RADIO IN VEGAS: OUR NAB2000 PREVIEW ISSUE

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Page 99

Radio World®
The Newspaper for Radio Managers and Engineers
March 29, 2000

NEWS MAKER

FCC's Solomon Promises More Efficient Enforcement

"My dog did it."

That's one of the more colorful excuses FCC Enforcement Bureau Chief David Solomon and his staff have heard as they investigate complaints of commission rule violations.

The commission recently reorganized its enforcement efforts, bringing activities that had been scattered in several industry bureaus into a cohesive unit staffed by 290 employees.

Solomon has been with the agency since 1987. In the past he worked in the Office of the General Counsel when current Chairman Bill Kennard led that office and most recently as deputy general counsel.

As head of the new Enforcement Bureau, which opened in November, Solomon has pledged to speed up the decision-making process. He says no longer will each decision be reached only after several months — or years — of a paper process.

Stations say it's common for their cases to take several months, and sometimes years, to be resolved.

"If we're doing an investigation, a station has a right to know quickly if there's nothing ... that we're done with it," said Solomon. "Regardless of what the answer is, the fair thing is to get to it quickly and get an answer."

The new bureau is focusing particularly on enforcement in three areas — spectrum efficiency; local competition in telecommunications, both wired and wireless telephones; and consumer protection.

David Solomon

Solomon spoke to **RW** News Editor/Washington Bureau Chief Leslie Stimson about how these changes are likely to affect stations, and especially how the commission intends to enforce its low-power FM rules.

RW: Broadcasters are very concerned

See SOLOMON, page 5 ▶

NEWS ANALYSIS

Suppliers Gear Up for LPFM Sales

by Randy J. Stine

Many broadcast equipment suppliers and manufacturers are predicting a mini-sales boom thanks to the creation of a new class of low-power FM stations.

If opponents fail to stop it, more than 1,000 new LPFMs could be allocated in the United States. Industry officials put the potential RF and studio equipment sales market in the range of $10 million to $12 million.

Equipment suppliers and manufacturers interviewed for this story agreed most low-power licensees — including community organizations, churches and schools — will be operating with extremely small budgets.

Typical costs

Dollar estimates for studio and RF equipment run from $10,000 to $20,000 to get a typical LP100 on the air. The price tag will be a little less for an LP10. The figures exclude tower and building facility costs. Experts said that

See LPFM, page 8 ▶

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World Radio History

◆ NEWSWATCH ◆

$10,000 Gear Fine Imposed

WASHINGTON The FCC has fined former pirate radio operator Leslie Brewer and his company, Leslie D. Brewer's 2-Way Radio, $10,000 for selling an unauthorized FM transmitter. Officials with the commission's Enforcement Bureau said Brewer sold a fully assembled, 20-watt transmitter capable of operating in the FM band to an undercover commission agent. The commission did not authorize the transmitter, and the device had no FCC identifier number affixed to it.

Brewer previously operated an unauthorized FM station on 102.1 MHz in Tampa called "Tampa's Party Pirate." The FCC and the U.S. Marshal's Service seized equipment from that station in November 1997. The U.S. District Court for the Middle District of Florida recently upheld the validity of that seizure.

Clear Channel/SFX Valued at $4.4B

Clear Channel Communications Inc. will own radio, billboards and entertainment venues in more than 30 markets if a deal announced in February is approved.

Clear Channel intends to buy live entertainment venue owner and operator SFX Entertainment Inc. for a deal valued at about $4.4 billion.

Including pending acquisitions, Clear Channel would own radio stations and/or billboards in nearly every market where SFX owns entertainment venues. Clear Channel owns more than 860 radio stations; SFX owns or operates 120 entertainment venues in 31 of the top 50 markets.

Clear Channel Chairman and Chief Executive Officer Lowry Mays said the agreement "leverages the marketing and promotional strength of Clear Channel's broadcasting and outdoor advertising platforms and adds a new component to the marketing solutions."

Going by the value of Clear Channel stock at the end of February, the deal is worth about $3.3 billion in stock plus Clear Channel's assumption of $1.1 billion of SFX debt.

Subject to regulatory approval, the deal is expected to close in the third quarter of this year.

See NEWSWATCH, page 5 ▶

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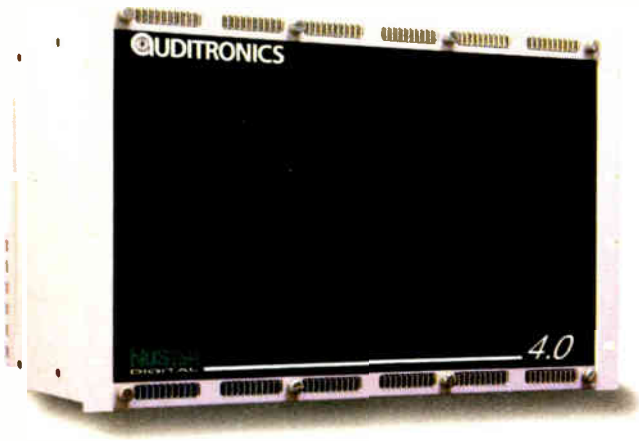

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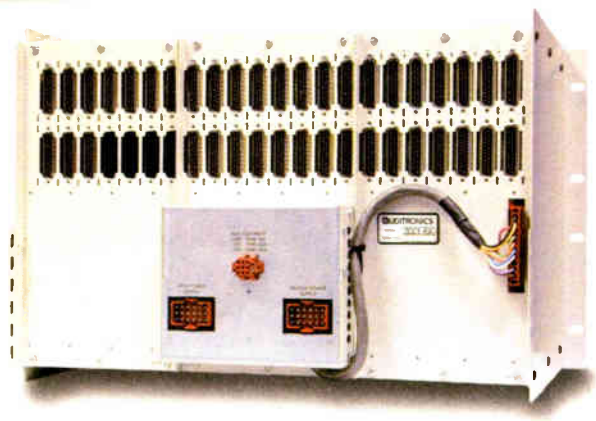

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DIGITAL NEWS

$12.9 M Loss For XM in Q4

WASHINGTON XM Satellite Radio Inc. reported a fourth-quarter operating loss of $12.9 million, or 27 cents a share, for 1999. That compares to an operating loss of $4.2 million, or 62 cents a share, for the fourth quarter of 1998.

The subscription satellite-delivered digital audio broadcasting service went public in the fourth quarter of 1999. It raised gross proceeds of $123 million through an initial public offering of 10.2 million shares in October 1999. XM raised an additional $240 million (gross) in equity in January 2000, through another offering of 6.4 million shares of stock.

SFX to Help Build XM's Brand

WASHINGTON SFX Entertainment Inc., soon to be part of Clear Channel Communications (see page 2), will demonstrate XM Satellite radios at its entertainment events.

The goal is to build brand awareness and subscribers for XM's service, planned for launch in early 2001.

Clear Channel is an investor in XM Satellite.

Under an exclusive agreement, XM kiosks at SFX venues will offer personal demonstrations of XM's service. XM will gain exposure through signage, video spots, branded premium giveaways such as XM CD samplers and public address announcements. XM will have a presence on the SFX.com portal and will have print ads in SFX entertainment guides.

Robert F.X. Sillerman, executive chairman of SFX, said the agreement is more than traditional corporate sponsorship. "Our companies occupy the same space in four categories: music, theater, family entertainment and sports. And, among live entertainment providers, we offer the broadest range of assets and audiences. As a result, our audiences mirror each other."

XM Radio President and CEO Hugh Panero called the agreement a "dream marketing relationship" to reach the logical, early adopters for XM's service.

SFX claims millions attend its events annually.

— Leslie Stimson

Corrections

The last sentence of the Newswatch item on page 5 of the March 1 issue was cut off. The sentence reads, "The FCC staff said when deciding whether broadcast material is indecent, Commissioners draw on their knowledge of the views of the *average* listener."

On page 5 of the Feb. 16 issue, in "Y2K Okay, Problem Dates Remain," a quote attributed to Susquehanna Radio Corp. Senior Vice President Charles Morgan about a station that went off the air as a result of Y2K should have been attributed to Entercom Vice President of Engineering Marty Hadfield.

DIGITAL NEWS

IBOC Prepares for NAB2000

by Leslie Stimson

By the time broadcasters attend NAB2000, a volunteer group of representatives from all facets of the radio industry may be done with its initial evaluation of two systems being developed for in-band, on-channel digital audio broadcasting in the United States.

The DAB Subcommittee of the National Radio Systems Committee, a standards-setting group, had hoped to know by the end of March whether data from the two systems submitted — from USA Digital Radio and Lucent Digital Radio — showed whether each system is significantly better than analog AM and FM.

If at least one system meets the NRSC criteria, the next step would be to proceed to the so-called "phase two" of the evaluation process, which is expected to include direct system comparisons.

Comparison shopping

"Our position has been, and Lucent's position has been, if you get over that hurdle, that some sort of head-to-head testing makes some sense," said USADR President and CEO Robert Struble.

"There are a lot of details to be figured out on how that would work," he said.

The IBOC proponents hope a standard will be set by the end of this year and that receivers would be available for consumer purchase in 2001.

The timing would dovetail with a pending FCC rule making on digital audio broadcasting. The FCC accepted public comments on that earlier. While not limiting the scope of the rule making to IBOC systems only, the commission said it is predisposed to support an IBOC system for the United States if that system works.

At NAB99, Harris Corp. and other industry members called for an alliance among the IBOC proponents. Since then, USADR has teamed up with former competitor Digital Radio Express, leaving two competitors.

Both Lucent and USADR have said they would become allies again if it made business sense. Both companies previously took part in a joint development agreement.

USADR also is collaborating with Digital Radio Mondiale to develop an AM system that they hope could be used as a worldwide AM DAB standard.

DAB proponents have another factor to worry about. The FCC is about to license potentially 1,000 or more low-power FM stations.

Both IBOC proponents have said they were concerned about potential interference from the new low-power stations.

"LPFM will cause some Swiss cheese in the spectrum," said Struble.

"When you drop in new transmission and new energy into the spectrum, you're going to cause interference.

"Does that mean we won't have a system? Of course not. Does it mean DAB's not going to be as good as if LPFM wasn't there? Yes, but it's not for us to decide if LPFM is or is not in the public interest."

