FM stations is still in my head.

Here goes, in no particular order: WJFM, Grand Rapids, MI 500 kW (currently operating at 320 kW, I'm told); WOOD Grand Rapids, MI 265 kW; WOMC, Detroit 214 kW; WCZY, Detroit 165 kW, 50 kW vertical; WMC, Memphis, 300 kW; WKAR, East Lansing, MI, 125 kW; WRAL, Raleigh, NC, 250 kW; WRVQ Richmond, VA, 200 kW; WSLQ, Roanoke, VA 202 kW.

Some stations which formerly operated at super power include: WUOM, Ann Arbor, MI 230 kW; KQUE, Houston, 280 kW; WILL, Urbana, IL 300 kW; WFMT, Chicago, 135 kW; WEAW, Evanston, IL, 180 kW.

Of course, all of this is relative to how you define super-power. This will vary with whether the station is located in a Class B or Class C area, or how much

antenna height there is for a station's given power.

The classic case of that is KLOS Los Angeles. Face it: anybody running 72 kW ERP at 3000 feet is running super coverage, if not super power.

And isn't that really what the game is about?

Art Reis, CE
Satellite Music Network
Chicago, IL

In defense of FMX

Dear RW:

I just wandered through the latest FMX articles (9 August, 1989) and read through the Bose "three-test method" three times, to make sure I hadn't missed something.

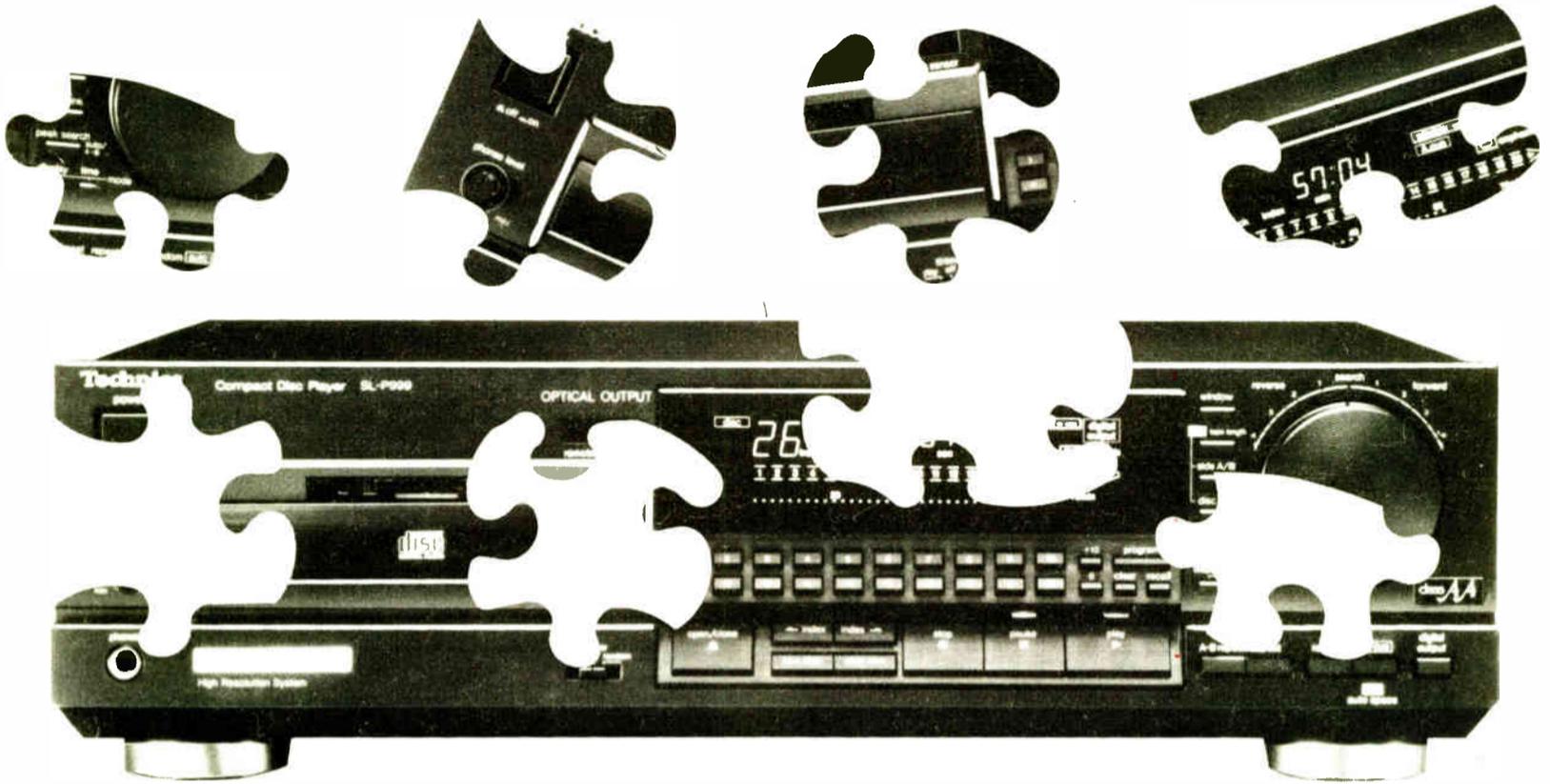
Seems to me that some of the "distortion" the Bosemen predict might really be due to the basic presence of incidental Amplitude Modulation in the FM signal, which can certainly exacerbate the "multipath" effect in most receivers. A lot of folks believe that, when such synchronous AM is present, the amount of baseband loading *will* affect receiver distortion. So I suppose that, to the extent an FMX signal in the baseband increases loading, FMX can be shown to add to the "multipath" problem.

But I believe that FMX is well-engineered, and it certainly makes theoretical sense. If FMX falls down in practical application, the problem may lie in the transfer function between exciter and receiver—i.e., a non-linear FM transmission system. I'll bet that FMX, properly installed, riding a signal with minimal incidental AM, plays very well on a good radio.

Mark Durenberger
WCCO Radio Sports Network
Minneapolis, MN

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Broadcast Equipment

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EPA Enacts Tank Testing Rules

by John Gatski

Washington DC Radio stations with underground fuel tanks that are 25 years old or older must implement mandatory

and possibly expensive leak-testing methods by 31 December, according to Environmental Protection Agency (EPA) rules.

This and other EPA regulations were

approved last year to prevent underground storage tank leaks from contaminating the environment, a frequent problem with bare steel tanks, the agency said.

The EPA said individual states have enacted as stringent or even tougher regulations regarding underground storage tanks.

1979. (See chart.)

Tanks less than ten years old are not required to meet leak detection requirements until 31 December, 1993.

Some expense

"There will certainly be some expense," NAB Deputy General Counsel Barry Umansky said. "Although it (leak detection regulation) does impose a monetary burden . . . the burden is not that much. It is far less costly than (cleaning up) a spill."

Like other stations, many Emergency Broadcast System (EBS) stations use gas powered generators for auxiliary backup power, according to the FCC.

EBS stations that have government-loaned tanks and generators will be paid

Across the board

Hundreds of radio stations nationwide have underground tanks for their generators, which are used to keep stations on

The EPA said individual states have enacted as stringent or even tougher regulations regarding underground storage tanks.

the air during power outages.

Based on the regulations, station owners will have to meet the requirements and keep appropriate records, subject to EPA inspections.

According to the EPA, the 31 December deadline for implementation of leak detection measures and record keeping applies only to tanks made in 1965 or earlier. There are varying leak detection deadlines for tanks between 1965 and

by the government to meet the EPA requirements, but stations that do not have government tanks will have to pick up the expense themselves, according to FCC EBS Engineer Frank Lucia.

Three options

In order to comply with leak detection requirements, a station owner must choose at least one of three options: (continued on page 26)

WHAT DO YOU HAVE TO DO? Minimum Requirements	
You must have Leak Detection, Corrosion Protection, and Spill/Overfill Prevention.	
LEAK DETECTION	
NEW TANKS 2 Choices	<ul style="list-style-type: none"> Monthly Monitoring* Monthly Inventory Control and Tank Tightness Testing Every 5 Years (You can only use this choice for 10 years after installation.)
EXISTING TANKS 3 Choices <i>The chart at the bottom of the next page displays these choices.</i>	<ul style="list-style-type: none"> Monthly Monitoring* Monthly Inventory Control and Annual Tank Tightness Testing (This choice can only be used until December 1998.) Monthly Inventory Control and Tank Tightness Testing Every 5 Years (This choice can only be used for 10 years after adding corrosion protection and spill/overfill prevention or until December 1998, whichever date is later.)
NEW & EXISTING PRESSURIZED PIPING Choice of one from each set	<ul style="list-style-type: none"> Automatic Flow Restrictor Automatic Shutoff Device Continuous Alarm System Annual Line Testing Monthly Monitoring* (except automatic tank gauging)
NEW & EXISTING SUCTION PIPING 3 Choices	<ul style="list-style-type: none"> Monthly Monitoring* (except automatic tank gauging) Line Testing Every 3 Years No Requirements (if system has the characteristics described on page 11)
CORROSION PROTECTION	
NEW TANKS 3 Choices	<ul style="list-style-type: none"> Coated and Cathodically Protected Steel Fiberglass Steel Tank clad with Fiberglass
EXISTING TANKS 4 Choices	<ul style="list-style-type: none"> Same Options as for New Tanks Add Cathodic Protection System Interior Lining Interior Lining and Cathodic Protection
NEW PIPING 2 Choices	<ul style="list-style-type: none"> Coated and Cathodically Protected Steel Fiberglass
EXISTING PIPING 2 Choices	<ul style="list-style-type: none"> Same Options as for New Piping Cathodically Protected Steel
SPILL/OVERFILL PREVENTION	
ALL TANKS	<ul style="list-style-type: none"> Catchment Basins Automatic Shutoff Devices Overfill Alarms Ball Float Valves
* Monthly Monitoring includes: Automatic Tank Gauging, Vapor Monitoring, Interstitial Monitoring, Ground-Water Monitoring, Other Approved Methods	

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FCC Candidates Under the Lens

by Benn Kobb

Washington DC The road to Senate confirmation was not an easy one for new FCC Chairman Alfred Sikes and fellow commissioners Sherrie Marshall and Andrew Barrett.

Yet, despite an often confrontational hearing before the Senate Commerce Committee, the Senate unanimously approved President Bush's nominees in August as Congress adjourned for a summer recess.

Former NTIA chief Sikes joined Marshall, a communications attorney, and Illinois Commerce Commissioner Barrett, a former Illinois commerce commissioner before the Senate committee July 31.

Indecent broadcasts

In oral and written statements, the nominees addressed subjects ranging from telephone regulation to HDTV to amateur radio. The leading topic of the hearing, however, was indecency, obscenity and violence on radio and television—and what, if anything, the three commissioners-to-be were going to do about it.

Barrett said that although he is personally offended by indecent and obscene programming, such programming is broadcast because "there is a market for it. We always have to keep that in mind."

Barrett's statement infuriated some members of the committee, notably Sen. Albert Gore (D-Tenn.). In an intense oration, Gore described the recent radio broadcast of a tape containing sounds of the murder of a mother and daughter. Gore said it was broadcast as entertainment.



Newly confirmed FCC Chairman Al Sikes (left) takes oath of office.

Gore told Barrett that the FCC has the power to destroy unauthorized stations: "If somebody else tries to broadcast on the frequency used by that businessman, you will, if necessary, dynamite the tower. And there's a market for what that broadcaster's putting on."

"I'm telling you straight from my heart as the parent of four children: I'm sick

and tired of it, and I believe that parents all across this country are tired of it. They know that there's a way to (regulate broadcasting) that's consistent with our values and traditions."

No "vulgar" radio

Sikes replied that as the owner of a rock radio station, he had instructed his manager to remove "vulgar lyrics" from the station's programming. He said he declined to subscribe to MTV or HBO cable channels because he didn't want to expose his teen-age daughters to the channels.

Sikes preferred that broadcasters voluntarily discontinue indecent and violent material through industry-wide efforts such as the NAB Code. He noted that Supreme Court decisions pre-empt much broadcast content regulation.

Barrett said he thought that anyone us-

ing the public airwaves should be held to high standards, but that he didn't know what standards the FCC had for programs.

Marshall said she believed that the FCC should find some way to regulate "parts of this area" but that the courts keep striking down such regulations.

On the proposed lottery system for station allocations, Sikes said that he supports President Bush's proposal to award licenses for some uses of the spectrum by means of auctions.

The FCC has proposed to resolve some spectrum disputes through a process of private interference negotiations. Sikes was asked if he believes such an approach is in the public interest, and whether the negotiations would conflict with the Communications Act statement that licensees do not have a vested property right in the spectrum.

Sikes replied that with FCC review of the terms and conditions of the arrangements, interference negotiations "should be considered" but that he will look carefully at the legality of the process.

Saying Goodbye to Patrick

by Benn Kobb

Washington DC After Dennis Patrick presided over his final FCC meeting on 2 August, he was treated to a going-away party that featured a video satire of the outgoing chairman and his FCC career.

The program made fun of his high school report cards, trademark hairstyle and his penchant for surfing and rock music. Colleagues praised Patrick as the only FCC member who could "credibly lip-sync (rock band) Guns 'N Roses."

TV celebrities appearing on the video included *Night Court's* Harry Anderson, who instructed Patrick in how to use the gavel as a macho symbol; Mary Hart of *Entertainment Tonight*, who urged Patrick to replace co-host John Tesh and to teach her "all about cellular telephones"; and Pat Sajak of *Wheel of Fortune*.

Sajak claimed responsibility for thinking up most of the important objectives of the FCC such as aboli-

tion of the Fairness Doctrine and development of HDTV. He said Patrick's pet projects were "getting free cable TV for commissioners, getting someone to teach him to use a VCR and appointing a blue ribbon committee to investigate why the little dot in the middle of the TV screen stays on after you turn off the set."

Much was made of Patrick's often rocky relationship with a Congress upset over the FCC's broadcasting, telephone and spectrum policies. In one skit, an angry Congress cuts the FCC's electric power, forcing the agency to operate by lantern light. News of Patrick's resignation prompts Congress to turn the lights back on.

On another note, Patrick's adversaries held another party and gave him the "Tin Toaster Award" for what they considered bad moves of deregulation. The award's name was a reference to former chairman Mark Fowler calling TV a "toaster with picture."

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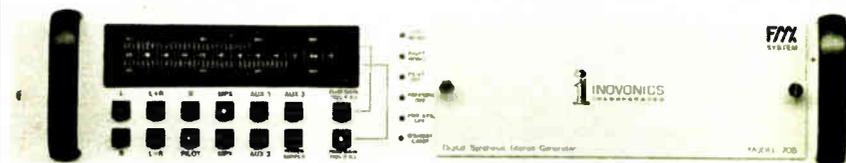
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NEW ORLEANS SEPTEMBER 13-16, 1989
National Association of Broadcasters

NAB's Fall Show Sizzles with More Exhibits and Sessions



Radio Conclave Boasts a Sold-Out Trade Floor, Increased Registration

by Judith Gross

New Orleans LA The National Association of Broadcasters is telling stations that "Everyone who's anyone in radio" will be at Radio '89, the fall management, programming, sales and engineering convention to be held here 13-16 September.

NAB is backing up that claim with a full lineup of big name industry personalities as the show returns to this city at the mouth of the mighty Mississippi.

Encouraged by support from the major radio networks, who pulled their support from the spring convention and opted to make their mark at the fall conclave, the NAB also is fielding growing sentiment toward a splitting off of radio from the spring convention.

The association, however, has decided to let the industry answer that question

for itself (see related story, this issue).

In the meantime, talk about a possible merging of the NAB's fall radio show with the SBE national convention, which is usually held several weeks later, appears to be at a standstill.

The SBE show is aimed at both radio and TV engineers and there is concern on the part of SBE members about relinquishing what to date has been a modestly successful show to another organization.

Show sold out

The radio show has continued to see strong growth this year, with exhibit space in the New Orleans convention center completely sold out at more than 40,000 square feet.

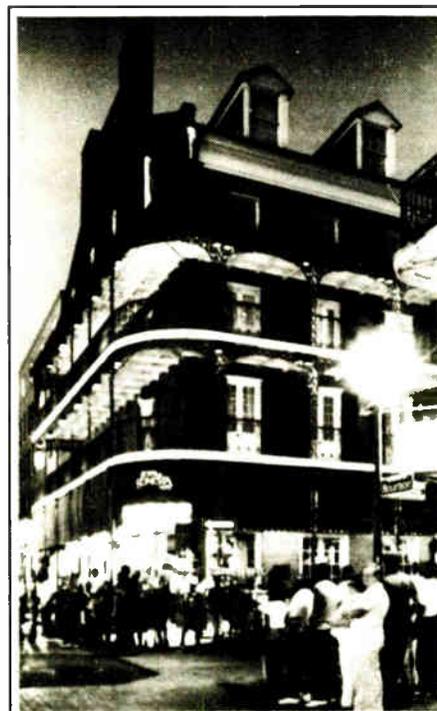
In mid-August, NAB rushed to open between 2000 and 3000 square feet more space for exhibitors due to "high demand," according to the association's exhibits department.

NAB also has reported that hospitality suites are completely sold out as well.

More than 180 companies have taken booths for the exhibit showcase, with

nearly a third of them vendors of station hardware. A few product introductions also are planned.

NAB said that advance registration for attendees to the convention was running about 8% over last year's at the same time.



The sights and sounds of the French Quarter await conventioners attending Radio '89.

NAB Senior VP for Radio, Lynn Christian, said that advance response to Radio '89 and the success of the association's spring show run counter to the national trend, which has reported slower than usual convention activity.

Christian said the radio show in particular seems to be generating more interest this year. "I just think the radio show has always had a momentum. But

this year in particular, maybe there wasn't as much preconvention excitement for the spring show as there is for the radio show."

Christian attributed the excitement, at least in part, to the general success of radio as a growth industry, with financial institutions becoming increasingly involved in radio transactions.

"The radio business is going through an exciting time overall," Christian said. "They called the '40s the Golden Age, but maybe the '80s are the Platinum Age."

Something for engineers

Christian also stressed the importance to the show of engineering sessions, paralleling the importance to the industry of engineering talent itself.

"As often is the case in this wonderful world of show business, the people on the air get the headlines, but that should not detract from the importance of the people behind the scenes," Christian said.

The Radio '89 engineering conference has been expanded to include three special seminars plus four special sessions.

In addition to the 21st Directional Antenna Workshop, which will run two days, Thursday and Friday, 14 and 15 September, NAB Science & Technology is presenting an updated version of its Digital Workshop, which was popular last year at Radio '88.

The Digital Workshop will be held the day before the exhibits open, on Wednesday, 13 September. In addition to presentations on the state-of-the-art, digitally, the workshop will hear a luncheon address from Steve Lyman of the Canadian Broadcasting Company, who is active in the efforts toward a standard

(continued on page 12)

NAB Takes Marketplace Stand on Split Shows

(continued from page 1)

"The television people don't have to go to the fall show because there is no reason whatsoever for them to go," Burns said. "I'd like to see the NAB make it just as unimportant for the radio people to go to the spring show as they make it for the TV people to go to the fall show."

Burns suggested the NAB team up with the SBE, which holds a fall convention for engineers in order to create a single annual "super" radio show. He predicted such a show would increase NAB revenues well above current levels.

Numerous considerations

"I think the NAB has a lot of trepidation about splitting the shows up because of revenues and I don't blame them for that," Burns said. "But I would contend there would be more revenue if they split them up. Everybody wants more, more, more space every year. The spring show would be sold out anyway and the fall show would probably grow by 20 to 30 percent."

On the other side of the issue is Mitchell Self, chairman of the NAB small market radio committee and president and GM of WLAY-AM/FM in Muscle Shoals, AL. "I don't see the reason to destroy something that is successful," he said.

"As a radio broadcaster, I enjoy going to the spring convention when there are a lot of things and people there. I think there are cross interests in radio and television," he added.

Self said he attended at least two days of radio sessions "and every session was standing room only. There were good sessions and people were

learning from them."

Self agreed with the NAB position that the marketplace should decide. "If people quit going in the spring maybe the NAB will be forced to change. But I don't think that's the trend right now. The radio part of this year's spring convention was stronger than it has been in the last 10 to 15 years I've been attending."

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Meeting on the Mississippi

September will concentrate on PCs for engineering applications. It will include a "tour" of the CompuServe BPFORUM and a look at programs in the public domain.

the keynote address.

Of interest to a cross-section of attendees will be a session featuring an update on the prospects for radio-only legislation, including license renewal

reo will be discussed at the session.

Convention planners have in past years included a number of events to lure attendees into the exhibit hall. This year such events will include exhibit hall

(continued from page 11)
digital interface.

Also on the agenda this year is a new workshop to be held on Tuesday, 12 September. "Technical Aspects of Shortwave" will feature the how and why of commercial shortwave, a growing interest among broadcasters.

The shortwave seminar will cover transmission, antennas and listener response, and include a look at some stations which are making a success of commercial shortwave.

Two separate sessions will cover AM and FM engineering. The AM session will present an update of the NAB's antenna project and cover topics relating to the NRSC standard.

The session on FM engineering will feature presentations on FM directional antennas, Class A upgrades and multipath testing, among other topics.

In addition, the NAB has scheduled four sessions of special interest. Transmitter remote control, a technology which has seen changes including new FCC rule interpretations over the past few years, will be the focus of a session on Thursday, 14 September.

A session to be held on Saturday, 16

September will concentrate on management for engineers called "Key to Successful Communications" on Saturday, 16 September. Judith Sheets Perkinson from the Calumet Group will be the presenter.

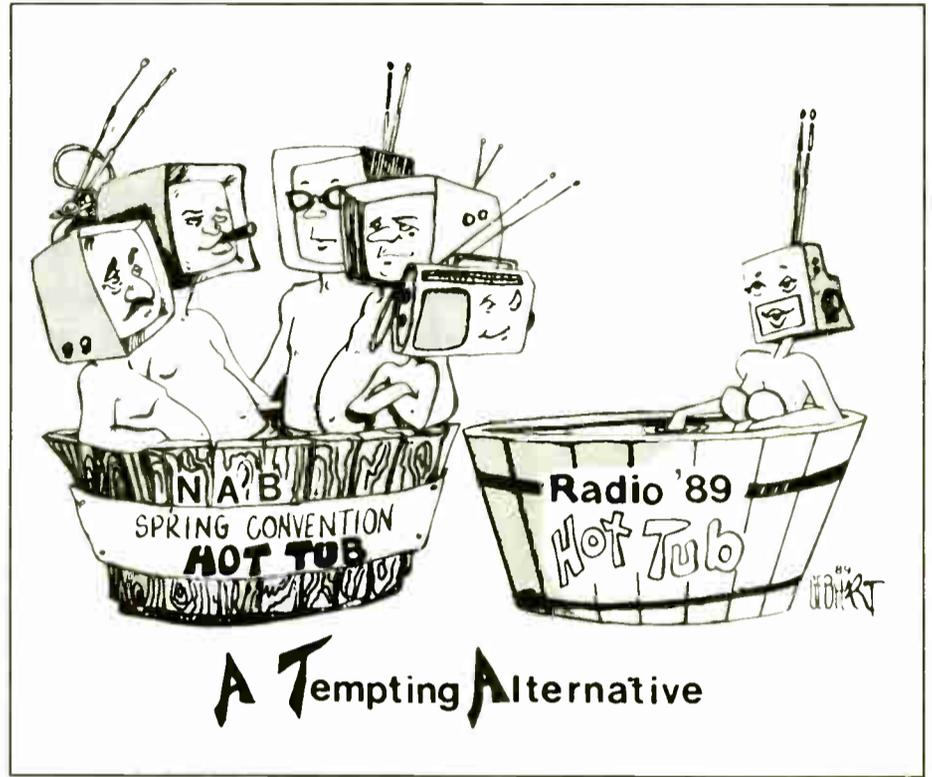
And a session looking at interference, its causes and cures, will be held on Friday, 15 September and include presentations by Wilson LaFollette of Cohen & Dippell (formerly with the FCC) and Jim Hawkins with the FCC, among others.

Something for everyone

Marketing and promotion sessions also have been increased this year, including special presentations on contests and a session called "AM Rebound."

Management sessions of note include "Dealing With Difficult Talent" with guest speaker Patricia Zagarmi and "Building a Winning Team" with former Boston Celtics coach Arnold "Red" Auerbach.

At the radio management luncheon on Friday, 15 September, PepsiCo board chairman and CEO Wayne Calloway will share management strategies that shaped the success of one of the country's largest corporations as he delivers



and technical reform.

Congressional bills calling for radio-only license renewal reforms, and also seeking to encourage the marketing of radios with both AM as well as FM ste-

coffee breaks, a carnival, a party, and a programming and production showcase on Friday, 15 September.

A "walk-around luncheon" on Saturday
(continued on next page)

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Radio '89 and All That Jazz

(continued from previous page)
day, 16 September will feature Cajun cookin' as attendees browse the exhibits.

Awards and entertainment

A full slate of awards ceremonies are planned for the show as well.

The Crystal Radio Awards Luncheon, on Thursday, 14 September will recognize 10 stations for their efforts to improve the quality of life in their individual communities. The 10 award winners will be narrowed down from 45 finalists.

Radio personality John A. Gambling of the Gambling radio family dynasty, and

ality of the year, newcomer station of the year and legendary station.

The nominees include such well-known names as Scott Shannon (KQLZ, Los Angeles) for large market personality of the year; Paul Harvey, Larry King, Charles Osgood and Sally Jesse Raphael for network/syndicated personality; and WLS, Chicago and WNBC, New York for legendary station.

The ceremony will be hosted by broadcast industry veteran Dick Clark and guest presenters include Casey Kasem, Larry King, (Cousin) Bruce Morrow and Gary Owens, among others.

A full lineup of entertainment also is

planned for the awards ceremony. In the comedy category are comedians Mack & Jamie, Jeff Altman and John Candy. Paul Shaffer and "The World's Most Dangerous Band," of *The David Letterman Show* fame will provide the music and Shaffer will help Clark emcee the awards presentation.

And in mid-August, NAB also announced that the ceremony's producer, Tony Quin, of the Film House had signed up singer Donna Summer to provide entertainment at the gala event.

And if all of the star-studded gaiety isn't enough to keep attendees in-



terested, there's always the fast-moving nightlife of New Orleans.

The convention center is conveniently close to the paddlewheel tour boats cruising the Mississippi, to the city's Riverwalk promenade and shopping plaza, and to the food, drink and jazz of the city's famous French Quarter.

For more information, contact NAB at 202-429-5350.

The newly named Marconi Awards will be presented . . .

host of *Rambling with Gambling* on New York City's WOR, will emcee the awards along with AP White House Correspondent Wendell Goler.

The recipient of this year's National Radio Award, to be presented during the convention as well, is Ray Livesay, chairman of the board of the J.R. Livesay Broadcast Group based in Mattoon, IL.

Livesay, one of the founders of the Daytime Broadcasters' Association, was instrumental in leading the successful drive to persuade the FCC to adopt pre-sunrise rules allowing a 6:00 AM sign-on for stations.

Livesay will receive the award for his "long-term involvement and continuing contribution to the radio industry."

The final, grand awards ceremony will be at the close of the radio show. The newly named Marconi Awards will be presented for outstanding station, station of the year, air personality (or team) of the year, network/syndicated person-



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New and Improved Gear Takes NAB Show Spotlight

Falls Church VA The fall radio show has traditionally attracted more general management and programming attendees than engineers, but the trend is shifting.

Declining numbers of full time station engineers, and the general "crossover" in station management has meant that more engineers show up for the NAB's radio show at the same time that more managers and program directors have a say in station hardware purchases.

Most companies exhibiting alter their marketing approaches to reach the non-technical staffs at a show such as Radio '89, but even RF related companies find enough of an interest in their products to make trekking to the convention worth their while.

This year, the recent compromise reached on consumer DAT technology shows every sign of boosting the digital products found at the show.

And an increasing emphasis on AM improvement, FM upgrades and better coverage overall should propel antennas and transmitters into the limelight as well.

What follows is a select listing of Radio '89 exhibitors with a focus on hardware and technical equipment vendors, as well as music syndicators who have been increasingly offering music libraries in newer digital formats.

Radio '89 Exhibitors

Accu-Weather Booth 0756
Complete line of weather services for radio stations.

Aircraft Music Library Booth 0152, 0154
Music library and related services, including formats on CD.

Allied Broadcast Booth 0419
(see Harris-Allied)

AKG Acoustics Booth 0455
Will feature the pre-production version of the DSE 7000 Digital Sound Editor, introduced in prototype at the spring NAB show. Producer/editor Jay Rose will give hourly demonstrations of the RAM-based workstation.



AKG's DSE 7000 workstation

Aphex Systems Ltd. Booth 0233, 0235

Will introduce the new remote control VCA model 150, featuring two self-contained channels of VCA with servo-balanced in and out. It can be controlled

by potentiometer or two models of a digital wall-mount unit that displays attenuation by LED or digital counter.

Arrakis Systems Booth 0330, 0332
Will feature the new 12,000 series audio console with totally modular input, output and monitor modules in three mainframe sizes: 10, 20 or 30 channels. The consoles have VCA controlled fades, feature a comprehensive logic system and three stereo output busses among other features.

Associated Production Music Booth 0936
Music library services in a variety of formats.

ATI—Audio Technologies Inc. Booth 0418, 0420

Will feature the full "Problem Solver" product line and introduce the restyled and improved Vanguard Series 8 and 12 mixer dual stereo audio consoles. Also new are the M100 Ultimike Mic Amplifier, the MLA400 and 800 line-to-line amps and the MMA400 and 800 mic-to-line amps.

(continued on page 19)

It's Not Just A Phase We're Going Through.

The tremendous success of the Tannoy PBM series of reference monitors is by no means coincidental. Since the introduction of the world renowned NFM-8 nearfield monitor, much time and effort has been spent on discerning the needs of the mixing engineer and the applied requirements of "playback monitors". The PBM Line exemplifies this commitment to excellence in reference studio monitoring. These compact loudspeakers sport robust poly cone mid-bass transducers utilizing efficient long-throw, high power voice coils. The low frequencies are carefully controlled by optimally tuned ports located on the rear of the loudspeakers. Hi frequencies are provided by Hi Power ferro fluid cooled polyamide dome tweeters which extend H.F. bandwidth beyond 20KHZ. The driver accompaniment is knitted

together by means of a precision hardwired crossover unit, utilizing robust low loss components, and heavy-duty input terminals which will accept standard 3/4" spaced banana plugs and the majority of high quality, specialist audio cables. Transducers and crossover assemblies are neatly housed in a stylish, high density, partical wrap cabinet, specially designed to minimize unwanted cabinet resonance, and high frequency reflection. In summarizing, we have left the best feature of all for last "price versus performance."

TANNOY
Professional Products

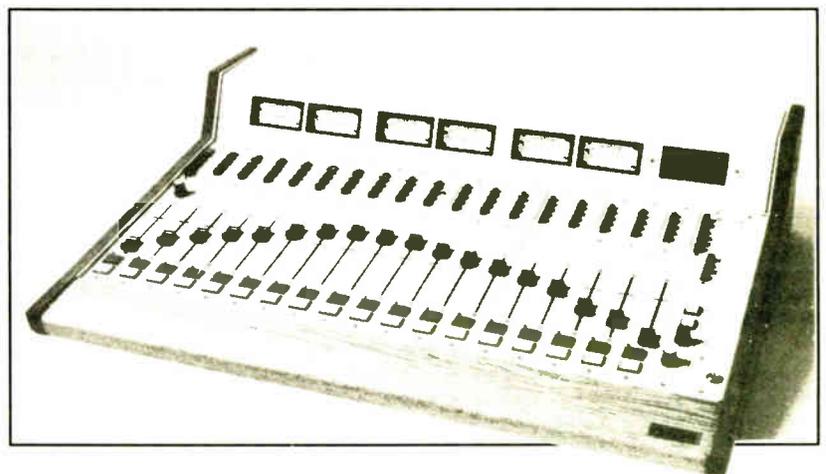


TEC AWARD WINNER

TANNOY

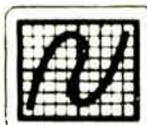
Tannoy North America, Inc. 300 Gage Ave., Unit 1, Kitchener, Ont., Canada, N2M 3C8
Telephone (519) 745-1156 Telex 009-55338 Fax (519) 745-3984

Arrakis Authority



Northeast Broadcast Lab proudly presents the new Arrakis 12,000 Series. We'll help you choose the proper configuration to meet your present need and provide room for future expansion.

Get accurate advice, superior service *and* a paltry price from the Arrakis Authority. Call us today!



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Fax: 518-793-7423

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Tel: 215-322-2227
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DURA TRAK 90™

Forget it.

Once you install a Dura Trak 90 cart machine, you can forget it. Our engineers have made these new BE cart machines the simplest, most reliable and best-performing decks in their class.

First, they built wide frequency response, low wow and flutter and high S/N into both record/playback and playback Dura Trak 90s. With their accurate cart guidance systems, Phase Lok V head blocks and rugged direct drive motors, Dura Trak 90s deliver the clean audio performance your listeners demand.

Next, they made Dura Trak 90s simple to operate and virtually bullet-proof: After all, talent uses your cartridge machines, not just technicians. Cart-not-cued and Cart-previously-played lockouts are designed to eliminate mistakes on air. Fast Forward and three tone cue sensing are standard, too.

Above all, they engineered Dura Trak 90s for outstanding durability, because radio never stops. The ultra-rugged mechanical design is derived from the most advanced cart machine ever made: our

Phase Trak 90™. It includes a 1/2" thick aluminum deck plate, gold-to-gold contacts, a solid cast front panel, a toroidal power transformer, and a cool running low voltage solenoid.

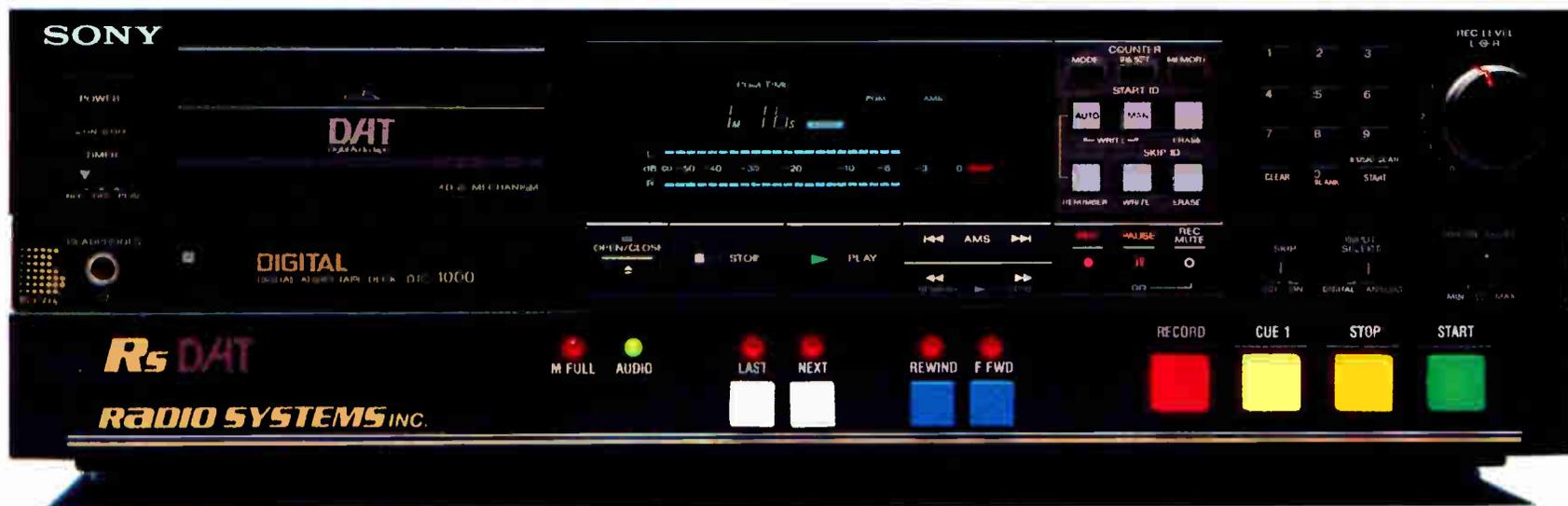
Simple operation, exceptional reliability, superior audio quality, affordable price: Dura Trak 90 has them all. So you really will be able to forget it: Just remember to get in touch with your Broadcast Electronics distributor or call Bob Arnold at (217) 224-9600.



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DAT was invented for your home.

Rs DAT is for your studio.

Other DAT machines only take you halfway.

You need more in your studio than just a DAT machine. You need a DAT machine that can interface to your console and automation equipment. You need a machine with remote control and status information. And you need it to perform like a cart machine - - reliably and quickly.

Meet the RS-1000 from Radio Systems.

The RS-1000 is an integration of the Sony DTC-1000 and a special microprocessor-based controller from Radio Systems. Its features include:

- Full *broadcast* remote control (not a hard-wired remote, like most other machines).
- Rear-panel ports for automation and serial interface.
- Thirty cut, random access memory.
- EOM signals and relay closures.
- Automatic cue-to-cut.
- Cart machine style buttons and dubbing.
- Sampling rates for recording at 44.1 and 48 kHz.
- Balanced audio inputs and outputs.
- "Next" and "Last" functions for quick cut re-cue.
- Industrial-grade head life.
- 16-bit linear D/A conversion.
- Logging data.
- Total harmonic distortion < .0055%.
- Optional rack mount.

Imagine recordable digital audio in your automation system or as a live source in your air studio. And with DAT archiving, your entire music library can fit into a briefcase.

Call today for more information on radio's hottest DAT machine, the RS-1000 from Radio Systems.

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Panels, Seminars, Exhibits And Festivities At A Glance



Tuesday, Sept. 12

1:00-6:00 PM • Technical Aspects of Shortwave Broadcasting

Wednesday, Sept. 13

8:30 AM-4:00 PM • Digital Radio Seminar

12:00-3:00 PM • Radio Station Tours

6:00-8:00 PM • Opening Reception

Thursday, Sept. 14

8:00 AM-5:30 PM • AM Directional Antenna Seminar

9:00-10:15 AM • Competitive Counterprogramming • Investing in a Promotion Director • Five Factors in Buying a Station • MegaSales • Radio License Renewal/EEO

10:30 AM-6:00 PM • Exhibit Hall Open

10:30-11:45 AM • Morals vs. Mornings • Minority Managers Make Their Mark • "Breakthrough" TV • SRA: Managing Sales for the '90s • Creating New Stations and Improving Existing Ones

12:00-1:30 PM • Crystal Radio Awards Luncheon

1:45-3:00 PM • Know Where You're Going: Developing a Marketing Plan • Dealing with Difficult Talent • Talk to the GM Chair • Games, Contests and Lotteries: New Opportunities • Qualitative Study of the Diary-Keeping Process

3:15-4:30 PM • Remote Control Technical Panel • Dealing With Difficult Talent • Through the Merchant's Eyes • Format Forums: Oldies, Dance, AOR, News/Talk, Religious

4:00-6:00 PM • Exhibit Hall Carnival

Friday, Sept. 15

8:00 AM-2:00 PM • AM Directional Antenna Seminar

9:00-10:15 AM • AM Rebound • Bottom-Up Marketing • Group Goals, Guides and Growth • Powerful On-Air Promotions • Developing a Win/Win Sales/Programming Relationship

10:00 AM-6:00 PM • Exhibit Hall Open

10:30-11:45 AM • Bottom-Up Marketing • Spanish Language Local Sales • Selling Your Congressman: How Grassroots Lobbying Affects Your Bottom Line • Format Forums: Full Service CHR, EZ Listening, New AC

12:00-1:45 PM • Radio Management Luncheon

2:00-3:15 PM • Interference: Its Causes and Cures • Making the Splash: Events Marketing • Women Managers: Attitudes, Actions and Achievements • America's Best Personality Radio • Why I Don't Buy Your Radio Station • Into the '90s: Research Strategies for the Next Decade

3:30-4:45 PM • FM Engineering (ends at 5:30) • Music and Radio Hot Seat • Service Strategies • To Contest or Not to Contest • Be a Big Fish in a Small Pond

4:00-6:00 PM • Programming & Production Showcase • Exhibit Hall Party

Saturday, Sept. 16

9:00AM-1:00 PM • Exhibit Hall Open

9:00-10:15 AM • AM Engineering (ends at 11:30) • Radio Only: Prospects for License and Technical Reform in the

101st Congress • Effective Reach: Effective Frequency • Promotions: Selling Your Soul? • On-the-Air: Recruiting and Training • Vying for Vendors

10:30-11:30 AM • Building a Winning Team (Guest Speaker: Red Auerbach)

11:30 AM-12:30 PM • Exhibit Hall Lunch

12:45-2:00 PM • Using Ratings and Research to Increase Revenue • Protecting

the Pitch • New Concepts in Station Financing • Format Forums: Soft AC, Classical, Urban, Classic Rock, Non-Commercial

2:15-3:30 PM • PCs for Engineering Applications • Breaking Ground: New Radio Revenue Sources • The Diary Debate • Substance or Scam: Emerging Marketing Techniques • Innovative Ideas=Winning Formats • 35+ Power

Marketing

3:45-5:00 PM • Management for Engineers • RAB Sales Session • Format Forums: Spanish AC Nostalgia Country

6:00 PM • Cash Bar Reception

7:00 PM • Closing Dinner

8:00 PM • Grand Finale Awards Show

Schedules are subject to last minute changes—check with NAB

Be prepared.

For the first real improvement in AM sound in more than a decade.



The future offers real promise for AM radio. NRSC AM radios are almost here, factory-installed in new cars. Soon, home stereos and portable sets will also be NRSC-equipped.

NRSC (National Radio Systems Committee) has created a voluntary national transmission standard that makes wideband high-fidelity AM radios practical. As broadcasters adopt the NRSC standard, receiver manufacturers can extend and flatten their frequency response without risk of increasing the audibility of interference.

Is your station prepared?

The 9100B NRSC-standard OPTIMOD-AM® is the first choice of AM stations concerned about improving their sound to compete with FM. OPTIMOD-AM sounds great on both the new NRSC receivers *and* on the millions of narrow-band receivers already in the field that will be in use for years to come.

When replacing older-style processors with OPTIMOD-AM, stations experience a significant increase in coverage area. And when replacing any processor, stations experience a dramatic improvement in sound quality, on both *voice* and *music*, with no sacrifice of loudness.

Superior sound is an important part of an overall strategy to increase ratings and profits. With OPTIMOD-AM, your announcers' voices will have presence and impact, while still sounding very clean. Music will have real bass, with punch and warmth, not boom. The highs will seem to open up. And loudness and tonal balance will be consistent from source to source.

OPTIMOD-AM can be configured to operate optimally in mono, C-QUAM® stereo, or Kahn stereo. Mono units can be field-upgraded later to stereo by simply plugging in additional cards.

Be prepared. Call your Orban Broadcast Products Dealer for more information on OPTIMOD-AM 9100B, or call us direct.

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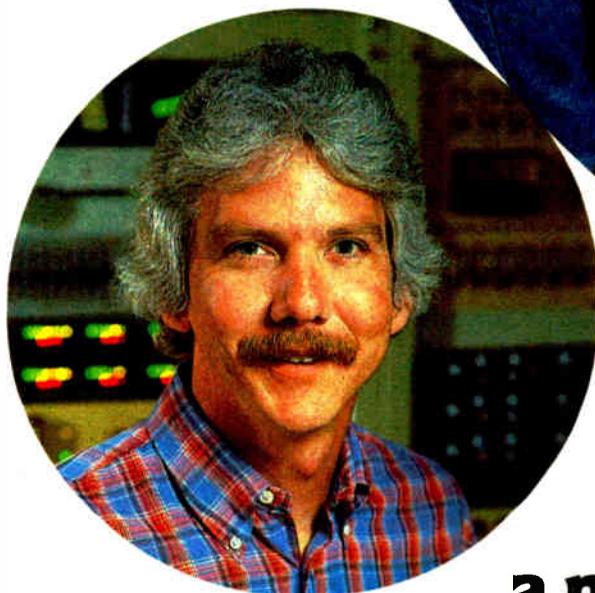
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Circle 5 On Reader Service Card

World Radio History



“Auditronics’ 400 gives medium-market KZZP® a major-market sound,”

says Jim Kunowsky, Chief Engineer of Phoenix’ number one hit station. “Our 400 lets us do a lot of fancy promos and commercial production that most stations can’t do in-house. And it’s eight-track record capability with full EQ on every input channel gives us the creative latitude of a recording studio.”

“Yet the Auditronics 400 console is simple enough that the people who use it every day for dubbing from CD to cart for our on-air music find it very easy to use. A big value of the 400 for us is that it can be configured to do everything from simple dubbing to complex original productions with equal ease. Thus, it gives KZZP a whole level of performance above what you normally see in radio production.”

“When the 400 isn’t booked with our own work, we rent the room for a nationally-syndicated high-energy six-hour dance party called Hot Mix. The Hot Mix

producers love the 400 console because even though they don’t use it every day they can be up and running in about ten minutes, which is very time-efficient”.

“While we’re willing to spend money, Nationwide Communications Inc.’s philosophy is that what we spend the money on has to do its job. So far, the Auditronics 400 console is doing its job admirably.”

If you’d like to know more about why Jim Kunowsky likes Auditronics consoles for both on-air and production, call today toll free 1-800-638-0977, or circle reader service number for complete information.



auditronics, inc.

3750 Old Getwell Road, Memphis, Tennessee 38118 • 901-362-1350

Circle 45 On Reader Service Card

RADIO '89 EXHIBITORS

(continued from page 14)

Audio Broadcast Group, Inc.

Booth 0905

Will feature its complete line of broadcast products and services.

Audiopak

Booth 0449

Will exhibit its line of broadcast audio cartridges for all uses and station needs.

Broadcast Audio Corp.

Booth 0225

Will show the full line of modular consoles, the rack-mountable RM-6 mixer and the new system 24-IV 24-mixer console.

Central Tower

Booth 0857

Will highlight the company's tower services for the radio broadcaster.

Century 21 Programming

Booth 0309, 0311

Will feature a full line of music library and format services.

Circuit Research Labs

Booth 0650 0652

Featured will be AM stereo products including the stereo gain controller, spec-

Fidelipac

Booth 0509

Will feature its complete line of Dynamax broadcast audio cartridges, recorders, reproducers and accessories.

Fine Tuning Associates

Booth 0409

Features complete studio design and construction and audio consulting services.

FirstCom

Booth 0911 0913

A complete line of music formats including digital libraries on CD and DAT.

FM Construction Company

Booth 0950

Features studio design and construction services including pre-fab studios for stations.

Gentner Electronics Corp.

Booth 0245

Will have twice as much exhibit space as before, with active displays of the EFT 3000 frequency extender, with three lines back to the company's headquarters.

The company will also feature its Audio Prism and Phoenix AM NRSC processors, the VRC-2000 remote control system and telephone hybrids and interfaces.

Harris-Allied Broadcast Equipment

Booth 0419

Harris will show its complete line of AM and FM transmitters including the DX line of digitally-modulated AM transmitters.

Allied Broadcast will introduce the Time Squeeze, a skimmer which telescopes programming for a station or its competition, the Henry Dub Center mixer from Henry Engineering with brand new furniture and the new Modulation Sciences FM ModMinder modulation monitor.

Harrison by GLW Ent. Inc.

Booth 0853

Will highlight its (formerly Harrison's) audio console line.



IGM Communications

Booth 0228

Will be showing updated versions of automation systems, introducing new software for the IGM-EC and IGM-SC.

International Tapetronics

Booth 0519 0521

Will feature its full product line of audio cartridge machines and a fully operational version of the Audio Switcher, as well as the ScotchCart II broadcast audio cartridge.

Jampro Antennas

Booth 0961

Will feature the company's line of radio station antennas.

Kalamusic

Booth 0100

Complete music library services for the broadcaster.

LDL Communications

Booth 0410 0412

Will feature its tower services for radio broadcasters.

LPB Inc.

Booth 0819

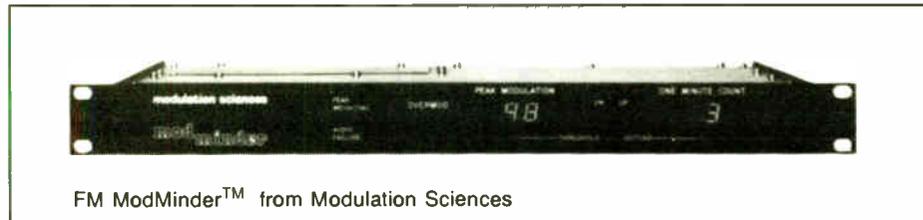
Will feature two studios with furniture; one will have the Signature console line and the other the company's brand new Citation-II console. Also featured will be the company's low-power transmission equipment with music feeding into a 30 W transmitter.

Media Touch Systems

Booth 0545

The company will feature its Touch-screen systems and show the OPLog control and automation system, the OMNIPlay smaller version automation system and the DAMS (digital audio mass storage) system.

(continued on page 21)



FM ModMinder™ from Modulation Sciences

Broadcast Electronics

Booth 0701

Will feature the new FX50 FM exciter, the DT90 cart machine, the ST90 cart eraser/splice finder, the PhaseTrak 90 cart machine, MixTrak 90 on-air console, FM transmitters, AM stereo EQ and the DV2A solid state digital record/player.

Broadcast Supply West

Booth 0830, 0832

A variety of products will be featured, including the Amber test set model 3501 for audio tests, the new Arrakis 12,000 series console, new CRL mic processor and the Apex model 250 audio processor.

Broadcast Technology Partners

Booth 0951, 0953

Will be highlighting the FMX stereo extension system for FM and give an update of the technology's acceptance among broadcasters and receiver manufacturers.

Bdcters General Store

Booth 0956

Will feature the company's full line of radio station and audio products.

Cablewave Systems

Booth 0400

Will show the company's line of RF related gear including coaxial cable and connectors.

tral energy compressor and AM stereo matrix processor, the DX-1 noise reduction system, the SPF-300 NRSC filter, and the PMC-450 tri-band peak modulation controller.

Comrex Corporation

Booth 0745

Will show the new 3-line frequency extender system, also frequency extender for cellular telephones plus the full range of frequency extenders and telephone hybrids and couplers.

Concept Productions

Booth 0917 0919

Will show automation systems for broadcasters, including DAT-based systems.

Continental Electronics

Booth 0350 0352

Will highlight equipment for the Class A FM broadcaster, many of whom were recently approved for a power increase by the FCC.

On exhibit will be the 3.8 kW solid state FM transmitter and the 5 kW transmitter, as well as exciter and transmitter switches.

Dataworld

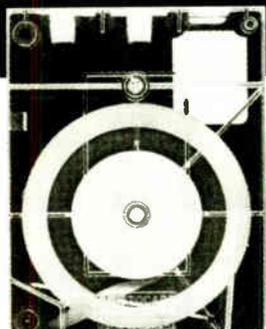
Booth 0720

Will feature a full line of station coverage and database services.

Great Sounds From Great Cartridges

ARISTOCART

*Superb in Quality
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SPACE SAVER UNITS
Aristocart's compact racks are simple, lightweight, rugged and ready to wall mount.

Model AW-20, holds 20 cartridges

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Get back on the air fast! These RF Specialties offices now stock a full assortment of Andrew and Cablewave connectors for immediate delivery. For connectors or any other RF needs, call RF Specialties!



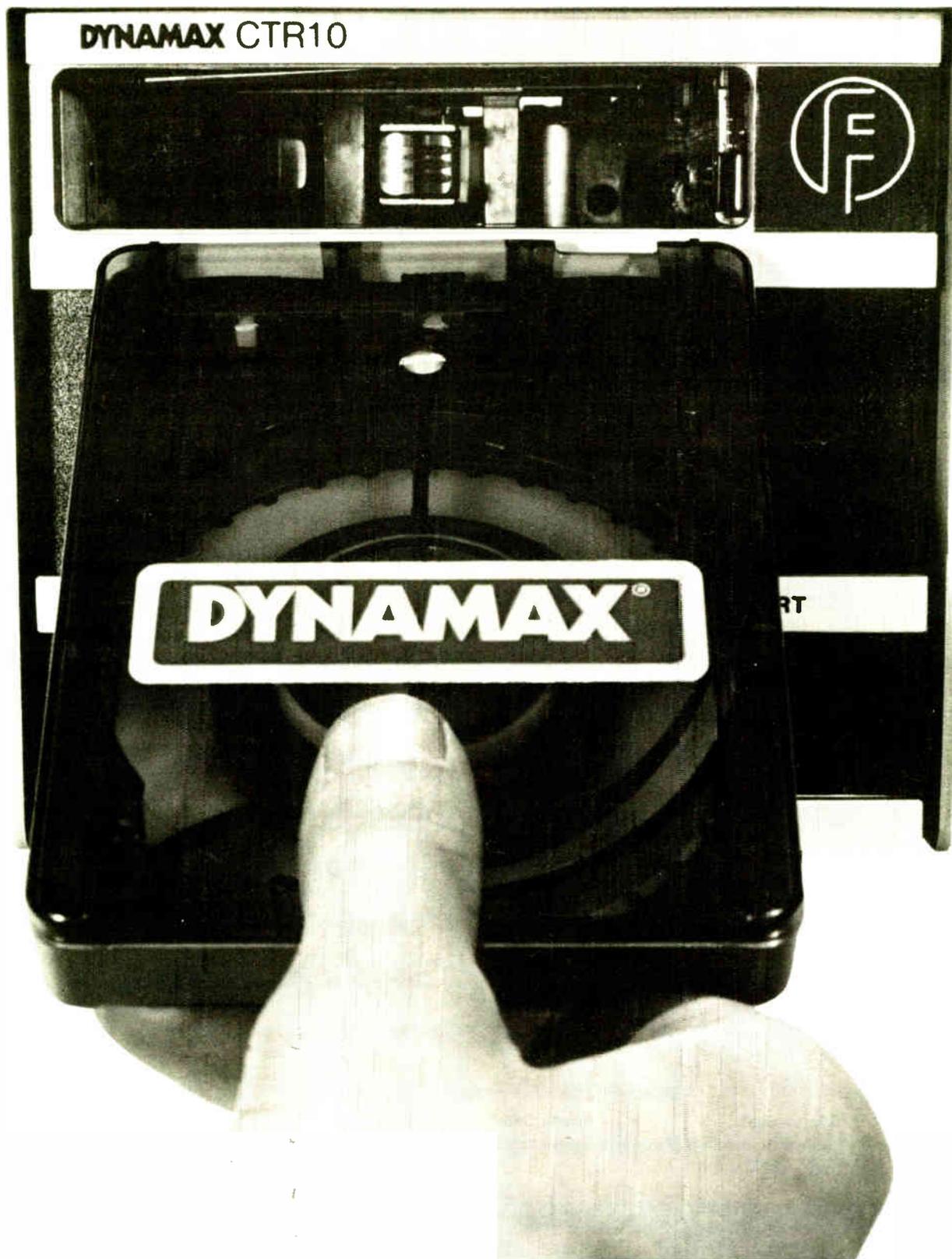
RF Specialties Group

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• Competitive Pricing •

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Every cartridge you play means air time won or lost. Fidelipac's cobalt-formula Dynamax removes the doubt—you can count on Dynamax for a stand-out performance every time.

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ATLANTA, GA CHICAGO, IL DALLAS, TX
LOS ANGELES, CA RICHMOND, IN

ALLIED
Broadcast Equipment

RADIO '89 EXHIBITORS

(continued from page 19)

Modulation Sciences Booth 0256

Will introduce the FM ModMinder, a brand new modulation monitor for FM which measures shorter peaks and allows stations to use less processing, increase average modulation and still stay within FCC limits.

Shively Labs Booth 0614 0616

Will feature its line of antennas, multi-station combiners and antenna pattern services, also full-blown samples of pattern studies for stations' coverage. Also, Bob Surette is scheduled to present a paper on FM directional antennas during the engineering conference.



Exciting News

The synchronous FM exciter from TFT will be on display.

Motorola Inc./AM Stereo Booth 0901 0903

Complete line of AM stereo exciters and related products.

Music Director Programming Service Booth 0909

Music services for the broadcast industry.

Otari Corp. Booth 0452-0456

Will feature the MK-III-2, the MK-III-4 and the MK-III-8 recorders as well as the MX-50, the MX-55N and MX-55NM, the MTR-10, MX-70, 5050-II and 5050-BQII

Studer Revox America Booth 0244

Will feature the A723 active studio monitor, the A779 professional compact mixing console, the Revox C270-TC pro two-channel recorder w/SMPTE time code and the C270 autolocator/channel remote/transport remote control.

Target Tuning Inc. Booth 0360

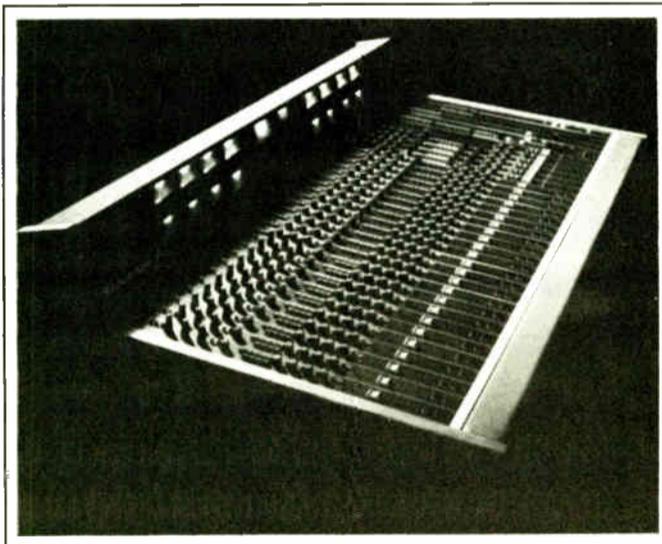
Will show its frequency-locked personal AM stereo radios and introduce its SCA receivers.

Tennaplex Systems Inc.

Will feature antenna and antenna related services for radio stations.

A Sound Choice

The SP-6 stereo production console from Wheatstone also will be featured.



recorders, the CTM-10 cart machine and the ARS-1000.

Pacific Recorders & Engineering Inc. Booth 0239

Will feature the new Radiomixer console introduced at the spring NAB show.

Radio Systems Inc. Booth 0753

Will feature its RS series consoles, the RS-1000 DAT system, standard and custom pre-wired studios, custom studio furniture and RS studio products.

Schafer Digital Booth 0139

Will show the DAPS 8000 Digital Audio Programming Sequencer featuring random access digital audio and complete live assist.

TFT Inc. Booth 0408

Will feature the new synchronous FM exciter and the new complete EBS system, both introduced at the spring NAB show, as well as the user-friendly RPU unit and the 2-channel FM mod monitor.

Tri-Tech Booth 0419 (with Allied)

Will feature the RBS 801 introduced at the spring NAB show. It's a portable, compact unit designed for remote broadcasts in areas served by cellular phone, with built-in mic mixer, cellular telephone and standard phone interface, also built-in battery.

Wheatstone Corp. Booth 0305

Will show the A-500AS on-air console introduced at the spring NAB show, the SP-6 production console and the new line of studio furniture.

WE'VE MADE DEAD AIR A DEAD ISSUE.

There are worse things in radio than dead air. But not many.

And if your CD players aren't built to resist tracking errors, you could find yourself listening to some very embarrassing silence.

Not with the new CD-701 from Tascam. Its unique disc clamping system is a technological triumph that virtually eliminates disc vibration. So you never hear the awful hush that means a tracking error has occurred.

What you do hear is the finest sounding CD unit you can buy, with the same proprietary "ZD Circuitry" praised by two of Japan's top audio magazines* for eliminating low-level digital distortion.

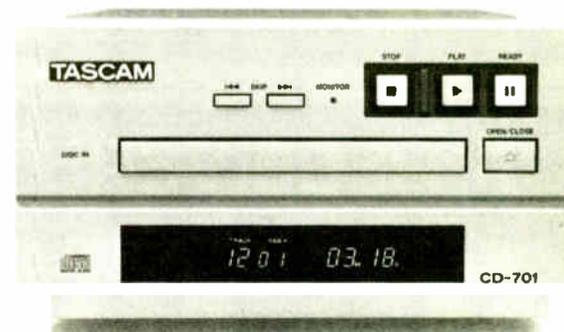
Then there's the optional RC-701 Remote Control with Auto Cue so you can cue to the music instead of the track (for even less dead air). Or you can add the Ram Buffer for true, instantaneous startup.

And with four times oversampling and 16-bit D/A converters in an extra-rugged chassis, the CD-701 is superbly designed for the broadcast environment.

Can a CD player really deliver this kind of performance, track after track, disc after disc? Only if it's a Tascam.

Contact us or visit your Tascam dealer for more information about the CD-701. And take the sounds of silence off your playlist.

TASCAM



© 1989 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640, 213/726-0303
*Radio Technology Component Grand Prix '88, CD Division, Stereo Sound Component of the Year (1988) & Best Buy (1988)

DC Plays Host to Annual IEEE

by John Gatski

Washington DC The 1989 IEEE symposium, scheduled here 21-22 September, will cover such radio topics as FM tube powered transmitters, improved nighttime performance for AM antennas and an update on RF radiation regulations.

Newly appointed FCC Chairman Alfred Sikes also is scheduled to address the IEEE conference.

For 39 years, IEEE symposiums have concentrated heavily on engineering and technically detailed presentations of the latest equipment technology, theories and practical methods pertaining to radio and TV broadcasting.

The radio session begins 9:15 AM, Thursday, 21 September. Mukunda Shrestha of Broadcast Electronics Inc. will present a computer analysis of FM transmitters using tube power amplifiers.

A tube power amplifier can offer optimum transmitter performance while maintaining a wideband signal, according to the company.

Also in that session, Shively Labs' Bob Surette is scheduled to discuss conditions under which to use a five-band pass filter or a four-band pass filter in an FM combiner system.

Following that, consulting engineer Tom Osenkowsky will address factors

that affect FM directional antenna performance.

Hatfield and Dawson Consulting Engineers' James Hatfield will discuss use of MININEC to calculate antenna monitor parameters from field parameters on AM directional antennas.

The final radio-only session will deal with improved nighttime performance of AM antennas. The session will be presented by Valentin Trainotti, an engineer for the Argentinian company, CITEFA.

Among topics of interest to radio broadcasters in the TV session, 2 PM, Thursday, is a presentation by Dr. Ali R. Mahmad on an "improved" version of Jampro's spiral antenna that was created in the late 1970s for low VHF and FM. (A morning session Thursday will address advanced television.)

Other radio-related technical sessions will be held on Friday during the general engineering session, beginning at 2 PM and include an update on RF radiation standards by Jules Cohen of Jules Cohen

and Associates. Herman Hurts, Jr. also is scheduled to address the recently revised FCC Part 15 interference rules.

Associated with the conference is the IEEE/Association of Federal Communications Consulting Engineers (AFCCE) joint luncheon, during which Sikes will speak. It is set for noon to 2 PM on Thursday and a banquet is scheduled for 6 PM.

For more information about the IEEE conference, contact Secretary-Treasurer Robert Denny, Jr. at 202-659-3707.

Station Lottery Plan Opposed

by Charles Taylor

Washington DC Negative sentiments toward an FCC proposed implementation of a lottery system to assign new station allocations predominated reply comments filed in mid-July.

The Commission presented the lottery idea, contained in docket MM 89-15, as a possible way to reform current comparative renewal abuses, most involving allegations of payoff scams by applicants.

Best, not luckiest

In initial comments filed in June, most commenters reiterated that reforms in the comparative hearing process would

be more constructive than the proposed lottery.

"The Commission should select the best applicant and not the luckiest," wrote the NAB, which was joined in reply comments by National Public Radio, the National Federation of Community Broadcasters and the National Association of Public Television Stations.

"The lottery process sets only one standard, that of minimal basic qualifications. Chance should not replace reasoned decision making," NAB said.

The Federal Communications Bar Association (FCBA) restated its view that reforming the current process would eliminate many of the problems that first

prompted the Commission to search for a new method of license allocation through the lottery.

The organization took issue with commenters that supported the lottery, arguing that their concerns could be dealt with in a reformed comparative hearing process.

Form advisory group

FCBA also supported the formation of an advisory group to consider ways to reform the process, incorporating the suggestions of those displeased with the current system.

The National Association of Black
(continued on page 26)

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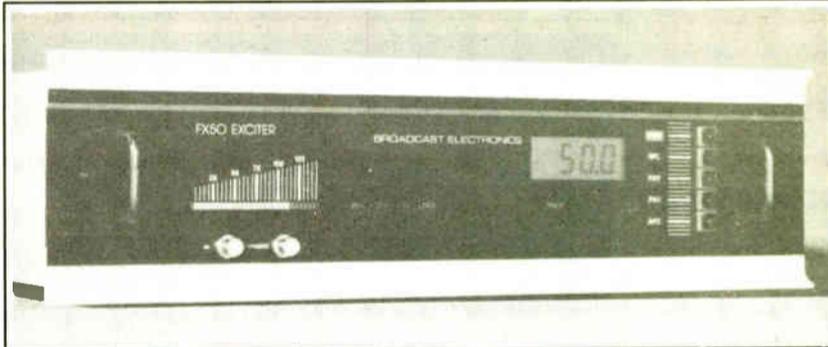
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Diversity vs. Localism: Translator Battle Lines

by Charles Taylor

Frederick MD Almost since their debut in the early 1970s, Lee Smith has built a career on the planning and installation of FM translators and boosters in low power and small market radio stations.

In late 1987, the radio engineer anticipated funneling his expertise into a new company specializing in establishing and leasing translators to stations interested in extending their service area via the satellite link that translators allow.

Smith's business plans, however, now are on hold amid an FCC-initiated freeze on FM translator applications for commercial stations.

As a result of the March 1988 freeze, no commercial FM may install the equipment to extend its signal, pending action on a sweeping ruling (contained in docket MM 88-140) intended to cite proper applications of a translator vs. abuses.

No signs of a lift

Now 17 months running, the freeze shows no signs of being lifted in the near future and certainly not before a new FCC chairman is in place, said Marcia Glauberman, acting branch chief of the FCC's policy and analysis division.

"We could either close off the whole business and lift the freeze or we could go to a notice of proposed rulemaking and make new rules. It could take any direction," she said.

According to Smith, the lack of agency action has led to the unnecessary stalling of his company's startup, while, he maintained, creating a disservice to the public interest concept that is supposed to guide the Commission.

"Legitimate radio broadcasters have a need and a desire to expand their signals into places on a deregulated basis," he said. "The point I wish to make with the FCC is that it really is in the free market interest to allow everybody to put in translators wherever they see fit, as long as technical guidelines are followed."

Amid competition with TV, VCRs and other media, radio is fighting for survival, Smith stressed. "I'm saying let's make radio more competitive by allowing it to be spread around by translators."

Amiss on diversity

John La Tour, owner of Power Du Pree Broadcasting in Fayetteville, AR, which owns and services translators used by 55 radio stations nationwide, added that many markets are being cheated out of programming diversity because of the freeze.

"In most large markets in the South, if you don't like country or rock, you're out of luck. That's all there is," he said. "Allowing narrow appeal programming will mean a lot of variety out there for the American people to choose from."

He compared those limitations to TV before satellite-fed cable systems: "You had three choices—ABC, NBC and CBS. If you didn't like what they were playing you were out of luck. Now you've got a great variety of narrow appeal pro-

gramming that we otherwise wouldn't have."

The NAB, in turn, has consistently supported the freeze on commercial translators. In April, the organization urged in an FCC filing to limit the use of translators until "general and consistent technical standards and overall policy decisions" are reached in docket MM 88-140.

Ralph Justus, NAB's director of engineering regulations and international affairs, stood by the view.

"The reason that this proceeding came up was to eliminate abuses of translator service as it was originally intended," he said. "It makes no sense to lift the freeze at this time if the FCC is poised to adopt some new regulations that further define the translator service itself, including interference protection and permissible service."

"We are firm believers in local program service," added Barry Umansky, deputy general counsel for the NAB. "If there's one thing that translators are not, it's local program service. A translator's basic nature is to bring in material from outside of the market."

"We have no problem in bringing service where there is none or to fill in a dead spot in broadcasters service area. Our only beef is translators operating outside of that scheme," he said.

Limiting competition

But according to La Tour, NAB's motives are more self gratifying: "NAB is run by the big market guys. They don't care about variety, they just want to limit their competition."

"They don't want us to cycle off some of their revenue," he continued. "We're not talking about putting (major market stations) out of business. We're talking about the difference between them making \$2.3 million and \$2.2 million."

Said Smith, "I understand NAB. They're saying, 'Our members are concerned.' But this is small business and NAB is supposed to be representing everybody. The small markets are not a threat to anybody if it (translator use) is deregulated so that any station, any broadcaster, can do what they want."

Justus replied, "It's unfortunate that small market stations and their legitimate concerns to provide improved service to their communities are being thwarted by this delay, but we would hope that people would understand the long-term benefits for all broadcasters, regardless of their market, by correcting these loopholes that created these abuses in the first place."

For now, Smith and La Tour have no choice but to wait and hope that the FCC sees fit to lift the freeze and more freely allow the employment of translator technology.

"If they'd just take the shackles off of them and let them go," Smith said. "Within the context of open competition, more is better—not necessarily more original radio stations, but a wider divergence of existing stations."

For information, contact Lee Smith at 301-662-0040; John La Tour at 501-443-7878; or Barry Umansky at 202-429-5456.

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Land Values Lure AMs to Sell

(continued from page 1)

lanta's WPLO-AM—now WKHX-AM—in 1985, the transaction included a stipulation that the station's facilities and antenna would have to be moved to another site.

The former owner then tore down the original antennas and sold the land for a profit that reportedly rivaled the station sale.

These two cases show that AM owners and investors are giving as much consideration to the value of a station's site as its signal, a trend that has developed over the past several years, according to industry consultants and brokers.

In markets ranging from Philadelphia to Greensboro, NC, AM facilities are being moved or shut down so landowners can cash in on acres of land that have greatly appreciated in value since the stations' antenna farms were built years ago.

"The time has come when AM radio owners must recognize that they can no longer define their businesses as radio time sales only, but that they have transcended the line into real estate sales," said John VerStandig, owner of WGMS in Washington.

David Cole, VP for tax appraisal at Broadcast Investment Analysis, a Washington communications financial consultant, said AM owners are discovering that those 20 acres of land they

bought in 1948 are worth hundreds of thousands of dollars an acre.

"Somebody looks at the bottom line and says, 'Gee, we can sell all this (land) for \$12.5 million, spend \$2 million for a new (antenna location) and still have \$10 million to put in the bank,'" Cole commented.

Sometimes the move occurs when a station is sold, with the seller stipulating that the new owner must build a new antenna on an alternative site.

But there is a down side to this trend.

The negatives

An AM owner may succumb to the realization that a real estate developer is willing to pay more for the station's land than its profits ever might hope to generate and the owner will then surrender his license.

"Land values are going up, and AM radio station values are stable or going down," said Radiotechniques Engineering Corp. President Ted Schober, "so you have two curves: one where real estate values in certain areas—the areas where you'd like to have a radio station—keep escalating, and one where the value of AMs has not been escalating as time has gone on."

"The good part is that it will make the AM band a little less crowded," Schober said. "The bad part is that some of the

better stations may suffer this fate because they'll be in the areas where land is going up in value."