Shown is Kenwood's concept AM/FM/IBOC radio with USADR's new 'iDAB' brand logo.

At NAB2000, USADR plans to air a live IBOC FM signal on Las Vegas station KWNR(FM) from the station's transmitter 12 miles from the Las Vegas strip.

LDR planned an over-the-air demo of its FM system with a Harris STL.

Nautel Ltd. will have demonstrations of USADR's and LDR's AM systems in its booth. Broadcast Electronics and QEI Corp. will demonstrate USADR's FM system. Harris Corp. will show both USADR's AM and FM systems and LDR's FM technology. Armstrong will exhibit LDR's FM system.

USADR also plans to display a prototype Kenwood "iDAB" receiver, the brand USADR plans to use to describe IBOC DAB to consumers.

Lucent Digital Radio also plans to exhibit at NAB2000.

Although radio's transition to digital will among the topics at several sessions, some panels are devoted exclusively to it.

DAB sessions in the Broadcast Engineering Conference are "DAB Worldwide Perspectives," Sunday, April 9 at 9:30 a.m., and "Implementing DAB and the Future of Radio" at 1 p.m.

A third DAB session, part of the Radio Management Conference, is "The ABC's of DAB," Tuesday at 9 a.m.

Some panels at NAB2000 are devoted exclusively to radio's transition to digital.

World Radio History

Confessions of an E-Mail Pig

From the Editor

Paul J. McLane

You wouldn't know it to meet me.

Walking down the hall on the third floor of IMAS HQ, I look like any other denizen of the editorial slave galleys — harried, hurried, just a bit rumpled, red felt-tip stains on the fingers, always another deadline just ahead, another new piece of gear to check out.

Somewhat distracted, perhaps, but a normal fellow all in all.

But sit me down in front of my Compaq Deskpro, click on the GroupWise Mailbox logo, put the mouse in my hand and I turn into E-Mail Pig.

They should form a support group for people like me.

"My name is Paul, and I'm a recovering e-mail abuser."

I can't stop myself. Checking e-mail is the first thing I do every morning, before I listen to voice mail, turn on my radio or let my Starbucks coffee cool (tall drip, Valencia syrup).

If I have an important message for someone, I want to send an e-mail. Forget the phone, forget knocking on the next door down the hall.

I e-mail in the morning, I e-mail after lunch. I e-mail in my sleep.

I manage by e-mail, too.

★ ★ ★

Let's see what's in the hopper this morning.

Here's one from Paul Kaminski, a contributor who lives in Florida but travels the country for Motor Sports Radio.

God knows where Paul K. is writing from today, maybe Daytona or Dover Downs, but he's on the job for **RW**. He wants to try out the latest remote mixer from JK Audio and writes to ask about it.

Here's a note from Barry Mishkind, columnist for **RW** and moderator of a popular chat group at broadcast.net, about plans for the upcoming NAB show.

Geoff Steadman at Orban writes in reply to my inquiry on the progress of the Cart Chunk audio interchange initiative.

Jim Weitzman sends a note to let me know about a going-away dinner for our adviser Tom McGinley of Infinity, who is moving to Seattle after years in the D.C. area.

Here's one from a college professor seeking my opinion for a survey about the future of Webcasting.

Scott Beeler of Harris Corp. drops a note thanking me for the column about the late Jesse Maxenchs. He's one of many readers who took a moment to remember Jesse to me.

There's more.

A reader in Forestville, Calif., takes time to respond to a commentary we published by Carl Gluck of Salem Communications about low-power FM, with some strong words of his own.

Dale Tucker of our sales staff, a true native of the radio world, wants to know if I noticed a certain discussion on an industry listserv.

James Hodgkins writes to tell about the many e-mails he received after we published his photographs of the removal of the towers of WEEU(AM) in Reading, Pa. A colleague would like one of those pictures for use at the NAB convention.

There are newsletters, push mails about SBE activities, digests of listservs about radio engineering and management issues, about DAB. And there are letters to the editor, all of which come right to my desk.

The e-mail buck hasn't just stopped here: it has moved in and installed track lighting.

In a typical month, I send more than 1,000 e-mail messages: instructions to editorial staff, responses to reader queries, assignments to writers, information requests to manufacturers.

A thousand messages. A *thousand*.

Presumably I read as many as I send. That's a busy e-mail box.

Of course, **RW** exists at an information hub. We have set ourselves to monitor many channels of incoming information, and we filter it to help our readers make sense of the trends in the industry.

In short, we read thousands of messages so you don't have to.

★ ★ ★

Stations can use e-mail as a promotional tool, if done with discretion. It is also a powerful management tool.

Radio World exists at an information hub. I send more than 1,000 e-mails a month, and probably read that many again.

Engineers can communicate quickly with colleagues at other stations owned by the same group, and their friends across town.

SBE groups, like our own Chapter 37 here in Washington, are turning from the fax to e-mail to deliver meeting notices and newsletters.

Suppliers can notify customers of software updates or service bulletins. And e-mail will allow me to keep in close touch with important people like Tom McGinley, no matter how far away he moves.

But e-mail has its dangers, and it's not uncommon to have a love/hate relationship with e-mail.

It affects your behavior. Look how easily I can avoid personal contact, if I choose to. Why walk down the hall when I can send an e-mail?

Leslie Stimson, our overworked news editor, will tell you she probably gets 600 of those 1,000 monthly e-mails. She's an e-mail victim. And she's not the first one to suggest, on occasion, that I might get my point across by knocking on her door once in a while.

Just look at any listserv group and you realize that e-mail can bring out the worst in certain people who are not skilled socially. In the electronic era, it's oh, so so easy for an offended party to fire off a riposte, without the benefit of a deep breath and a second thought.

And it's easy for the recipient to take offense, lacking the nonverbal cues that we rely on every day.

I know. I've offended people with e-mails, without ever intending to.

The questions I should ask myself to avoid bombarding others with e-mails are the same questions a station should ask as it considers how to reach its clients, and that SBE chapters should ask to determine if they are using this medium wisely.

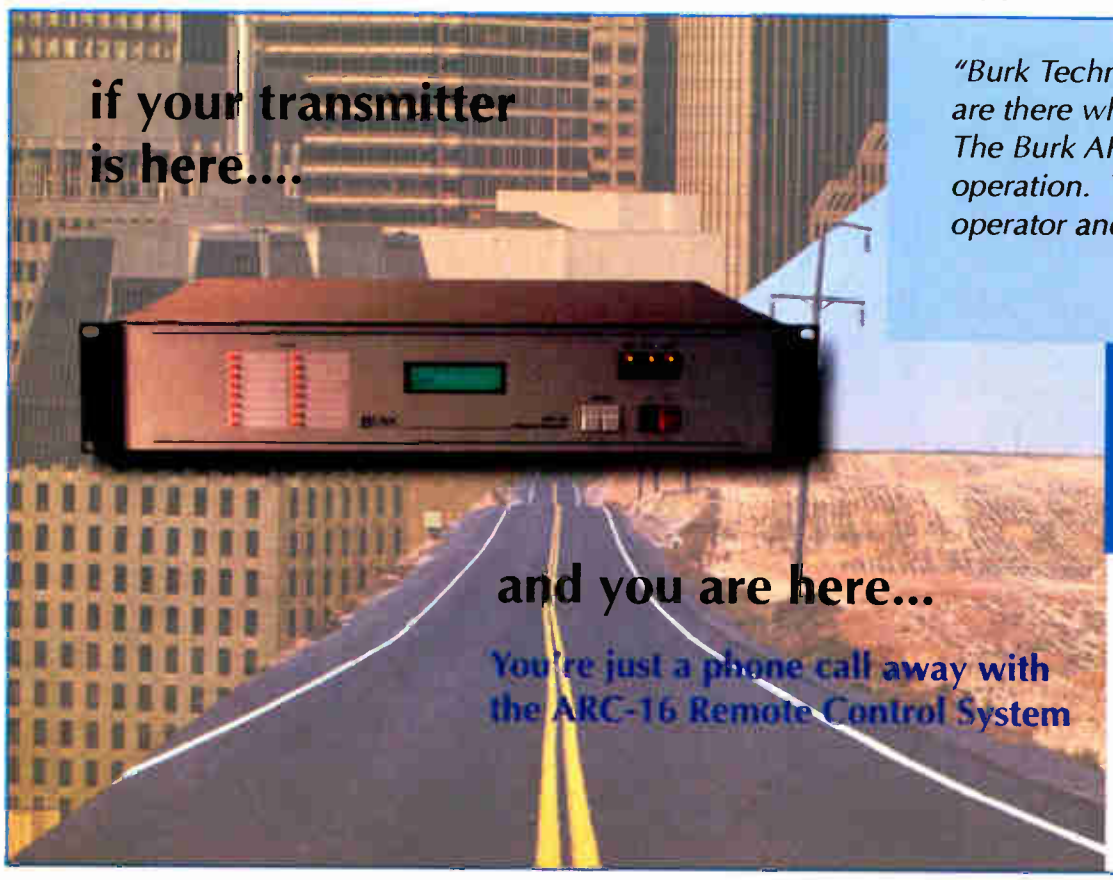
A manager must be careful not to create a tidal wave of information — for employees, for fellow engineers, for listeners.

Sure, there are questions of etiquette, and the correct use of emoticons like :-) or :-/ or the problems of attachments that contain viruses.

But even more simply: Is the e-mail timely, is it important? Can the information be transmitted in a different way, or combined with others efficiently?

Am I communicating with this person because it's convenient for both of us, or merely convenient for *me*? Is the loss of personal or more intimate contact worth the time saved using e-mail?

This is a good reminder as we get ready to walk the floors in Las Vegas and see old friends and new. There's no replacement for looking someone in the eyes.



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World Radio History

He Busts Violators for FCC

▶ SOLOMON, continued from page 1

about LPFM stations operating at higher power levels than authorized. How will the FCC figure out who's going over those power levels and what can you do about it?

Solomon: I'm not sure it's correct to just assume that people who have low-power FM licenses are going to be inclined not to comply with the law any more than people now who have broadcast licenses for 1,000 watts, generally speaking, don't go out and broadcast at 5,000 watts.

... Particularly many of the kinds of people or groups who will get these licenses — you're talking about educational institutions, community groups, churches and the like ... I think their inclination is to comply with the law.

But we have people in the field who are now part of the enforcement bureau (25 field offices). We also have the technical and public safety division, with lawyers and engineers in Washington.

If there are complaints that people are exceeding their power and we have some credible basis to go and investigate, we will do that. If we find violations, we'll take appropriate enforcement action.

Pirates on air

RW: *But some people who are going to apply for these licenses claim they're going to continue operating illegally. Is there any way to know how many pirates are on the air now?*

Solomon: We cannot say with specificity how many pirates are on the air now. The FCC generally becomes aware of a pirate broadcast operation through complaints from FCC licensees, many of whom may be experiencing interference from the pirate broadcaster's operations.

We investigate all reports of pirate radio station operations and take action to shut them down either by issuing warning letters, conducting inspections or by pursuing criminal or civil action through the Department of Justice.

Since Jan. 1, the FCC has shut down 25 pirate radio operations either through issuing warning letters or seizure of equipment coordinated with the Department of Justice.

In 1999, the FCC shut down 154 pirate broadcast operations.

RW: *How can a broadcaster file a complaint, for any violation, and how would that change under the new enforcement bureau?*

Solomon: In the broadcast area, it's fairly up to the broadcaster how they want to bring it to our attention.

They can talk to someone in the field about a problem they're having. They can write a letter, either to the field (office) or to our Technical and Public Safety Division, headed by Joseph Casey, who had been deputy chief of the former CIB (Compliance and Information Bureau). Or they can file some sort of more formal pleading seeking specific action.

But the one thing we're going try to do in the Enforcement Bureau, across the board, is to try and move as quickly as we can on things and try to give quick and clear answers.

I think broadcast stations already understand that both in the field and in Washington, and formally and informally, if they have facts that they want to bring to our attention of potential violations, they can do that.

RW: *How can a station do that, specifically for interference concerns about an LPFM station?*

Solomon: For low-power FM, they can choose various ways. They can call the field. They can indicate to the field that they have this concern and let them know what it's based on. They can write a letter either to the field or to our Investigations and Hearings Division, or, if they choose, they can file a more formal pleading.

Whether they do it orally or in writing, the more information they can give us to support what they're saying, the easier it is for us to investigate it quickly.

RW: *If they bring it to a field office, what happens?*

Solomon: If they come with some credible information, then we will investigate it. Obviously, the information suggesting more serious violations get higher priority. But the key is to bring us evidence and information that's credible.

They can, through their own monitoring of the station, gather information, if they have reason to believe there are violations. (It's) the same thing as with full-power stations. If a broadcast station right now believes that someone is interfering with their signal by operating at power over their authorized levels, that's something they can bring to our attention.

Include details

RW: *What kind of information is the FCC looking for?*

Solomon: The more information that you can bring to our attention, the better.

If you just say, "Somebody is out there. I don't have a clue what frequency they're on, and I don't have a clue who they are or where they're located and what they're doing," that's different than saying, "I overheard the following person who is operating on this frequency at this time of day, from this location."

RW: *Let's say you get a complaint now. You've got vehicle that helps you detect*

See SOLOMON, page 6 ▶

Typical Broadcast Fines

The following are base "forfeitures" or fines for typical broadcast violations set by the commission in 1997. The FCC can reduce or raise the monetary penalty assessed based on several factors listed at the end of this chart.

VIOLATION	AMOUNT
Misrepresentation/ lack of candor	Statutory maximum
Construction and/or operation without authorization	$10,000
Failure to comply with prescribed lighting and/or marking	$10,000
Public file rules	$10,000
Political rules	$9,000
Unauthorized substantial transfer of control	$8,000
Failure to permit inspection	$7,000
Transmission of indecent/ obscene materials	$7,000
Interference	$7,000
Importation or marketing of unauthorized equipment	$7,000
Main studio rule	$7,000
Broadcast hoax rule	$7,000
AM tower fencing	$7,000
Exceeding of authorized antenna height	$5,000
Unauthorized discontinuance of service	$5,000
Use of unauthorized equipment	$5,000
Exceeding power limits	$4,000
Failure to respond to Commission communications	$4,000
Lotteries or contests	$4,000
Airing phone conversations without authorization	$4,000
Transmitter control and metering requirements	$3,000
Enhanced underwriting requirements	$2,000
Failure to provide station ID	$1,000
Unauthorized pro forma transfer of control	$1,000
Failure to maintain required records	$1,000

Upward Adjustment Criteria
(1) Egregious misconduct
(2) Ability to pay/relative disincentive
(3) Intentional violation
(4) Substantial harm
(5) Prior violations of any FCC requirements
(6) Substantial economic gain
(7) Repeated or continuous violation

Downward Adjustment Criteria
(1) Minor violation
(2) Good faith or voluntary disclosure
(3) History of overall compliance
(4) Inability to pay

Source: FCC Enforcement Bureau

◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

FCC Requests $237 Million

WASHINGTON The FCC has requested an increase of more than $10 million in the amount allocated to its Enforcement Bureau in the agency's fiscal year 2001 budget request, submitted to Congress in February. The FCC proposes adding 40 employees to the enforcement staff.

The Enforcement Bureau's goal for FY2001 "is to achieve 90-percent compliance with antenna registration, interference complaints and equipment license requirements," stated the FCC in its budget.

Of President Clinton's $1.84 trillion fiscal 2001 budget request, $237 million is earmarked for the FCC, a $27-million increase over the previous fiscal 2000 budget of $210 million.

World Radio History

Solomon Leads Enforcement

▶ SOLOMON, continued from page 5

illegal operators. How do you use the vehicle to bust somebody?

Solomon: Basically, these are direction-finding vehicles that have equipment in the car that can help locate certain signals on certain frequencies and where the people are located.

You can basically measure where it's coming from. At that point the staff can knock on the person's door.

Often, the first step is to simply inform them of what appears to be happening. In many cases, the people will come into compliance at that point if they simply didn't realize — say they're unlicensed people — what the rules are.

The tendency is for broadcasters to be more aware of the rules. But there are still situations where (we) find that existing licensed broadcasters are operating not in compliance with the rules. And when you inform them of that, you fix the problem.

Then, depending on the facts and whether the person continues, there are a number of enforcement options that can involve monetary penalties. In the case of pirate radio, it can involve, with the assistance of the Justice Department, seizing the equipment or injunctions or other steps.

RW: What about equipment rule violations, for LPFM or in general? Would the Enforcement Bureau handle the complaint if a station doesn't have an EAS encoder, for example?

Solomon: The Enforcement Bureau (has) most of the enforcement responsibilities and enforcement staff from the Common Carrier Enforcement Division, the Wireless Enforcement Division, the Mass Media Enforcement Division and the Compliance and Information Bureau in the broadcast area. The exception is things that come up during the renewal and assignment application processes where you get Petitions to Deny.

With that exception, basically we're responsible for enforcement against licensees.

The only other exception to that is political broadcasting enforcement, (which) remains in the Mass Media Bureau.

The new EEO (Equal Employment Opportunity) rules are still in the Mass Media Bureau. Although there have been some changes, traditionally, those have been tied to the license renewal process. But basically, for virtually of all the broadcast rules, the Enforcement Bureau handles enforcement during the license term.

RW: So anything to do with getting a license is still handled by Mass Media?

Solomon: If it's an application for a license. In other words, if you want to apply for a new station, or get your station renewed, or assign your station to someone else, you need to apply for approval to do that. The Mass Media Bureau will handle that approval process.

Sometimes during that approval process, issues come up as to whether someone has violated the law, either the statute or the rules. Typically that comes up in a Petition to Deny that will say, "We want you to deny the application or designate it for a hearing because they've done the following wrong thing." That would be handled by the MMB.

RW: What are the typical violations?

Solomon: It probably helps to distinguish between different kinds depending on where they come from.

From listeners, you often get complaints about contest violations; that the contests on the air were done in an unfair or deceptive way. For example, they promise a prize and then they don't provide the prize.

Recently we issued a Notice of Apparent Liability against someone whose slogan was something like, "Win ten thousand." And then after the person won the contest, they (the station) said that was 10,000 lira, which is about $4.

(The station was Clear Channel's KPPR(FM), El Paso, Texas.)

RW: And the listener thought the station meant 10,000 dollars?

Solomon: Right. Also, before you put someone on the air and record them for broadcast, you're supposed to let them know you're putting them on the air live or that you're recording them. Often, listeners complain that wasn't done.

Another area is indecency violations, particularly if people have a tape or a transcript; the FCC will look into that.

From stations, you often get technical complaints. Things like complaints of interference, or complaints about overmodulation by a station or AM stations broadcasting at excessive power at night.

From time to time, when you get disputes between stations, you get allegations of unauthorized transfers of control or misrepresentation, which is basically suggestions that the station's been lying to the FCC.

Always document

RW: For a station complaining about

See SOLOMON, page 7 ▶

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FCC: How We Bust the Perps

Usually, the first point of contact with someone suspected of violating FCC rules is through one of the FCC's 16 field offices or nine resident agent offices.

For illegal operators, the first step the enforcement team takes is to send a warning letter. In 85 to 90 percent of these cases, the FCC said, the broadcaster will stop the illegal activity. If not, the next step is punitive action.

Photos by Leslie Stimson

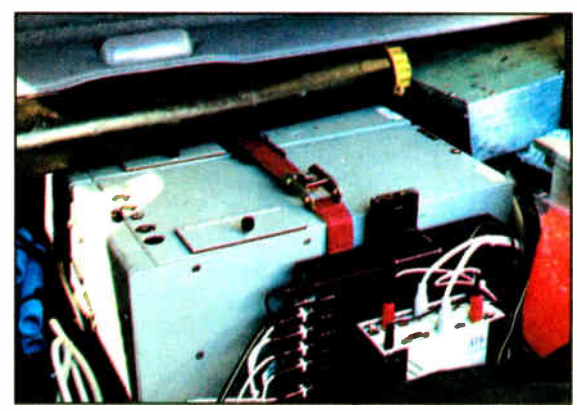
Engineer Charles Magin demos the device used in an Enforcement Bureau vehicle to detect illegal operators.

The vehicles used by the field offices to detect illegal operators and others suspected of breaking the rules are vital to the commission's enforcement efforts.