The concept of selling a station for its land value is sound, added Larry Wood, president of Wood and Co., a Cincinnati broadcasting broker.

"Every buyer, every seller, every owner has to weigh the costs of putting up a new facility against the current costs of the land the tower sits on. If it turns out

in all, you could spend a half million dollars. Plus, it may take you a year or so to do it."

According to Leon Van Bellingham, a VP at media broker H.B. LaRue in New York, the problems can be endless. "It becomes such a horrendous ordeal, many just stay where they are."

Schober explained that a station he represents (which he would not identify) was offered a bid from a developer

... brokers see the practice of land selling gaining momentum ...

that the land is worth more to a developer (than the broadcaster), it does make sense (to sell)."

The negative side in going for the cash, Cole maintained, would be if a station sold the land and turned the license in and abandoned AM. "If it sold the land and built a new site and is still serving a community, I don't see that as a negative impact," he continued.

But, as the brokers pointed out, it takes a lot more for an AM broadcaster to move sites or to sell out than just an offer from a prospective real estate developer.

The AM owner first must be fortunate enough to locate an alternative antenna site offering a compatible signal pattern. He also must see to demolishing the original antenna, oversee intricate and sensitive filings for construction with the FCC and FAA and manage consulting and attorney fees.

County and local boards

"In this day of the consumer being very conscious of RF radiation, getting state, county and local boards to approve the construction can take more time than the federal government," Cole said. "All

for more than the AM's value. Because of its lack of success in locating an alternative site, the station may end up turning in its license.

"They started out earnestly looking for anywhere to place a new antenna and realized that zoning was so difficult it wasn't worth it. Towns aren't going to open their doors to let you in," he said.

Still, brokers see the practice of land selling gaining momentum among more AM owners in the coming years, particularly in metropolitan areas where desirable acreage is increasingly difficult to obtain.

"Cities continue to grow out to where radio stations have their towers, and more and more, that land will become more valuable for apartments and commercial usage," said Charles Giddons, a partner with Media Venture Partners in Washington, DC.

Cole, however, said he doesn't think too many broadcasters are in danger of "selling out."

"While we may see more of it, there are still broadcasters in this business who are wholeheartedly interested in more than just dollars and cents."



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Fee Hike Sparks Protest

(continued from page 1)

Zaragoza said the Capitol Hill action to increase fees and fines is two-sided.

He said the action is commendable in that any action to get the FCC more money can only improve the efficiency of the agency, which has been burdened with a personnel shortage and a backlog of work.

However, Zaragoza called the proposed fines "a substantial increase."

High fees

Some of the fee increases for broadcasters are substantial, such as hearings, which would jump from \$6000 to \$6760. Hearings include major/minor changes, new or comparative hearings.

Fees such as shortform transfers would go up slightly, from \$70 to \$80 under the committees' plans.

House Telecommunications and Finance subcommittee spokesman Mike Connolly said the two budget reconciliation plans will go to their respective floors and then to a conference

CHANGES IN SOME FCC FILING FEES			
Type of Filing	New	Old	
New or Major Change CP:	AM	\$2255	\$2000
	FM	\$2030	\$1800
Minor Change:	AM	\$565	\$500
	FM	\$565	\$500
Hearing (Major/Minor Change, Comparative New or Renewal)	\$6760	\$6000	
License:	AM	\$370	\$325
	FM	\$115	\$100
	AM (DA)	\$424	\$375
	FM (DA)	\$355	**
	AM (Remote control)	\$35	
Assignment or Transfer:	Long Form (314/315)	\$565	\$500
	Short Form (316)	\$80	\$70
Renewal	\$100	\$30	

committee to work out the differences before being sent to the President.

May said there could be some slight variations in the fee and fine increases from the committee-approved forms because the House version contains the controversial anti-dial-a-porn and Fairness Doctrine resurrection.

Those volatile issues could spark debate that could end up altering a compromise reconciliation budget slightly, May added.

On the plus side, May said the industry can breathe a sigh of relief over the committees' exclusion of spectrum fees as a revenue source.

A partial list of fees that would be raised if the reconciliations are passed include: AM construction permit, \$2000 to \$2255; FM construction permit, \$1800 to \$2030; hearing (major/minor change, comparative new or renewal), \$6000 to \$6760; AM license, \$325 to \$370; FM license, \$100 to \$115; AM directional license, \$375 to \$425; FM directional license, \$355; and AM remote control, \$55.

For information about the possible fine/fee increases, contact the FCC Legislative Liaison office at 202-632-6405, Jim May at 202-429-5301, Richard Zaragoza at 202-659-3494 and Mike Connolly at 202-226-2424.

Staffers Join FMX

by John Gatski

Bloomfield Hills MI Broadcast Technology Partners (BTP) has added three positions to its staff in an attempt to bolster marketing and support of FMX, the controversial stereo enhancing technology.

After a recent move of its headquarters from Connecticut to Michigan, BTP followed up by hiring Louis Raymo, former engineering director at ABC O&O WRIF-FM in Detroit, as the company's broadcast and industry relations director.

BTP also hired Dr. Takeo Sawatari, who was principal physicist at Bendix's advanced technology center, as research director and Katie Mullen as assistant marketing director.

BTP Marketing Director Ben Micznik said the positions are not replacements for any employees, but they were added to enhance the transition from a technology to a marketing emphasis.

Not all of the approximately 30 people on staff in Greenwich, CT, have yet agreed to relocate to Bloomfield Hills, Micznik said.

BTP President Emil Torick will remain in Connecticut, while technician Jim Monahan decided to leave the company. Tom Rucktenwald, VP en-

(continued on page 27)



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New Underground Tank Rules

(continued from page 7)

monthly monitoring, monthly inventory control and annual tank tightness testing, or monthly inventory control and tank testing every five years.

EPA specialist Kim Green said that monthly monitoring and five-year tank tightness testing is the cheapest way to comply with the regulations, but stations only would be allowed to use that option until 31 December, 1998.

Under that option, a stick or ruler can be used to measure the fuel each month. Tank tightness testing has to be performed by a tank expert and involves pressurizing the tank, Green explained.

The monthly monitoring option in-

cludes either the use of a tank gauge, vapor monitoring, or ground water monitoring methods (digging a test well), which are more expensive because of needed required measuring devices and installation costs.

More expense

The most expensive requirements will be corrosion and spill overflow/protection requirements, which all tanks must meet by 31 December, 1998.

"It is going to be expensive, especially in urban areas," Lucia said.

He said some tanks built under paved parking lots will have to be dug up to make mandated improvements either by

addition of corrosion resistance to the tank or installation of a new tank and piping.

In an upcoming info packet, the NAB will alert stations to the EPA underground tank requirements and the appropriate timetables, according to NAB

Engineering, Regulatory and International Affairs Director Ralph Justus.

For information contact, the EPA Office of Underground Storage Tanks at 202-382-3000, Barry Umansky at 202-429-5456, Frank Lucia at 202-632-3906 or Ralph Justus at 202-429-5341.

Lottery Draws Fire

(continued from page 22)

Owned Broadcasters cautioned against a "hasty retreat" from the comparative hearing process.

Instead, the association supported the amendment of Form 301, which it said should help shorten the length of time between the closing of a filing window and the award of a license to an applicant.

The group also backed the restriction of incentives for law firms to use contingent fee arrangements to prosecute ap-

plications on behalf of financially unqualified applicants.

Finally, in its discussion, Cohen and Berfield, PC, attorneys for eight broadcasting partnerships, stated, "What is clear is that the lottery proposal . . . has engendered little enthusiasm and substantial recognition of the serious legal difficulties that would arise from its adoption. It should be rejected."

For information on the proceeding, contact Andrew Rhodes at the FCC, 202-632-7792.

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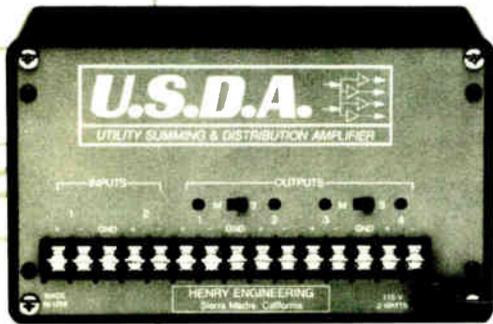
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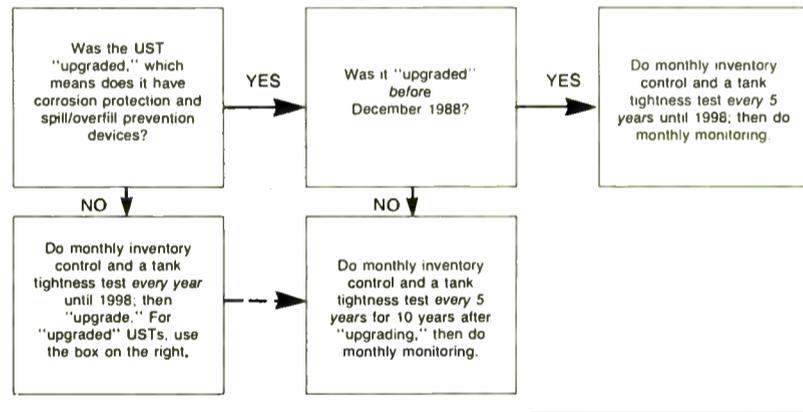
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Existing Tanks** Installed	By No Later Than:	} December 1998	} December 1998
Before 1965 or unknown	December 1989		
1965-1969	December 1990		
1970-1974	December 1991		
1975-1979	December 1992		
1980-December 1988	December 1993		
Existing Piping			
Pressurized	December 1990	December 1998	Does not apply
Suction	Same as existing tanks	December 1998	Does not apply

* New tanks and piping are those installed after December 1988
** Existing tanks and piping are those installed before December 1988

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Sonrise Dealings Investigated

by Charles Taylor

Washington DC After making national news connected with the mysterious deep sea plane crash of its former attorney Thomas Root, the FCC has directed an investigation into Sonrise Management Services for alleged application abuses.

The Commission asked an administrative law judge to examine the Columbus, GA, company that specializes in assembling investment partnerships to apply for FM station licenses.

The investigation, ordered in MM docket 89-358, is based on information alleging that Sonrise, its applicants, and their attorneys, consultants and advisors, "have engaged in a pattern of conduct that constitutes an abuse of the Commission's processes and may also violate the Criminal Code," the Commission said.

Questions surrounding Sonrise arose in July when Root, who represented most of the company's organized partnerships before the FCC, was rescued from the Caribbean with a mysterious gunshot wound after a plane he was flying crashed.

Since then information has surfaced regarding the legality of Sonrise's business dealings. Since 1985, the company has organized 161 investor groups that applied for 165 station licenses, according to *The Washington Post*.

FMX Adds to Staff Roster

(continued from page 25)

gineering, left BTP before the move.

Some stations using FMX worry that the hiring of new people signals a shift toward heavier sales rather than technical support, a scenario BTP has denied.

"Everything is the same," Micznik said.

He said Raymo will increase market visibility and service to stations, networks and manufacturers, not de-emphasize it.

"What we are looking to do is establish a much more complete relationship with the broadcast industry," he said.

Marketing FMX has become a primary effort by BTP, which developed FMX with CBS and the NAB.

The technology has been under a cloud of uncertainty since January when Bose Corp. President and MIT Professor Amar Bose and Bose engineer William Short released a sharply critical report of FMX, claiming tests proved the technology did not perform as advertised.

BTP denied the allegations, but the market at this point has been stagnant, according to industry analysts.

Only one company manufactures the FMX generator, but there are few receiver manufacturers that have put consumer units on the market, although two companies now produce the FMX chip.

Slightly more than 100 stations broadcast in FMX stereo, based on BTP estimates.

For information from BTP, contact Ben Micznik at 313-540-4380.

Investors normally were recruited to front about \$89,000 to have Sonrise oversee an application with the FCC for an FM license. The company would keep close to \$20,000 in fees and the rest would go to the FCC for filing fees and engineering consultants, the Post said.

Sonrise was not listed as a partner on the Commission applications.

While the company has argued that it provides a valuable public service by

helping investors and minorities get into broadcasting, FCC Administrative Law Judge Walter Miller claimed the applications filed by Sonrise "bear all the indicia of the classic sham."

In fact, Sonrise has filed suit against Root, claiming breach of contract, misuse of escrow funds and double billing.

The Commission said it will investigate only applications by the company that have been settled, thus developing

"a record fully considering all aspects of (Sonrise's) activities with respect to any and all applications that have been dismissed and that are no longer the subject of a pending or proposed hearing proceeding."

A final report is to be submitted to the Department of Justice's Criminal Division for prosecution consideration.

For more information, contact the FCC at 202-632-5050.

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Recording Tips for Multitimbral Synths

How to Get That Fully-Arranged Sound with Only One Keyboard

by Bruce Bartlett

Elkhart IN Recent columns in this series have covered ways to record your own musical compositions for spots, weather music, news intros, etc. So far we've explained recording techniques for a polyphonic synthesizer and for a synth synchronized to a drum machine. This month we'll focus on recording a multitimbral synthesizer.

are set to channel 1. Then track 1 will play the bass patch. Track 2 will play another patch, and so on.

Figure 1 shows the connections. First, plug a MIDI interface into the user port of a personal computer. The computer will be used to run a sequencer program. (Two alternatives to a personal computer are a standalone sequencer or a sequencer built into a keyboard).

Connect a MIDI cable from the MIDI OUT port of the synth to the MIDI IN connector of the interface. Connect another MIDI cable from the MIDI OUT connector of the interface to the MIDI IN port of the synth. Finally, connect the synth's audio output(s) to a monitor power amp and speakers.

Begin the recording process with the first synthesizer track. Select your first desired patch on your synthesizer. You might want to adjust the timbre of the

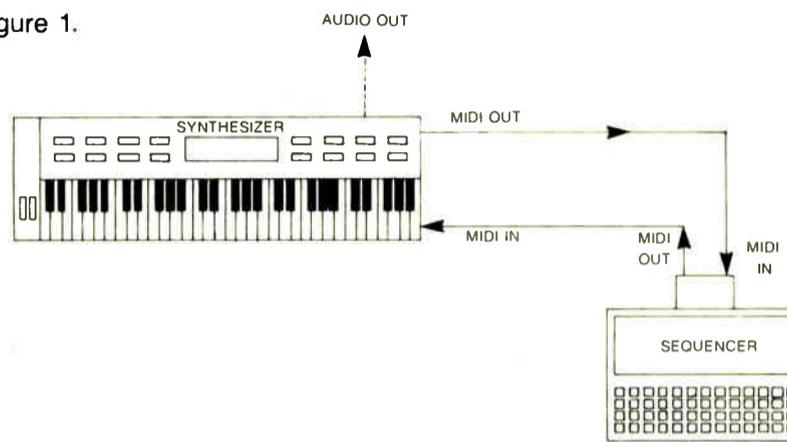
beats and pulses. When you press the stop key on your computer keyboard, the sequencer will stop recording and will go to the beginning of the sequence (the top of the tune).

If the part is difficult to play rapidly, you can adjust the sequencer to a very slow tempo. Record while playing the synth at that tempo, then play back the

Here's an example. Let's say you've just recorded a drum part into the sequencer on track 1. Then you can go back to the start of the sequence, play the drum part and add a bass line on track 2 in sync with the drums. Then you can go back to the top and add a piano on track 3.

In short, you record a different patch on each track in the sequencer and play

Figure 1.



LINE OUT

A multitimbral synthesizer is an electronic keyboard instrument that can play several patches at once. A patch—also called program or preset—is a sound or timbre, such as piano, bass, drum kit, or flute.

With this method, you play the parts for several different instruments (patches) on the same multitimbral keyboard and record each performance on a separate track of a sequencer. (Basically, a sequencer is a computer that records note data (note on/off, key number, and so on).

During playback, the sequencer plays the desired patches (instruments) in your synthesizer. It sounds like a band playing. You record the synth's output and that recording is the final product.

Assigning MIDI channels

Each track and patch are set to corresponding MIDI channels. For example, suppose both track 1 and the bass patch

You can make more tracks available by bouncing tracks.

patch with the sound controls on the synthesizer in order to create unusual sounds. Set the synthesizer patch to MIDI channel 1.

Setting the tempo

Adjust the metronome tempo on your sequencer as desired. Then assign sequencer track 1 to MIDI channel 1 and set the sequencer to record on track 1. Hit the record key(s) on your computer keyboard.

Listen to the sequencer's metronome and play along with its beat. The sequencer will keep track of the measures,

sequence at a faster tempo.

Another way to record your performance is in step-time, one note at a time. This procedure was discussed in last month's column.

On your computer keyboard, hit the play key (designated in the sequencer-program instructions). You'll hear the sequence playing through your synthesizer.

You can correct mistakes by punching into record mode before the mistake, recording a new performance and then punching out of record mode.

Overdubbing on other tracks

With your first track recorded and corrected, you're ready to record other tracks. Set sequencer track 2 to MIDI channel 2 and set the sequencer to record on track 2. On your synthesizer, select the next patch (instrument voice) you want to use and set it to MIDI channel 2.

Then hit the record key(s) on your computer keyboard. Play the new part on the synthesizer while listening to your pre-recorded track 1. This track is played by the synthesizer.

back the recording through the multitimbral synthesizer, which plays all the patches simultaneously. Or use several synths, one for each part, if necessary. Set each track to a different MIDI channel and set each instrument or patch to the same channel that its track is set to.

Bouncing tracks

What if your sequencer records eight tracks, but you want to play ten patches at once with several synths? You can make more tracks available by bouncing tracks. This is the process of mixing (merging) two tracks into one, thus freeing one of those tracks. If you bounce, say, track 5 onto track 4, you can record a new instrument on track 5.

To do it, hit the bounce key(s) on your computer keyboard. Type in the source track and destination track (indicate the track to which you want to bounce). In a few seconds, the bounce is accomplished.

You can only bounce one track at a time. You can bounce a track into a pre-recorded track, however, without erasing the pre-recorded track. The pre-recorded track and bounced track will merge. Unlike bouncing with a tape deck, there is no generation loss (no loss of sound quality) when you bounce with a sequencer.

You can record program changes on a separate track and later bounce that track to a performance track. The performance track and program-change track will merge into one.

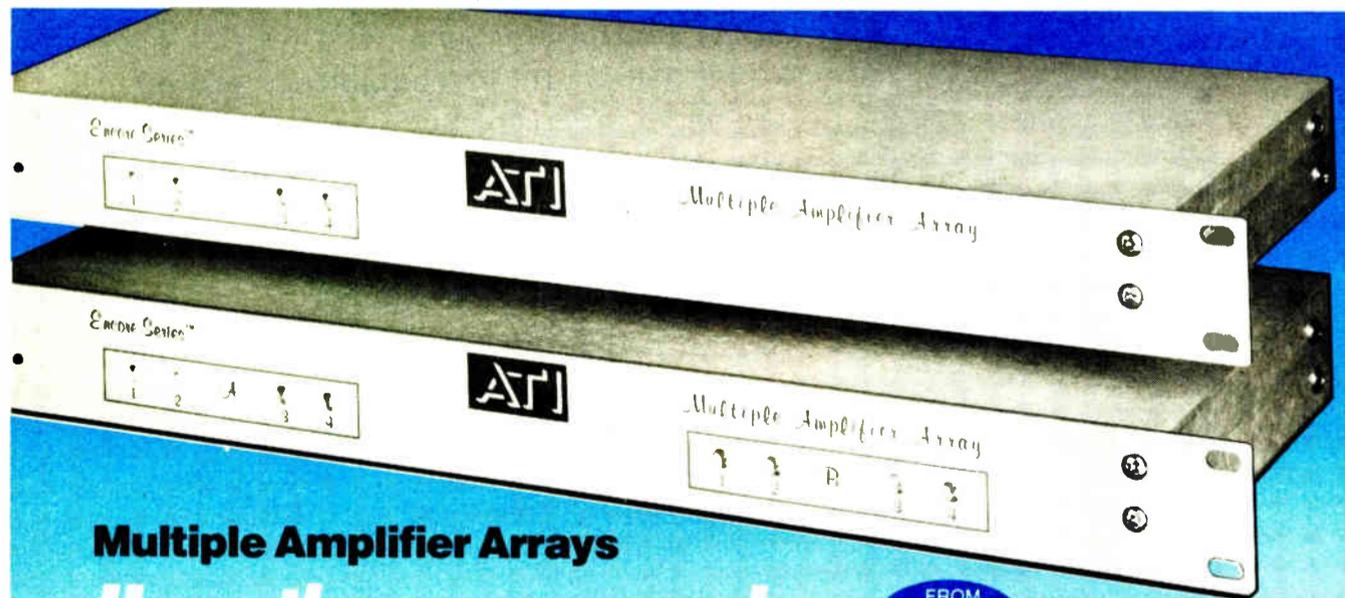
Editing the composition

Now your sequenced performance is perfect, so you can put together your composition. As described last month, you can rearrange song sections, and append one section to another, by pressing a few keys on the computer. You also can have any section replayed wherever desired in the song. Thus, you might build a song by having the computer play sections A, B, B, C, B, D, B.

With your song recorded and arranged, you'll want to adjust the relative volumes of the tracks to achieve a pleasing balance.

If your multitimbral synthesizer doesn't have separate outputs for each patch, you have to adjust the mix at the sequencer. To do this, adjust the volume (key-velocity scaling) of each track by hitting the appropriate computer keys. This

(continued on page 44)



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DAT: After the Compromise

by Mel Lambert

Studio City CA The recent announcement by the Japanese and European makers of consumer DAT machines is one of those examples of Good News/Bad News.

The Good News is that, finally, US consumer interest in things digital can be satisfied with a flow of affordable DAT product from the mass merchandisers. Which in turn will mean that the makers of professional hardware can, at long last, make use of that good ol' "Economy of Scale" and offer DAT decks with the

out of record mode. Easy when you know how.

So far so good. The current generation of DAT machines—some of which are entering the US via grey-market sources—will not record digitally at 44.1 kHz, the idea being to prevent digital copying from CDs and other DAT players. All of which made eminent sense and, I would have thought, would have satisfied the RIAA's "anti-copy brigade."

(And let's not forget that professional

decks equipped with AES/EBU digital in/out would totally ignore any copy-inhibit bits placed into the consumer-style S/P-DIF/CP-340 Type II interfaces; so radio stations can transfer between any and all digital sources to and from DAT.)

Well, let's just agree that at long last we have an agreement between the record industry and DAT manufacturers, even if it doesn't make a lot of sense in terms of preventing digital taping of CDs, etc. (Odd, huh? Only DAT tapes that you

make yourself will be copy inhibited.)

Now, of course, the makers of DAT hardware will have to develop the appropriate chips and encoding schemes to ensure that DAT tapes are encrypted with the correct information; that the digital bitstream contains the necessary copy-inhibit bits; and that slave decks respond appropriately.

I have heard rumors that "correctly attired," or RIAA-approved DAT machines won't be hitting these shores until late

(continued on page 45)

DIGITAL DOMAIN

kinds of features needed to withstand the rigors of day-to-day life in a broadcast facility.

The Bad News is that inevitable delays in bringing product to market might very well put a severe crimp in the long-term expectations for DAT hardware.

Cutting to the chase: Will DAT for both consumers and professionals alike survive the coming impact from erasable compact disc and related random-access technologies?

History of a compromise

To backtrack for a moment. In late July, it was announced that representatives from the record industry and the major consumer electronics manufacturers (or at least those with an interest in offer-

Only DAT tapes that you make yourself will be copy inhibited.

ing DAT units) had agreed on an "anti-copying" modification for Digital Audio Tape recorders.

Recalling that all of these "DAT is Bad" discussions during the past two years—stemming from initial worries by the Recording Industry Association of America (RIAA) that DAT meant even more loss of record sales through home taping—have involved the development of techniques for discouraging and/or preventing the digital copying of record product, the resultant solution leaves the situation somewhat confused.

Not, I hasten to add, about the actual ramifications of the agreement; more exactly why the RIAA and the IFPI (International Federation of Phonographic Industries) accepted such a weird compromise.

In a nutshell, what the DAT makers have agreed to implement is a scheme for ensuring that a DAT tape of copyrighted material cannot be copied digitally. It's OK, we now discover, to dub compact discs and similar sources to DAT via digital ports.

But, during that recording—on consumer decks only—a copy-inhibit code will be printed to tape which, upon replay, will cause a second DAT machine connected digitally to mute and/or drop

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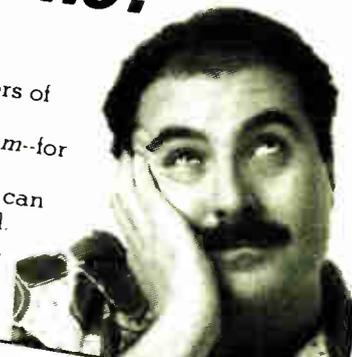
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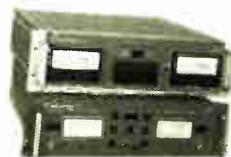
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Manual Muffs and Misprints

by Barry Mishkind

Tucson AZ A couple of months ago, we looked at some of the interesting items that find their way into print as manufacturers go through the difficulty of preparing documentation for those of us in the field.

It has been gratifying to receive the various examples sent in by RW readers. And I stand ready to share more of them if you'll take the time to send me a copy of any curious language, strange instructions or interesting misprints. The address is listed later on.

ECLECTIC ENGINEER

Among my long-standing favorite examples are the strange instructions found in a college text used while I was in school.

While operation in control rooms has changed since the late '60s, I do remember combo operation as being common. In fact, I did combo announcing at that time.

So imagine my surprise to be taught that for stations playing music, "Two tables equipped with 33 1/3 and 78 rpm speed settings are necessary. A 45 rpm setting can also be useful at times."

I do remember chuckling a bit at that "at times" while cueing up the latest Beatles 45, or some other 45 rpm hit record.

Another comment from the same text provides the answer for any of your newer jocks when they ask why they shouldn't pin the needle on the VU meter: "If the needle is slammed abruptly to the top of the dial, the action is called *bending the needle*." Really!

The text claimed to be teaching a solid understanding of what goes on in our medium, but you will probably agree that most of these college texts we had in the '60s and '70s actually taught the technology and operations of the '40s, right?

Are there any other examples out there from these texts?

Manual mania

Joe Sands of KMZQ in Las Vegas, like many a diligent engineer, tries to set up and check out new transmitters using the step by step procedure found in the instruction manual.

Thus it is with some agitation that Joe reports several occasions as he moved on from, say, instruction "g" to "h" in the manual, that instruction "h" would begin with, "However, before you do 'g' . . ." and then go on to offer such possibly important advice as "remove primary AC power."

Joe says he has seen these kinds of instructions all too often. He is alive at last report. Apparently he has developed the habit of reading two instructions ahead most of the time.

Moving on to less hazardous manuals, a major tape deck—used in hundreds, if not thousands, of stations—advises the user to tune the "equalizer adjustment controller finely," and never, never "use colophon tape."

Such problems often are generated by

someone asked to translate from another language without really knowing English very well. Hence this same manual discusses the "amplifire" section, which is presumably quite "hot."

Other interesting words found in this one manual include "mechanical," "fasilitate," and the melodious "con-figulation."

A few years ago, at the NAB convention, a major overseas corporation was proudly showing off its new multiple CD player, programmable for "up 0 musical serections."

One last example, from the "can't see

the forest for the trees" school of spelling: a manual for a motion sensor inscribed "INSTPUCTION MANUAL." I think I have to pull up my spelling checker on this one . . .

Moment of silence

And finally, since everyone else has had his or her say on the effectiveness or not of the NAB sponsored 30 seconds of silence, I wanted to point out a related issue.

It seems that in a number of locations, station clocks were not exactly synchronized. Thus, the 30-second

silence did not match from station to station.

On the other hand, I recall with pride my being at the SBE luncheon when several hundred digital watches all "beeped" in unison on the hour. We engineer types got it right!

Have a good month.

■ ■ ■

Barry Mishkind, aka RW's "Eclectic Engineer," is a consultant and contract engineer in Tucson. He can be reached at 602-296-3797. Send examples of humorous instruction manual language to 2033 S. Augusta Place, Tucson, AZ 85710.



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It Pays to Review the DCO Log

by Harold Hallikainen

San Luis Obispo CA This month we'll continue to look back over the violation notices the FCC issued in 1988.

Most of the violations found by the FCC could have been detected and fixed by the station prior to an inspection, if the required designated chief operator (DCO) log review was complete.

Part 17.47(a) requires a daily tower light inspection, unless an automatic alarm that detects the failure of any lamp is installed. In many stations, a current-sensing transformer is used to remotely check the lights.

By observing the sample from this transformer, the operator must be able to detect the loss of any lamp (including the relatively low power, steady burning, side lights).

I'd suggest stations add a steady burning light (116 watts) and a light switch after the current sensing transformer, either in the transmitter building or the antenna coupling unit.

On a typical short tower, the current transformer would then sense the current going to two flashing 620 watt lamps and three steady 116 watt lamps. Your quarterly inspection of the tower light indicator would be to turn off this non-

required light and insure the operator can detect the loss of this lamp.

If the operator can detect the loss of this 116 watt lamp, she/he can detect the loss of one of the side lights, the beacon lamps, or the flasher.

INSIGHT ON RULES

If you are giving the operator an analog sample of tower light current, put a space on the log for the operator to log that reading. Put a lower and upper limit

on the reading. As part of the weekly log review, insure this reading is within tolerance.

While at the transmitter some night, turn off your test lamp (described above) and see if the operator properly discovers the improper lamp operation.

Frequencies, remote meters

Although the current Rules do not require stations to have a frequency monitor, stations are required to be on frequency. Many stations still have frequency monitors (from when they were required).

If you still have frequency monitors, I'd suggest a daily log of all carrier and sub-carrier frequencies, or deviations from what is licensed.

The DCO can then review these log entries, insuring on-frequency operation. Several AM stations have been cited for off frequency carriers.

As for remote meter calibration, remote base current ammeters must agree within 2% of the local meter (73.57(d)(2)). Part 73.1410(c) requires other remote meters to be calibrated as often as necessary to insure proper operation.

Although the Commission has not used the "tightened window" concept in enforcement, I believe it is the safest way to ensure compliance.

Determine the worst case error in a reading due to the rated or demonstrated stability of the indicating instrument and

Make sure operators log EBS tests sent and received.

the remote indicating instrument (the remote control).

Based on this possible error, determine a tightened window of authorized operation. For example, assume your antenna monitor is accurate within 0.5°, your remote control agrees within 0.5%, your licensed phase is 100° and your authorized phase deviation is 3°.

You should keep the antenna monitor indication within $\pm 2.5^\circ$ to insure the actual phase is within 3°.

The remote control might be off by up to 0.5% of 100° or another 0.5°. You should keep the remote indication within 2° of that licensed.

Most recent remote controls use an analog multiplexer driving either a dual slope or successive approximation analog to digital converter. Calibration scaling factors are held in EEPROM or battery backed RAM.

The most likely cause of inaccuracy in such systems is drift in the reference voltage circuit. You may want to connect a standard alkaline battery to one of your metering sample inputs.

We've found that the indicated battery voltage is generally within 0.1%. If you have your operators log the battery voltage at least once a day, you'll quickly discover any drift in the A/D reference circuitry, which would then cause inaccurate meter readings.

Operating parameters

It is true that the FCC removed the specified schedule of when transmitter parameters are to be logged (except DAs with non-approved sampling systems). Based on this, many stations have stopped logging readings.

(continued on page 44)

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A Pressurized Line Saves Down-Time

by Don Henderson

Pendleton OR As engineers, we all have our troubles during the winter weather. However, a recent event during the month of February really brought to mind the age-old expression, "An ounce of prevention is worth a pound of cure."

I received a call from a station which complained that the transmitter was kicking off for no apparent reason. The unit looked fine and all of the meter readings were normal.

TECH TIP

Also, none of the tally lights were on, so the technical staff would bring it back up on high power and watch it for a while. The transmitter would run for a day or two and then—"Bang!"—off it would go.

This continued for several days but they were always able to bring it up on high power and keep it there.

Finally, after doing this for a week or two it started not wanting to stay on high power when they brought it up. They were able, however, to get it to run on low power.

After inspecting the transmitter site I still couldn't get a solid handle on the problem, until I received a call one night following a drastic temperature drop.

Fighting the cold

When we arrived at the transmitter site it was four degrees below zero outside. Inside the building it was 32° and this caused the exciter to fail while we were there.

After getting new heaters in the building and warming things up to a toasty 65°, I thought we might have the problem licked.

Of course things are not always as they seem. Two days later the station called again and said the signal was so weak it couldn't be heard in their city of license!

This time I knew we had a serious problem, but what? Antenna heaters? Ice on the antenna? All kinds of questions went through my mind.

As soon as it warmed up a little, I decided to climb the tower and check the heaters as well as the antenna. On my way up the tower, we found the problem.

The answer hit me when I was on the tower and the fellow on the ground heard something strange as I moved the transmission line. You guessed it—arcing in the line!

This particular installation had not had any pressure in the transmission line for quite some time. I drilled a small hole into the outer Hyperlon jacket and found water.

I don't mean a small amount—we removed about a pint or more from the outer jacket.

We got all of the water out that we could, but the transmitter was still unable to put out enough power to cover the city.

Listening to the cable as we moved it back and forth, I found the area where

the line was arcing. I knew that we would have to cut that section out and ordered a splice kit to repair the line.

Reviving the signal

When I received the splice kit we spent most of a day getting the rig back on the air. I found a three foot section of the line had arced; this had melted the inside Teflon spacer, allowing the inner conductor to come into contact with the outer conductor.

This arc was caused by the water that had gotten into the line. Where did the water come from? Normal condensation. This line had not been pressurized for some time; air had gotten in and condensed with the heating and cooling of the line.

... it looked like we had water in the transmission line.

After getting the splice in I did some calculations and figured that transmission line was absorbing approximately 3400 watts of power!

Needless to say, this whole affair was rather expensive. Besides the lost air time, the station had the expense of the splice kit, next day air service to get it and the time that it took to find the problem and repair it.

All of this could have been avoided by following what most, if not all, of the transmission line manufacturers suggest—*pressurize the line*. Yes, simply keeping a tank of nitrogen or using a dehydrated air pump could have prevented a lot of frustration and expense.

Here we go again

A couple of days after getting the station back on the air I had a call from another station. As this one explained the symptoms to me—high VSWR, low power output, etc.—I immediately figured out what the problem was.

The folks there told me that the line had never been pressurized. Again it looked like we had water in the transmission line.

Sure enough, after taking the line apart from the isocoupler, that is what was found. I don't know what steps they have taken since that time to keep the water out. It could be that they will have had to replace a two hundred foot run of transmission line.

If you haven't checked your "pressure on the line" for a while, now is a good time to do it. Also, if you have leaks in the line due to an open bleeder valve or whatever, fix them so that the line will hold a good three pounds at all times.

There will always be a small amount of pressure that will leak out, but if you keep the pressurization system in good working order you might avoid the expense of a repair job and lost air time.

■ ■ ■
Don Henderson is president of Henderson Electronics. He can be reached at 503-278-2175.

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An Integrated Circuit Primer

Regardless of the Type, ICs are Now Standard In Today's Electronics

This is the eleventh installment in a 12-part series called An Introduction to Active Devices. Readers who have registered with Northern Virginia Community College can receive continuing education credits from the college upon successful completion of an examination at the end of this series. To register, contact the Director of Continuing Education, Annandale Campus, 8333 Little River Turnpike, Annandale, VA 22003, or call 703-323-3159. The fee for the course is \$20.

by Ed Montgomery

Part XI of XII

Annandale VA Integrated circuits have become a standard in the electronics industry today. ICs consists of small solid-state components formed together, interconnected and sealed in a container. The only access one has to these components are the pins extending out from the case.

There are four different ways integrated circuits are constructed. Often one hears the terms "monolithic thin-film," "thick-film" and "hybrid" devices without knowing what the differences are.

Monolithic ICs

Monolithic ICs are constructed in a manner similar to bipolar transistors. The active devices consist of some arrangement of PN junctions grown in a crystal to form transistors and diodes at specific locations.

Passive devices such as capacitors are added between the active components through the application of small strips of aluminum or gold metallized film.

Specific resistances are arrived at by

Figure 1.

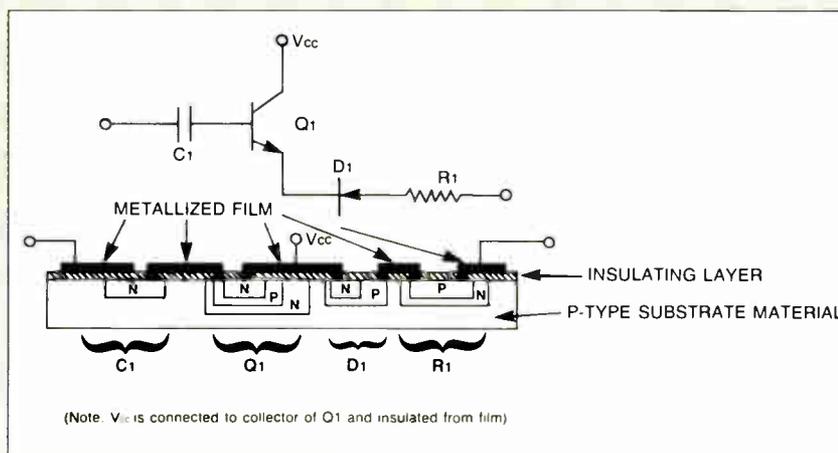


Figure 2.

Classification	Number of Components
SSI	Less than 200
MSI	200 to 1,000
LSI	Over 1,000

growing a PN junction with its dimensions controlling the magnitude of resistance. This is illustrated in Figure 1.

ICs do not have to be bipolar in construction; field effect transistor (FET) technology can also be applied. Insulated gate technology is employed, and these chips are often known as IGFETs

or MOSFETs. They can be either P or N channel devices.

MOSFETs are much smaller than bipolar chips. The FET components can be made in a much smaller area. MOSFET technology permits a much higher degree of isolation from other components. They also use less power and have

higher input impedances.

Bipolar chips do have some advantages over MOSFETs, though. Bipolar circuits are faster and can operate at higher frequencies.

The thick and thin of it

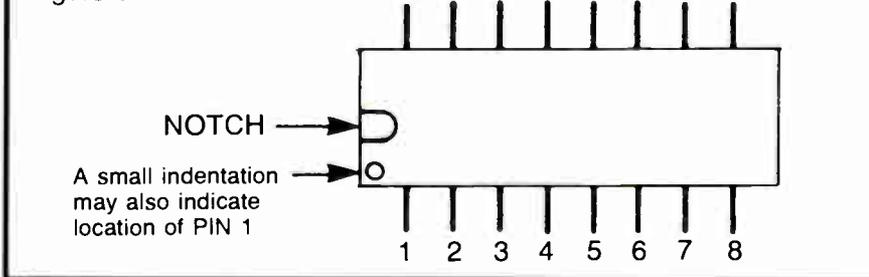
Thin-film ICs use a technology of applying a film to the surface of an insulating material. Resistors and capacitors consist of layers of metal and oxide usually less than .0001 inch thick applied to an insulating substrate material usually made of glass or ceramic material. Active devices are grown and attached to the substrate with thin wires connecting them to other components.

ICs are produced using a silk screen process. A metallized ink is applied to an insulated substrate material. Where ink is applied a chemical action takes place. When the chip is heated, the ink hardens and takes on specific resistance and capacitance values.

Active devices are formed separately and applied to the substrate. Thick films

Thin-film ICs use a technology of applying a film to the surface of an insulating material.

Figure 3.



formed during the silk screening are usually greater than .0001 inch thick. Thick film ICs are usually larger than thin-film chips. They often look more like circuits containing discrete devices.

Hybrids and classifications

Hybrid ICs are a combination of the previously described forms of chip construction. Hybrid construction permits greater flexibility and circuit complexity. Here one has the ability to include a great deal of circuitry (monolithic technology) combined with high accuracy of components and larger power output (associated with thick- and thin-film technology).

Chips are often classified as small-scale integration (SSI), medium-scale integration (MSI) and large-scale integration (LSI). A description of these classifications is illustrated in Figure 2.

ICs are often constructed in a dual in-line package, known as a DIP. Shown in Figure 3, this type of construction permits easy identification of leads and is convenient for replacement.

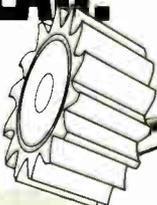
ICs are found everywhere in electronics. Modern transmitters use them throughout their systems. They consume very little power and generate little heat. Yet ICs do have limitations.

They can not handle high voltage and current. They can be damaged by power surges and lightning strikes. Once defective, they can not be repaired. Troubleshooting often comes down to replacing the entire circuit board the chip is attached to rather than just a component.

Ed Montgomery currently is an electronics teacher at Thomas A. Edison High School in Fairfax County, VA. He has taught broadcast engineering at Northern Virginia Community College and worked as a broadcast engineer for several radio stations.

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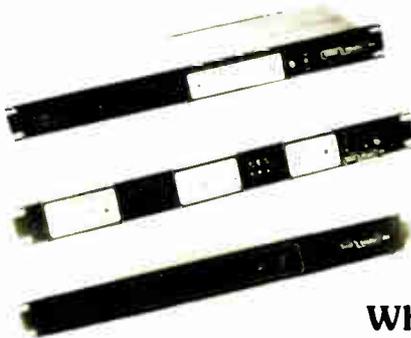


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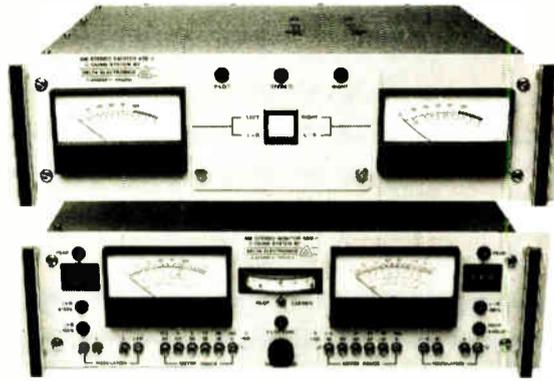
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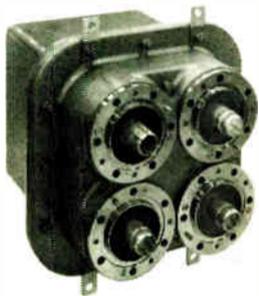
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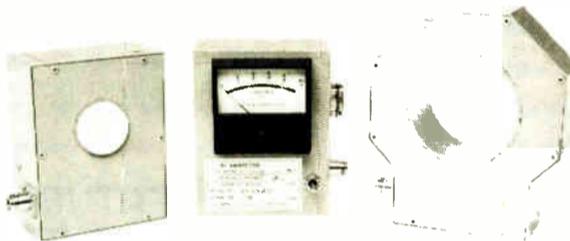
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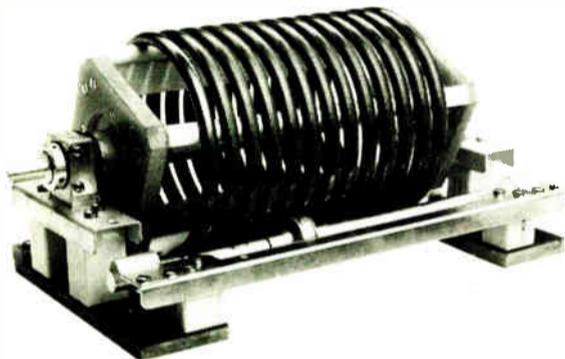
Coaxial Transfer Switches—These 1 7/8" and 3 1/8" motorized four port switches are designed to switch between antennas, transmitters, or dummy loads both quickly and efficiently. The switches can also be operated manually and are fully interlocked.



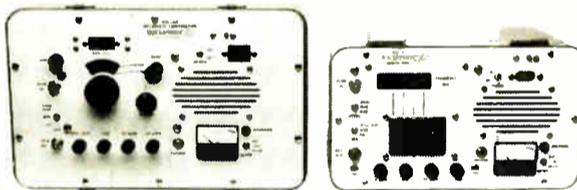
RF Ammeters and Sampling Toroids—Precision toroidal current transformers (TCTs) provide stable antenna monitor sampling while eliminating the problems associated with loops. TCTs also work well in supplying additional modulation monitor or test sample RF outputs. The transformer coupled ammeter (TCA) offers stable base or common point current readings, independent of modulation. The dual and single scale meters also provide remote DC outputs.



Low Power RF Ammeters—When every milliamp of current counts, depend on the accuracy of the TCA-Jr. This portable RF ammeter is designed to plug into either a Delta MJ-50 Meter Jack (pictured above), or a standard J-plug jack. Two current ranges are available: 0.2 to 1.0 Ampere, or 0.4 to 2.0 Amperes.



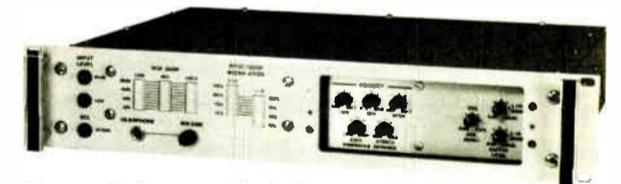
Rotary Variable Inductor—Where long life and high reliability are required, specify the RVI. Designed to provide long life, even under continuous rotation, the RVI is available in either 12 μ H or 10 μ H versions (maximum inductance). Other values by special order.



RF Receiver/Generator—A rugged, high output (2 watts) generator and correlation detector receiver virtually eliminate false nulls caused by interfering signals. The RG-3A operates from 0.5 to 1.65 MHz, and the expanded range of the RG-4 generates signals from 100 kHz to 30 MHz.



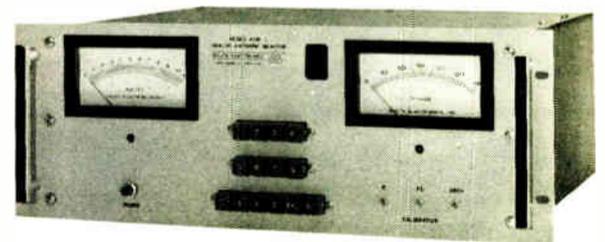
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Revitalizing a Tired Console

by Bill Higgs

Louisville KY Some things need to change on the inside, but not on the outside. Like the Volkswagen, consoles look pretty much the same on the exterior while many changes have been made on the innards.

BOTTOMLINE BROADCASTER

Slide faders are becoming a way of life, and our beloved VU meters have nowadays been replaced by blinking LEDs, but the operation of a broadcast board is still pretty much the same. An old-timer would feel right at home in front of many of today's consoles.

Last month we reminisced a bit about the classic steel cabinets, with images of

... anything that uses tubes or discrete transistors is probably due for an update.

amber pilot lights, round VU meters, and brightly glowing 12AY7s (you old old-timers will tell me all about 6V6s that didn't glow and type 30s that did).

Updating components

Let's begin this month by defining old. For our purposes, anything that uses tubes or discrete transistors is probably due for an update.

With the state of the art what it is, equipment goes over the hill sooner than it used to. The IC op-amp has revolutionized the audio console, particularly in one basic feature: the summing amplifier.

First, a bit of "noise" about noise. Noise of any sort has been a bugaboo in radio audio since de Forest first noticed shot noise in his triodes, and it comes from several sources: thermal noise (unavoidable above absolute zero), hum and

inherent device noise. Unfortunately, amplifiers can't tell the difference between noise and signal and happily boost both.

Older consoles, both tube type and solid state, had handled the noise problem in the preamp stages pretty well. Well-filtered power supplies, shielded mic cables and quality transformers helped. So did low-noise tubes and transistors. Likewise with line amplifiers.

A major noise producer, however, was

approximately five to fifteen times the fader (as in Sparta, for example); the resistors should be at least 47K. Identical resistors will yield approximately unity gain, while a higher value feedback resistor will increase gain.

There is always a tradeoff, however. Higher value resistors will increase noise, which is what we are trying to eliminate. No such thing as a free lunch.

The gain pots can be anything from 50 cent trimmers to 50 dollar steppers. I

coupling. The chips specified have very little offset (stray output voltage), so I did not find coupling capacitors necessary. Besides, I hate the miserable things.

Putting it together

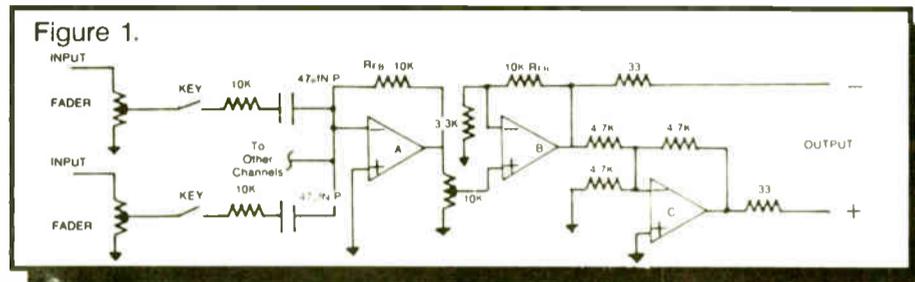
Construction, fortunately, is straightforward. Layout is not especially critical, but keep the inputs and outputs separated. I have built this circuit on etched PC boards, and also on perboard. Both seem to have worked equally well. I would recommend some copper on top the board, however, to head off any feedback problems.

Be sure to allow some cooling. One way these chips manage such excellent distortion figures is by increasing the bias currents. Translation: they run warm.

At this point, all we need to have a happy console is metering and monitoring. Next time we'll look at an audio monitor circuit and a meter isolation amplifier.

In the meantime, if you haven't done it already, put a fresh coat of paint on the console and reletter it. Put a Dorsey record on the old transcription turntable, prop your feet up, and relax. You deserve it.

Bill Higgs is on the engineering staff of WHAS-TV, was CE for WXLN/WFIA and has also done station consulting work. He has a PhD. in Theology which helps explain his patience with small market radio. He can be reached at 812-945-9414.



the summing amplifier. It generally "summed" audio currents into a low value resistor, followed by a high-gain circuit to recover resistive losses. And any resistive source followed by high gain leads to noise.

Herein is the beauty of the modern IC op-amp. The inputs to this device, inverting and non-inverting, follow one another. If one of the inputs is grounded, the other will appear as a virtual ground. We can therefore sum into what appears to be a ground node, rather than into a resistive load.

Isolation between inputs is thus greatly increased. Furthermore, and more importantly, our nasty old resistor is gone, with all its thermal noise. The gain of the stage becomes clean, and design of a summing amp becomes simple. Or almost simple.

The design stage

Consider Figure 1. This circuit was used in an automation system design of mine, as well as in several retrofits I have done. The circuit works well, and is fairly foolproof. Note that I have used 10 kilohm resistors into the circuit as well as for the feedback resistors.

The idea here is that the resistors be

confess to being fond of 10-turn pots for accuracy of adjustment.

The line amplifier is a simple differential driver. A simple design, really: one side swings toward the +15 volt rail while the other side swings an equal amount toward the -15 volt rail. The 33 ohm resistors are primarily for protection of the op amps, which will run an output of approximately +6 dBm. This allows adequate headroom for most purposes.

Beyond the summing amp, I used DC

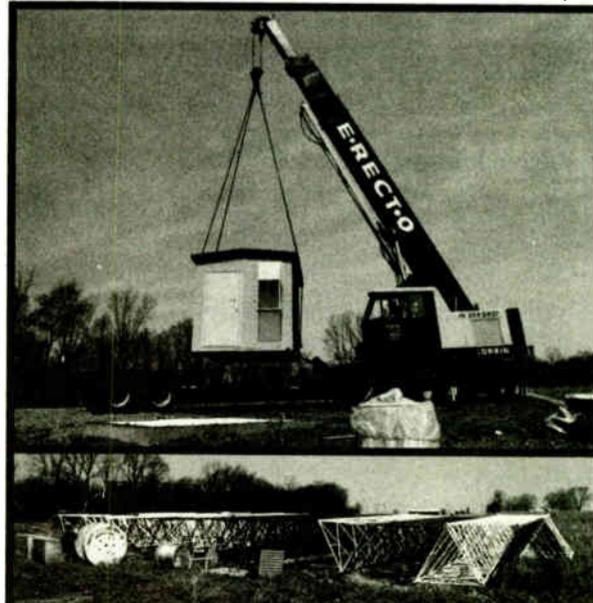
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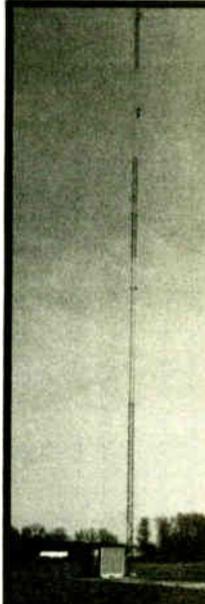
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Speakerphones May Be the Answer for Many Stations' Headaches

by John "Q" Shepler

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Telephones and radio stations have been together for a lot of years. Our audio standards were derived from phone company standards. Why, then, is it so difficult to hook the phone line to the control board and get something that sounds good?

A big hassle a lot of stations have is putting a listener's call on the air. There's poor Jo-Jo-In-The-Morning with the handset tucked under his cheek and the cord stretched across his neck. This man is seriously trying to discuss last night's game with an irate listener, while he fumbles for his next cart.

Jo-Jo's a top radio gymnast, but sooner or later, he's going to get tangled up in that cord and the stack of carts will crash to the floor. Expletives will not be deleted.

Not only is the normal phone handset difficult to use on the air, it sounds crummy. If you use a telephone company coupler to grab the audio, you get whatever is on the line. The caller's au-

dio is attenuated by miles of wire, so you pot up 10 or 20 dB.

Every call has a different level. Worse, what you say in the mouthpiece has a hot level. You pot down, way down, to un-pin the board meter. Your voice sounds muffled, not anywhere close to studio quality.

Q-TIPS

The next thought is to tap the audio off the earpiece, not the phone line. This makes your voice sound even crummier but helps equalize the levels. Still no good.

The early years

In the old days, you either lived with this situation or got sneaky. Old Ma Bell guarded her lines and equipment like they were on loan from Fort Knox. Woe unto the station engineer caught hooking a home brew hybrid gizmo on the line or even popping the cover off a phone. Since deregulation, lots of companies are in the phone business, and some make equipment just for broadcasters.

Before deregulation, there was one way to get decent phone audio on the air. You rented a Bell Speakerphone.

This was a two-piece setup with the microphone in the main phone body and a separate speaker. Executives loved these for hands-free operation, so they were easy to come by.

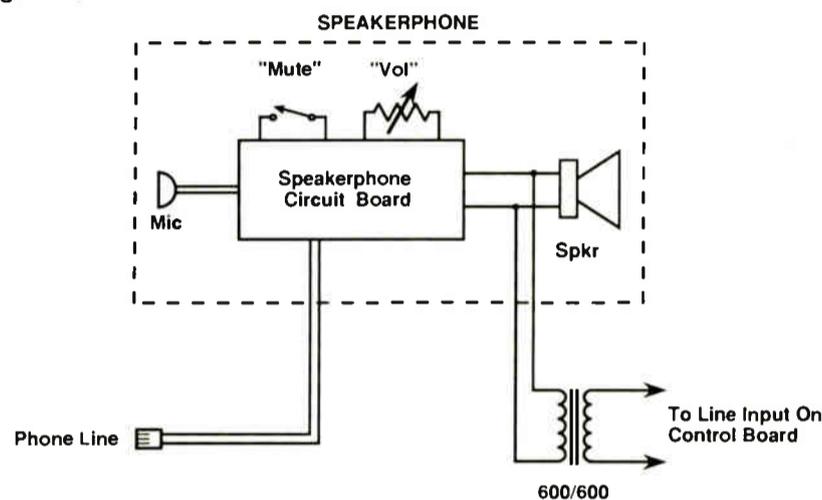
To do a talk show with the Speakerphone, you talked into the studio mics as usual. A call would come in and everybody in the studio would listen to the phone speaker and respond through their microphone. The caller would hear the studio announcer and guests through the phone mic. It would sound

a mic in front of the speaker, connect a cheap 600/600 ohm transformer across the speaker. This will provide a line level to the board. Set the phone next to the board or on top of it so the caller can hear you.

Now, you can talk to the caller hands-free off the air. When you go on the air, don't touch the phone. Simply turn on your mic and pot up the phone audio.

For recording callers without going on the air, switch your mic and the phone

Figure 1.



a little hollow at the caller's end, but OK on the air.

How did the phone get on the air? Easy. Just supply another microphone pointed at the phone's speaker.

I still think this is the slickest setup for most stations. You can buy a speakerphone for \$50 to \$100 just about anywhere. If you own your own business phone system, you may have to get the instrument from the company that made the system.

Figure 1 shows the hookup. Instead of

to the audition channel. You'll get studio quality.

Another option is to bridge the studio mic preamp and feed live mic into one channel of a recorder and feed the phone to both the board and the other channel of the recorder. Just turn down the monitors before you start recording.

Some speakerphones have a MUTE button that comes in handy. When you put a ball game or market report on the

(continued on page 48)

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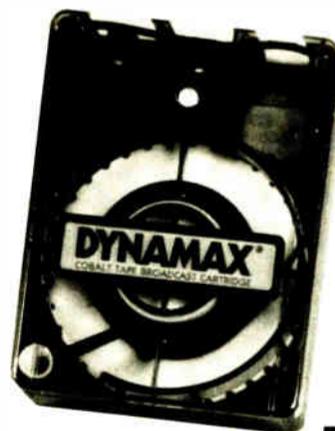
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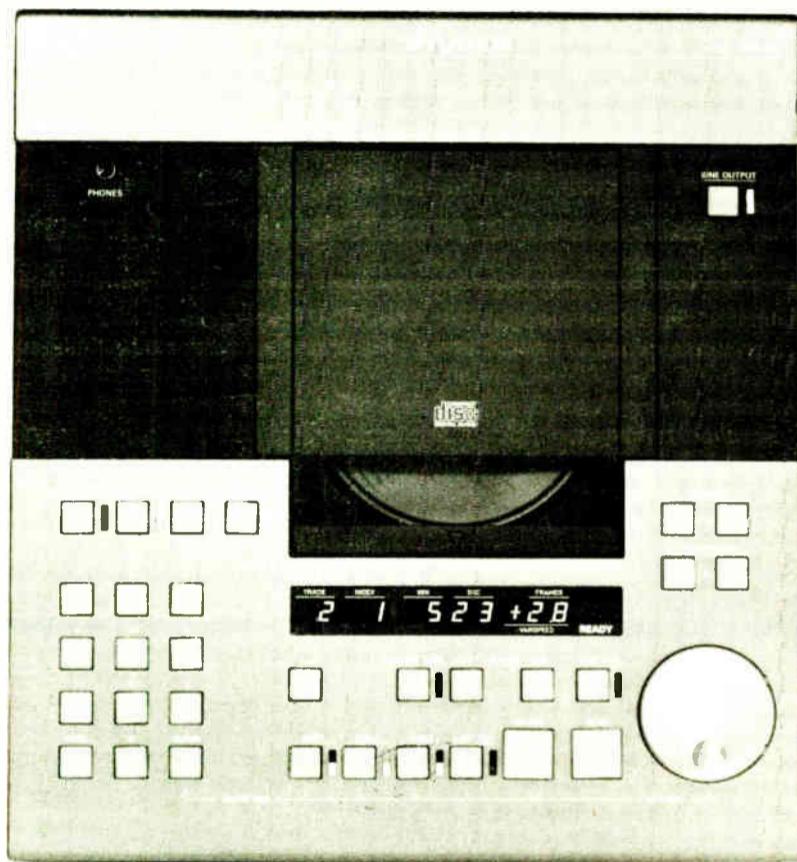
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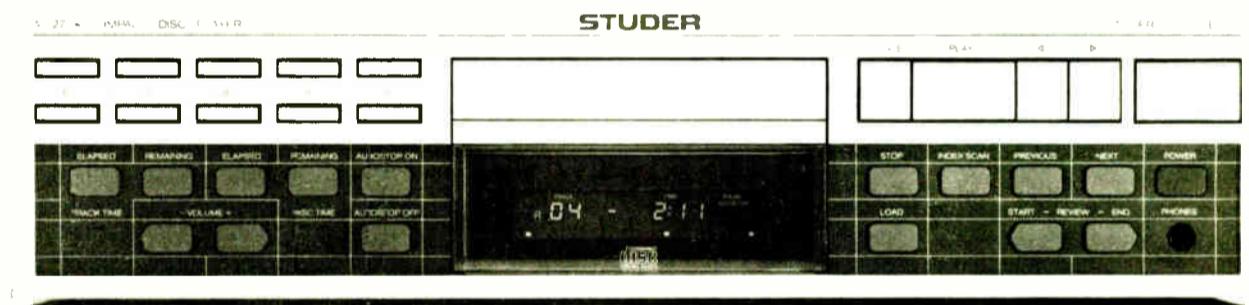


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Wisconsin Willey & Rex of the Rockies

by George Riggins

Long Beach CA Department of Incidental Corrections and Miscellaneous Information. It seems as though old age and senility have taken their toll. A call from St. Louis corrected my comments regarding the MITS computer and Southwest Technical Products. Seems that two different companies are involved.



The caller is a collector of the MITS systems and has several working models. More on these companies and products as the information becomes available.

Wind power

As for WIBU, Poynette, WI, there is agreement that the call stood for "Wind Is Being Used." Fred Baumgartner, a sometime contributor to *Radio World*, was not the first to call with the data on WIBU, but Fred says that he worked at WIBA in Madison, WI for several years and has a lot of history of the area filed away in his head. He just has to get the

needle dropped in the correct groove to play back the facts.

As stated by Fred, "WIBU was one of many stations put on the air in Wisconsin by Willey Forest, a Wisconsin radio pioneer and a class A tinkerer."

The station has had a rather spotty history, but is running on all cylinders again. According to Fred, WIBU recently has been just ahead of total darkness because of the way the former owners programmed the station.

New owners recently changed the format to "All Polka" and the station was in the black in just a few months. Fred also sent along a copy of the newspaper article from *The Capitol Times* in Madison, WI. Dated Thursday, 2 April, 1925, the paper gave an account of the new station and what was taking place.

Roland Bushland, owner and manager of WCFW, Chippewa Falls, WI, sent a clipping regarding WIBU that appeared in the Columbia County Senior Citizen Newspaper, Vol. 2, No. 2 (no date given).

To quote H. Paul O'Brien, "High atop Radio Hill in Poynette, Wisconsin, it's polka time on The Polka Station, 1240 WIBU . . . It's just another polka like any other polka, but—oh!—what a girl in my arms . . ."

According to Lee Harris, 31, co-owner of WIBU, the station is one of the 10 oldest stations in Wisconsin. WIBU was one of only two stations in south central

58 YEARS AGO

SIX STATIONS CLEARED OVER CLINIC TALKS

Washington. The Federal Radio Commission made the following announcement:

Complaint was received concerning the methods and operation of the Hudson Clinic which broadcast over a number of stations in and around New York. The complainant is apparently a disgruntled patient of the clinic who resents both the manner in which he was treated and the amount demanded for treatment.

An investigation has been completed of the programs broadcast by this clinic, which is located in New Jersey and which treats varicose veins by injection methods. The stations over which these broadcasts were carried were: WAAT, Jersey City, N. J.; WBBC, Brooklyn; WAAM, Newark; WCDA, New York; DKBO, Jersey City; WOV, New York, and WRNY, New York. Sworn statements have been made on behalf of the Hudson clinic over these stations.

Hypothetical Questions Answered

Questions and answers by the Hudson Clinic were carried over some of the stations named. However, personal representatives of the clinic stated that these

questions and answers were purely hypothetical and that no diagnoses were made or attempted at any time over the air.

Two representatives of the Commission were directed to proceed to New York on July 18 with the Commission's portable recording apparatus and to report programs of the Hudson Clinic. About 10 of these programs were recorded, all of which were similar in character to the transcripts submitted by the stations under oath.

While the Hudson Clinic is being severely criticized by the medical profession, the broadcasts seem to contain nothing upon which criticism might be based.

Case of Medical Ethics

All of the persons administering treatments are duly licensed physicians under the law of New Jersey, where the clinic is located. It appears that it is a case concerning ethics of the medical profession, and it is not a matter upon which the Commission may take action. It is therefore recommended that no action be taken regarding the programs by the Hudson Clinic over the stations named above and that the matter be closed.

Reprinted from *Radio World*, October 1931.

Editor's note: The **RW** of today and the **RW** of old, printed for a period of time in the 1920s and 1930s fortuitously share the same name.

Wisconsin until after World War II.

The station was originally programmed from the home of William Forest, which was across the street from the transmitter. The studios have been located—variously—in Madison, Portage (above the Downtown First National Bank), Baraboo, and Beaver Dam (above I.K. Mayr).

The other station in the area, WIBA, reportedly was put together by the same Willey Forest.

Helen Poindexter, widow of Ray Poindexter, a well-known broadcaster of the mid-south, sold the last copy of *Golden Throats and Silver Tongues* to me. She reports that she has about 100 copies of Ray's first book, *Arkansas Airwaves*. If anyone is interested, let me know and your request will be forwarded to Helen.

Trailblazer of the Rockies

One of the true pioneers of radio in the Rocky Mountain region had to be Rex Howell. *Colorado West*, the Sunday magazine of *The Daily Sentinel*, published Sunday, 23 May, 1976, did a feature article on Rex who was celebrating his 50th year in broadcasting.

The color picture on the front page shows Rex adjusting a Collins "box" (probably the FM exciter), a Sta-Level (at least that is what it looks like), a Heath audio oscillator, a patch bay, what ap-

pears to be a frequency counter and a Belar mod monitor. All the proper paper is hanging over the two racks of equipment with the emergency flash light on a magnetic holder ready—we hope—for use.

The first station owned by Rex Howell was KFXJ, Edgewater, CO. The station got its start when Rex purchased the equipment from the estate of Elden Horn, who was electrocuted while installing a station for the University of Wyoming at Laramie.

The equipment was licensed for portable use under the call letters KFXJ and was specifically prohibited from operating in any city where there was an existing station. A simple solution was to set up two blocks out of Denver in Edgewater and go on the air. Official opening night was 1 May 1926, with 15 watts of power.

According to Official Bulletin #2 from the Federal Radio Commission dated Monday, 18 April 1927, KFXJ—along with about 120 other stations—was issued a temporary permit to continue broadcasting from 2938 Benton St. Edgewater, CO at the same 15 watts on a frequency of 1390 kilocycles, wavelength of 215.7 meters.

Rex moved the station to Grand Junction in 1930, and although there were

(continued on next page)

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Stalking the AM Stereo Car Radio

by George Riggins

Want an automotive receiver that will decode AM stereo? Radio Shack has one—catalog number 12-1933. The problem is it will not fit the DIN dash configuration of most cars being sold today.

Radio Shack does not have a DIN conversion package, but J.C. Whitney of Chicago does. Catalog numbers for the conversion package are 55BA4088n for Chrysler, Ford and GM; 55BA36848 for most European and Japanese models; and 78BA4280AF for makes and models not specifically listed (These numbers

were taken from page 24, catalog number 504A, of J.C. Whitney & Co., Chicago, IL.)

In trying to replace an AM stereo receiver stolen a couple of months ago, I found that no one at the retail level is interested in knowing about AM stereo. In fact, one Radio Shack manager made the comment, "Who wants to listen to KFVB, an all-news station, in stereo?"

The man was serious and did not know that in the Los Angeles area there are many stations in stereo. He did not seem to be interested enough to want to know what is happening to the AM band.

When this episode was related to Richard Rudman, director of engineering at KFVB, I listened to about five minutes of good laughter. As Dick put it, "We are only broadcasting a synthesized stereo signal."

To finish the story, I have not been able to install a new AM stereo/FM stereo receiver because I cannot find one to fit a DIN configuration. The Radio Shack unit will fit from behind the dash, but will not slip in from the front.

Radio Shack has no DIN kits! In fact, none of the manager trainees knew what a DIN installation kit was!

As a thought, the NAB powers-that-be should put together a promotion kit

and purchase 100,000 sets for stations in major markets to use for local promotion.

Probably a good start would be a receiver for the home or garage work bench. An AC/DC receiver would be less expensive than a decent automobile unit.

Get something out there! Let the masses find that a stereo signal on the AM band does have something to offer.

The reaction I get when stereo on the AM band is mentioned to friends and neighbors is, "so what." If AM stereo is to succeed, a better promotion job will have to be accomplished by all concerned.

Call Signs

(continued from previous page)

thin financial times ahead, managed to keep going. As time progressed, the AM power was raised to the present 50 kW day (10 kW night) and FM and TV stations were added.

The KFXJ call was transferred to Montrose, CO and another station, with a call sign of KREX, was moved to Grand Junction to identify more closely with Rex Howell. As the station group grew, the KFXJ call was dropped. It was decided to go with the call signs of KREX at Grand Junction, KREY at Montrose and KREZ at Durango. The stations were called the XYZ network.

WIBU was one of only two stations in south central Wisconsin until after World War II.

As a result, the stations' corporate names were changed from Western Slope Broadcasting Co., Black Canyon Broadcasting, and Mesa Verde Broadcasting Co. to a new name of XYZ Television, Inc.

More recent history of the station group shows that the KREX ownership was split in 1984 and the radio calls changed to KIIO-AM and KVEE-FM. After a couple of ownership changes, the present call signs of KVEE and KVEE-FM were put in place in 1987.

According to the Sentinel, Rex Howell was granted his first amateur license at age 13. He held the calls of W0RX, K0RX and N0SMY. The newspaper account did not specify which call Rex chose to keep in later years, but any amateur would probably be correct on his first guess. Rex Howell became a silent key in 1979.

I do not know who to thank for the report on Rex Howell, but thanks.

A radio Who's Who

Lately, I've received several very interesting documents. One such is a package from Detroit, including the complete Report of the Committee in the matter of The Crosley Radio Corporation (WLW), Cincinnati, Ohio.

Reading the entire list of stations in the
(continued on page 48)



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Reporter: Denise O'Brien.
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A DCO Log Review

(continued from page 34)

If, however, you stick to the "old rules" and log readings every three hours or so, and immediately after a mode change, the DCO will have something to review on a weekly basis that demonstrates compliance with many of the terms of the license.

The DCO log review should include limit checks on all logged parameters, which should include those necessary to determine power by the direct and indirect method, DA parameters, and the suggested daily readings.

Many stations were cited for operating

outside the authorized power window. Most were operating under power (anywhere from 1% to 89%). Other stations were cited for operating at 108% to 140% of licensed power.

You may want to use the "tightened window" limits for your log review. Of course, limit charts and instructions should be posted for other operators.

Ensure the logged power/pattern change times are correct. One station was cited for changing to night pattern 15 minutes late. Another was fined \$2000 for operating ND during DA hours,

operating at 140% power and causing harmful interference to another station.

EBS

Probably the most frequently violated rules (and those that got a fine almost every time) regard EBS. Operators are required to log EBS tests received and sent.

The station is required to have a test transmission logged (once a week on a random basis between 8:30 AM and local sunset) and an over-the-air test reception logged each week, or include an explanation as to why.

The explanation would normally tell what you are doing to insure it does not happen again (repairing EBS generator/receiver/decoder, etc.).

Failure to log EBS test reception will

get you a \$300 fine. At sign-on (or midnight, if 24 hours) have the operator check the EBS receiver to insure it's receiving the proper station and that EBS is not activated [73.931(d)].

Have the operator log the results of this test. Make sure operators log EBS tests sent and received. As part of your weekly DCO log review, make sure all these EBS items are logged.