Using the vehicles, the FCC has shut down more than 450 illegal operators over the past three years.

"In the early years, our focus was determining signal strength and direction," said engineer Charles Magin, district director of the Columbia, Md., field office of the FCC's Enforcement Bureau. Using that information, field agents would drive until they found their illegal operator.

Now, the FCC uses a signal direction-finding system controlled by a computer that is "married" to a mapping and compass package and a central computer. These computers communicate with each other and the antenna hidden in the vehicle's structure.



Shown is one of the computers in the back of the enforcement vehicle.

FCC engineers designed and built the equipment used in the enforcement vehicles.

Located near the dashboard, the FCC agent can "see" signal frequency and strength on a spectrum analyzer and observe a frequency display that identifies the vehicle's geographic location, all displayed on monitors.

"The agent frequently checks to ensure that the information being received from the direction-finding system is accurate," said Magin. "He or she can then make judgments on whether the information displayed is accurate or if it's been affected by interference from various sources."

Signals, signal strength and their geographic locations are documented. The vehicle is equipped with electronic video recording systems to further document actual sound heard, be it conversation or other sounds.

The FCC placed restrictions concerning the publication of details on these vehicles to avoid helping would-be violators.

— Leslie Stimson

World Radio History

▶ SOLOMON, continued from page 6

another station, what kind of documentation do they need to back up their claims?
Solomon: There are no particular rules. The main area where there's a policy of documentation is in the indecency context. Because of the First Amendment concerns involved, we typically want to get a transcript or a tape when someone is alleging indecency.

It's more likely that we're going to pursue a complaint, and have more success pursuing it if there's more information from the broadcaster for what it's about. ...

'I like to make things happen and get things done.'

If they write a letter that just says, "There's a station out there doing something wrong," that's pretty difficult for us to investigate. But if they give us some specific, credible evidence, that makes it easy to investigate.

***RW:** Often, in the decisions I've seen over several years, it seems stations can get their fines reduced or dismissed if they at least put up some defense. Is that an accurate characterization?*
Solomon: The statute (section 503b) of the Communications Act sets out a series of statutory factors that the commission is supposed to look at: the nature of the violation, the history of the entity, their ability to pay — basically a series of equitable factors about what the appropriate fine is in light of the violation and the person or entity it violates.

The commission has also spelled those out in a forfeiture policy statement (*see sidebar*).

As a matter of law, we apply the statutory factors and look at the facts of each case and decide what the appropriate amount is. If the commission begins with a Notice of Apparent Liability, where it issues for what it refers to as the "base amount" in the Forfeiture Policy Statement — if there are facts demonstrating that there's a reason to have it lower, based on commission policy and precedent, then it will be lowered.

In some cases, the commission issues NALs that are higher than the base amount because the facts show it's egregious or intentional.

***RW:** You're looking at other cases that are similar and saying, "Here's what we did in this case where the violations were similar to yours, so this is how we're arriving at the amount."*
Solomon: And also with the forfeiture policy statement that was issued in 1997 that sets out base amounts for a typical forfeiture in a particular area, this is what you would be fined unless there are particular reasons for it to be higher or lower.

***RW:** How long does a typical broadcast investigation take now, and how would that change under the new Enforcement Bureau?*
Solomon: We cannot really answer this question because there really is not a "typical broadcast investigation."

I expect investigations and orders to move more quickly in the Enforcement Bureau. One thought behind creation of the bureau was that by separating enforcement from rulemaking, we would be able to focus our resources and speed enforcement efforts.

Obscenity vs. indecency

***RW:** Let's discuss the difference between indecency and obscenity and why we might see one station fined for airing a raw bit on Howard Stern in one market, but a station in another market might be airing the same bit and is not fined. Is that because someone in the first market complained?*
Solomon: Why would there be an indecency forfeiture for one station as opposed to another station? Because of the First Amendment concerns. Over several years there's been a lot of court litigation over the indecency statutes and our rules.

The way the commission approaches indecency is it acts in response to complaints where it has a transcript or a tape. If we get information with respect to a particular station in running a particular program, we will investigate that. If it's indecent it may lead to a monetary penalty.

The difference between obscenity and indecency: Obscenity is unlawful and can be prohibited, whereas indecency is lawful, but the courts have upheld the fact at certain times of day because of children being in the audience that it can be restricted.

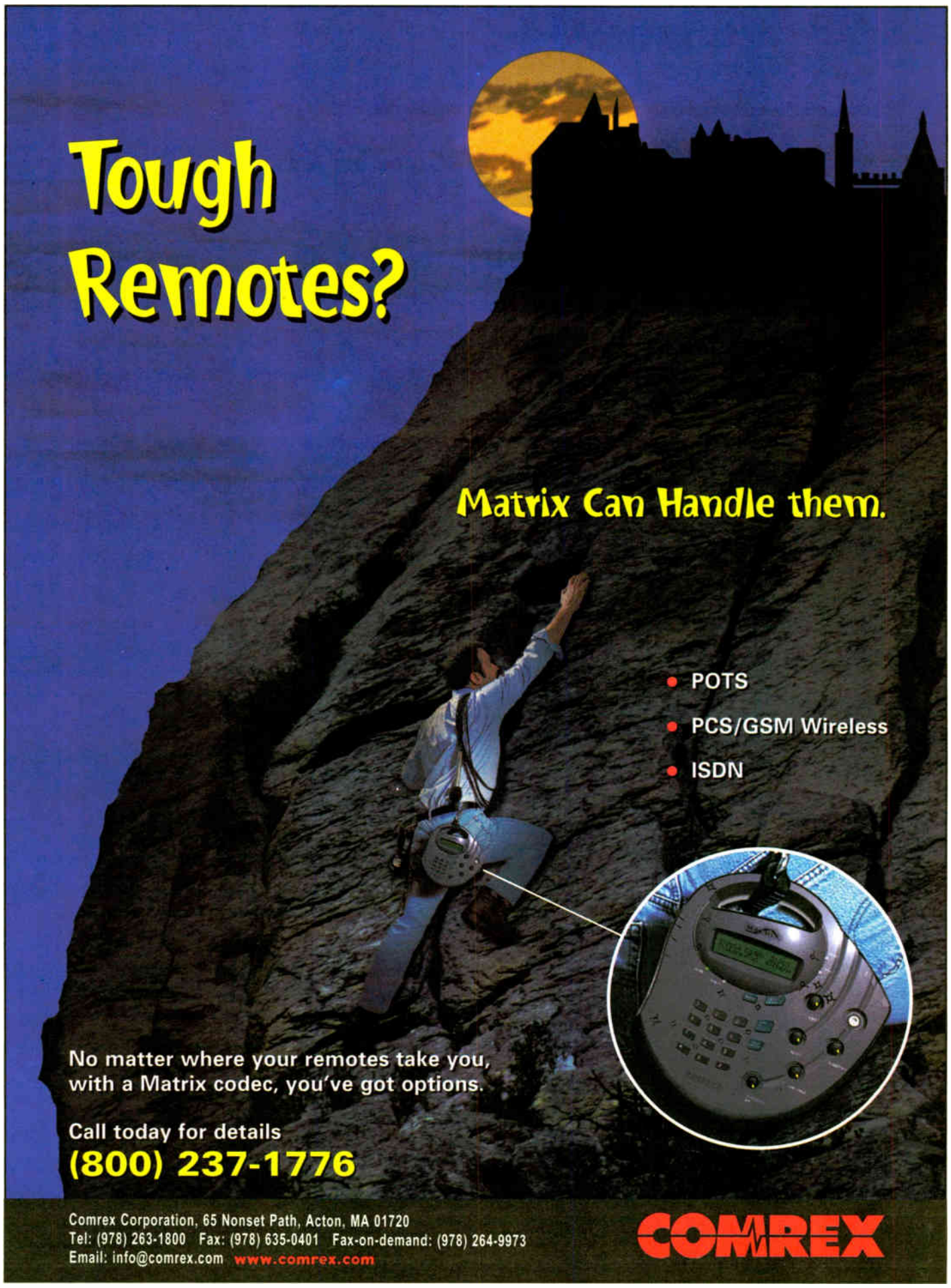
***RW:** The so-called "safe harbor" from 10 p.m. to 6 a.m.?*
Solomon: Other than 10 p.m. to 6 a.m., indecent programming is unlawful.

***RW:** Another violation for which stations are fined is to the main studio rule. Can you define what the FCC means when it says a station's main studio needs a "meaningful staff presence?"*
Solomon: In general, under the FCC's rules and case law, a "meaningful staff presence" means having a manager and a staff person who can perform multiple duties available during normal business hours.

This does not mean that anyone has to be tied to their desk, but the idea here is that there is enough of a presence at the main studio that members of the public can have access to the public file and some ability to interact with station management.

***RW:** President Clinton's budget request for fiscal 2001 includes 40 extra full-time positions for the Enforcement Bureau. If approved, what would those people do?*
Solomon: The extra resources would be devoted to a wide range of tasks given to the Enforcement Bureau.

See SOLOMON, page 8 ▶



World Radio History

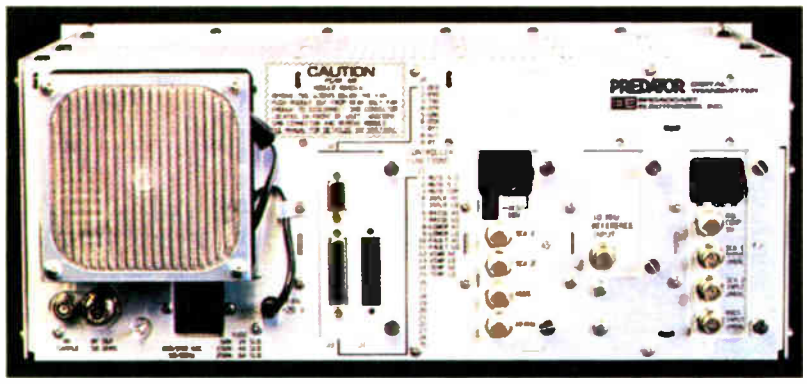
Manufacturers Ready for LPFM

▶ LPFM, continued from page 1

in most cases, LPFMs can use an antenna on top of a building and will not have to build a tower.

Potential LPFM licensees are calling suppliers to look for plenty of guidance.

"There is going to be a real steep learning curve required of these people," said Bill Ashley, account executive for Bradley Broadcast and Pro Audio. "It's still early in the game, but a lot of people I've spoken to don't have a clue."



B.E.'s Predator exciter/transmitter could be used for LPFM.

Ashley said he was fielding low-power FM telephone calls within hours of the FCC's announcement in January.

"We're recommending they have a competent communications attorney and engineer at the ready. No one is buying equipment just yet," Ashley said.

Sticker shock is also a factor.

"I had someone call me asking if they could do it for $600. That's not realistic. Many I've spoken to are still surprised by what it will cost to do this," Ashley said.

Ashley said equipment manufactures would probably make money on LPFM, but suppliers, faced with competitive demands, will find it more difficult.

"This will be hardly more than a nuisance to a lot of dealers ... much like EAS was. Prices will be kept down to the point where you ask yourself 'Why am I doing this?'"

Keeping prices low will be the main focus of suppliers, said Kathleen Karas, branch manager for Crouse-Kimzey of Annapolis, Md.

Affordable resources

"You'll have to keep it affordable and be prepared to do a lot of hand-holding throughout the process," Karas said. "It could be a big drain on manpower and resources."

Karas said most of the calls about LPFM to her office have come from lawyers and engineers representing possible licensees.

Among the companies most interested in this possible new market of buyers are transmitter makers. Several said they plan to demonstrate low-power transmitters at NAB 2000 and will pursue the LPFM market aggressively.

Although the FCC passed the LPFM proposal 4-1 in January, the rule will not be enacted until April 17. The FCC could decide to make minor changes by that date. It could also rescind LPFM, if forced to do so by court or congressional action.

Like the rest of the industry, suppliers said they were watching the lobbying and court fights that followed the FCC vote.

"We know it's too early to predict an exact outcome. ... I think we'll see a version of low-power FM implemented eventually," said Ernie Belanger, sales and marketing manager at Armstrong Transmitter Corp.

Belanger said the RF company's FMX transmitter line and 707 antennas would be suitable for LPFMs.

"Fact-finding" is how Belanger described the calls he has received on LPFM.

"There've been sincere inquiries looking for information on transmission. Most of the callers have no comprehension of what RF is or how it works. They don't understand antenna gain and line loss," he said.

Belanger said low-power licensee hopefuls are investigating pricing so they can set budgetary figures. An RF package from Armstrong for an LP100 would average $5,000 — about half that for LP10s.

(Crown) thinks low-power FM will go through in some form or another and when it does, price is going to be king.

— J. Paul Firminger

"I tell them they are looking at a minimum of $10,000 for studio and RF equipment to get up and running. If they want automation ... (the price could be) even more than that," Belanger said.

BE's Marti division is in the process of developing two new RF products for LPFM — the Plug-N-Play 150 for LP100

See LPFM, page 10 ▶

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World Radio History

New FCC Enforcement Chief Speaks

▶ SOLOMON, continued from page 7

Among these tasks: enforcement of rules designed to protect consumers such as rules prohibiting slamming and rules regarding access to telecom services and equipment for the disabled, enforcement of the requirements to open local telephone markets to competition, investigation and shutting down of pirate operations, and investigation of interference complaints.

***RW:** What are some of the strangest excuses you and your staff have heard from stations in defense of whatever violations they are involved in?*

Solomon: One was where somebody's answer to why they were doing something was because voices were telling them to. They were receiving voices in their head telling them to violate the FCC rules! That's kind of interesting and it's not on our list of things that get you a reduction.

One licensee said a disgruntled employee who'd been fired was basically camping out on their rooftop and transmitting from their roof and pretending it was them so they'd get blamed for certain violations ... which, in the absence of proof, is also a little hard to believe.

***RW:** But some of this will stop now, correct? With the new enforcement bureau, you'll speed up handling the complaints.*

Solomon: We're certainly hoping to look at things quickly and do it seriously.

Another one has come up more than once. In a recent broadcast case, someone said that their dog did it. They said the dog was grabbing the wires and the microphones and stuff.

We also actually had a slamming case in the common carrier area recently; it's what we refer to as "the dead-dog case." Slamming is when your long-distance carrier gets switched from one company to another without your approval.

When we were doing a slamming investigation, the company came back and said, "Here's the signature of the person who authorized me to change it." We passed the signature along to the person who had complained and said, "They say it's your signature." They said, "Well first of all, for privacy purposes, we put our phone under our dog's name. But, in any event, our dog is dead. So they forged the signature of our dead dog."

***RW:** How was working with Bill Kennard?*

Solomon: Bill is a wonderful boss. He had a professionalism and approach to law and issues where he just brings a lot of energy and enthusiasm, that sort of intellectual energy, to a variety of issues.

He was very beloved as general counsel by the people who were in the general counsel's office. As chairman, people still enjoy working with him.

***RW:** He jokes that you're so punctual you water your plants at the same time every week!*

Solomon: I like to make things happen and get things done, although that's not the example I always like to use (laughing).

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World Radio History

LP Gear Created, Re-Purposed

▶ LPFM, continued from page 8

stations, with a suggested list of around $5,000, and the Plug-N-Play FM20, for LP10s, with a suggested list of $2,000.

Tim Bealor, product manager of RF for BE, said the new products will be available in time for LPFM rollout later this year.

"(LPFM) certainly is a hot topic for our sales offices. And we've recently seen an increase in the numbers of calls from engineering consultant-types. That tells me people are taking it seriously. The potential licensees I've spoken to are very anxious and excited to get going," Bealor said.

Quality products

Bealor said it is incumbent upon RF manufacturers to provide the best equipment for a reasonable price for the benefit of LPFMs and existing broadcasters.

"We have to make sure that the low-power people get a quality product on the air to minimize the potential for interference and for them to be good, conscientious broadcasters," Bealor said.

Crown Broadcast is among those companies that figure to be well positioned. The company has a history of serving the low-end market, both in the United States and overseas. Crown plans to introduce a new LPFM transmitter at NAB2000 for under $3,000.

"(Crown) thinks low-power FM will go through in some form or another, and when it does, price is going to be king," said J. Paul Firminger, product line manager for Crown Broadcast.

Firminger said the few inquiries he's had on LPFM were from complete broadcast novices.

"There is a whole educational process required here. It's going to take time to walk them through the question-and-answer period. We'll have to simplify things the best we can," he said.

Dan Dickey, vice president of engineering and internal R&D for Continental Electronics Corp., said the Continental 802B exciter is suitable for use as a low-power FM transmitter. The 802B's variable outputs of 5 to 50 watts make it a possibility for LP10 use.

One equipment supplier and manufacturer is noncommittal about its pursuit of the LPFM market. Harris Corp. wants to see what becomes of the pending NAB lawsuit against the FCC before setting plans.

In most cases, LPFMs can use an antenna on top of a building and won't have to build a tower.

"I'm not sure the market is going to be as big as some say ... (LPFMs) are going to be built with a different class of equipment than what professional broadcasters use," said Jim Woods, vice president, Radio Systems Business Unit, Broadcast Communications Division, Harris Corp.

Woods said Harris has done market research into what potential customers would want to pay for LPFM gear.

"There isn't a transmitter on the market today that addresses the price points people think these things are going to cost," he said.

Woods said the LPFM RF market might only be $2 million.

"Divided up among a handful of manufacturers ... that's not a lot of money. It depends on how hard you want to chase several hundred thousand dollars. If these things get built with $1,000 transmitters and home-stereo-quality equipment, it probably won't be a very interesting possibility for (Harris)."

Woods said there is still a lot of doubt around the industry as to whether low-power FM will ever happen.

What to Buy, What To Buy ...

Like any radio manager, an LPFM planner faces numerous hardware choices.

We asked two industry distributors, Bradley Broadcast & Pro Audio and Crouse-Kimzey of Annapolis, to prepare typical lists they might quote to a prospective LP100 planner. The results are shown here.

*Items are at list price for this example, and do not include shipping or tax. **RW** has combined some line items to save space.*

A glance at the lists demonstrates the many choices a planner faces: Single-bay or multibay antenna? What kind of processing is necessary? What about EAS, modulation monitoring, consulting?

The choices and variables are many. For instance, Crouse-Kimzey has packaged its first two lists, containing RF and Studio gear, as an LPFM starter kit, and added the services of a communications law firm, engineering firm and leasing company. The package price is $25,000.

The lesson: LPFM planners have a lot of homework to do.

Crouse-Kimzey of Annapolis

Sample 100 Watt LPFM RF Package

Description	Quantity	Total List Price
Energy-Onix SST-150 Exciter	1	$ 3,595
Celwave ECFM-1 Antenna, Single-Bay	1	861
Gorman-Redlich EAS1 EAS Encoder-Decoder w/Recvr	1	2,110
Andrew LDF4-50A 1/2" Foam Coax	100'	255
Cable Connectors & Hardware	1	144
RF SUBTOTAL		**$ 6,965**

Sample On-Air Studio Package

	Quantity	Total List Price
Autogram MiniMix 8A Console	1	$ 2,499
Shure SM58-CN Microphone With Cable	1	212
Atlas-Soundolier DS-7 Mic Stand	1	15
Furman PB-48 Patchbay	1	169
Technics SL-PG480A CD Players	2	358
Fostex 6301 BEAV Powered Speakers	2	458
Technics RS-TR272 Cassette Deck	1	179
dbx 160 Compressor/Limiter	1	459
Westclock 12" Wall Clock	1	24
Koss R/80 Headphone	1	49
Lot Audio Cable, Connectors	1	250
STUDIO SUBTOTAL		**$ 4,672**

Sample Options & Accessories

	Quantity	Total List Price
Bird 43 Wattmeter with Element	1	$ 338
Inovonics 708-00 Stereo Generator & Processor	1	1,530
360 Systems Digicart II Plus Hard-Disc Recorder w/24 Hours Storage	1	4,495
360 Systems Short/cut Digital Editor	1	3,495
Radio Systems TI-101 Telephone Interface	1	495
Middle Atlantic ES+S12D Console Table w/Overbridge and Cabinet	1	3,102
Audioarts SDA8400 Distribution Amplifier	1	524
OCWhite 51900B Mic Arm with Riser	1	160
Electro-Voice RE-20 Microphone w/Shock Mount	1	608