We'll continue this look at FCC violations next month. I really appreciate all the calls I receive to discuss these articles. I'll look forward to hearing from you.

♦ ♦ ♦

Harold Hallikainen is president of Hallikainen & Friends, a broadcast equipment design, manufacture, sales and installation firm. He can be reached at 805-541-0200.

Synthesizer Recording

(continued from page 28)

only works if your keyboard is velocity sensitive.

After you've adjusted the volume of each track in this way, hit the play key on your computer keyboard to play the sequence. The desired mix of patches will play on your synth.

If your synth has several individual outputs—one for each patch—connect them to a mixer and set up a stereo mix with panning and effects.

Recording the mix

If your synth has a single output (mono or stereo), use your 2-track recorder to record the mix from that output.

Plug your synthesizer's audio output (mono or stereo) into the line inputs of your 2-track recorder. Or, if your synth has several individual outputs connected to a mixer, record off the mixer stereo outputs.

Hit the play key on your computer keyboard, and set the recording level for your recorder as follows:

- Cassette: 0 maximum
- Open-reel: +3 VU maximum
- DAT: -3 dB maximum.

♦ ♦ ♦

Bruce Bartlett is a microphone project engineer and technical writer with Crown International. He can be reached at 219-294-8000.



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Will DAT Survive?

(continued from page 29)

spring of next year, some six to nine months away. This delay could very well mean that consumers once again look for other devices to round out their stereo systems.

Bad news, maybe, for the consumer electronics industry, but what of the impact on the broadcast community? These days we are being offered a spectrum of studio and portable DAT decks, ranging from lightly warmed-over consumer decks with hard knocks reliability to match, through well-engineered professional machines, on up to full-function, time code-capable recorders. You pay your money and you take your choice.

Price of progress

But we all know that the major manufacturers of CD and DAT hardware amortize a great deal of their R&D costs over both the consumer and professional markets.

For the broadcasters to be able to purchase cost-effective hardware that will be supported and upgraded for the foreseeable future, a manufacturer needs to look for a wider marketplace than the (relatively) modest number of recording and production studios, TV/radio stations and video post facilities that make up the majority of potential Pro-DAT users.

True, professional decks need to be offered with more sophisticated features than those for the consumer market. But there's no denying that innovating for a million potential users makes a great deal more sense than developing specialist products for just several thousand.

And yes, I've heard all of the arguments. The professional market is, to a certain extent, self-supporting and will (and has already) innovate specialist

products for its own use. It's been my experience, however, that rare indeed are products from Japan that truly break new ground without a diverse and expanding user base.

Proceed with caution

So what's the prognosis? To go DAT or not to go DAT; that might be the question of the moment. My advice would be to proceed carefully. Check with the major suppliers and their distributors to see if you can secure a commitment from them about new hardware that does what you need it to do.

You should look for features such as full remote-control functions; correctly implemented digital interfaces with transfer of Start IDs and timing information, in addition to digitized audio at 44.1/48 kHz; full dealer/distributor support and information about head life and tape reliability; time code capabilities with dedicated editing controllers (even if you never plan to synchronize digital audio to picture, accurate assembly and insert editing for DAT requires a dedicated time code track); and so on.

DAT holds a great deal of promise for broadcasters as a portable, cost-effective, high-quality recording and playback medium. But we will soon outgrow the initial fascination with its features and functions. For DAT to be accepted by the broadcast community it needs active and continuing support from the manufacturers.

♦ ♦ ♦

Mel Lambert has been intimately involved with the production and broadcast industries on both sides of the Atlantic for the past decade, and is currently president of Media & Marketing, a consulting service for the professional audio industry. He can be reached at 818-753-9510.

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KMOD Spoofs MTV's "Remote Control"

by Dee McVicker

Tulsa OK KMOD FM's CE Steve Davis doesn't know what has come over the station lately. One week it's a Smokehouse Blues remote and the next, a TV game show. So much for the proverbial pocket protector and the reputed bench job.

OFFBEAT RADIO

A few weeks ago Davis did a remote from Disney World, a two-state hop from the station's studios in Tulsa, Oklahoma. And prior to that, it was the station's infamous TV game show—a take-off on MTV's spoof of early TV quiz shows. Davis has done the TV gig twice and it's likely he will do it again next year.

A radio TV quiz show?

Lampooning MTV's *Remote Control* game show was the station manager's idea. It was first staged at the station's annual Rainbow Expo, a fair-type extravaganza. KMOD's version of the wayward MTV music and TV trivia show was, according to Davis, "a measure of silliness" that they didn't actually broadcast.

It was intended as a promotion to give KMOD listeners a chance to get up on stage and win prizes. No one suspected that they would stage the event again—especially for MTV, which was looking for a worthy Tulsa contestant.

But, they did. And Davis was behind the sound board once again, screaming into the mic and concocting an ambience of chaos. The local Brady Theatre was the stage for the event this time, and a representative from MTV flew in for the occasion.

Word of KMOD's promotion had evidently reached MTV through a sponsor of the Rainbow Expo affair, and MTV was there to audition a likely contestant for the real show.

Meanwhile, contestants sat in overstuffed chairs facing a large, make-believe TV screen. They had been selected from the audience, and many of them had their feet propped up on foot massagers that looked remarkably like bowling pins.

Every once in awhile a contestant would throw a nervous glance at one of the props. Usually it was the hospital gurney with IV stand—the coveted "hot



Discussing last minute details before the show.

seat," where finalists were strapped in and purportedly hooked up to an IV for the final round.

Behind the scenes

The TV screen, actually a rear projection screen, had a border of lights that signified channels, or categories of questions. "When a contestant called a channel, we'd blink the channel light on and off. Plus, when they were waiting to pick (a channel), we'd make the lights cycle



The gang's all here: (from left) KMOD's Brent Douglass, Bill Paddock, winner Kimmie Ray, MTV rep Richard Conner and KMOD's Phil Stone on the set.

around and flash," said Davis. Some of the more popular channels were "Gilligan's Island" and "Tulsa TV."

Each contestant had a dummy remote control device that worked on the "manual overdrive" principle; meaning, the contestant would shout out the channel (or category) of choice and Davis and Remote Engineer Byran Sparks would scramble for the right slide projection with its carted audio effect.

Since Davis had to find his way through a good many carts and Sparks was equally preoccupied with a slide projector that held only two slides at a time, synchronizing the two was quite a feat.

Once this was managed, the screen would miraculously show a caricature interpretation of the selected channel—thanks to salesman Brad Popejoy, the station's closet cartoonist. At the same time a theme song, or a facsimile of one, would introduce the next question.

By now, the contestants would be getting itchy fingers. The first one to push his or her buzzer would get a turn at answering the question. The DJ (or MC, as MTV calls them) played on this mount-

ing excitement with typical DJ-style antics as he strolled the stage with a wireless mic.

Everything, including the buzzer, was miked to the PA system, so there was no chance of missing out on any of the ear-splitting fun.

Hidden talents revealed

Some of the categories featured the KMOD crew in rare form. DJ Paul Welch made a great Whistler's Brother, evidently a family member in the Whistler's Mother entourage, who would whistle a tune that contestants would have to guess.

News Director Janine Burns, a very good singer in other settings, belted out segments of songs—notably off-key—for which contestants had to supply the next line. Sonya Brown, the station's sales secretary, did an equally off-the-wall pantomime of impressions in the bad impressions category. Even the dentist of one of the engineers threw in a keyboard number every now and then to set the mood.

When contestants thought they had

(continued on page 52)

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Studio Phone Solution

(continued from page 40)

air, you can push the mute button and no sound will be picked up by the phone. You can then make as much noise as you want in the studio without cutting off the caller.

The down side

As you can tell, I'm hot on speakerphones. There is one situation where they don't work well, though. That is when the

caller has to be able to talk and listen at the same time.

Here's an example. A station has an on-air contest. The caller gets 15 seconds to answer a question. During this 15 second torture period, the caller hears a clock ticking over the phone, with a buzzer at the end. Sorry—contest over.

You can't do that with a speakerphone because only one party can talk on the phone line

at a time. The speakerphone has a VOX circuit inside that switches between you and the caller.

That's not a big problem in most conversations because only one party talks at a time. However, if you start talking or make other noises in the studio, the caller is cut off.

If you want to play a cart down the phone line while the caller is talking, or if you want

your talk show host and callers to be able to scream at each other simultaneously, you need something called a hybrid.

A hybrid transformer or circuit converts the separate talk and listen channels into a two-way signal on the phone line. It's also called 4 wire/2 wire conversion. Your normal phone has this circuit inside, but as you know, the audio picked off the line isn't fit for broadcast.

A number of companies: Gentner, Telos and Symetrix, to name the best-known, are now making broadcast quality hybrid phone interfaces. If you

need this sophistication and can afford it, that's your best solution.

However, if you still want to run that contest with a cheapo speakerphone, here's a thought. Tell your caller to turn on the radio, but just loud enough to hear, or put a headphone on one ear. That way, you can have a two-way system without getting feedback on the air.

■ ■ ■

John Shepler is an engineering manager, broadcast consultant, writer and regular RW columnist. He can be reached at 815-654-0145.

Radio's Pioneers

(continued from page 43)

Official Bulletin of the FRC, dated 18 April 1927, is most fascinating. The list of stations is a veritable Who's Who of the early broadcasters. As listed, there are several cities that were operating stations. Several of the early calls have been transferred to other cities, and some have gone never to be used again.

Among the other documents received was a copy of *The Proceedings and Recommendations for Regulation of Radio*. The conference from which the proceedings were taken was the Fourth National Radio Conference. It was chaired by then Secretary of Commerce, Herbert Hoover.

The Conference ran from 9-11 November 1925. Among the nine committees was one on interference! From all indications, we were plagued by that nasty bug even in that early period of radio history.

Ever wonder what the suggested costs of stations were in 1931? *Electronics* magazine did a breakdown of several power ranges as to capital costs and maintenance. Projected costs, including operating expenses for the first year, were estimated to be approximately \$109,300 for a 1 kW station and \$634,150 for a 50 kW station.

As written, the figures were to be regarded as minimum costs, and did not include such things as the foundations for the buildings and towers. Not excluded, but with cautions, were the possible costs of land depending on the local land values and the amount of property required for the transmitter site. The author cautioned that costs could be increase by as much as 100 percent.

More reminiscing next month.

■ ■ ■

George Riggins has experience in radio and electronics dating back to the 1930s. He is also a licensed ham operator and has had his own broadcast sales and service company, Riggins Electronic Sales, for over 20 years. He can be reached at 213-598-7007.

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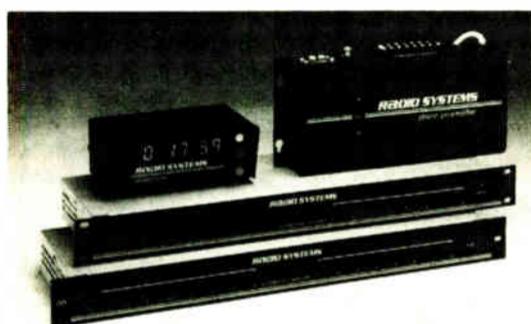
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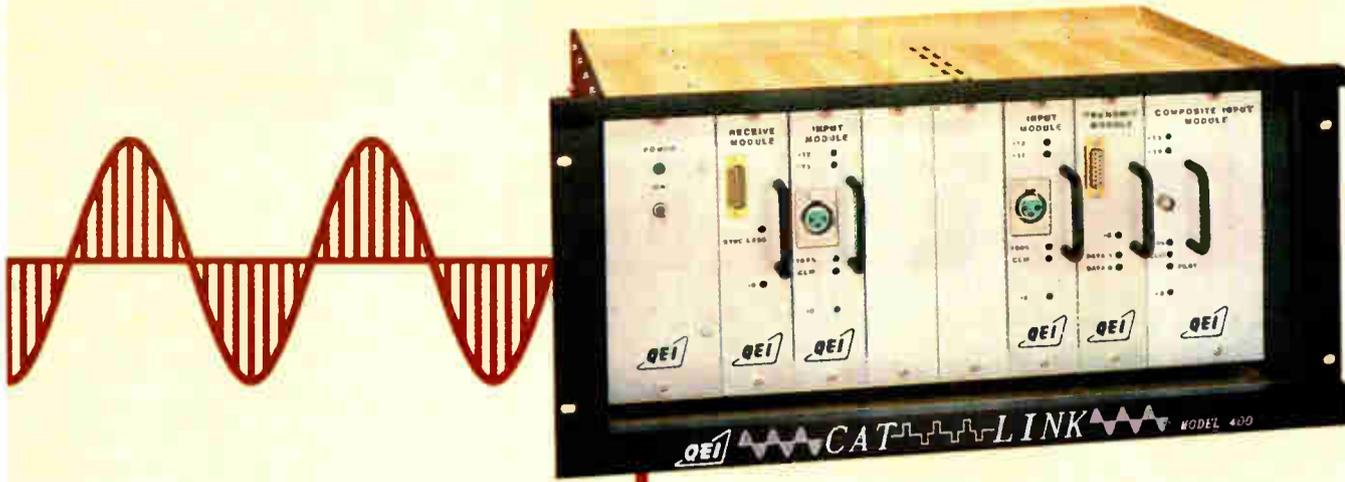


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- Multiple Signal Path Options

It's time for a new kind of STL. Drastic cost increases are just one sign that the phone company is tired of balanced equalized lines and is ready to pull the Class A plug. Meanwhile, microwave spectrum is scarce—in some areas, channels are unavailable.

QEI's new CATLink Composite Audio Transmission Link is the *digital* STL alternative. It transmits composite and other signals over a single telco T1 data line*. T1 service costs less than Class A, and it's so reliable that the big banks use it for their vital financial data.

CATLink encodes the fully processed *composite* signal and decodes it at your transmitter, so you can run the stereo generator and processing at the studio. At the same time, CATLink configurations can send and receive SCAs, control channels, voice communications, RS232 data, AM audio, transmitter readings, and satellite or remote programs.

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Worried about replacing Class A lines, getting a microwave channel, or sight-line infringement? Call QEI toll-free at 800-334-9154 for full info on CATLink, the bidirectional, digital, *easy-wired* STL. And turn the weak link in your signal chain into one of the strongest.

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Computerizing Radio News

by Phillip O. Keirstead

Tallahassee FL After stabilizing in 1988, the newsroom computer business has again heated up, with at least six new firms offering products to radio stations.

The major theme of this new batch of vendors is wire capture. Their software will take in your wire service feed on your computer, while the computer is actually being used for something else.

To some extent, this entrepreneurial outburst complicates shopping for a newsroom computer system, and obscures the fact that after years of research and marketing effort, there are a variety of proven products on the market.

The entrance of new vendors has its pluses and minuses. On the plus side, more competition can mean better software at lower prices. On the flip side, some among the half-dozen firms have not done their marketing homework and do not appear to have products suitable for immediate use in radio newsrooms.

The competition

Of the new entrants, the first systems were designed to run on Apple Macintosh computers. Newsroom software vendors have shied away from the Macs, because they are better graphics machines than word processors. However, they are extremely popular with some sectors of the business and personal computer market.

Sandra Scheld of Hoffman Estates, IL, has created software for the Mac. She calls her package WireWrite. Scheld has credentials in radio and broadcast news.

WireWrite provides simultaneous wire capture and editing on one Macintosh. You can also network the Macs so several workstations have access to the wire copy. Scheld provides the news copy retrieval software and you provide your favorite word processing package.

WireWrite also provides some archiving capabilities. The quoted prices are \$1295 for commercial stations and \$995

for non-commercial/non-profit organizations.

Porter Communications and Publishing Systems in Merrimack, NH offers a system called PADCOM. The software is designed to run on IBM compatibles, although it can be imported to Apple systems through networking. Owner Gary Porter, like most of the new broadcast newsroom computer vendors, has a background in newspaper computer systems.

I saw a demonstration of the Porter software in Merrimack earlier this year. It was not set up for ease of use. A published list of users shows one radio station and an impressive collection of newspapers, but Porter told us there were no radio users. Frankly, this one

On the plus side, more competition can mean better software at lower prices.

needs a lot of refinement.

Information Engineering Associates in Bedford, MA has acquired rights to broadcast software developed by Wayne Perrick, who was demonstrating his system to broadcasters late last year.

The company is populated with Atex veterans who consult on newspaper computer system problems. They sell PC-based software for newspapers and seem to know that field. In conversations, they have appeared naive about broadcasting and certainly do not seem to have developed a marketing strategy. The capability seems to be there, but is the software?

New releases

I was tipped that a firm called Computer Engineering Associates in Baltimore planned to enter the newsroom computer market. They steadfastly refused to respond to calls, so we'll just

have to see whether this one is vaporware, a bad tip, or a reticent firm.

The Associated Press introduced a PC-based software package at the NAB convention in April, planning to release it to the market in August. Deputy Director Lee Perryman is riding herd on the project, called AP NEWSDESK.

The software runs on IBM compatible PCs. It captures the AP wire, and allows you to review, edit and print the stories that interest you. It features easy pop-up and pull-down menus. While AP is running in the background, you can be tooling around with WordPerfect, Lotus 1-2-3, or some other software. AP provides a cable to connect the AP satellite dish to a serial port on your computer.

The AP system demonstrated well at the NAB, and it is supported by good instructions and documentation. One advantage to the user would be AP's extensive service network. For AP, it would mean getting rid of responsibility for pesky printers. No price information has been released.

The last of the direct entrants into the

radio newsroom computer field is PC Newswire Manager, from Bavren Computer Associates (Richard Boblenz) in Marlton, NJ. I talked with Boblenz, whose product has been quietly on the market for over two years.

Boblenz is a veteran of Delta Data, a newspaper computer firm which dabbled in broadcast computers. He has installations running at WUSL-FM, WEGX-FM, and WFLN-FM in Philadelphia, and is installing a system at WHWH in Princeton, NJ.

One feature I noted of the system was a one-key switch between the word processor and the wire capture feature. The system also provides automatic archiving.

Prices run about \$1000 per workstation plus \$600 per newswire received. Check this one out.

Another new firm is NewsMaker Systems of Moorpark, CA. The company's product is currently being sold to TV stations, although it can be used for radio.

I saw the system at the NAB this year.

(continued on page 52)

Newsroom Computer Vendors at a Glance

Information Engineering

3 Preston Court Bedford, MA 01730
617-275-3870

Michael V. McKenna, President
Charles Fizer, VP Sales

Bavran Computer Associates

12 Marni Court Marlton, NJ 08053
609-983-2960

Richard L. Boblenz, President

5th Estate Software

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Hoffman Estates, IL 60195
312-354-9577

Sandra Scheld, President

Porter Communications & Publishing Systems

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Merrimack, NH 03054

603-424-4161

Gary Porter, President

Computer Engineering Associates

Baltimore, MD

301-247-5244

Paul Keys, President

The Associated Press

Broadcast Services

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Washington, DC 20006-1253

202-955-7223

Lee Perryman, Deputy Director

NewsMaker Systems

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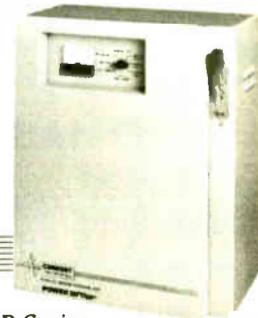
A television signal going to millions of homes can be a very complicated process. In Dallas, WFAA-TV has been THE dominant force for decades. This success is due, in large part, to the technical expertise BEHIND the camera.

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The Changing Face of Radio

by Dave Hebert

Pasco WA The changing face of broadcasting in the 1980s has given way to new attitudes, needs and methods of problem solving. Ground rules that were taken for granted just a few short years ago are rapidly changing to make way for an industry which, itself, is taking a journey that few among us could forecast.

Witness the advent of satellite delivered programming. This single factor has shifted attention from the local broadcaster providing (and determining) the unique programming required by his

In the classic sense, the contract person conducts affairs as a business. He or she may be involved in a solo service, or may employ others.

This business can acquire equipment, clients, and services much as any other business. The business has responsibilities to pay for whatever assets it has, as

results for whatever financial commitment he incurs in his operation. The technical person, on the other hand, must have an impetus to become efficient and cost effective for the client while making a living.

The concept of "productive time" seems to satisfy these considerations. As

It would appear this factor is part of the evolutionary process that technical deregulation has taken.

Mutual understanding of the needs of all concerned is a vital tool in working through this dilemma.

While the industry is "streamlining" itself to meet changing demands, we should continue to conduct business with the most progressive theme we can.

...

Dave Hebert is president of Dave Hebert & Associates. He is an occasional contributor to RW and can be reached at 509-545-9672.

... it is reasonable to use the concept of "productive time" in determining charges for a particular task.

CONTRACT ENGINEER

community to a syndicator whose specialty is a service professionally delivered and generic in nature.

Ultimately, the industry as a whole is seen as less of a career opportunity by those who once could have seen it as a rewarding way of life. This trend, for whatever reason, has translated into other changing aspects of broadcast life.

Broadcasters lobbied the FCC during the 1970s to relax what were seen as antiquated, counterproductive technical requirements. We are light years from the days when every station was required to have a staff engineer, or at least an available one. Many see this loss in accountability as more contrary than the rules of the "old school."

Now, engineering departments have been replaced with so-called "contract engineers," who assume all or partial responsibility for many (sometimes competing) broadcasters. For many radio stations, this new relationship can create some stress and misconceptions as to how the situation can be handled for the benefit of those involved.

well as any other demands that other business enterprises encounter.

When one factors in such costs as taxes, depreciation, insurance, maintenance of capital assets, rent, etc., suddenly the "price of poker" goes up.

What we are really discussing is time. This commodity to the broadcaster represents the commercial inventory he can sell to make his business turn a profit, in view of the costs and overhead he feels. To the contract person, this same inventory must be turned into an income that can support his business obligations as well as provide a living.

To be ethical in our concept of how the service person insures a fair return for time invested, we must insure that the technical time available for the task required by the broadcaster is used wisely and productively.

The technical person should determine the cost of doing business and weigh it against the needs of many broadcasters. I believe that it is reasonable to use the concept of "productive time" in determining charges for a particular task.

Obviously, nothing in our world is 100% efficient. The technical person cannot be productive in this manner, either. The radio broadcaster is entitled to

one becomes more proficient at accomplishing a particular task, the time involved becomes less.

The goal of improving one's technical expertise is rewarded by financial returns more closely reflecting the time actually delivered in accomplishment. We have a condition of better work for the broadcaster, and better pay for the provider.

Both manager and technician must determine the most cost-effective method of accomplishing a task. These needs may be better addressed by replacement of a piece of station equipment, or its return for factory repair.

Sometimes, we may also look at using another technical person more versed in the repair of a particular piece of equipment. Honest communication along these lines can serve everyone's needs.

Unfortunately, sometimes the technical person must weigh the needs of one client against another. It is impossible to be at more than one location at a time, so the technical person must be able to fairly identify if a problem with one station is more disruptive and serious than that of another client.

The decision can be stressful and sometimes lead to ill will. Since it is impossible to schedule emergencies, we have to deal with them as best we can.

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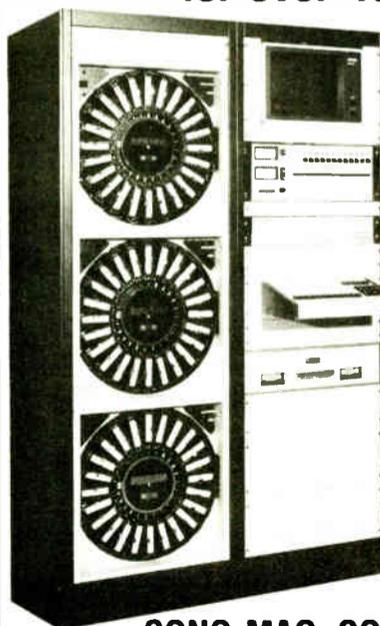
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Carver PM 1.5 450 W per chnl at 8 ohms, excel cond, 2 rack space, 24 pounds, \$650. B Fisher, KPOK, Box 477, Bowman ND 58623. 701-523-3683.

Fender CBS Rhodes FR 7221 (2) solid state, main & slave for Rhodes cabinets, \$40/both. P Russell, Bowdoin College, AV Services Sills Hall, Brunswick ME 04011. 207-725-3066.

QSC 1400 200 W per chnl at 8 ohms, 300 W per chnl at 4 ohms, mono bridging, octal accessory sockets, fan cooling, \$500. R Hoover Ross, The Auditory Perception Lab, 88 Sherman 2nd Fl, Brooklyn NY 11218. 718-965-2420.

Vital AA-1A(11) audio dist amps w/track mount main frame, one input by 6 output. G Mundkowsky, 12918 Smallley, Grandview MO 64030. 816-966-0731.

Bogen TCB 250 solid state 250 W PA amps (2), some repair, complete, \$225 ea or \$400/both; Altec 1590C 250 W PA amp, needs some repair, complete, \$300. J Sigmon, WBZK, POB 398, York SC 29745. 803-684-4241.

CRL SEC-800; CRL SEP-800; CRL SMP 850; Mod Sci StereoMax; Mod Sci CP803 composite processor; Mod Sci SCA-186 Side-Kick; Apex 700 studio dominator, all in mint cond, BO. C Bobbitt, Comm Investment Corp, 312 E South Temple, Salt Lake City UT 84111. 801-364-3561 X271.

Radio Shack/Realistic MPA 80 high fidelity PA amp, 80 W RMS 4 mic inputs, 2 phono inputs, aux input. P Baillon, 612-222-5555.

Dynaco 70 tube type, 35 wchan stereo, vgc, \$85/firm. M Kuehl, 1418 N Stevens, Rhinelander WI 54501. 369-4007.

LEL DA-8, new 8 chnl out mono or 4 chnl out stereo, individual level adjustments (8) avail, \$150. G Walden, KYW, 5th & Market, Philadelphia PA 19106. 215-238-4893.

Crown D75 power amp, excel cond, \$400. G Gilbreath, 702-454-2085.

Radio Shack/Realistic MPA 80 high fidelity PA amp, 80 W RMS 4 mic inputs, 2 phono inputs, aux input. P Baillon, KMCM, 1218 Pioneer Bldg, St Paul MN 55101. 612-222-5555.

Crown C-40, mint cond, \$175. C Volpe, 540 Stemmers Run, Essex MD 21221. 301-391-6927.

Yamaha CA810 amp, 85 W per chnl, \$300. B Feinberg, Totaltape Publishing, 800-874-7599 X337.

Yamaha MLA7 8 chnl mic/line preamp, 8 in 8 out, many uses, new cond, \$295; Shure 330 ribbon mic, \$100 ea; Ampex cinema tube amp. F Brullodt, Box 135, Clio MI 48420. 313-686-2473.

Want to Buy

RCA MI-11658B type BA-71C, (2) preamps for RCA type BC-8A dual chnl studio console. R Paolangel, RP Prod, 324 S Geneva, Ithaca NY 14850. 607-273-5773.

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Want to Sell

Cablewave Heliacx, 3" cable, 300' in various lengths, some new, some old w/6 connectors, \$3000. B Magrill, WYKS, 4908 NW 34th, Gainesville FL 32634. 904-375-2200.

Shivley 6813 3 bay, 92.1 MHz, 14 mos old, \$1500. K Austin, KFXI, POB 433, Lawton OK 73502. 405-658-9292.

Andrews HJ7-50A 1-5/8" air 300' & 400', gd cond, 12 yrs old, \$900. C Benner, WUSL, 440 Domino Ln, Philadelphia PA 19128. 215-483-8900.

Comark FMHC-6 6 bay FM tuned to 103.7 w/225' of 3" coax. A Kord, WWRX, Box 325, Westerly RI 02891. 401-596-7728.

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Shively 6813 8-bay antenna tuned to 89.5 MHz, \$4000. G Gilbreath, 702-454-2085.

ERI FMH Series 10 bay centered Rototiller at 92.3 MHz, vgc, \$9950. G Wachter, KFYI, 631 N 1st, Phoenix AZ 85003. 602-258-6161.

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Jampro JSCP-3 (3) elements tuned to 107.3 MHz, recently removed from service, \$1000 ea or \$2500/all. R Shroyer, KMWX, POB 1460, Yakima WA 98907. 509-248-1460.

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Scala HDCA 10, FM, new & used, assorted freq, esp educ band, 75 ohm UHF & N termination, negotiable. R Archut, WKDN, 2906 Mt Ephraim, Camden NJ 08104. 609-854-5300.

RCA BCF 12B 12 bay 100 kW FM; Wegener SMN satellite receiver complete, BO. J Miller, ST Bdcg, 908 Frontview, Dodge City KS 67801. 316-227-4444.

RCA 4 bay w/de-icers tuned to 92.1 MHz, \$300; Jampro 3 bay high pwr tuned to 92.1, \$400; 322' of 1-5/8" jacketed Andrew cable, \$8/ft. J Thomas, WLEW, Bad Axe MI. 517-269-9931.

Harris/Gates/ERI FMC-8 8-bay circularly polarized medium power FM, 20 yrs old, currently on air at 99.1 MHz, available shortly. A Chambers, WAWZ, Box 37, Zarephath NJ 08890. 201-469-8022.

ERI 106.5 12 bay low power antenna, gd cond, on ground, used 1 yr w/bracket, BO. R Wachter, KNSX, 3418 Douglas, Florissant MO 63034. 314-872-2660.

Cablewave 3" air dielectric 50 ohm jacketed, cable over 450', only 5 yrs old, w/3" flange connectors, \$2500. J Littlejohn, WBYR, 347 W Berry Ste 700, Ft Wayne IN 46802. 219-420-9890.

Andrew LDF5-50A 7/8" foam dielectric 50 ohm transmission line, 200' long w/2 type N connectors, 1 yr old, \$250. G Wilson, WGTG, POB 30, Toledo OH 43692. 419-243-3091.

World Tower 300', solid rod, 18" face, standing, 7 yrs old, gd cond; 18" face side-mounting brackets for ERI 3-bay antenna system. R Miller, WRVI, 815 W Dean, Virden IL 62690. 217-965-3388.

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Phelps Dodge radomes (3) for CP-1000 Series antenna, one new, 2 used, \$600/all. M Black, WEOS, Geneva NY 14456. 315-789-8970.

ERI Isocoupler 402 10 kW, 1-5/8" in & out w/adapters for 7/8" line, tuned to 93.5 MHz, \$700; Phelps-Dodge SLCC-78-50 300' of 7/8" air dielectric transmission line, gd cond, \$1000. C Gennaro, Roberts Bdcg, 1018A E Main, Merrill WI 54452. 715-536-6262.

ERI FMHH G5-4 4-bay, high power horizontal only 4 bay antenna tuned to 94.5 MHz 1/2-3 MHz. Available in Eugene, OR. Contact Chris Reid Murray, CE, KMGE. 503-484-9400.

Rohn SSV Series 120' or SSV heavy series tower, includes 11N, 12NH, 13NH, 14NH, 15NH & 16NH sections, can go to 320', 2 yrs old, excel cond, \$8000. A Kord, WWRX, Box 325, Westerly RI 02891. 401-596-7728.

Cablewave 1-5/8" air dielectric coax cable, 165', \$1155; Andrew FM antenna fittings for coax cable, call for details. K Croswait, WTNN, 13206 Buttermilk Rd, Knoxville TN 37932. 615-531-2297.

Phelps-Dodge CFM-LP3 3 bay tuned to 92.7, w/Radomes, excel cond, \$1200; 250' 1-5/8" transmission line w/connectors, \$300. G McCoy, KZEN, 1606-1/2 16th, Central City NE 68826. 308-946-3816.

RCA-Dielectric BFH 2A 2 bay antenna on 98.3, \$600. JA Bowab, WDLT, 2402 Wolf Ridge, Mobile AL 36618. 205-344-3698.

Rohn 80 tower & 35 acres in Meramec Springs MO, highest point in the area, 3 yrs old, will sell for replacement value & reinstallation of same tower due to relocating FM. R Wachter, KNSX, 3418 Douglas, Florissant MO 63034. 314-872-2860.

Stainless G24/25 200'; 20' sections, guyed, new sandblast, primer, paint, on ground, 24" face, 2" tubing, BO. J Blodgett, WGTG, 308 Westgate Pkwy, Dothan AL 36303. 205-794-4770.

Coax switch, 3-1/8", manual, \$900; 3-1/8" coax switch, electric, \$1300. J Mitchell, WJKL-TV, 315-673-9049.

Want to Buy

FM antenna tuned to 96.7. C Froke, POB 811, Deer Lodge MT 59722. 406-846-1221.

ERI 93.3 antenna 4 or more bays, low or hi power & 1000' of feedline, 1-5/8" or larger, have ERI 12 bay lo power antenna on 106.5 to trade. R Wachter, KNSX, 3418 Douglas, Florissant MO 63034. 314-872-2660.

FM antenna, 100.1 MHz, low power, 2 or more bays, 350' of 1-5/8" transmission line; Andrews Dehydrator. J Lankenau, Jefferson Comm, 1026 Terrace Rock Circle, Ballwin MO 63011. 314-391-6394.

ERI 4 or more bay on 93.3 MHz & 550 of feedline 1-5/8" or larger. R Wachter, KNSX, 3418 Douglas, Florissant MO 63031. 314-872-2660.

UHF TV bdct/translator antennas, Scala paraneals; any chnl, Scala SL-8; Bogner B Series or Bogner LPS 1, 2 & 4; UHF TV translator antennas on old chnl 70 thru 83 band; Scala SL-80 or paraneals; Bogner B4, B8, B16 or B24; Emcee DGA-10 corner reflectors. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

UHF TV bdct/translator antennas, Scala paraneals, any chnl, Scala SL-8, chnls 19-23, 32-36, 60-64, Bogner B Series, chnls 20-30, 31-42, 55-69, or Bogner LPS 1, 2 & 4. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

UHF TV translator antennas on old chnl 70-83 band, Bogner B4, B8, B16 or B24, Emcee D-10 corner reflectors. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

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TTM124/Telcom c4, TTM frame holds & powers 24 Dolby, dbx, or Telcom cards, comes w/16 Telcom c4 cards, \$1500. R Rhodes, POB 1550 Radio City Station, NNYNY 10101. 212-245-5045.

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Orban 424A stereo complimenter/de-esser/gate, excel vocal processor, \$689/BO; Orban 674A stereo para-graphic cross-EQ, \$899/BO, both in new cond. J Loether, 202-298-9550 voice mail.

JVC VP-101 digital audio processor, allows to record digital audio on the video head of any video deck w/sub-carrier input, in CD quality, \$2500/BO. R Lawrence, Moonshadow Video Prod, 4280 Reston Rd, Roseburg OR 97470. 503-679-8966.

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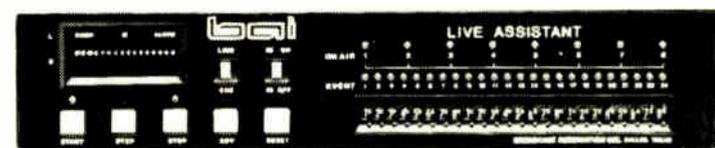
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UREI 537 1/3 octave band EQ (2), \$500 ea or \$800/both. G Gilbreath, 702-454-2085.

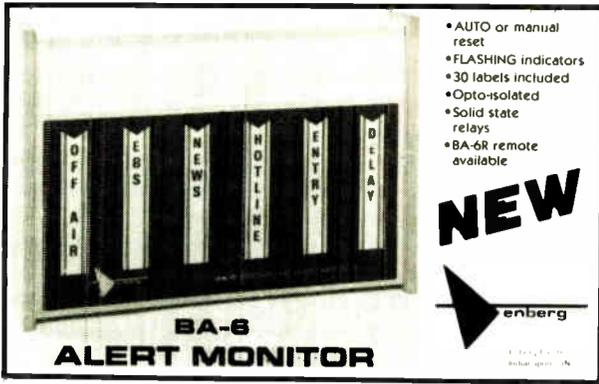
Orban 245 stereo synthesizer, like new, owners manual, \$250. Chuck, 615-968-9532 aft 6PM.