Bradley Broadcast & Pro Audio

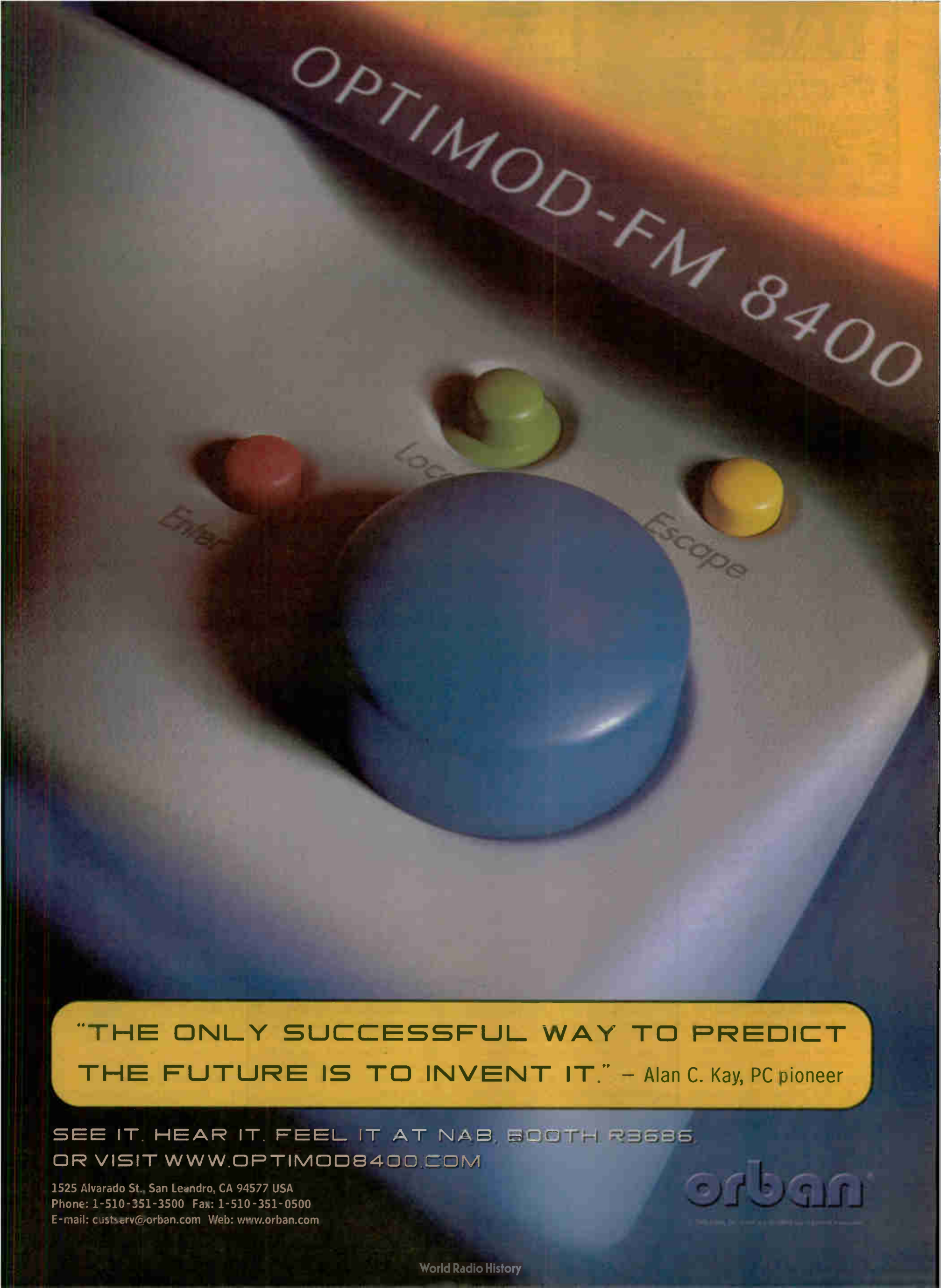
Sample 100 Watt LPFM RF Package

Description	Quantity	Total List Price
Crown 100-Watt FM System *Note: Above Includes Stereo Generator and Audio Processing*	1	$ 6,150
Shively 6812-3 Three-Bay Antenna	1	2,100
Cablewave FLC7850J Cable	100'	585
Cable Connectors & Hardware	1	306
Inovonics 530 FM Mod Mon	1	2,500
TFT EAS 911R4 w/Rec & Printer	1	2,195
TFT EAS 930A Rcvr-AM/FM/WX	1	1,470
Equipment Rack and Power Strip	1	724
RF SUBTOTAL		**$ 16,030**

Sample On-Air Studio Package

Description	Quantity	Total List Price
Arrakis 12005S Console	1	$2,295
Samson DMS80 Monitor System	1	300
M-A MD2-Disk 48" Straight Desk	1	489
Technics SL-PG480A CD Player	2	260
Excalibur CD-2 Interface	1	180
Audio Technica ATM-25 Mic	1	278
Luxo LM-1 Oyster 1 Lb	1	60
Luxo Table Mnt Oyster 50005	1	15
Audio Technica AT804 Mic	2	220
Atlas DS-5 Desk Stand	2	39
Sony MDR-7502 Headphones	1	74
Telos One Hybrid/Modem Case	1	680
Excalibur Hybrid Adapter	1	99
Tascam 102MKII Cass Deck	1	399
Excalibur Ia-1 Interface	1	180
Wire, Connectors, Misc. Hardware	1	335
STUDIO SUBTOTAL		**$ 5,903**

World Radio History



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World Radio History

Radio Converges on Las Vegas

Sharon Rae Pettigrew

From the transition to digital, LPFM and IBOC DAB, to advertising dollars, consolidation and the Net, concerns of radio managers and engineers are on the agenda at NAB2000.

In 1999, according to NAB, 1,427 exhibitors showed off their goods on the floor of the Las Vegas Convention Center and the Sands Hotel. This year, an estimated 1,500-plus exhibitors are featuring technology and industry solutions.

The total exhibit area has expanded from 901,902 net square feet to an estimated 910,000-plus.

The Las Vegas Convention Center

Springboard

Tim Schwieger, president of BSW, is chairman of the Exhibitor Advisory Committee. He sees the spring show as a springboard for new technology debuting in broadcast.

"Every spring, we look forward to all the new product rollouts," said Schwieger. "I think this year it's going to be very lucrative."

For the first time, BSW will exhibit in both the North Hall, the traditional Radio/Audio area, and the bigger South Hall.

"We realized we needed to get to our customers on the video side who need audio equipment," said Schwieger.

SBE President Andy Butler is looking forward to a big show. Among the important events he cited is a meeting of the National Radio Systems Committee, the industry standards-setting group.

"The NRSC DAB activities are going to be yielding some concrete results," said Butler. "We've got low-power FM to deal with, and from what I've seen, we're going to see more digital product for a lot less money. And I can't wait.

"I think one other exciting thing is the AES has completed their digital audio workstation standard for audio file transfer and exchange," said Butler. "That opens up the possibilities for some really interesting systems integration."

Cautious consideration

Tyler Callis, North American sales manager for Netia, said the economy is going to be a factor at this year's show.

"Because of the healthy economy, customers need to be very careful about how they approach going digital or going to the next phase in their digital conversion," he said. "People don't realize what options are available to them. Folks need to carefully consider and look at the show."

Jim Woods, vice president, Radio Broadcast, Harris Corp., called the NAB spring show the "domestic U.S. broadcast industry's watershed event regarding new product introductions. It's generally seen as setting the stage for the coming year as to what folks can expect from us and the industry."

David Kerstin, president of Broadcasters General Store, looks to the spring NAB show as a chance to see what's new and to visit with customers.

"With the pace things are going — e-mails, faxes, phone calls — it's nice to see folks face-to-face, and renew old relationships," said Kerstin.

Musicam USA Vice President of Business Development Art Constantine said he's ready for the "largest opportunity that manufacturers have all year to meet with customers and show wonderful new products and get great feedback — not only about what customers think of products but what they are doing and what they plan to do."

Constantine said he regards NAB as much for research as he does for the selling and display of Musicam USA's products.

"This show is very important for radio," said Ann Marie Cumming, director of media relations for NAB. "NAB2000 gives radio professionals an edge in determining where their business is going in the future."

See OVERVIEW, page 22 ▶

High-Power Technical Panels Meet at Show

Scott Fybush

What impact will LPFM have on your radio receiver?

When will IBOC happen? What is the timetable for satellite radio?

How much does a good consulting engineer cost?

The answers are part of the Broadcast Engineering Conference at NAB2000.

You could call this the first NAB show of the new century. Or, if you're a stickler, you could say April's NAB2000 convention is the last of the old.

For engineers who will present papers at the engineering conference, it's a little of each.

From studio design all the way to the transmitter site, engineers are relearning skills and tools for the next century, and the sessions April 8 to 13 in Las Vegas will offer ideas for stations of all sizes.

Up in the air

The conference is co-produced by NAB and SBE. Here are highlights for radio attendees.

The panel "Implementing DAB and the Future of Radio," on Sunday afternoon, April 9, will look at the status of digital audio broadcasting and the rollout of satellite radio.

Representatives of USA Digital Radio, Lucent Digital Radio, Digital Radio Express, Harris Corp., Shively Labs, Sirius Radio and XM Satellite Radio will take part, along with officials of NAB, the NRSC and the FCC.

The moderator is Milford Smith of Greater Media.

At a Monday morning session, "Free Tech Advice! Ask the Consultant," radio consultants Robert Denny of Denny & Associates, Herman E. Hurst of Carl T. Jones Corp. and John C. Kean of Moffet, Larson & Johnson Inc. will gather to share war stories and provide advice about getting the most from your consultant.

Barry Thomas, SBE national secretary and technical director of AMFM Inc. station KCMG(FM) in Los Angeles, moderates that session.

Monday afternoon, April 10, the focus is on one of the most basic elements of broadcasting: the tower.

"Broadcast Towers: Prime Real Estate for the Digital Age," also moderated by

See ENGINEERING, page 14 ▶

NEWS MAKER

Dorrough Honored By NAB

Robert Rusk

Michael Dorrough will receive this year's NAB Radio Engineering Achievement Award. He will be honored at the Technology Luncheon, Wednesday, April 12, at NAB2000.

Dorrough, co-founder and president of Dorrough Electronics Inc. in Woodland Hills, Calif., is best known

Mike Dorrough, Right, and Les Paul

as the "father of discriminate audio processing," which he began developing in the early 1960s. The technology is used widely in the radio, television and motion picture industries.

Dorrough, 58, said he was "ecstatic" about the honor. He said he has done his work "in the spirit of better quality and better audio." He thanked his peers, including John Marino at NAB, for believing in his concepts.

Marino, NAB vice president of science and technology, said, "Mike Dorrough, with the development of his Discriminate Audio Processor, (has) played a major role in enhancing the audio quality of radio broadcasting. His passion for quality audio has been an inspiration to countless station managers and engineers."

Recording roots

Dorrough began his career working as a sound mixer at a recording studio owned by well-known air personalities Casey Kasem and "Emperor" Bob Hudson, who in 1963 were with KRLA(AM) in Hollywood.

From there Dorrough went to work as a sound engineer for Motown Records in Detroit, then back to the West Coast and RCA Records.

See DORROUGH, page 20 ▶

World Radio History

THE RESULTS ARE IN:

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*Source: *Duncan's Radio Market Guide*, 1999 edition
**Source: *The American Radio* by Duncan's American Radio; based on Arbitron Spring 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight
***Source: Arbitron Fall 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight

See Us At NAB Booth # R2057

World Radio History

Full Slate at Engineering Confab

▶ ENGINEERING, continued from page 12

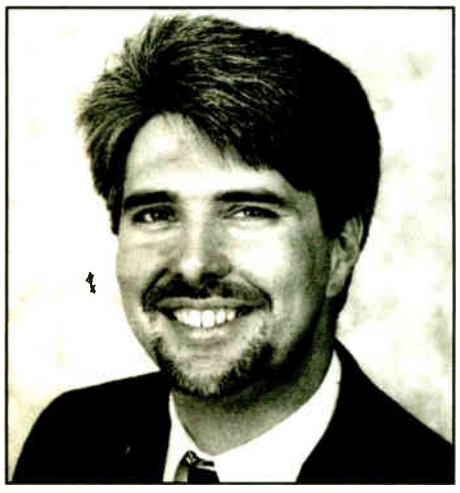
Thomas, will offer broadcasters ideas for making the most of their sticks.

With many stations selling their towers to big national companies like American Tower Systems, the session will offer advice to those stations that haven't sold.

Money questions

"Is your tower worth more to you as an income generator than as a capital item to sell?" asked John Heimerl of Heimerl & Associates and WHRO-TV in Norfolk, Va.

Heimerl will offer advice from his experience managing tower sites for individual owners and for big groups.



Barry Thomas

Many engineers, especially at FM stations, are coping with site moves forced by DTV displacements.

They'll hear about the latest research and newest antenna designs from panelists Adam Jones, a mechanical engineer from Dielectric Communications; Eric Wandel, a professional engineer for ERI Inc.; Don Doty, president of Doty Moore Tower Services; Dan Barton, antenna development engineer for Andrew Corp.; and Thomas Silliman, president of ERI.

The low-power FM debate remains hot, and a key underlying argument is how much interference it could cause.

Monday afternoon, Robert Hess of WBZ-TV in Boston will moderate a panel, "FM Receiver Studies: Surfing the Ocean of Interference," reviewing several studies that were conducted by various participants in the LPFM debate.

Speakers will be on hand from Moffet Larson & Johnson PC, Carl T. Jones Corp., T. Keller Corp., Broadcast Signal Lab and the FCC itself.

Growing your plant

Tuesday morning, April 11, the attention shifts to the studio, as engineers hear from colleagues working through the transition to a digital world.

"We've had a few years of digital technology behind us," said moderator Barry Thomas, "and now we've got people who have actually done it and are learning from their mistakes." (Thomas will be a busy man at this show.)

Among the presenters at "The Foundations of Radio — The Physical Plant" will be Eric Hoehn, chief engineer at Washington's WETA-FM.

"The stuff we used to take for granted, you have to check," Hoehn said. He has just completed a rebuild of WETA's studios in Arlington, Va.

The digital era brings questions all along the broadcast chain, down to the wiring level.

"Do we use 75-ohm coax like we've always used, or do we use 110-ohm twisted-pair for the digital equipment?" Hoehn asked. Reference levels and connectors were also a consideration in his project.

"You've got to start thinking of wiring as digital transmission lines," Thomas said.

In addition to Hoehn's project, presenters include **RW** columnist Alan R. Peterson; Jim Sensenbach, chief engineer of KUSC(FM) in Los Angeles; G. Michael Patton of Michael Patton and Associates; and Martin Wolters of Cutting Edge Technologies.

Also on the panel: David Baden and William Eldridge of Radio Free Asia; and Jim Dalke and Will McCormick of Inspiration Media in Seattle.

Signal techniques

On Tuesday afternoon, it's the transmitter's turn at a session called "Radio: Optimizing the Signal."

"This is the traditional RF session or signal session that they have each year at NAB," said moderator Tom McGinley, chief engineer of Infinity Broadcasting stations WPGC-AM-FM and WARW(FM) in Washington, D.C., and **RW** technical adviser.

Here too, though, the world of digital will share the spotlight with traditional topics like AM directional array maintenance.

Steven Spradlin and Ky Luu of Harris Corp. will present two of the company's new techniques for digital amplitude modulation.

Markus Grossenbacher of Swisscom AG will show how the Swiss national FM network has been rebuilt. Manohar Lal of All India Radio will share his network's version of the controversial Crossed Field Antenna.

John McCaffrey of Audio Processing Technology Ltd. in Belfast will discuss distributing high-quality audio over the Web and other digital networks.

Cris Alexander, director of engineering for the Crawford Group, will share advice on "AM Directional Arrays: What to Do When They're Broken"; while Consulting Engineer Tom Osenkowsky will dispense emergency-planning tips for broadcasters.

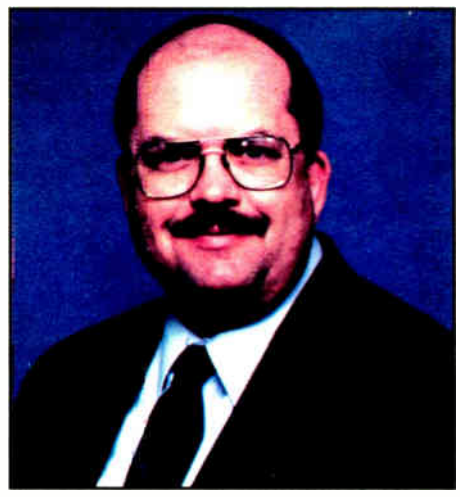
Alexander and Osenkowsky are both **RW** contributors as well.

Alexander said his presentation will be especially helpful to engineers who've found their workloads increased by consolidation.

"Maybe they were engineering a few FMs and now the group has soaked up an AM directional or two, and the engineer is wondering what to do with it," he said.

Combining traditional engineering with the Web, Joe Mauk, Infinity Broadcasting market engineer for Fresno, Calif., will demonstrate the new transmitter remote control system he has developed for his stations.

"It combines Linux with off-the-shelf Opto 22 control modules to allow a DJ or an engineer to use a Web browser to control transmitter readings," he said.



Dane Erickson

The system replaces seven different remote control units that had previously been used at Infinity's three Fresno-area transmitter sites.

Instead, a single interface allows all seven stations to be controlled from anywhere in the building, and even remotely over the Web.

In a similar vein, Glen Clark of Glen Clark & Associates will discuss his computer modeling of AM directional patterns, the subject of a current FCC rulemaking to ease proofing requirements for directional AMs.

"He's going to talk about his computer optimization routine that has demonstrated that computer prediction models of directional arrays and the real world can be brought closer together than in the past," McGinley said.

Wednesday brings the annual all-day SBE/Ennes Radio Workshop. This year's theme is "Broadcasting: Getting the Word Out."

Speakers help technology managers get the most out of their systems and look ahead. Intercoms, Internet delivery and the future of radio are on the agenda.

Speakers include **RW** Editor Paul J. McLane; Roger Stanwell of Trilogy Broadcast Ltd.; Steve Clawson of Radio Sound Network; and Kelly Hannig of Gentner Communication.

Of course, no NAB/SBE conference would be complete without a discussion of the latest changes in the regulatory environment.

Wednesday morning, April 12, "Regulations: Keeping Pace With Broadcast Technology" will offer insight from several panels of experts.

A hot TV topic is on the agenda.

"A big issue will be where we stand on 2-GHz ENG channels," said moderator Dane Ericksen of Hammett & Edison.

Panelists Ray Benedict of CBS, Richard Rudman of KFWB Los Angeles and Victor Tawil of MSTV will offer the latest news on how broadcasters will be reimbursed for the return of a portion of the spectrum they've used for decades for remote newsgathering.

"The good news right now," Ericksen said, "is that it looks like we'll end up with seven 14.5 MHz wide channels instead of seven 12 MHz wide channels," allowing TV users room for two audio channels instead of one along with digital video.

Another looming concern is the Sept. 1 deadline for stations to certify that they meet the FCC's 1992 RF radiation standards.

"Most TV stations have already done that," said Erickson, but many radio stations are still several years from the renewal period in which they'd have to certify compliance.

Auction system

Panelists William Hammett of Hammett & Edison, James Hatfield of Hatfield & Dawson, and Richard Tell of Richard A. Tell Associates will answer questions and provide updates on the compliance process.

Walter Moore of the American Public Power Institute will discuss some of the new choices broadcasters have in obtaining power for their transmitter and studio sites.

RW regular Harold Hallikainen of Hallikainen & Friends will open the session with "Spectrum for Sale or Rent."

In addition to presenting an overview of the history of U.S. spectrum-allocation policy, Hallikainen will talk about the strengths and weaknesses of the current system of auctioning unused broadcast frequencies.

"We tried comparative hearings and it doesn't look like those worked that well, it doesn't look like lotteries worked that well — so how well will auctions work?"

Hallikainen said he'll also address low-power FM.