Shure M610 (2) feedback controller, 8 band EQ. BO. G Mundkowsky, 12918 Smalley, Grandview MO 84030. 816-966-0731.

Gates LE-2 line EQ, like new w/book, \$150. P Schneider, KPMJ, 1280 S Oxnard, Oxnard CA 93034. 805-985-8346.

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Mic Mix TW-1 time warp effects unit w/manual, as is, looks gd, \$75. D Bailey, 3422 Beech, Roulett TX 75088. 214-475-9796.



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Pultec EQs, tube compressors, etc, especially need Fairchild 660 or 670; also other vintage tube signal processing equip. J Kreines, 5330 Kennedy, Millbrook AL 36054. 205-285-6179.

RCA/Control Design Corp 24 tray kartwheels (3), clock, programmer, needs work, BO. D Wolfe, KRIX, 901 E Pike Blvd, Westlaco TX 78596. 512-968-1548.

Sono-Mag MSP-1 sat automation controller, currently in use, perfect working cond, printer, manuals & spare parts kits included, \$3500. E Stokes, WCVR, POB 249, Randolph Ctr VT 05061. 802-728-4411.

Harris 9000 stereo automation system including (10) Otari ARS-1000 DS; (2) 24 Tray 60 Cart II; ITC Delta triple deck; logging package; additional CRT console, \$25,000 complete, used only 6 mos. K Britton, WMHT, 17 Fern, Schenectady NY 12306. 518-356-1700.

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MEI 100 48 event programmer, price includes (4) Revox PR99 14" stereo PB R-R machines, complete live assist automation system, \$8000. K Dickson, WRXJ, 8386 Baymeadows #107, Jacksonville FL 32250. 904-636-0507.

SMC Carousels 252RS, (4) random select, excel cond, (2) racks, 2 Carousels, \$500, 3 for \$465, 4 for \$450, all 4 Carousels plus 2 racks, \$2100. J King, WROB, POB 1336, W Point MS 39773. 601-494-1450.

SMC SM-25 dual chnl silence sensor, brand new, \$300. A Weiner, Britton Road, Monticello ME 04760. 207-538-9538.

Harris 9000 Series, cleartext logging package, TI-840 & TI-851 printers, live studio/newsroom remote control, RAK-90 autotalk cabinet, Otari ARS-1000-DS reproducer, Go-Cart II, stereo, 24 tray, complete wall interface electr & cabling, 11 rack units, BO. T Quarantone, Q-Tone Bldg, Rt 1 Box 33, Ocean View DE 19970. 302-539-2600.

Sonomag (SMC) MSP-1 2000 event satellite automation controller, perfect working cond, manuals, printer & spare parts kit included, currently on-air, \$3500. E Stokes, WCVR, POB 249, Randolph Ctr VT 05061. 802-728-4411.

Comp. automation sys. incl. (5) Revox PR-99 pb reel machines, ster., Instacart w/48 cart cap., (2) IGM Carousels w/48 cart cap., (2) Audicord ster. cart machine, PC compat. computer w/all software & interfaces, Sentry System, excel working cond. B Ferguson, WMMJ, 400 H St NE, Washington DC 20002. 202-675-4800.

Sono-Mag SM-25 decoder, will run two tape machines, new, BO. A Weiner, Britton Rd, Monticello ME 04760. 207-538-9538.

AUTOMATION EQUIP

Want to Sell

SMC RP1000/DS20 w/4 SMC 350 RS B Carousels, all books, system kept in fine cond, w/spare cards, \$10K/negotiable. R Ferguson, KRIZ, 216 S Bdw Box 10, Minot ND 58702.

SMC ESP-1 (4) 352 RSB Carouse's, (2) 722 dual cart decks, net delay machine, 20 chnls of audio, (4) Revox A77 reels. R Monroe, KKTX, Box 192, Kilgore TX 75662. 214-984-2001.

Gates, various pieces of late 60s SP-10 automation gear for parts, inquire for complete list. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

Harris System 90 logger, decoder, monitor, Brain, etc, BO; IGM Instacart, 48 tray, stereo, excel cond, mounted in equip rack w/all cards, \$7000. S Cohen, KFNN, 65 E First Ave, Mesa AZ 85210. 602-644-1510.

Automatic electric telephone type relays & coi's for Schafer 800 automation, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Automated Broadcast Controls w/(4) Otari AFS-1000DC reproducers, (2) 24 cart Carousels, 80 event sequence controller & audio controller, w/manuals, gd cond, \$10,000 pls shpg. B Herrera, KCRT, 100 Fisher, Trinidad CO 81082. 719-846-3355.

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SonoMag MSP-1 automation controller w/2000 event random access memory, \$2500. W Hanlon, WKFD, 19 Updike, Wickford RI 02852. 401-295-8808.

IGM 383 time announce control used w/(2) cart machines, advancing them alternately every minute, BO. D Gander, KDUZ, Box 10, Hutchinson MN 55350. 612-587-2140.

SMC DT-5 automation system cart encoder w/keyboard & CRT mon, \$500/BO. T Randall, KJLQ, Box 790, Brookings SD 57006. 605-692-9102.

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RCA TK-710 w/14:1 lens & 12:1 lens, AC adapter, batteries, case w/wheels, new studio view finder, Bogen tripod w/fluid head, all in gd cond; (2) VCR cables & one VTR cable, \$2400. R Shaffer, Lobb & Shaffer Videos, 1613 Washington, Prospect Park PA 19076. 215-532-7010.

Panasonic WV32408A camera w/8:1 autofocus zoom, stereo snd, title gen & Panasonic AG2400 portable recorder w/remote control, battery charger/AC adapter, cable-ready programmable tuner, fluid head tripod, padded carrying case & manuals, mint cond, \$2400/BO. Mark Bainer, 207-784-9181.

JVC BY-110 3-tube ENG/EFP camera w/10X servo-zoom lens, battery, AC adapter/charger, hard case & cable, 10 pin, for Panasonic NV 8420 prof VHS VCR w/battery, AC adapter/charger & case, all in excel cond, camera for \$1900, VCR for \$700 or all for \$2500/neg. J Loether, 202-298-9550 voice mail.

Telex MC-PR III RP audio, excel cond, \$995. L Chatman, IVA, 424 Commerce Ln Ste 1, Berlin NJ 08009. 609-768-5006.

New STL NAB cartridge test tapes in mono, stereo & compatible formats, AA-2, AA-3 & Aristocart shells, BO; PR&E Tomcat R/P stereo & (2) stereo play cart decks w/spare parts kit, rack mount, also spare parts, switches, relays & heads for 270/280 series. BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

ITC Omega Series (2) playback desks, program cards need minor repair, otherwise excel cond, \$800 ea pls shpg. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

Sparta portable, AC/battery, runs gd, \$50; ATC 8 kHz exc amp, \$10. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

BE 5300/3500 (2) triple play & record cart, mono player, have 3 cue tones w/spare part, call for price breakdowns. B Gellhaus, WVDV, POB 73, Cheltenham PA 19012. 215-635-4815.

BE 2000 RPS R/P, (2) 2000 PS PB Spotmasters, vgc. BO. I Baron, IVCUA FM, 200 UCIV Catholic Univ, Wash DC 20064. 202-635-5106.

BE 3300, \$750; BE 5502, \$1200; Harris C90, \$500; RFI filter Sprague F-1135/G JN17-3300B1 250 VAC, 100 A single or 3 phase, use on 208 or 240V, 3 pole 100 A, \$600; (4) pole 100 A, \$700. Dave, 209-467-0317 evenings only.

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Tapcastor 700-R/P/R/P, fair cond, as is, \$75; Rapid Q MA024A R/P, repairable but in fair cond, \$80. M Rakoff, 114-41 Queens Blvd, # 148, Forest Hills NY 11375. 718-591-0002.

ITC 3-D (2) triple deck, mono, \$900; Gates Criterion 80 stereo PB, \$450. A Pavao, KY-NO, 2125 N Barton, Fresno CA 90703. 209-255-8383.

ITC 99A mon R/P, excel cond, all automatic features, bulk erases, splice finds & does record head alignment all by micro processor, will guarantee 90 days, \$1195. E O'Donnell, WIBW, POB 119, Topeka KS 66601. 913-272-3456.

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Parts & manuals for RCA 7 Series; record amp for RCA 7 Series; parts & record amp for Harris Criterion ATC Series. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

ITC 3D mono w/WRA record amp, triple deck. C Waltman, KNEW, 66 Jack London Sq, Oakland CA 94607. 415-836-0910.

ITC 3 deck mono, all tones, working cond. R Yaw, KOJM, Box 7000, Havre MT 59501. 406-265-7841.

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ITC 770 PB, want up to (4). J David, KMPL, POB 907, Sikeston MO 63801. 314-471-1520.

Entire set-up for Transtar Country format, buy or trade for Harris system w/5 Scully reels, 2 Instacarts, time announce, 2 CRT's, etc. Harris on air now. B Harmon, WPLA, POD J, Plant City FL 34289. 812-754-9191.

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SMC 350 Carousel's & parts, Instacarts, ITC triple decks. B Romeijn, KJNO, 3161 Chan-nel Dr, Juneau AK 99801. 907-586-3630.

SMC Mini-Pro automation controller. WVIS, POB 467, Frederiksted, St Croix VI 00840. 809-778-5199.

Instacart or Go-Cart mono, any tray size, one or more, will consider units needing service. L Maierhofer, WTGC, 101 Armory Blvd, Lewisburg PA 17837. 717-523-3271.

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RCA TK1, 10, 30 camera chains, tripods, wood or metal, heads, etc; also TM-5, TM-10 monitors & gd 15GP22 CRT. A Weiner, Britton Road, Monticello ME 04760. 207-538-9538.

Miller Pro/Pro Jr fluid heads or similar quality heads. R Lawrence, Moonshadow Video Prod, 4280 Weston Rd, Roseburg OR 97470. 503-679-8966.

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Gates/Harris stereo & monaural record amps for Criterion cart machines, \$100 ea monaural (2), \$250 for stereo or BO. B Burnham, WHBT, 1293 Floyd, Jackson MI 49203. 517-782-1510.

ATC PB-150 tube mdl, seems complete, gd for parts, etc, \$100/BO. J Sigmon, WBZK, POB 398, York SC 29745. 803-684-4241.

ITC 3D mono, gd cond, \$1000. B Mountjoy, WIDD, 610-1/2 Hattie, Elizabethton TN 37643. 615-543-5849.

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RCA PK-301 vidicon camera, requires drive pulses, mono, w/manual, \$100; RCA PK-330 studio vidicon cameras, mono w/10-1 zoom lens, control units cable & manuals. B Humpherys, UMC 8500, Logan UT 84322. 801-750-3133.

Ikegami HL-79D, 15:1 zoom, perfect, all access, \$9000; Sony Betacam, vgc, accessories, \$6000; one pass blank Betacam & U-matic tapes, \$4 ea. Ugly George, 212-677-2200, M-F, 9-5, Fax: 212-941-0956, 9AM-5PM.

Studio camera zoom lenses (4) Rank, Taylor Hobson Varotal RM 10:1 zoom w/1.75 & 3X range ext w/zoom & focus controls & pan head arms in flight cases, \$500 ea. J Krepol, RNDL, 6147 Walker, Phila PA 19135. 215-624-1050.

Ikegami HL 79EAL w/Canon J13x9B lens w/2X extender, AC pwr supply, mounting plate, VTR cable, manual, extender board, & case, \$18,500; Sony BVU 110 recorder, w/time code card, \$2600. D Marlin, 7 Minola, Lexington MA 02173. 617-861-1346.

Panasonic WV-3800 w/RCU & cable, zoom lens, & full ENG package w/carrying case, needs work, BO. J Garvey, Video Yesteryear, Box C, Sandy Hook CT 06482. 203-744-2476.

JVC BY-110 3-tube camera w/case, (2) batteries, pwr supply & charger, (2) cables, 10X lens, like new, \$2300/BO; (4) JVC 1-tube cameras S-6U, \$400 ea/BO. T Quinn, Monte Vista Std, 208 Cherry, Capitola CA 95010. 408-475-0423.

RCA TK44 plumbicon camera chains (3). P Douglas, KWGN, 6160 S Wabash Way, Englewood CO 80111. 303-740-2222.

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Crown motor, capstan, Dale HMR 50-6, for bi-directional, Crown player, new, BO; Tape-athon 702-7 & 702-10 portable tape players, bi-directional, auto reverse, call for details & prices. E Davison, 135 N Illinois, Springfield IL 62702. 217-787-0800.

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Ampex 350-351 or AG440 or MR 70 tape machines w/both record & PB functions, 7.5 & 15 ips, mono, P Hons, Mainline Comm, 100 Poplar St, Portage PA 15946. 814-736-3883.

Teac X1000-R 10.5" 1/4 trk 7.5-375 ips, dbx, rack mountable, stereo auto-reverse, remote capable, \$500. L Domnitz, 754-46th Ave, San Francisco CA 94121. 415-750-0431.

Scully 280B (2) FT unmounted, very clean, \$450 ea or \$850/both. J Kreines, DeMott/Kreines Films, 5330 Kennedy Ave, Millbrook AL 36054. 205-285-6179.

Revox A-77 (3) rack mount 2 portable, 2 gd transports, one needs capstan motor & heads, \$500/for two, \$200/other; Dokorder 1140 4 trk 1/4", gd transport & PB, records poorly, gd heads, you ship, no service info, \$200. B Sauter, WSLU, Payson Hall, SLU, Canton NY 13617. 315-379-5356.

Telefunken M15A 24/32 trk 15/30 w/autolctr & varispd, \$25K; Telefunken M15A 2 trk 7.5/15, \$4K; Tascam 80-8 w/dbx rack mt, \$1100; Nakamichi 550, BO, R Rhodes, POB 1550, Nyny 10101. 212-245-5045.

Teac 222 1/2 trk, new, \$800; Teac 224 1/4 trk, new, \$1400. J Pappas, The Pappas Group, 209-523-5248.

Nakamichi MR2, used approx 150 hrs, rack mount, variable bias & pitch, Dolby B&C, superb cond. H Carter, 509-328-5729.

Scully 280B-4, 280B-FT, mint, 4 trk \$3000, the FT \$1500; Ampex AG354-2 in perfect cond, \$1000/BO. R Bruce, UAR Slds, 8535 Fairhaven, San Antonio TX 78229. 512-690-8888.

Scully 280B, brand new cond, w/spare head stack & parts kit, \$1700; Sony PCM F-1 digital processor, portable, used 3x's, \$1300. D Kocher, 1901 Hanover, Allentown PA 18103. 215-432-0520.

Tascam Portastudio 2 yrs old, excel cond, but FF & RW do stick, \$450. B Howard, KOFO, Box 16, Ottawa KS 66067. 913-242-1220.

Ampex 440 stereo in walnut console & remote w/(2) 375 Inovonics electronics, \$1500; Ampex 354-2 stereo, gd cond, \$495; MCI JH110B stereo w/remote walnut console, \$2500; MCI JH110A stereo remote in walnut console, BO. J Price, 2651 Globe, Dallas TX 75228. 214-321-6576.

Otari MX 5050 (2) in fair cond w/one remote, \$600 ea. J Super, WVAM, Box 1827, Altoona PA 16602. 814-944-9456.

Akai GX-280D 1/4" R-R stereo, parts machine, \$20. P Russell, Bowdoin College, Sills Hall, Brunswick ME 08011. 207-725-3066.

Ampex 440C 1" deck, no heads but has guides, includes power supplies & manual, \$450. R York, Jewel Records, 1594 Kinney, Cincinnati OH 45231. 513-522-9336.

Magnecord 1024 (2), one in excel cond & one in decent shape, BO. R Fess, WLRB, 119 W Carroll, Macomb IL 61455. 309-833-5561.

Telex Mdl 235 (3), Mdl 300 high-speed mono cassette duplicators, 3.75 & 7.5 ips, includes (2) bias oscillators, (3) record amps, & equip rack, needs work, BO. J Garvey, Video Yesterday, Box C, Sandy Hook CT 06482. 203-744-2476.

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Otari ARS-1000 (3) in excel cond. V Clough, WZFX, 225 Green, Fayetteville NC 28302. 919-486-4991.

Revox A700 stereo 2 trk, \$800; Pioneer 2022 & 2024 2 trk & 4 trk, \$850; Onkyo TARW99 dual cassette, \$200; Technics M27X cassette w/dbx NR, \$100. G Ernst, Bayside Studios, POB 166, Linda City OR 97367. 503-996-6020.

Crown 722/724 1/2" or 1/4 trks, new heads w/flight case, mint cond, \$800; Otari 5050-III 8 trk, mint cond, \$3000. C Volpe, 504 Stemmers Run, Essex MD 21221. 301-391-6927.

Ampex AG-440/B in vgc, \$500/BO. J Davis, WVQM, 5024 E Lacy, Madison WI 53711. 608-271-6611.

Telex M235-42 1/4" tape duplicating system, 4 trk 2 chnl, one master w/spare & 4 slaves w/electronics & cables, \$700; Sony TC-854-4S 1/4" 4 ch, 4 trk w/simul-sync, 7.5-15 ips, Canon inputs w/dbx 154 type 1 NR system, \$900. J Krepol, RNDL, 6147 Walker, Phila PA 19135. 215-624-1050.

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Scully M100 16 trk, 2" in console (2), one has great remote/counter, both in vgc w/dg heads, \$7000 & \$8000. R York, Jewel Records, 1594 Kinney Ave, Cincinnati OH 45231. 513-522-9336.

Tascam 480B 8 trk 1/2" deck w/autolocator, carton & manuals, immaculate cond, \$3500/both. R Cannata, Cantrax Recorders, 2119 Fidler, Long Beach CA 90815. 213-4986492.

Scully 280B 200-466 AW-F black front w/slide out racks, cracked VU glass, \$100. L Beigel, On-Cue Recdg, POB 85042, Los Angeles CA 90072. 213-466-3595.

Otari MX-5050 10" 1/2 trk recorder, 7.5 & 15 ips, gd cond, w/manual, \$900; Revox A-77 10" stereo recorder, excel cond, w/manual, \$400. B Mounjoy, WIDD, 610-1/2 Hattie, Elizabethton TN 37643. 615-543-5849.

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Ampex 600 (3) for parts, BO. B Oostenburg, KCKY, POB 6, Coolidge AZ 85728. 602-963-9390.

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Technics RS-1506 1/4 trk R/P, 1/2 trk PB, 3.75-7.5 ips, wireless remote unit, owners manual, vgc, \$795 pls shpg; Nakamichi RM100 wired remote for 460/480Z series, excel cond, \$25 pls shpg. S Hofmann, Cameron Univ Theater, 2800 W Gore, Lawton OK 73505. 405-581-2428.

Remote recording trailer 16' w/Quad 8 console, isolation xformer, will run on 110/220 VAC, 24 trk ready, \$5700/BO. B Petruzzi, Rouse St Prod, 804 E Old Hickory Blvd, Madison TN 37115. 615-868-8516.

Otari MX 5050-4 4 trk 1/4" recorder in portable case/configuration, vgc, \$1200. B Petruzzi, Rouse St Prod, 804 E Old Hickory Blvd, Madison TN 37115. 615-868-8516.

Ampex AG-440B 2 trk (3), 10.5" rack mount prof, vgc, \$700 ea plus shpg; Scully 280 4 trk 1/2" in Ruslang console, late mdl w/motion sensing, spare cards & capstan motor, low hrs, gd cond, \$1600 plus shpg; Denon DH-510 2 trk 10.5" reels, 7.5-15 ips, excel cond, \$900; Teac 2300X stereo 1/4 trk, 7" reels, excel cond, \$250. K Pechkam, 2737 Florann, Madison WI 53711. 608-271-8763.

Pentagon 1100 high speed duplicator, R-R & cassette, (2) cassette master units, mdl CM1140, (2) dual position slave units, mdl CS1140, R-R master unit, mdl RM1140, R-R slave unit, mdl RS1140, manuals & spare parts, \$2100/BO. M Gellos, Pensacola Christian College, 904-478-8480 X5041.

Revox PR 99 (2) gd cond w/tone sensor E.O.M's, PB only, \$1500/pair. B May, KVIN, Box 419, Vinitia OK 74301. 918-256-7224.

Wollensak 3M 1520AV portable 3.5 & 7 ips, excel cond, no AC cord, \$75. P Salois, KPCR, POB 1, Bowling Green MO 63334. 314-324-2283.

Revox floor stand for Revox PR-99, in box, never used, \$150. E Welch, WKCL, POB 809, Ladson SC 29456. 803-553-5420.

Ampex 440 mono (2) in Ruslang roll-around cabinets, gd cond, \$750 ea; Telex 6120 R-R module, like new, BO. D Flynn, Continental Recordings, 1 Thompson Sq Ste 501, Boston MA 02129. 617-241-5150.

Tascam 122 (10) cassette decks, excel cond, \$350; Otari 5050B 1/4 trk, excel cond, \$950; Otari 4 trk 5050B, 1/2" & 1/4" decks, the 1/2" has an extra transport, \$1500 ea. M Zook, Masterworks, 4024 Williamsburg Ct, Fairfax VA 22032. 703-385-1780.

Telefunken M15A 24/32 trk w/autolocator, both heads, all documentation & varispd, \$25000; Teac 80-8 8 trk w/dbx, rack mount, \$1100; Telefunken 15A 2 trk, 7.5/15, in console, \$3000; Revox A77 1/4" 1/2 trk, make offer. R Rhodes, POB 1550 Radio City Station, Nyny 10101. 212-245-5045.

Sony DTC-1000ES DAT machine, top half of PCM-2500, BO, call after 2PM. R Kaufman, Pams Prod, POB 462247, Garland TX 75046. 214-271-7625.

Ampex 440-C FT recently re-cond, w/variable speed osc, mounted in roll-around cabinet, \$1295. W Hanlon, WKFD, 19 Updike, Wickford RI 02852. 401-295-8808.

Otari MK III/4 1/2" 4 trk, never used, BO. D Day, WQXY, 1001 Howard 42-F, New Orleans LA 70113. 504-525-9600.

Want to Buy

Magnecord 728/748 or 1028/1048 for parts or to make one of ours into parts. NE Stephany, WACK, POB 1420, Newark NY 14513. 315-331-7100.

Inovonics 355 & 900 pwr supply. L Beigel, On-Cue Recdg, POB 85042, Los Angeles CA 90072. 213-466-3595.

ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

MCI/Sony capstan & reel motors, any cond., recdg heads, most mfgs, machines, new, used. Relapped then sold. Amp Services, 224 Datura St No 614, W Palm Beach FL 33401. 800-826-0601, in FL 305-659-4805.

Tascam 388 8 trk recorder/mixer in gd cond. M Sokol, JMS Prod, 121 E Baltimore, Hagerstown MD 21740.

Revox 725 or 727 CD player, gd cond for prod room. M Hoskins, KMDN, No 210 Rainbow Mole, Great Falls MT 59401. 406-761-1000.

Magnetax bin loop recorder, mono or stereo 1/4" in any cond. T Boddie, 12202 Union, Cleveland OH 44106. 216-752-3440.

CONSOLES

Want to Sell

Audionics Grandson 18 input console, \$3800/BO; Speck 33X16 rcdg console 3-band sweep EQ, patch bay plus 24 tr harness, \$3795/BO. G Freeman, Pranava Prod, 1227 Sierra Alta Way, Los Angeles CA 90069. 213-475-8390.

RCA 8 pot, gd cond, BO; Cetec 2000 8 pot, 16 input w/pwr supply, gd cond, BO. D Wolfe, KRIX, 901 E Pike Blvd, Weslaco TX 78596. 512-968-1548.

Gates Stereo Statesman currently in use, avail in mid July, \$1200/BO. B Anderson, WTGY, POB 9, Marshall Rd, Charleston SC 29321. 601-647-5600.

Tascam M-50 12x8x8, lots of extra features, low hrs, mint cond, \$2900. K Flory, The Production Co, Box 1027, Siloam Springs AR 72761. 501-524-4626.

Allen & Heath Systems 8 16 input, 8 subs, 16 monitors, 3 effect sends, +4 or -10 level options, excel cond, \$3000/BO. M Mantell, 1st Impressions, 15 Perkins, Brockton MA 02401. 508-580-1844.

Gates/Harris Executive 10 chnl stereo solid-state console in clean, vgc w/manuals, \$1000 pls shpg. B Mounjoy, WIDD, 610-1/2 Hattie, Elizabethton TN 37644. 615-543-5849.

Autogram AC-8/IC-10 spare parts, lamps, switches & bridging input transformers, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

UREI MOH-410, 4 chnl expandable to 9, pwr supply included, gd cond, BO. B Pirle, Terrell Bldg, 203 Brookhollow, Terrell TX 75160. 214-563-7708, before 9AM/alt 9PM.

Autogram AC-6 6 chnl 23 input stereo, in excel cond, includes ESE built-in timer, \$4200/BO pls shpg. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

Gates Stereo 80 complete w/pwr supply, most rotary faders new, works fine, 3 mic input 4 line input, includes book, \$800. C Benner, WUSL, 440 Domino Ln, Philadelphia PA 19128. 215-483-8900.

Russco 505 5 pots w/Q & push on-off switches, 2 internal TT PQ's & pwr supply, pot 5 has 5 inputs, mono 19x5x8, \$600. L Beigel, On-Cue Recdg, POB 85042, Los Angeles CA 90072. 213-466-3595.

Ramko DC8M5 8 chnl stereo, excel cond, all manuals & extras, \$5500. R Trumbo, KNLf, POB 117, Quincy CA 95971. 916-283-4144.

QRK Omega 10 chnl, all plug-in amps, digital switches, complete set of spare PC boards, \$4500. B Brown, WPRS, POB 367, Paris IL 61944. 217-465-6336.

Ramko DC8MS 8 chnl 20 input stereo board w/2 LC4 remote control accessory, excel cond, \$5500. R Trumbo, KNLf, POB 117, Quincy CA 95971. 916-283-4144.

Sparta Centurion II 8 chnl, 3 inputs ea, stereo, 3 output busses, monitor amp, gd cond, \$1100/BO. R McDaniel, KJRG, Box 567, Newton KS 67114. 316-283-5150.

Numark DM 1550 4 chnl DJ mixer, 2 phono inputs, 2 line inputs, 2 mic inputs, 6 band graphic EQ, always in road case, excel cond, \$150. B Fisher, KPOK, Box 477, Bowman ND 58623. 701-523-3883.

Harris Stereo-5 modified w/5534's, no documentation, \$600/BO. J Claybrook, WMMJ, 530 Beacon Pkwy, Birmingham AL 35209. 205-943-9800.

Cetec 2007 8 stereo input, 2 stereo output, mint cond w/stepper pots & padded edge, 4 yrs old, \$2500. D Prentice, 1001 Sunflower, Rio Rancho NM 87124. 505-891-0502.

Yamaha MQ1602 16x2 PA mixer w/2 sends, dual 9-band graphic EQ, gd cond w/road case & manual, \$975 pls shpg. S Hofmann, Cameron Uni Theater, 2800 W Gore, Lawton OK 73505. 405-581-2428.

Tascam 10 modules, w/12 ea #101 inputs, (4) #102 sub-master, #103 master gain, #104 talkback, #107 quad panner, power supply (4) meter drivers, clean, gd cond, \$50-\$75. M Kuehl, 1418 N Stevens, Rhinelander WI 54501. 715-369-4007.

DISCO & SOUND EQUIPMENT

Want to Sell

Shure SR107 10 band EQ, balanced in, out, \$130 ea; Shure room analyzer w/mic, \$75. D Kocher, 1901 Hanover, Allentown PA 18103. 215-432-0520.

Liquidating complete studio, everything for sale: Ampex 2" multi-track, Biamp console, dbx NR, patch bays, 2 mastering decks, 2 cassette decks, reverbs, gates, compressors, gdmics, time aligned monitors, furnishings, etc. call for complete list. \$18,500. G Ernst, Bay-side Sound, POB 166, Lincoln City OR 97367. 503-996-6020.

URIE 813 (A's), time aligned speakers, excel cond, \$2500/pr. D Flynn, Continental Recordings, 1 Thompson, Ste 501, Boston MA 02129. 617-241-5150.

Community Light & Snd RS440 4-way speakers (one pair) w/Community VB790 bass bins, in Anvil cases, excel cond, \$2200 plus shpg. J Kreines, 5330 Kennedy, Millbrook AL 38054. 205-285-6179.

Various Eventide, Lexicon, Valley People outboard gear, call for complete list. G Guarino, Sorcerer Snd, 19 Mercer, NUNY 10013. 212-226-0480.

dbx NR system, 24 chnls, mdl 310D modules in (2) mdl 216 main frames, \$1900/BO; dbx NR, 310D modules in 216 main frame, as is, 24 chnls, \$500 or \$2300 for all 48 chnls or trade. R York, Jewel Records, 1594 Kinney, Cincinnati OH 45231. 513-522-9336.

Eventide Harmonizer H949 w/DeGitch, mint cond, \$1500/BO. S Cronen, Starbeat Recdg, 9 E Larkdale, Deerfield IL 60015. 312-945-3555.

EV Sentry 500 time coherent studio monitors, \$700. G Ernst, Bayside Studios, POB 166, Lin-da City OR 97367. 503-996-6020.

Lexicon Prime Time, gd cond, \$350; Ecoplate II plate reverb, \$495; dbx 157 4 chnls NR, \$350. M Zook, Masterworks, 4024 Wil-liamsburg Ct, Fairfax VA 22032. 703-385-1780.

Klipsch La Scalla's speakers (2) \$800/pr pls shpg; (2) Nak MRI's, \$700 ea; Tandberg 320 cassette deck, \$300. B Feinberg, Totalltape Publishing, 800-874-7599 X337.

Ampex MM1000 2" 16 trk w/SO, dbx NR, Biamp 16x8x16 console, 128 point patch bays, looms & remote, \$10.5K/all. G Ernst, Bayside Studios, POB 166, Linda City OR 97367. 503-996-6020.

JBL/AGK D16R2405/R-25 16 ohm, replace-ment diaphragm for JBL 2405 tweeter in un-opened box, \$50; AKG R-25 remote control unit for AKG BX-25 reverb unit, \$50 or swap for a Revox A-77 remote control. J Roper, Imperi-al Snd Std, RR31 Box 405, Terre Haute IN 47803. 812-877-2663.

Want to Buy

dbx 904 noise gate. R Burton, Audio Rents Inc, 7237 Santa Monica Blvd, Hollywood CA 90046. 213-874-1000.

Fairchild 670 or 660's, in working or repaira-ble cond. Mike, Morning Star Recd, 155 Sand-ers Ferry Rd, Nashville TN 37875. 615-824-9434.

LIMITERS

Want to Sell

CRL APP 400, PMC 300A, SEP 400B, SPF 300, in service, 2.5 yrs old, vgc, in use, avail 30 days, \$2700. M Tracy, KOAQ, POB 1263, Scottsbluff NE 69361. 308-635-2690.

CBS/Thompson CFS 4300 AM peak limiter, new, \$525. G Landau, WSMQ, 3300 Jaybird, Bessemer AL 35020. 205-428-0146.

UREI 1176 LN excel cond, schematic, silver face mdl w/LN module installed at factory, \$300. R Jordan Jr, Southland Recdg & Snd, 812 Young, Selma AL 36701. 205-874-8009.

CBS Audimax 444 AGC, \$200/BO. M Patton, WXOK, 6619 Cezanne Ave, Baton Rouge LA 70806. 504-292-4189.

Orban Optimod 8000A recently removed from service, clean in gd cond, \$1500. C Gen-naro, Roberts Bdcg, 1018A E Main, Merrill WI 54452. 715-536-6262.

Audio & Designs vocal stressor 4 band EQ & compressor, limiter, noise gate at same time, vgc, \$1100; Programming Technologies Ecoplate2, excel cond, \$650/trade. J Pines, 217-367-3530.

PR&E Multilimiter FM/AM, new matched stereo pairs, also AM Multilimiter, \$250 ea; Orban 418A stereo compressor/limiter, switchable pre-emphasis, front end of 8000A, BO; CBS Labs 410, 411, 4300, excel cond; (2) new CBS Labs dynamic presence EQ's, silmline, \$100 ea. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

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Trade new Valley Intl Gain Brain 2 for Valley Intl Maxi-Q. J Pines, 217-367-3530.

Aphex Aural Exciter Type B in excel cond, \$100/BO. R Pollard, KSKG, 1217 S Santa Fe, Salina KS 67401. 913-825-4631.

RCA BA-6A tube limiter, rack mnt, vgc, \$450/trade. J Pines, 217-367-3530.

CBS 410 FM peak limiters (2), BO. M Saady, First City Recdg, 141-60 84 Rd 3E, Briarwood NY 11435. 718-846-2062.

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Optimod 8000A just factory redone, \$2000/firm; Optimod 8100A, \$4000; XT-2 6 band, \$1800; Studio Chassis for 8100A, \$500. B Watson, KCHZ, 1551 Amar, W Covina CA 91792. 714-946-6249.

Thomson-CSF 4500 Presence EQ, new, \$595; Ramko portable mixer PM-42, \$450; ESE ES-214 audio level meter, \$95. H.M. Dyer Electronics, 2982 Wixom Rd, Milford MI 48042. 313-685-2560.

Orban Optimod 8000A stereo generators (2), \$1500/ea; various CBS Labs 444 Audimax III (2), \$100 ea; CBS 400 Volumax, \$75; CBS Audimax II, tube, BO; Harris Solid Statesman, \$175; Gates Sta-Level, tube, BO. M Hurst, WI-CO, POB 909, Salisburg MD 21801. 301-742-3212.

Inovonics 221/MAP II AM processing system w/mdl 215 AGC limiter, excel cond, \$400/BO; Marti CLA-40H, excel cond, \$150/BO; UREI LA-4, \$400/BO. T Randall, KJJO, Box 790, Brookings SD 57006. 605-692-9102.

Mod Sciences Stereo Max, like new, works great, will trade for Optimod XT chassis or BO. J Aughney, KLCE, POB 699, Blackfoot ID 83221. 208-785-1400.

CBS Volumax 4000A, working when re-moved, has manual, \$150. B Oostenburg, KCKY, POB 6, Coolidge AZ 85728. 602-963-9390.

EXR Corp EX-IV exciter in gd cond, \$500/BO; Valley People Dyna-Mite mic processor, dual, desk top case, excel cond, \$500/BO. J Claybrook, WMJJ, 530 Beacon Pkwy, Bir-mingham AL 35209. 205-942-9600.

Gregg Labs 2542 2 chnl audio processor, \$300. T DeCapua, WLKK, 18 W 9th, Erie PA 16501. 814-456-7034.

Orban 8000A Optimod, excel cond, on-air now, \$1500. A McCoy, KZEN, 1606-1/2 16th, Central City NE 68826. 308-946-3816.

Orban 8100A XT2, 6 band limiter chassis, brand new, \$1500. A Pavao, KYNO, 2125 N Barton, Fresno CA 90703. 209-255-8383.

Want to Buy

Fairchild 660 tube, fair price/trade; Aphex/B&B CH-1 compressor/noise gates, cash or trades. J Pines, 217-367-3530.

Texar Audio Prisms (2) & RCF5 card. WVIS, POB 487, Frederiksted, St Croix VI 00840. 809-778-5199.

CBS Volumax 400 manual, copy OK if legible & schematics included, will copy your manual & return it, will pay postage both directions. T Wheeler, RR1 Box 215, Carlock IL 61725. 309-376-7721.

MICROPHONES

Want to Sell

RCA 77, \$350; HME, Telex, Cetec Vega wire-less mics, BO. J Price, 2651 Globe, Dallas TX 75228. 214-321-6576.

AKG 451E (2) w/AGK pwr supply, \$450/pr. R Sanchez, KUCV, POB 83111, Lincoln NE 68501. 402-472-3611.

AKG C-60 tube condenser mic systems, mint, tube 451e w/AC701K w/cardioid capsules, pwr supply & cables (4), 2 pairs, will trade, \$800/pr or \$1525/all. J Pines, 217-367-3530.

Sony ECM-30 condenser lavalier in box, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

RCA 44, \$750; Sony AC148A 2 mic pwr sup-ply, BO. R Rhodes, POB 1550, NUNY 10101. 212-245-5045.

RCA ribbon mics including BK-11, \$400; 74-B, \$250; (2) SK-46, \$250 ea; Shure 330 ribbon, \$250; Dynamics (2) Shure 555W, \$60 ea; EV 611, \$50; EV 630, \$25; Astatic DN-HZ, \$180. Tracy Eaves, 615-821-6099 (PMs).

RCA SK-46 program velocity ribbon, new, \$325. D Miller, Airborne Audio, 11647 W 83rd Terr, Lenexa KS 66214. 913-492-8822.

EV RE50, like new, no case, includes clip, \$75. H Carter, 509-328-5729.

RCA 44 classic ribbon, \$750. R Rhodes, POB 1550 Radio City Station, NUNY 10101. 212-245-5045.

Neumann TLM-170, new, blk finish, \$1250/trade; AKG D-1000E, vgc, \$75. J Pines, 217-367-3530.

Telefunken M221A tube-type, supply & cable, excel cond, will swap for a Neumann U47let, other trades considered. E O'Brien, Imperial Snd Std, RR 31 Box 405, Terre Haute IN 47803. 812-877-2663.

RCA 77DX vintage ribbon mic, in excel cond, BO; RCA 44BX vintage ribbon mic, excel cond, BO, call after 2PM. R Kaufman, Pams Prod, POB 462247, Garland TX 75046. 214-271-7625.

RCA 77D or 77DX original shock mount, silver, \$150. E Kovach, 14269 Jackson, Taylor MI 48180. 313-285-9710.

Bruel & Kjaer 2801 condenser mic power supply for B&K tube type mics, will trade for a Sony C-37A power supply or Sony AC 148 supply. J Roper, Imperial Snd Std, RR31 Box 405, Terre Haute IN 47803. 812-877-2663.

TOA/Neumann J-1 & U-64, like new, wind-screen & cable, \$60/firm, \$250 for Neumann. M Kuehl, 1418 N Stevens, Rhineland WI 54501. 715-369-4007.

WE & Atec 633A dynamic Saltshaker mic on stand, mint cond, (2) \$60, (4) \$100; EV 627 dynamic, \$25/BO. M Saady, First City Recdg, 151-60 84 Rd 3E, Briarwood NY 11435. 718-846-2062.

AKG, Calrec, Sennheiser, and more, call for complete list. G Guarino, Sorcerer Snd, 19 Mercer, NUNY 10013. 212-226-0480.

RCA-77 DX, cleveite brush headset. E Esser-man, WFOX, Atlanta GA. 404-953-9369.

Sennheiser MD-421, new (2), \$195 ea. J Pap-pas, The Pappas Group, 209-523-5248.

Want to Buy

Vintage ribbon mics, RCA 77s/44s & tube condenser mics, especially Neu-mann/Telefunken. Jes, 5330 Kennedy, Millbrook AL 36054. 205-285-6179.

Neumann, Telefunken, etc, vintage tube mics, also RCA 44 & 77's. J Kreines, DeMott/Kreines Films, 5330 Kennedy Ave, Millbrook AL 36054. 205-285-6179.

Any condenser shotgun in working cond, prefer Sennheiser or AKG but interested in others. H Biller, 125 Lee Ste 2, Takoma Pk MD 20912. 301-270-1448.

Pre 1960 ribbon or condenser mic. R Van Dyke, Squires Ave, E Quogue NY 11942. 516-728-1327.

Neumann KM-56, U-64, U47, M-50, M-250, AKG C-12, c-12A, C-24, C-28, Telefunken U-47, ELAM-251, KM-56, trade of cash for gd cond. J Pines, 217-367-3530.

WE 373, 600A carbon mic in the 1A, B brass case. A Weiner, Britton Road, Monticello ME 04760. 207-538-9538.

Neumann U87's, U47, U67 or any kind of Neumann's or commercial mics, any cond. J Price, 2651 Globe, Dallas TX 75228. 214-321-6576.

RCA 77DX ribbon mics; RCA 44BX ribbon mics. R Kaufman, PAMS Prod, POB 462247, Garland TX 75046. 214-271-7625.

MISCELLANEOUS

Want to Sell

RCA assorted dual jack audio patch panels & patch cords; Cannon UA Series assorted male, female, cable & panel microphone connectors, BO. B Humphreys, UMC 8500, Logan UT 84322. 801-750-3133.

McMartin AM freq mon, excel cond, \$300; RCA tube type limiter, BO; IGM 85-0011 chnl cards, fair cond, \$50 ea; IGM 50-3 Carousel controller, fair cond, \$100-150. J Thomas, WLEW, Bad Axe MI. 517-269-9931.

Moos 902 VCA w/pwr supply. R Robinson. 203-269-4465.

ATT Merlin 410 phone system w/4 lines in & 10 stations, includes wires & 8 phones, 3.5 yrs old. M Hendee, KUNQ, POB 30, Houston MO 65483. 417-967-3353.

Spotmaster 20 space rack mount cart rack, BO; PR&E DT-10 (2) 10 minute UP timers, tenth & hundredths seconds, in rosewood case; Elcom Engineering composite clipper & 1 W 1x2 RF splitter, excel cond, BO; many new hammetone/alum rack filler panels, 1.75" on up, also rack mount AC outlet strips & rack screws, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Canon female chassis mount, used 3 pin XLR female on right angle bracket, 60 pcs will sell entire lot only, \$30. R Nimitz, Univ of Notre Dame, POB 1088, Notre Dame IN 46556. 219-239-6423.

NCR 7900 VDT's (2), \$75 ea; NCR line printer w/stand, \$1000; (2) Applied Digital Data System VDT's, \$50 ea; (2) Data Comm line printers, \$75 ea; Western Union Telex TTY-style terminal w/stand, \$50; (9) removable hard disks, \$100 ea. T Weeden, WMTV, 6802 Putnam, Madison WI 53711. 808-274-1515.

Presto 8K disk recorder in portable case, no manuals, mint cond, BO pls shpg. S Dela-hoyde, Box 33063, Phoenix AZ 85067. 602-937-9088.

Phasemaster T-4000-A2 rotary phase con-verter, 40 A 220/440 V 60 Hz, used 35 mos, BO over \$500 pls shpg. R Jenkins, WAVL, POB 277, Apollo PA 15613. 412-466-8481.

Radio Shack TRS-80 Model II includes 3 drive expansion unit, Okidata 82A lineprinter, \$500/BO pls shpg; Xtel AF teleprinter, needs some work, includes service manual & 79 rolls of printer paper, cond unknown, \$150/BO pls shpg. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

Reliant 16 computer phone system w/16 complete stations, built in intercom system & 6 line capability, excel cond, \$1000; also Telrad phone system w/3 stations, can expand to 8 stations, \$450. V Clough, WZFX, 225 Green, Fayetteville NC 28302. 919-486-4991.

Advent 1000 videobeam TV projector, com-plete as is, \$150, pick-up only located in NYC area, \$150. A Weiner, Britton Rd, Monticello ME 04760. 207-538-9538.

Pole contactors (3), 120 V coil, 80 A, \$50; 160 A, \$100. Dave, 209-467-0317 evenings on-ly.

Extel teleprinter AF-11, BO. M Cramer, WGBA, 1391 N Road, Green Bay WI 54307. 414-494-2626.

Sonex One natural white, unopened boxes, \$150 ea pls UPS. J Kreines, DeMott/Kreines Films, 5330 Kennedy Ave, Millbrook AL 36054. 205-285-6179.

Sola/Wilkinson single phase AC line surge protector in outdoor housing; Sola 500 VA harmonic neutralized transformer, BO; Belden 8451, several new 100, 250, 500 & 1000' rolls, black stranded audio wire & new boxes of insulated spade lug terminals, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Sparta tech manuals for xmtrs & audio products. Write for list. D Peluso, KFM Radio, POB 15223, Las Vegas NV 89114.

Tec attenuators mono pots for RCA BC7A board, gd cond, some w/cue, \$40 ea; Shalco attenuators, stereo pots in gd cond w/cue. B Arnold, 700 Productions, 105 Dorado Court So, Middle Island NY 11953. 516-924-9020.

Supply of RCA replacement parts & 7, 8, & 9 pin brand new tubes, write or call for list. J Thomas, WLEW, Bad Axe MI. 517-269-9931.

Radio Shack TRS-80 computer monitor, key-board, expansion interface, quick printer, as is, \$20. P Russell, Bowdoin College, Sills Hall, Brunswick ME 08011. 207-725-3066.

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MISC . . . WTS

TRS-80 Mod-1, expansion interface, (2) B/W mon, (3) disk drives, 5 meg hard disk, 14" wide printer, billing software, vidtex & mod-em, eng software & more, \$600/BO. F. Vobbe, GNBC, POB 5031, Lima OH 45802. 419-228-4199.

Staco 291 variable auto-transformer 0-120 V at 3 A, panel mount, new, \$20. M Kuehl, Passage Prod, 1418 N Stevens, Rhineland WI 54501. 715-369-4007.

Tandy 1000 20 meg hard drive, CM-11 color monitor, lots of software, \$1850. C Springer, KLMR, POB 890, Lamar CO 81052. 719-336-2206.

IGM equip racks, 19" w/AC strip & removable rack-rail, 22x25x70, two side panels, one door, black, \$300. L Vidoli, WEEI, Schraffts Cir, Boston MA 02124. 617-242-5900.

Gates V-22 volume indicator panel, like new w/book, \$150; Atlas MS-25 floor stands, new in boxes (2), \$50 ea; Gates BC1J high voltage transformer, like new, \$250; Collins 20V2 modulation transformer, like new, \$150. P Schneider, KPMJ, 1280 S Oxnard, Oxnard CA 93034. 805-985-8346.

RCA On-Air lights, QKI telephone interface. K Anderson, 2358 S Man St, Salt Lake City UT 84115. 801-466-3196.

Schematics for Beaucart R/P model 2 tape cart unit, also rear terminal ID connections, photo copy greatly appreciated. D Peluso, KFM, POB 15223, Las Vegas NV 89114. 702-732-7753.

Harris, RCA, Allied, etc. product catalogs; 4th & 6th editions of NAB Engineering Handbooks. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

111-C coils (4) needed. L Thomas, KMTG, POB C, Russellville AR 72801.

MONITORS

Want to Sell

FM receiver module for TFT-760 EBS unit, tuned to 102.9 MHz, BO. M Patton, WXOK, 6819 Cezanne Ave, Baton Rouge LA 70806. 504-292-4189.

TFT 730A SCA mod mon, 2.5 yrs old, including 67 kHz SCA gen for Harris TE3 exciter, both in excel cond, \$1000. D Starkey, WVHF, 350 W Main, Clarksburg WV 26301. 304-624-5525.

Belar RF amp for AM, \$75. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

McMartin TBM-4500A FM stereo mod mon, \$800. G Wachter, KFYL, 631 N 1st, Phoenix AZ 85003. 802-258-6161.

Nems Clarke 8 tower directional antenna monitor, BO or trade for AM or FM mod mon. F Vobbe, GNBC, POB 5031, Lima OH 45802. 419-228-4199.

Belar SCM-1 subcarrier monitor crystalized for 67 kHz & 92 kHz, \$990; Belar RFA-2 AM RF amp tuned to 1340 kHz, \$300. M Hurst, WICO, POB 909, Salisbury MD 21801. 301-742-3212.

TFT 730A 2.5 yrs old, SCA mon, excel cond, \$1000. D Starkey, WVHF, POB 2423, Clarksburg WV 26301. 304-624-5525.

Jennings RB7-A vacuum relay, 7 kV, 14 A DPDT, \$120. J Cunningham, KHKC, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

Want to Buy

Belar FM mod mon for xmtr site. WVIS, POB 487, Frederiksted, St Croix VI 00840. 809-778-5199.

FM monitor w/RF amp. D Van Zandt, WJLU, 2596 S.R. 44, New Smyrna FL 32069.

RCA BW-50, Belar AM-1, or AM monitor capable of measuring 100%-neg/125%-pos, will consider others, also looking for an FM monitor rod. F Vobbe, GNBC, POB 5031, Lima OH 45802. 419-228-4199.

FM mod mon, working or repairable, reasonably priced for subsequent donation to classical station, older unit OK. E Reihl, 1715 Illinois, Northbrook IL 60062. 312-272-7125.

FM stereo mod mon, any brand in gd cond. C Froke, POB 811, Deer Ledge MT 59722. 406-846-1221.

Manuals & parts for McMartin TBM 3000 & TBM 3000A freq mon; TBM 3500 & TBM 3700 mod mon; TBM 2200 stereo mod mon; TM 45-T remote metering panel. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

MOVIE PROD EQUIP

Want to Sell

Model 1036 5 Gang Ediquipt; Model 816 portable hot splicer, 16mm, Maier Hancock; Beaulieu crystal sync; Guillotine splicer, 16mm; Craig editor viewer, 16mm, KE-16; Duplikin III & IV; (2) Arion Omni-Mate, 2-Arion dissolve units; Beaulieu R-16 w/17 to 68mm lens; B&H wide angle w/case, filters, battery & charger; Singer Graflex 16mm, items are all in gd cond & are offered on a BO price, singly or all items. M Fiedler, 5346 Dupont Ave So, Minneapolis MN 55419. 612-822-0013.

RCA 35mm film recorder, excel cond, \$3500; Moviola 35mm upright (1) Moviola (1) Pix sound head, \$5000. J Gaffney, Ross-Gaffney, 21 W 46th, NNY 10036. 212-719-2744.

Kodak Marc 300 16mm pageant film projectors in working order w/spare lamps (2), \$75 ea. P Russell, Bowdoin College, Sills Hall, Brunswick ME 08011. 207-725-3066.

Kem 8 plate film editor w/16/35mm heads, \$20000. J Workman, Maritz Comm, 600 W Lafayette, Detroit MI 48226. 313-963-1200 X501.

B&H 1545 16mm sound movie projector, gd cond, \$125; B&H 1585 late mdl 16mm sound movie projector, excel cond, \$165; Neumade motorized 16mm film rewind w/foot control, includes one non motorized rewind, \$40. G Ormrod, GFO Prod, 432 E. X St, Tumwater WA 98501. 206-352-8028.

Eiki SL-0 16mm slot load projector, \$450; Maurer 05 body, 3 mags, no motor, \$750; B&H 70 DR w/Anvil case, 1" Comat, instructions, \$325. J Kreines, 5330 Kennedy, Millbrook AL 36054. 205-285-6179.

RCA 400 Senior portable 16mm projector, (2) cases, optical & magnetic sound, BO pls shpg. R Norman, RNP, 11 Glenwood, Toms River NJ 08753. 201-349-8569.

Arriflex S Model camera & any accessories wanted for Arri-S; also C mount lenses & editing equipment. H Biller, 125 Lee Ave Ste 2, Takoma Pk MD 20912. 301-270-1448.

Want to Buy

Mitchell 16 & 35mm cameras & access; Zeiss 9.5mm distagon, reasonable, need not mint. J Kreines, DeMott/Kreines Films, 5330 Kennedy Ave, Millbrook AL 36054. 205-285-6179.

Mitchell 35 & 16mm cameras & access, other prof 16/35mm cameras, Zeiss 9.5mm Distagon, reasonable, need not be mech mint. J Kreines, 5330 Kennedy, Millbrook AL 36054. 205-285-6.

RECEIVERS & TRANSCEIVERS

Want to Sell

GE portable units wchargers (2); Motorola base unit; base antenna, all 26 MHz band; CB base antenna; (2) RCA stereo TT EQ preamps, look similar to BA 26B. H. Canaday, WHOO, 1 Radio WHOO Rd, Orlando FL 32808. 407-295-3990.

Johnson ST4, like new, 91.1 67 kHz, 92 kHz, \$75. C Peterson, Showsound, 5405-A Southern Comfort Blvd, Tampa FL 33614. 813-884-1462.

ICOM IC 02AT hand held rec & trx, 140.400-162.900 programmable, tone encoder, 38 tones 67.0-250.3 all std equip includes book & shipping carton, new cond, \$300. B Boyer, WMOP, POB 3930, Ocala FL 32678. 904-732-2010.

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McKay/Dymek AM-10 wideband AM tuner, \$195. G Wachter, KFYL, 631 N 1st, Phoenix AZ 85003. 802-258-6161.

McMartin & ABS TRE-6B & TR-55D, large qty available, prices negotiable. R Giller, IL Farm Bureau, 1701 Towanda, Bloomington IL 61702. 309-557-3252.

RCA Tac Tec (2) UHF 2 chnl handhelds, one has blown RF PA, w/leather holsters & drop in charger, \$100/both. G Wilson, WGTE, POB 30, Toledo OH 43692. 419-243-3091.

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Johnson ST-4A SCA rcvrs (2) less X-tals, test-ed, \$50 ea/BO pls shpg. K Smith, 118 Barstow, Gorham ME 04038. 207-892-8776.

Beacart BC140 10 chnl programmable scanner, \$50. P Russell, Bowdoin College, Sills Hall, Brunswick ME 08011. 207-725-3066.

Want to Buy

Sequera 1 FM tuner w/scope, working cond only, also service manual. P Madnick, DTG, 5743 Corsa Ste 207, Westlake Village CA 91362. 818-706-3338.

GE ET-72A/ER-46A Executive 30 W FM radio, need manual or schematic, also units for parts/operation. M Starin, WJYY, 457 Varney, Manchester NH 03102. 603-625-1165.

25-50 MHz FM monitor rcvr tube types preferred, crystal-controlled. M Starin, WJYY, 457 Varney, Manchester NH 03102. 603-625-1165.

Aerotron 7N20 44-54 MHz 12 W FM radio, need manual or schematic, also units for parts/operation. M Starin, WJYY, 457 Varney, Manchester NH 03102. 603-625-1165.

Motorola 2-way radios to be used on my repeater freq, 462.675 & 467.675, list avail radios & write. C Hoffman, 251 174 St, Ste 404, Miami Beach FL 33160.

McKay/Dymek AM-10, 8, 7 AM tuner, wide band, working cond only, also service manual. P Madnick, DTG, 5743 Corsa Ste 207, Westlake Village CA 91362. 818-706-3338.

KLH Model 21 small FM mono table radio, working or not wanted for parts unit. J Roper, Imperial Snd St, RFR31 Box 405, Terre Haute IN 47803. 812-877-2663.

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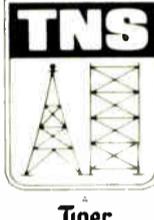
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Marti STL-8 (2) xmtrs, (2) rcvrs, xmtr combiner, rcvr combiner, in gd cond, \$2600/BO. R Pollard, KSKG, 1217 S Santa Fe, Salina KS 67401. 913-825-4631.

Catel CA-2000 FM modulator & stereo gen for cable systems, like new, manuals, \$800. J Corcoran, KWWW, POB 638, Watauga WA 98807. 509-662-7135.

Wegener 1601 mainframe, complete system for SMN country coast to coast including power supply 1683-08, 1606-02, 1645, 1646, 1622 cards & on board downconverter. Less than 1 yr & in excel cond, \$1800/BO. T Randall, KJQJ, Box 790, Brookings SD 57006. 605-692-9102.

Fairchild Dart 384 75 kHz dual program card, excel cond, \$675. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

FOR SALE

Ku-Band Earth Station

26' highway trailer, enviromentally controlled shelter, 4.5m dish, dual 300W TWT amps, 25kw diesel generator, monitoring and test equipment. Write or phone: Mr. Seaberg, 715 N. Wheaton Ave., Wheaton IL 60187. (312)-653-2421.

Microdyne 1100-FCC(X1)R(DC/L) satellite/TV receiver, EC, analog rec w/manuals, 3 yrs old, \$1200. J Mabb, WHVC, Box 123, Hudson NY 12534. 518-828-3341.

Gentner TEI-9 telephone interface dual buss 9 & 5 line opt 1A2 keyset system, \$2500. B Gellhaus, WDVTV, POB 73, Cheltenham PA 19012. 215-635-4815.

Drake ESR 2240 satellite rcvr, receives audio & video signals. P Baillon, 612-222-5555.

Comrex PLX-R single line freq extension receiver unit, \$200. M Black, WEOS, Geneva NY 14456. 315-789-8970.

TFT 7610 digital remote control system, configured for 4 wire operation, in service, 5 yrs old. P Baillon, 612-222-5555.

Fairchild Dart 384 to trade for a 75 kHz card, will consider purchase if price is right. G Dow, WBKN, POB 711, Brookhaven MS 39601. 601-833-6221.

Modulation Associates BP72 includes main chassis, pwr supply & (2) demods, one is switchable between 76.7 & 77.9 MHz, the other 64 & 76.7 MHz, does not have the downconverter. BO. D Gander, KDUZ, Box 10, Hutchinson MN 55350. 612-587-2140.

Advanced Micro Dynamics TC-8 w/speech dialup option, \$2600/BO. M Black, WEOS, Geneva NY 14456. 315-789-8970.

Marti STL-10 dual system, 4 yrs old, \$2995. T Mensendiek, KSSC, POB 409, Carthage MO 64836. 417-358-4049.

Moseley PCL-303 STL-xmtr & receiver, in gd cond, \$1000. R Bauer, KCPX, 434 Bearcat Dr, Salt Lake City UT 84115. 801-485-6700.

Moseley MRC-1600 remote control, 4 yrs old in working cond, wireline, \$2500. A Pavao, KY-NO, 2125 N Barton, Fresno CA 90703. 209-255-8383.

Wegener 1601 tuned to Translar's AM only, complete package ready to go on the air, 18 mos old, doesn't include dish or LNA, \$3295. T Mensendiek, KSSC, POB 409, Carthage MO 64836. 417-358-4049.

Comtech RCV-360 satellite receiver, \$1000. W Hanlon, WKFD, 19 Updike, Wickford RI 02852. 401-295-8808.

** BAX **

FOR SALE OR RENT

C.N. ROOD 5KHz Bandwidth Extension System turns Phone Lines into Music Lines
Exclusive No. Am. Reps

MARCOM
408-438-4273

Moseley MRC-15 studio end of MRC-15 unit, or trade for Moseley PCL-505C receiver. P Parks, KYKR, 27 Sawyer, BMT TX 77702. 409-838-3911.

TFT 7610 digital remote control system, configured for 4 wire operation, 5 yrs old. P Baillon, KMCM, 1218 Pioneer Bldg, St Paul MN 55101. 612-222-5555.

Moseley SCS-2, status control system for phone line & new TSK-3 temperature sensing kit; also spare parts kits for PCL-303/C, 505/C & TRC15 remote control, BO; McMartin TBM-250C (2) FM RF amps & pre-selector; rack mount fixed tuned AM rcvr, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Moseley PCL-101 STL system, crystallated at 950.000 MHz, operational when removed, no manual, \$1050/firm, pre-paid, UPS, insured. D Peluso, KFM, POB 15223, Las Vegas NV 89114. 702-732-7753.

Drake ESR 2240 satellite rcvr. P Baillon, KMCM, 1218 Pioneer Bldg, St Paul MN 55101. 612-222-5555.

Moseley SCG-8 subcarrier generators one tuned to 67 kHz & one tuned to 92 kHz, \$595 ea. M Hurst, WICO, POB 909, Salisbury MD 21801. 301-742-3212.

Moseley MRC-1600 (2), \$1500/ea. A Kord, WWRX, Box 325, Westerly RI 02891. 401-596-7728.

TFT 7610-C remote control, 3 yrs old, clean, works perfectly, \$2400/BO. R Koltz, KKRK, POB 995, Kernville CA 93238. 916-376-3701.

Want to Buy

SA 7300/Dart 380 digital satellite rcvr w/15 kHz dual audio card & one cue card for satellite network reception. M Hoskins, KMOM, No 210 Rainbow Motel, Great Falls MT 59401. 406-761-1000.

Marti RPT-15 or RPT-30 for sports broadcasts, prefer UHF. P Baillon, 612-222-5555.

Complete satellite system, dish downconverter, receiver-demod & audio program chnl for SATCOM IR, transponder 23, 15 kHz digital chnl, must be compatible w/present digital format. B Stuart, KSUE, 3015 Johnstonville, Susanville CA 96130. 916-251-2121.

Satellite automation system w/manuals, complete system. B Carr, WRED, 1201 Fremont Pk, Woodville OH 43469. 419-836-9696.

Marti, RMC, 2AX to include: studio unit RMC-2 AXS xmtr, RMC 2 AXT (A), RMC 2 AXT (10) or RMC-2 AXT (25). D Slaats, WADC, 703 Market St, Parkersburg WV 26101. 304-485-7354.

RCA TTR-1 remote microwave rcvr & xmtr link. A Weiner, Britton Rd, Monticello ME 04760. 207-538-9538.

Marti RMC-15S, high speed, whole or studio unit, used or new. F Bonnet Jr, WOYE, POB 1718, Mayaguez PR 00709. 809-834-4384.

Marti RPT-15 or RPT-30 for sports bcdts, prefer UHF. P Baillon, KMCM, 1218 Pioneer Bldg, St Paul MN 55101. 612-222-5555.

Moseley TR-1S remote control head, studio unit only. J Kennedy, Bond Bldg, 309 W Main, Greenville IL 62246. 618-664-3300.

Macom MA-2B or 6B, working, repairable or for parts. Also consider other 2 & 6-7 GHz, all solid state gear, sub-carrier modules also wanted. R LaFrance, WTWS, 216 Broad, New London CT 06320. 203-444-2626.

STATIONS

Want to Sell

Large AM construction permit in the West, located in major market area, great night time coverage. C Hall, KRDA, 2207 S Nevada, Provo UT 84606. 801-374-6809.

Hot Daytimer, New York State for sale 75% to sales mgr-operator, long time pro-operator mgr stays negotiable. G Dacre, WTBO, 62 Main, Florida NY 10921. 914-651-4446.

1 kW AM on 1580 kHz, authorized for FT in a city of approx 15,000, less than 3 percent unemployment & only one other locally operated station, 1 hr So of Nashville, excel opportunity for owner and/or mgmt team, 200K cash or will consider reasonable cash offer. A Wilkerson, WLIL, POB 340, Lenoir City TN 37771. 615-986-7536.

Class A FM & 10 kW AM daytimer w/PSA priced for quick sale in Price UT. J Dart, 801-637-0863 or 1752 for details.

Will sell up to 45% of 10 kW AM under construction in SW Montana. Station will serve Bozeman, Butte, Helena, Dillon & Livingston, plus NE Idaho & Yellowstone Natl Park. Also unopposed FM application for Class C now before FCC. Golden Empire Bldg, POB 710, Ennis MT 59729.

Crosspoint Latch 6112, 8 inputs plus black/colorizer, (2) full ME's chromakeyer, DSK, gd cond, \$3100. H Larson, Matrix Mobile TV, POB 536, San Luis Obispo CA 93406. 805-544-5657.

Want to Buy

Telemation TSE-200VS service manual & operators manual. W Steinbrecher, USBP, Fletc, Bldg 64, Glynco GA 31524. 912-267-1862.

Telemation/Bosch 1000 Series routing switcher, 40x20 or larger, in operating cond or as parts. T Steinke, POB 413, Milwaukee WI 53201. 414-229-5470.

TAPES, CARTS & REELS

Want to Sell

Videotape, 3/4", 15 min, \$4; 30 min, \$5; 60 min, \$7, gd cond. J Workman, Maritz Comm, 600 W Lafayette, Detroit MI 48226. 313-963-1200 X501.

Fuji 621 1" 60 min plus 30M, 3/4" 5 min, 10 min, 15 min, 30M, 60M, gd cond. J Workman, Maritz, 600 W Lafayette, Detroit MI 48226. 313-963-1200.

Betacam 20 min & 30 min tapes, Sony, Fuji, 3M, Ampex, also Betacam metal SP tape; 3/4" videotape, 5, 10, 15, 30, 60 min. J Workman, Maritz, 600 W Lafayette Bl, Detroit MI 48226. 313-963-1200.

Ampex 456 1", (3) NAB 1" reels, 406 1" 4-NAB reels, 407 1" 3-NAB reels, 456 1/4" 20-bulk hubs. S Cronen, 312-945-3555.

Audiopak A-2 carts (50), some need to be rewound. BO. Brian, WEZQ. 205-487-3261.

A&D

Cartridge Rebuilding Service

We clean, load & pack. Serviced within 10 work days! Work guaranteed!
3380 Blakey Ave., Eau Claire, WI 54701
(715) 835-7347

6th Anniversary SPECIAL

FREE: '99 Money
\$Saving Idea\$ for Your
Station" with 13 weeks of

SMALL MARKET RADIO NEWSLETTER

Send Just \$33.00
275 19th Street
Otsego, MI - 49078

Selling equity interest in AM located in dynamic growing southern Utah community, turn around opportunity has been successful but under capitalized, principles only. M Skinner, 341 S Bluff, St George UT 84770. 801-628-1000 inquiries confidential.

AM station for sale, small market nice start up, living quarters, gd fishing & hunting, studio tower all on the same land making money, 125 miles from Seattle or Portland. E Kazmark, KAZZ, POB 1389, Deer Park WA 99006. 509-276-8817.

MARATHON PRODUCTS COMPANY

Audio Cartridge Rebuilding Division

Rebuilding/reloading, like new, all brands, any length, \$1.50 ea. FOB our plant, 48 hrs delivery.

New NAB Marathon cartridges prices on request.

35 Years professional experience!

Lifetime member AES R.D.MEYERS Sr.

Manufacturers of Audio Devices, Continuous Tape Mag.

69 Sandersdale Rd.,
Charlton, MA 01507

1-508-248-3157 or 1-508-853-0988

FM Class A & AM 1000. Retiring, priced to sell, Real Estate available. P Robillard, 1803 N 1st East, Haynesville LA 71038. 318-623-0105.

Want to Buy

Looking for AM, FM or LPTV, problem stations, turnarounds, daytimers, dark, etc. OK, bdcir seeking new challenge, send complete details w/price & terms. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

STEREO GENERATORS

Want to Sell

Motorola 1300 C-Quam exciter & Motorola 1310 C-QUAM mod mon, \$5500/both. T DeCapua, WLK, 18 W 9th, Erie PA 16501. 814-456-7034.

Generators: ea 55 kW 120/208 volt, complete w/accessories, Onan 275 hrs, \$5000, US Light & Power 235 hrs, \$3500. Kenneth Polly, Polly Electric Co, 314-443-7054.

Gates M-6146, matches M-6095, gd working cond, \$350/neg. S Neumann, WRPS, POB 5343, Rocky Point NY 11778. 516-744-3704.

Wilkinson SG1E stereo gen, \$800/BO; Colins TR-17 stereo gen, \$250. WVIS, POB 487, Frederiksted, St Croix VI 00840. 809-778-5199.

Want to Buy

American Electronic Lab 2213 operators & service manual needed. D Willey, Life Bldg, POB 96, John Day OR 97845. 503-575-1840.

FM stereo gens any kind reasonable, with or without exciters. Joe, WJKL, 3342 Perry, Syracuse NY 13215. 315-673-9049.

Harris audio input control module for model TE1 or TE3 FM exciter, RCA BTS-1A stereo gen, low pass, pre-emphasis filters. C Gill, POB 371, Indianapolis IN 48206. 317-923-2800.

SWITCHERS (VIDEO)

Want to Sell

Crosspoint Latch 6139BK 16 input video switcher w/model 7239 automated controller, \$17,000/BO. E Martin, Maxwell Prod, 2208 Terrace View Dr, Louisville TN 37777. 615-970-2192.

14" reels, (30) IGM big band music 2T stereo, 7.5 ips, never played, can be split for 10" reels, \$30 ea delivered. F Anderson, KANR, 3801 5 Ave So, Freat Falls MT 59405. 406-452-2810.

Background music on 10" reels, 3.75 ips, 1/2 trk mono, 1960 & 70's, min 6 hrs per tape, (12), \$25 pls UPS. E Davison, 135 N Illinois, Springfield IL 62702. 217-787-0800.

Records, 78 rpm, vintage MOR & Big Band, also Classic 16" comm transcription discs, BO. D Kelley, KISZ, POB 740, Cortez CO 81321. 303-565-1212.

U-matic cassettes, like new, one pass only, mostly 5 or 10 min lengths, cassettes include library cases, some shipping cases, approx 350-500 avail, \$2 ea pls shpg. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

Betacam tape, 20 min & 30 min, also metal SP Betacam, 20 min. J Workman, Maritz, 600 W Lafayette, Detroit MI 48226. 313-963-1200.

Columbia Masterworks etc. classical pre-recorded tapes (16), 7" reels, 7.5 ips, original boxes, BO pls shpg. S Delahoye, Box 33063, Phoenix AZ 85067. 602-937-9088.

Want to Buy

Beautiful Music/Big Band/Nostalgia bdcrt tape library on 10" reels, mono OK, stereo preferred. K Hill, WHCB, POB 2061, Bristol TN 37621. 615-878-6279.

LP records, Easy Listening mostly & others, hopefully a station changing over to CD can fulfill our need. Buck, KBUX, POB 1, Quartzsite AZ 85346. 602-927-5111

Top 100/200 of ea yr from 1950-1980 on record, tape. Also copy of History of Rock & Roll, Drake Chanault & Chum. S Stevenson, POB 735, Blaine WA 98230. 604-531-4576.

TAX DEDUCT EQUIP

Marti stereo/dual STL system, 950 MHz band, educ station needs 2 complete systems w/combiners & antennas, prefer recent, Marti STL-10 xmtrs & R-10 rcvr units, Scala Parafacter antennas, but will consider any comparable system. B Rathman, KRVN, 200 N Monroe, Eugene OR 97402. 503-687-3370.

EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers, write Radio World, PO Box 1214, Falls Church, VA 22041, Attn: _____

HELP WANTED

Wanted (new) PD or manager of (station), need at least 5 yrs exper. G Gardner, KLGK, Delta UT 84624. 801-673-1546.

BILINGUAL SALES ENGINEER

Needed in island paradise. Must be fluent in both English & Spanish, and know radio broadcast equipment. Technical ability a plus. Great ground floor opportunity for young engineer looking for a future and adventure. Reply to:

Radio World,
P.O. Box 1214,
Falls Church VA 22041.
Attn Box #89-09-02RW

Coastal Carolina, 100K FM & 5K AM needs exper & dependable CE. M/FE/OE. Write: Radio World, POB 1214, Falls Church VA 22041. Attn: Box 89-08-03RW.

CE for AM/FM combo in Central Minnesota, present chief soon retiring after 36 yrs. L Graf, KDUZ, POB 10, Hutchinson MN 55350. 612-587-2140.

CHIEF ENGINEER

530,000-plus for exper. energetic Broadcast Engineer responsible for the technical needs of university Radio and TV facilities. Solid credentials required. Excellent benefits.

Contact Immediately:
Dr. Joe Oliver,
Department of Communication,
Stephen F. Austin State University,
Nacogdoches Texas 75962.
(409) 568-4001 AA/EOE

SCETV is seeking an exper bdcrt maint tech at WSCI-FM in Charleston SC, to be responsible for all technical aspects of station operation. Installs, maintains & oversees operation of all equipment. Acts as liaison w/xmtr supervisor, NPR engineering & other professional organizations. Tech Dir of all field projects. Associate degree in electronics technology & one year exper in the repair & maintenance of electronic equipment used in the area of radio and/or television broadcasting & production. Salary range \$19,274-\$28,911, depending on experience. Please send request for application to: FM Station Manager, WSCI-FM, POB 801, Mt Pleasant SC 29464. EOE.

EMPLOYMENT SECTION

HELP WANTED: Any company or station can run "Help Wanted" ads at the flat rate of \$25 per listing per month (25 words max). Payment must accompany insert; there will be no invoicing. Blind box numbers will be provided at an extra charge of \$2. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for display rates.

POSITIONS WANTED: Any individual can run a "Position Wanted" ad, FREE of charge (25 words max.), and it will appear in the following 3 issues of Radio World. Contact information will be provided, but if a box number is required, there is a \$2 fee which must be paid with the listing (there will be no invoicing). Responses will be forwarded to the listee, unopened.

Mail to:
BROADCAST EQUIPMENT EXCHANGE
PO Box 1214, Falls Church, VA 22041

Chief Engineer: WWSN, Dayton OH. Aggressive person for Class B FM with new studios. Resumes to Bruce Dodge, VP/GM, WWSN, 100 Pine St, Ste 300, Dayton OH 45402. EOE/MF.

POSITIONS WANTED

Assistant Mgr in medium mkt. AM looking to move on to more challenges, hands on all operations. Write to Radio World, POB 1214, Falls Church VA 22041. Attn: Box 7-3-89RW.

Innovative young programmer looking to successfully pilot your CHR station into the 1990's & beyond, call Jim, 304-233-8937.

Morning drive personality looking for new opportunity. Adult communicator, A/C & CHR background. John, 619-240-9264.

Mature, topical, witty, 7 yrs in business seeking AOR gig, smooth pipes, will relocate. Sky King, 1783 Lancer Pl NW, Wash DC 20009. 202-265-5383.

CE w/big prod voice, over 10 yrs hands-on exper seeks CE position w/prod in a top 100 market. G Morgan, 704-563-8676.

Newcomer willing to learn radio, Ham & some tech exper, willing to start from bottom. S Neumann, 3 Pearl Rd, Rocky Point NY 11778. 516-744-3704.

Degreed eng (BSEE) w/5 yrs RF exper, seeks position. Experienced w/AM/FM shortwave. Willing to relocate, US/Internat. Write to Al Muick, POB 306, Fogelsville PA 18051.

Available July 1, 7 yr professional seeks OM/PPD for startup or turnaround FM or combo. Prefer Midwest, but will relocate anywhere for progressive management. For T/R: POB 201, Pratt KS 67124, by June 15. 316-672-6959.

Personality, or other position, with creative freedom, desire fun, promotionally active employer, no state situations. Call Mike, 414-257-0940 or 602-721-7263.

Announcer in 13th market seeks PD position in smaller market, South preferred, college degree w/expert to back it up. Matthew, 813-381-4875.

Former owner/GM w/major mkt exper, SF Bay area, seeks mgmt position w/mid to large mkt station(s), prefer West Coast, exper in all phases, incl turnaround. M Seeber, 408-371-8819.

Male broadcast school grad seeks DJ position, over 3 yrs exper in music & sports, will relocate. P Rappaport, 24380 Summerhill Ave, Los Altos Hills CA 94022. 415-948-9250.

Program Director, assistant engineer, announcer, board Op/AT, 4 yrs exper in mid market station. B.S. in communication, minor in business administration, very creative, willing to relocate. Write: Radio World, POB 1214, Falls Church VA 22041. Attn: Box 89-08-01RW.

For more information on a 7 yr exper announcer, w/show prep, copywriting & production skills write: S.C.S., 312 Robertson

TAX DEDUCT EQUIP

Non-profit missionary station in El Salvador needs 8008's in any cond so long as the bases, pins & plate caps are gd, will pay shipping; also need 892R's for xmtr, will pay shipping. J Counter, YSLE, 5484 San Patricio Dr, Santa Barbara CA 93111. 805-967-6410.

Non-profit educ sta needs donation of STL system & cart machines. R Moughton WNLE, Rt 2 Box 705A, Yulee FL 32097. 904-261-7841.

Bauer Md 660, FM exciter, for spare parts, need spare xtal, 89.9415 kHz, power supply, RF amp & FM exciter modules for the Granger/Bauer mdl 660, working or not; also needed are 1-5/8" flange connectors, 90 degree elbow, 1-5/8" to 3-1/8" flange adaptor, N to 1-5/8" flange adaptor EIA 3-1/8" -1-5/8" EIA reducer. B Rathman, KRVM, 200 N Monroe, Eugene OR 97402. 503-687-3370.

High School FM station is in need of carts & EBS monitor, will pay shipping. S Tressor, Kearns H.S., 5525 S 4800 W, Kearns UT 84118. 801-964-7500.

Non-profit Radio Reading Service for the blind & print-handicapped in Connecticut needs (2) R-R's & (2) cart machines in gd cond., will pay for shipg or pick-up. Cynthia Clark, CRIS Radio, 589 Jordan, Wethersfield CT 06109. 203-246-3579.

Non-profit station w/501C status seeks donations of all equip necessary to start up new FM. CSRA Public Radio, 1518 Tara Ct, Augusta GA 30906. 404-796-2865.

Christian broadcasting company needs mod. stereo mon, SCA mon, 500 watt xmtr w/exciter, mono R/P & P/B carts, 78" transmission line, prefer solid state equip, will give receipt for tax write off. D Willey, Life Bldg, POB 96, John Day OR 97845. 503-575-1840.

Computer equipment available. Will donate for tax deduction Data General Nova/4 System w/2 tape drives, Wang computer w/2 terminals, (2) Hazeltine 1500 terminals. J Davis or D Green, KJOI, 6430 Sunset Blvd, Los Angeles CA 90028. 213-469-9968.

Christian College in Utah is looking for equip for small NCE FM station. Need 1 or 2 kW FM xmtr, antenna, tower, about 100' console, cart machines, mics, EBS, processing equip, etc. Also test & office equip along w/easy listening & Gospel music tapes & LPs. Will pay shipping or pick up. Salt Lake Baptist College, 3769 W 4700 South, Kearns UT 84118.

Group home working w/troubled teenagers looking for video equipment. R Scott, ISOT Inc, Box 35, Canby CA 96015. 916-233-4601.

Any FM under 1500 W & AM under 250 W for new school FM station, any equip to get on the air; also carts, consoles, TTs, etc. tax receipt given. S Neumann, WRPS, POB 5343, Rocky Point NY 11778. 516-744-3704.

Christian Bdctrs seek donation of any radio equip, in working cond. MTD Comm, POB 2083, Ashland KY 41105.

Equipment rack, studio furniture, tone generator, mic arm needed. K Haas, Penna Public Radio, POB 224, Uwchland PA 19480. 215-458-0780.

FM xmtrs needed for charitable organization, will pay for transportation & give receipt for fair market value. T Hunt, SOS Radio Network, 702-731-5452.

Eng student desiring donation of old bdct equip (anything) in repairable cond, will pay all shipping charges. EE student at Purdue. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

Comm College has CP for new stereo FM, need: 3 kW xmtr, antenna, iso-coupler, mod mon, compressor limiter, RT machines, TC machines, TT's. J Gaboury, Arizona Western College, 602-344-7695.

Bdct Eng student at New England School of Bdctg in Bangor ME seeks any & all old bdctg equip in working cond or in need or minor repair, will pay shipping & will send tax receipt. S Brough, POB 159, Skowhegan ME 04976. 207-474-9068 or 5171 (work evs).

Non-profit missionary station in El Salvador needs 8008's in any cond so long as the bases, pins & plate caps are gd, will pay shipping; Also need 892R's for xmtr, will pay shipping. J Counter, YSLE, 5484 San Patricio Dr, Santa Barbara CA 93111. 805-967-6410.

Expressive Comm Inc a non-profit educ corp seeks new/used bdct equip, tower, xmtr, studio. M Scheurman, WAPN, 904-677-4272.

Simpson 458 oscilloscope w/manual, old but works & looks like new, \$200/BO. R Fess, WLRB, 119 W Carroll, Macomb IL 61455. 309-833-5561.

Tek 526 vectorscope, needs HV transformer, gd CRT, complete, very clean, \$250. H Larson, Matrix Mobile TV, POB 536, San Luis Obispo CA 93406. 805-544-5657.

Fluke DMM 8050A, excel cond, \$325. J Claybrook, WMJJ, 530 Beacon Pkwy, Birmingham AL 35209. 205-943-9600.

Potomac Instruments FIM-41 field intensity meter, less than 1 yr old, mint cond, \$1950; PI AT-51 audio test set, gen & analyzer w/TC-51 case, never used, \$2950. T Eiert, POB 1576, Eugene OR 97440. 503-345-5193.

ADC patch panels w/jacks (2), ID panel in a rack mount case. Ed, 808-847-4300.

Philips PM3055 oscilloscope, 60 MHz, dual time base w/probes & manual, never used, \$800; Riser Bond 2901B lime domain reflectometer w/soft case & manual, never used, \$500. T Eiert, POB 1576, Eugene OR 97440. 503-345-5193.

Air cooled dummy load, 10 kW, like new, \$1200; 15 kW heat exch type water cooled load, excel cond, sell contained, \$1500. J Mitchell, WJKL-TV, 315-673-9049.

B&K, Tektronix, Nicolet FFT, level recorder, beat freq oscillators, spectrum analyzers, sound level meters, plus more, call for complete list. G Guarino, Sorcerer Snd, 19 Mercer, NUNY 10013. 212-226-0480.

Leader LSG-231 FM stereo signal & generator, brand new, \$400. D Agnew, KKNB, 5601 S 27th, Lincoln NE 68512. 402-421-2223.

Potomac Instruments AA-51 & AG-51 test set in gd cond, \$2900 plus UPS. Jose Fernandez, POB 3047, Bayamon PR 00621.

Houston Instruments DMP29 8-pen plotter, A/B size, DM/PL language compatible w/everything from 1-2-3 to AutoCAD, never used, \$800. J Kreines, 5330 Kennedy, Millbrook AL 36054. 205-285-6179.

TEST EQUIPMENT
We Buy and Sell

All types of late model Test Equipment
Hewlett-Packard, Tektronix, Wavetek,
Fluke R.F. & Microwave a Specialty

G.V. BELL & ASSOCIATES

San Mateo, California
1-800-366-5240
(Inside 408/415 area)
415-366-5240
FAX 415-369-9698

Tek 529 wavelorn monitors (9), clean, well maintained cond, \$200 ea. J Perez, WJKL, 3342 Perry, Syracuse NY 13215. 315-673-9049.

HP AN/USM-37A microwave test set w/standing wave ind, 415B, slotted lines 806B, H010B, X810B, 809 carriage, waveguides & metal case, \$500; Narda 25223 microwave coupler directional, 1.7-4.2 GHz, \$100. J Cunningham, KHKC, Rt 2 Box 113B, Stonewall OK 74871. 405-265-4496.

Delta 01B-3, almost new in-line bridge & RG-3, \$4000. J Battison, 2684 Slate Rte 60, Londonville OH 44842. 419-994-3849.

RCA MI 11350 B1-11A transmission measuring set, made by Daven, precision attenuators over 100dB in 0.1 dB steps, input & output Z wide range, meter calibration changes automatically w/output Z, requires external audio source, \$250. R Cone, FM Unlimited, 6731 N Hermitage, Chicago IL 80626. 312-743-5850.

Eico 277 audio generator, gd cond, \$50. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

3M 210 SG/CB signal/color bar generator, BO. R Rhodes, POB 1550, NUNY 10101. 212-245-5045.

Simpson 379 battery tester or swap Simpson mdl 377 DC meter for above. J Roper, Imperial Snd Std, RR31 Box 405, Terre Haute IN 47803. 812-877-2663.

Interstate Electronics F-34 rack mount/desktop 3 MHz function gen; Fidelipac wow & flutter meter; Harris stereo gain set; Heathkit SM-128B factory wired freq counter; Bird Thru-line & 43 slugs, 4275 sampler, 8080 25 & 50 W dry loads, BO. B Royster, KOM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Want to Buy

Distortion analyzer in gd workable cond, late tube-type unit preferred. F Kavenik, WNVN, POB 187, Vernon Hills IL 60061. 312-680-5066.

B&W H10 dist meter and/or Gates gain set, will pay up to \$150 for ea in gd clean operating cond. J Alexander, 1511 N Jackson, Russellville AR 72801. 501-968-7270.

TRANSMITTERS

Want to Sell

AM xmtr, 25 kW, 1 yr old. M Pulley, KYOO, 304 E Jackson, Bolivar MO 65613. 417-326-5257.

Wilkinson 2500 E, E Kazmark, KAZZ, POB 1369, Deer Park WA 99006. 509-276-8817.

Collins 21-E 5 kW AM's (4), Gates BC-5E (3), RCA BTA-5T (1) Choice \$8700. 1 kW AM's, Gates BC-1G (2), Gates BC-1F (3), Gates BC-1J (2), Collins 20V3 (2), McMartin BA-1K (2), \$2000-\$5500. Jerry Kautz, Armstrong Transmitter. 315-488-1269.



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TRANSMITTERS

- 1KW Gates BC-1F
- 1KW McMartin BA-1K
- 1KW Harris BC-1G
- 5KW RCA BTA-5H
- 5KW Collins 21E
- 5KW Gates BC-5E
- 10KW RCA BTA10H
- 10KW Collins 21M
- 50KW Continental 317C

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Continental 814-R1 2.5 kW FM w/exciter, ERI 3 bay antenna & 250' 1-5/8" coax at 93.5 MHz, antenna & coax on tower, like new w/extra tubes, make offer. W McCan, KBHT, 101 S 4th, 3rd Fl, Crockett TX 75835. 409-544-9694.

Harris FM5H 5 kW FM tuned to 89.5 MHz, 9 yrs old w/spares & documentation, excel cond, \$14,000. G Glibreath, 702-454-2085.

Continental Electronics 315R-1 5000 W AM w/solid state exciter, \$32,000. D Jack, Tamarack Comm, 5410 SW Macadam Ste 240, Portland OR 97201. 503-221-5166.

RCA BTA 1MS, \$3500; Moseley stereo generator, \$500 & McMartin B-910 exciter, \$850. C King, KIXZ, 1703-B Avondale, Amarillo TX 79106. 806-335-1954.

TUBES

- 5762 4cx5000
- 3cx 10,000
- Any EIMAC Tube



EMCEE HTU-100 UHF-TV LPTV/translator 100 W w/exciter/upconverter, many extras, clean, vgc. Sue Jenkins, WKOQ, 1100 W 42nd St, Indianapolis IN 46208. 317-283-5800.

Harris/Gates FM-10H3 10 kW w/TE-3 exciter w/composite STL interface, 20 yrs old, well maintained, in service as aux xmtr. A Chambers, WAWZ, Box 14, Zarephath NJ 08890. 201-469-0991.

RCA BTA 50F 50 kW AM, fully operational, in storage for immed removal. Complete wall tubes, schematics, floor plans plus many extras. \$18,000 plus shpg; RCA BTA 5F 5 kW AM, excel cond, wall floor layouts, manuals, tubes, \$10,000 plus shpg; RCA mod transformer for BTA 5F xmtr, new in original crate, \$600 plus shpg. G Heidenfeldt, 2880 W Lake, Wilson NY 14172. 716-751-6187.

30 KW VHF
RCA TTV 30C
TUNE CH 30-52



PCB 1000/S power reduction unit, set to 350 W input, 63.7 W output, tuned to 1150 kHz, complete w/coaxial switch. J Sidote, WELC, POB 949, Welch WV 24801. 304-436-2131.

Harris TE-1 FM exciter tuned to 97.5 kHz equipped w/Orban baseband interface card, \$800. M Hurst, WICO, POB 909, Salisbury MD 21801. 301-742-2312.

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ITS 1615 & HMD12 H&V antenna, BO. W Ellis, KOZK, MPO Box 21, Splfld MO 65801. 417-865-2100.

30 W digital FM exciter, field selectable, 1/2 price. J Phillips, WZOM, 408-1/2 Clinton, Defiance OH 43512. 419-784-1059.

Acrodyne T210M/V LPTV xmtr 10 W low band VHF, low hrs, avail immed; Scala Yagi-5 element ant, \$5000. S Olson, WSSM, 1 Odana Ct, Madison WI 53719. 608-276-9454.

Harris 3.5 kW, 3 yrs old, excel cond w/Harris exciter & Orban 8100A Optimod, must sell for upgrade, on 967; also includes ERI single bay antenna, BO. R Wachter, KNSX, 3418 Douglas, Florissant MO 63031. 314-872-2660.

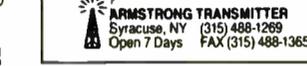
Trade RCA 20 kW for Harris or Collins 1-10 kW xmtr. J Mauk, KMJ, POB 70002, Fresno CA 93744. 209-266-5800.

RCA 50 kW AM (2), spare tubes & parts. O Borgen, WMIN, POB 25130, St Paul MN 55125. 612-739-4433.

Harris FM 2.5 kW w/Versa Count exciter, top cond, \$16500. G McCoy, KZEN, 1606-1/2 16th St, Central City NE 68826. 308-946-3816.

FM TRANSMITTERS

- 1KW Gates FM 1B
 - 1.5KW McMartin BF1K
 - 3KW CSI 1986
 - 5KW RCA BTF-10D
 - 5KW Gates FM-5B
 - 10KW RCA BTF-10D
 - 10KW CCA 10,000D
 - 15KW AEL FM 15KD
 - 20KW RCA BTF20E1
 - 27.5KW McMartin BF-25K
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Gates BC-5B (2) 5 kW AM, excel cond, one tuned to 1590 kHz the other to 580 kHz, plenty of spares, BO. D Barton, KMTI, POB K, Monti UT 84642. 801-835-7301.

Harris TE-3 FM 10 W exciter, w/Orban baseband card, tuned to 104.1, \$1400/BO; Collins A825W 10 W, tube type exciter, needs minor work, tuned to 99.5, \$650; Harris MX-15 exciter tuned to 106.1, recently aligned & calibrated by Harris, \$4500/BO. WVIS, POB 487, Frederiksted, St Croix VI 00840. 809-778-5199.

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Sintronics S1-F 1.5-2.0 kW FM xmtr, (2) exciters plus spare parts, new IPA & new rebuilt final, 6 mos old, single phase 220 V, now on-air, you pick up, w/manuals. \$14,500/BO. F Morton, KEYB, POB 1077, Altus OK 73522. 405-482-1555.

Gates M-6095 FM exciter, 10 W, gd cond, w/manual & 94.1, \$350/neg. S Neumann, WRPS, POB 5343, Rocky Point NY 11778. 516-744-3704.

AM major manufacturers late 2.5 or 5kW, with step down; also a 3.5-5kW and a 500 to 1000 W. L Maierhofer, WTGC, 101 Armory Blvd, Lewisburg PA 17837. 717-523-3271.

Collins 20 kW xmtr & 550' guyed tower in gd cond. D Radke, KWWK, 1220 4th Ave SW, Rochester MN 55902. 507-288-1971.

FM xmtr, 2-4 kW, will pick up at your site; also a 10 kW FM xmtr for EDFM. D Van Zandt, WJLU, 2596 S.R. 44, New Smyrna FL 32069.

TV xmtr for 432.25 MHz ATV operation, any cond. G Kirby, WMYR, 13613 US 36, Marysville OH 43040. 614-261-8871.

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TEST EQUIPMENT

Want to Sell

HP 330B dist analyzer, tube type, gd cond, \$50. T Weeden, WMTV, 6802 Putnam, Madison WI 53711. 608-274-1515.

Techn-Physic Laboratorium ME 102B wow & flutter meter, made in Germany, serviced by Gotham Audio of NY, BO. C Kimbrough, WRXO, POB 1176, Roxboro NC 27573. 919-599-0266 aft 6PM.

Delta TCA-5-EX RF ammeter, excel cond, AM Delta base current meter w/toroidal current transformer, calibrated in Delta Lab on 6/16/87, includes all documentation & calibration data in original box, \$400. P Stage, WKVI, POB 10, Knox IN 46534. 219-772-6241.

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FM xmtr, 5 kW, any age or cond, RCA TTU-2 Series A, C, E or D & TTU-44 exciter, working, any cond or for parts. J Kautz, WJKL, 3342 Perry Rd, Camicus NY 13215. 315-673-9049.

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RCA BTE 10-C crystal ovens; Gates BC1F AM xmtr; Raytheon RA1000, parts & info; Gates 25-A AM info. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

AM 1 kW in gd to excel cond at inexpensive price. K Hill, WHCB, POB 2061, Bristol TN 37621. 615-878-6279.

Any FM xmtr needed for high school, willing to pay reasonable price or gladly accept donation. J Mangold, KTBD, 100 Champions, E Paso TX 79912. 915-594-9441.

UHF & VHF TV translators, 10-100 W, will consider old UHF band 70-83 equip. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

Low band 2-6 VHF TV xmtr, 100 W to 11 kW, exper eng can handle removal; RCA TTU-1B or TTU-2A UHF TV xmtrs for parts. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

RCA BTE 15A FM exciter w/stereo & SCA generator. WJON, POB 220, St Cloud MN 56302. 612-251-4422.

TUBES

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Eimac 4CX3000A brand new, \$1200. K Carver, Project Light/Snd, 1418 Amber, Killeen TX 76543. 817-699-1530.

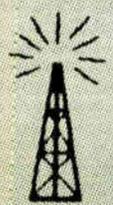
ELECTRON TUBES

Partial List: 6623, 23791, TH150, 6425F, 5604, 6696, 6697, 5681, 5682, 5671, 7804, 3CX10, 000H3, 3CX20, 000H3, 4CS5000A, 4CX35, 000C

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Want to Buy
VA651A rebuildable or working cond for use in RCA TTU-2 xmtr. J Kautz, WJKL, 3342 Perry Rd, Camicus NY 13215. 315-673-9049.

RCA 6181, used as final in RCA TTU-1B UHF TV xmtr. J Powley, 1536 Logan, Altoona PA 16602. 814-944-8571.

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Want to Sell
Denon DCD 810 CD players, used 1 month (2), \$240. JA Bowab, WDLT, 2402 Wolf Ridge, Mobile AL 36618. 205-344-3698.

QRK turntables (2), \$50 ea/BO. B Burnham, WHBT, 1293 Floyd, Jackson MI 49203. 517-782-1510.

Russco Studio Pro B (3), gd cond w/one arms, \$100 ea. M Black, WEOS, Hobart WS College, Geneva NY 14456. 315-789-8970.

Technics SL1500 MK II, in gd cond, \$275. E Kain, WNOE, 529 Bienville, New Orleans LA 70130. 504-529-1212.

Presto 6N (2) disc cutting lathes w/several lead screws in console, \$1300/both. E O'Brien, Imperial Snd Sld, RR 31 Box 405, Terre Haute IN 47803. 812-877-2663.

Stanton 210 phono preamp, \$100; Micro-Trak 2604 (2), \$75 ea. G Gilbreath, 702-454-2085.

Astatic X26 crystal recording head, w/instructions, new in box, \$50/BO. J Workman, Maritz, 600 W Lafayette, Detroit MI 48226. 313-963-1200.

Micro-Trak 303 (2) tone arms, gd cond, BO; Audio Technica turntable bases (3), BO; Technics SP-15 (2), gd cond, BO; Audio Technica ATP-12T tone arms, gd cond, BO. D Wolfe, KRIX, 901 E Pike Blvd, Weslaco TX 78596. 512-968-1548.

Technics SP-10 12", 3345 remote start, working cond, BO pls shpg. R Norman, RNP, 11 Glenwood, Toms River NJ 08753. 201-349-8569.

Stanton 310 preamp, many new Stanton 681S, D81S, 600/610 cartridges & styli, Stanton 500 replacement styli & Shure V-15III, BO. B Royster, KQM, 1019 Cordova, San Diego CA 92107. 619-223-3413.

Shure M95 cartridges, various types, \$9.95 ea; Stanton 500EE cartridge, \$9.95; Pickering NPAC cartridge, \$9.95; numerous styli, current & obsolete, in stock, generic & brand name, from \$1.95 up. Triode Electronics, 2010 W Roscoe, Chicago IL 60618. 312-871-7459, Fax: 312-871-7938.

Want to Buy
Rek-O-Kut B-12-H shock mounts, idler wheel, parts; Rek-O-Kut Micro-poise tone arms & parts; ORK 12-C parts, espec idler wheel & shock mounts. M Kuehl, Passage Prod, 1418 N Stevens, Rhinelander WI 54501. 715-369-4007.

TV FILM EQUIP

Want to Sell
Numerous pieces of equipment including Gates/Harris TE-201 color film camera, Quanta character gen, RTI film editor & film cleaner, projector, power supply, waveform monitor, videotape recorder & more, too much to list, call for more details and prices. J Fuehrer, NTV Network, POB 220, Kearney NE 68848. 308-743-2494.

B&H JAN 614 EVMS light weight pedestal mount, 16mm optical & magnetic sound telecine projector, complete w/manuals, excel cond, \$795. G Ormrod, GFO Prod, 432 E. X St, Tumwater WA 98501. 206-352-8028.

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Telechrome 3200 video dist amps, rack of eight, gd cond, BO. M Cramer, WGBA, 1391 N Road, Green Bay WI 54307. 414-494-2626.
Hotronic AD51-TFS frame sync/TBC, \$4000; Thomson-CSF 7011 chroma insert keyer, \$1250. H.M. Dyer Electronics, 2982 Wixom Rd, Milford MI 48042. 313-685-2560.

Panasonic editing system, 1/2" VHS, under warranty until 11/89, less than 100 hrs, (2) AG-6500 decks, AG-A750 controller, \$6700; Hitachi 13" color under warranty & (2) CT1386B, \$450/both; Fuji T-30 VHS w/bk hard-cover case (45), \$330 per unit, price for entire lot \$7000. D Murray, Murray Video Prod, 1918 Sloan, Latrobe PA 15650. 412-539-0465.

BTX 4500 non-chase synchronizer, \$595. G Freeman, Pranava Prod, 1227 Sierra Alta Way, Los Angeles CA 90069. 213-457-8390.

Sony FP-62 video projector, 30" to 200" w/built-in tuner, includes shipping case, \$750. R Nimitz, U of Notre Dame, POB 1088, Notre Dame IN 46556. 219-239-6423.

BTX 4500 time code synchronizer, BO. R Rhodes, POB 1550, NNYNY 10101. 212-245-5045.

Cohu 2614-400 video waveform multiplexers (2), parade display, w/manuals, \$50 ea; RCA MI-557301 module extender, \$25; Trompeter LPL-75 video patch plugs, 1" spacing, new, \$3 ea; Vital VI-500 color proc amp w/cable equalization, w/manual, \$75. B Humpherys, UMC 8500, Logan UT 84322. 801-750-3133.

IVC/Quantel TBC-2000 direct-only, wideband 4-line TBC (2), one working well & one for parts, manual included, \$1200/BO. G Odell, TFG, Box 9, Wethersfield CT 06109. 203-527-2972.

Complete mobile audio/music video system, JVC, Zenith, Numark, EV, Meteor, (2) projectors, (2) screens, (4) speakers, 1600 music videos, lights, \$10,000. J Whitehead, WQBE, POB 871, Charleston WV 25323. 304-744-9691.

Want to Buy
Sony 5850/5800/RM-440 wanted in gd cond. Have assorted equip to trade, or cash; also want video sync gen preferably w/rack. R Lawrence, Moonshadow Video Prod, 4280 Reston Rd, Roseburg OR 97470. 503-679-8966.

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Want to Sell

JVC CR4400U 3/4 port recorders (4) w/access, \$800 ea/BO; (3) Sony RM-430 edit controllers, \$500/BO; JVC BR-6400U VHS recorder, \$1500/BO. T Quinn, Monte Vista Sld, 208 Cherry, Capitola CA 95010. 408-475-0423.

Sony/Ampex 1", vgc, \$24,000; Sony VO-2600 U-matic VTRs, gd cond, \$350; blank 3/4" Betacam tape, \$4 ea. Ugly George, 212-877-2200, M-F, 9AM-5PM, Fax: 212-941-0956, M-F, 9-5.

RCA MI-4069B RCP for RCA TR-50 VTR, \$25. B Humpherys, UMC 8500, Logan UT 84322. 801-750-3133.

Sony VO-6800 portable 3/4" U-matic VTR, AC-PS, 8-NP1's w/charger, Kangaroo case/strap incl, \$2950. S Christian, Masterpiece Video Prod, 715 Cornwall, Silver Spring MD 20901. 301-439-5731.

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Panasonic NV-9200 3/4", NV-9100 (2), 3/4" National NV-9200 PAL (2), 1/2" Panasonic AG-6200's, NV-8200's VHS Nordmende PAL VHS (4), National NV-8600 (2) PAL VHS, Sony PAL Beta (2), all units need work, call for details. J Garvey, Video Yesterday, Box C, Sandy Hook CT 06482. 203-744-2476.

Want to Buy

Panasonic NV-9240 or Panasonic NV-9600, 3/4" VTR, must be in gd wrking cond. A McPeck, POB 444, Rogersville TN 37857. 615-272-4827.

Ampex portable 2" quad VTR; Ampex color mdl 1200, low band color VTR; Ampex, IVC old format 1" VTR. A Weiner, Britton Road, Monticello ME 04760. 207-538-9538.

Sony BVH-2000, 1" Type C, Type 2 control panel or Type 3 internal TBC, gd wrking order. J Stephens, KFPA, POB 1400, Amarillo TX 79189. 806-383-2226.

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For information, contact **Davida Rochman at Shure Brothers: 312-866-2542**, or circle **Reader Service 88**.

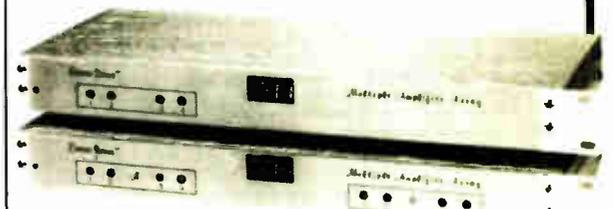


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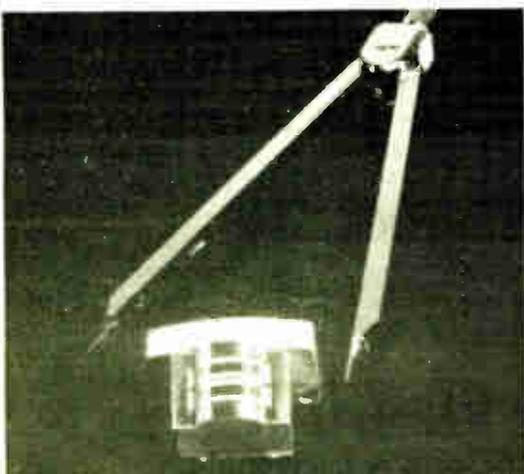
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For information, contact **Sam Wenzel at ATI: 215-443-0330**, or circle **Reader Service 81**.



Tape heads

Ultralife tape heads by Sprague Magnetics are inorganically bonded for wear resistance and electrical performance using a patented manufacturing process.

For information, contact **Darrell Sprague at Sprague Magnetics: 818-994-6602**, or circle **Reader Service 98**.



Phono connector

The new ProFi phono connectors, by Neutrik USA, have a ground shell which retracts into the connector body as the signal post is inserted into the phono jack.

When the connector is removed, the ground breaks last to prevent static and noise.

For information, contact **Bill Dorman at Neutrik USA: 609-327-3113**, or circle **Reader Service 73**.



Digital audio terminal

Corporate Computer Systems Inc. introduced the new VSAT digital audio terminal (VDAT).

The VDAT uses digital signal processor technology to provide two full duplex audio paths and one full duplex data path over a single 112 KB VSAT data channel.

For information, contact **Tim Chase at Corporate Computer Systems: 201-946-3800**, or circle **Reader Service 92**.

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Radio World

September 6, 1989 Issue Use until December 13, 1989

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014	034	054	074	094
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016	036	056	076	096
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018	038	058	078	098
019	039	059	079	099
020	040	060	080	100

ADVERTISER INDEX

Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.	Page No.	Advertiser	Reader Service No.
9	3M	12	45	BSW	37	17	Orban	5
43	AKG Acoustics	91	4	Burk Technology	42	40	P.A.S.	99
26	Allied Broadcast	40	48	Cablewave	66	47	Pacific Recorders & Engineering	
38	Allied Broadcast	53	12	CCA	67	50	QEI	84
39	Allied Broadcast	89	13	Communications Data Services	41	49	Radio Systems	29
39	Allied Broadcast	89	44	Cortana	93	16	Radio Systems	78
7	Allied Broadcast	83	42	CRL	65	19	RF Specialties Group	31
8	Allied Broadcast	52	51	Current Tech	30	52	Ron Radio	16
20	Allied/Dynamax	57	40	Cutting Edge	69	13	Shure	59
6	Allied/Technics	7	46	DataWorld	54	26	Sine Systems	15
32-33	Arrakis Systems	63	37	Delta Electronics	11	53	Sono-Mag	17
28	ATI	62	36	Di-Tech	2	24	Sprague Magnetics	27
7	ATI	50	34	Express Group	80	72	Studer Revox	68
31	Audio Bdcst Gp	33	29	Fidelipac	72	10	Studer Revox	13
42	Audiomedia Associates	87	27	Gentner	10	41	Tannoy	28
53	Audiopak	96	36	Harris	71	22	Target Tuning	22
18	Auditronics	45	8	Hnat Hindes	76	21	Tascam	26
45	Belar	43	53	Hnat Hindes	46	23	Tascam	8
3	Bradley Broadcast Sales	19	8	Inovonics	34	25	Tascam	32
15	Broadcast Electronics	61	11	Kintronics	38	44	Tri-Tech	58
24	Broadcast Services	3	63	LPB	25	19	Western International Comm	70
3	Broadcast Electronics	64	30	Motorola	23	2	Wheatstone	24
12	Broadcasters General Store	14	46	National Supervisory Network	85	64	Wheatstone	56
35	BSW	47	14	Northeast Bdcst Labs	55	39	Will-Burt	60
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The brand new console with a ten year track record.

Start with one of the longest-running success stories in the radio console business: the LPB Citation I. Then add the combined wisdom of ten years of user feedback and make that "wish list" of features standard. Now you've got the idea behind LPB's new low profile Citation II console.



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Before you buy *any* studio console, talk to a LPB Citation user (there are hundreds of them, so finding one won't be hard.) Then

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WODS OLDIES 103

CBS Radio, A Division of CBS Inc.
10 Winter Street
Boston, Massachusetts 02109
617-426-2200

Dear Gary:

It's 2½ years since we moved into our new location at Boston's Downtown Crossing. It's been 2½ years since we purchased the Wheatstone A-500 and the SP-5 consoles; and it's been 2 years since we became the No. 1 station (25-54 adults). The relationship speaks for itself.

Our format of Oldies plays the best music from the mid-fifties to the late sixties. We have totally captivated Boston (the 7th biggest market in the country), and the rest of Massachusetts, as well as Maine, New Hampshire, Rhode Island and Connecticut.

WODS, being a CBS owned and operated station, maintains the best quality control available. Our sound is second to none. We found the secret of being loud but clean. Our audio processing chain is tightly guarded by our Program Director, Dave VanDyke, under the watchful eye of our General Manager, John Gehron.

The most versatile and operated equipment in the station are the Wheatstone boards. The custom features, pull-out modules (without unplugging the board), easy readouts and reliability make the Wheatstone consoles an every day pleasure. When you add the sound quality with its low noise and distortion factors, it doesn't surprise me as to why we are the best sound in Boston.

From a technical standpoint it is always nice to have and operate good gear.

Sincerely,

Charles (Buddy) Giordano
Charles (Buddy) Giordano
Engineering Supervisor

Mr. Gary Snow
Wheatstone Corp.
6720 V.I.P. Parkway
Syracuse, NY 13211

July 12, 1989

 Wheatstone® Corporation

6720 V.I.P. Parkway, Syracuse, NY, 13211 (TEL 315-455-7740 / FAX 315-454-8104)