His proposal to the FCC called for an inexpensive auction system to pick LPFM broadcasters. Instead, he said the FCC is trying another idea, allotting licenses that, unlike full-power broadcasters, cannot be transferred or sold.

Wrapping up the conference on Thursday morning will be another name familiar to **RW** readers.

"Radio Transmitters: A Practical Workshop" is a three-hour training session presented by John Bisset of Harris Corp., author of the popular *Workbench* series.

Bisset will help attendees prepare to handle transmitter emergencies and improve their service regimen.

■ ■ ■

Scott Fybush edits NorthEast Radio Watch (www.bostonradio.org) when he's not working as a TV reporter in Rochester, N.Y.

A Monday panel will try to make sense of the various LPFM interference studies.

World Radio History

Get The Scoop Anywhere, Anytime

Field reporting the way it's supposed to work. Introducing the all new Scoop Reporter II portable CODEC from AETA Audio. This rugged unit combines POTS and ISDN facilities with an integrated three-channel mixer and internal battery supply. Featuring 99 user programmable presets, the Scoop Reporter II will handle two microphones and one line level input. A balanced XLR output can be used for studio producer IFB and Mix-Minus feeds from studio, or to feed the local PA. The Scoop Reporter II will operate on voltages from 85 to 240 volts at 47 to 440Hz. When AC is not available or fails, the unit will run on standard "D" cell alkaline batteries. The intuitive interface is so easy to use, your talent will be able to run a remote broadcast with no technical assistance. And with our 24-hour technical support, you'll never miss another field report. The Scoop Reporter is the all-in-one box that will get the scoop anywhere, anytime.

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- Supports G.711, G.722, ISO/MPEG Layer II, ADPCM and J.52
- ISDN or POTS
- Three-channel mixer
- PC programmable
- Send and receive 20kHz audio at 128kbs with ISDN
- Send and receive 7.5kHz audio with POTS

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So relax and give us a call – we've got your remotes covered.

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World Radio History

.... It's reality ..... the Aphex Model 2020 Processor.....

NAB

Aphex FM Pro Model 2020 - For FM, TV, Webcasting and CD Mastering

*** Hear the 2020 in action at Booth #R2368 ***

*** Audio Quality ***

"We auditioned all the popular processors and found the Aphex 2020 to provide the cleanest and most natural sound regardless of program material."
Edwige Ronciere, Service Qualité Radio France, Paris

*** Loudness ***

"We have used Aphex processors for over 15 years because they sounded the best. We installed the 2020s, we still sound the best and now we're also the loudest." Doug Stannard, GM - KROK, KVVP, Louisiana

"...excellent loudness." Andy Laird, CPBE, Director of Engineering, Journal Broadcast Group, Milwaukee, Wisconsin

*** Bass ***

"I heard bass detail in music that I never heard in two years of Orban® 8200 use...I was able to achieve the same peak to average ratios but with a more open sound." Mario Heib, CPBE, Consulting Engineer, Salt Lake City, UT

"The cleanest processor you've ever heard with the most deep, rich bottom end." Mark Pallock, CE - KKLA-FM, Salem Communications, Los Angeles

"You can't win this war."
Tom Koza, CE - Power 106, Los Angeles to the CE at competing station not using a 2020

*** Midrange ***

"From movies to news to sitcoms to music shows the 2020 has provided a natural, present quality especially for our lifeblood - the human voice."
Pierre Maillat, Ingenieur Maintenance Audio - Canal +, Paris, France

"...clear, unclouded midrange and highs." Andy Laird

*** High End ***

"The high end is clear without any of the annoying artifacts of the digital processors." Ken Dillard, CE - WKLS-FM Clear Channel Communications, Atlanta, GA

*** Extended Coverage ***

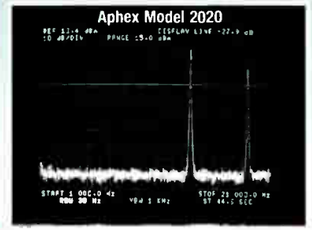
"After the installation of the 2020, the station's signal had a reach of 85 to 100 miles (up from 60 to 85). I can pull the station in clean all the way from Dalton, GA. Amazingly, I was able to hear my station while I was still west of Knoxville, over 150 miles away! ... I am a believer." Ken Dillard

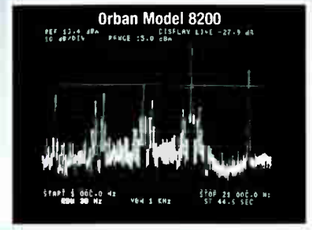
*** Value ***

"Not only a very good audio processor, it's also great value for money."
Steve Adler, Broadcast & Computer Systems Manager - DMG, Australia. Six Model 2020s

*** And No Digital Grunge ***

"We have had a hard time with the two popular digital processors we had on hand... They produced audible artifacts and a "synthetic sound"... We tried for hours and hours to create an acceptable sound." Ken Dillard





Composite Spectrum Response Comparison

14kHz mono Input. Sweep span is 1kHz to 21kHz. Vertical scale is 10dB/div. Major peaks are at 14kHz and 19kHz which are theoretically correct blips. The scale is adjusted to place the pilot close to -20dB which calibrates the display reasonably correctly in dB re: 100% modulation.

The 2020's noise floor (left) is free from spurs but spurs are blatantly evident in the 8200 (right). Note the clean spectrum of the 2020 with no trash or hash. Compare it to the 8200. Try this test for yourself - it's a real eye (and ear) opener.

Interested in a demo? Fill in a request form on our website www.Aphex.com or call us @ 818-767-2929

For more information on the 2020 visit www.Aphex.com

Available for reading or downloading are the following white papers by our VP of Engineering, Donn Wehrbach:

1) The Digital Grunge is proven
2) Aphex Model 2020 vs. Orban 8200 Optimod
3) FM coverage improvements with the Aphex Model 2020

Also available are reprints of these magazine reviews:
1) BE Radio - January 1998 by Andy Laird
2) Radio World - Sept 16 1998 by Mario Heib
3) Radio World - June 9 1999 by Ken Dillard

World Radio History

NEW

Model 1100 Discrete Class A Tube Mic Preamp with 96kHz 24-bit A/D

"...the results were astonishing, providing an awesome sound that was natural, dynamic and absolutely free of noise." George Petersen, Editor MIX Magazine - April 2000 - *Aphex Model 1100 Review*

This superbly crafted new breed of advanced tube microphone preamplifier reaches far beyond mere technical excellence to deliver sound that is uniquely involving, compelling, and real. Our incredible new 2 channel Model 1100 gives you up to 20dB more headroom than conventional pre-amps, allowing you to record hotter tracks with the highest possible digital resolution. This unprecedented amount of headroom, combined with an EIN of -135dBu, allows you to take more gain without the pain of overload distortion or noise.

To achieve this amazing performance, we developed new proprietary circuitry - here's a taste...

- Discrete Class A Bipolar PNP Solid State Front End
- Second Stage Reflected Plate Amplifier™ Tube Circuit
- Sweepable Low Frequency Cancellation Filter (LoCaF™)
- MicLim™ limiter on the microphone itself makes the 1100 virtually crash proof
- Drift Stabilized™ A/D Circuitry eliminates the need for high pass filtering in the digital domain
- Third Stage Reflected Plate Amplifier Tube Circuit Discrete Class A Impedance Balanced Output Stage

NEW

Model 1788 8 Channel Remote Controlled Microphone Preamplifier

Control via 1788R Hardware Remote Controller (shown) &/or PC running Windows 95/98

Perfect as a front end for any Live Broadcast feed, DAW, Fiber System or Digital Console and for Live Sound in Theatre, Tour Sound, Live Recording & Stadium Sound

- Improves sound by eliminating splitters and long mic level cable runs
- Features MicLim™ on the mic output itself for up to 20dB of additional dynamic range
- MicLim also makes 1788 virtually crashproof and improves set-up time
- Simultaneously drive two balanced analog outputs per channel PLUS three 24-bit digital outputs (T/DIF, ADAT, & AES/EBU)
- Glitchless continuously variable gain (LeNA™)
- Remote and local control of every function via MIDI, RS-232 or RS-422
- Fully Automated scene changes
- Control software for Windows 95/98
- 1788R hardware remote controls up to 16 Model 1788s (128 channels) simultaneously

Noted Users of the Aphex Model 1788

Effanel Music - Randy Ezratty - NY, NY
Grammy's, Metallica S&M Tour, MTV New Year's Eve, VH-1 Fashion Awards

Audiotek - Burbank, CA
Super Bowl XXXIII, XXXIV, Academy Awards, Grammy's, Net Aid

U.S. House of Representatives - Washington D.C
First Use: State of the Union Address

Canal + - Paris, France

ABC TV - Hollywood, CA
General Hospital

U.S. Army - Military Command Center - Yuma, AZ

Sony Systems

Seventh Day Adventist Church
House of Worship Recording - Worldwide Mission

MAGI Inc. - Gary Baldassari - Orlando, FL
Boyz 2 Men, 90 Degrees, 'N Sync, Nickelodeon

Online Communications / Burn-One - Purchase, NY
Broadcasting Live Online Remote Concerts

"Fosse"- London Production

Discreet Systems - Denver, Colorado
Studio and Location Recording

Joel Singer - Stow, Ohio
Studio and Location Recording

For more information on these or any other Aphex products
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The rave reviews are in.

The success stories are in.

Stations are reaching new listeners.

The listeners are hearing better sound and staying tuned longer.

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A dream???

World Radio History

Show Offers Help With Web, FCC

Harold Furchtgott-Roth

Michael Powell

Susan Ness

You can't possibly see and hear everything at the NAB show. This year's convention includes 11 conferences and about 150 sessions.

In addition to the engineering and sales sessions detailed separately in this issue, radio attendees can pick among conferences about the Internet, satellite technology, multimedia and much more.

But among the most pertinent are the Radio Management Conference and the Business, Law and Regulation Conference. Here are some highlights of those two tracks. Most sessions are in the Las Vegas Convention Center; check the on-site program for locations.

FCC commissioners *are among those slated to appear during the Business, Law and Regulation Conference.*

Online tips

Internet help will be offered in the Radio Management Conference, from "Save My Web Site" on Sunday afternoon, to recognizing your potential "Web Partners" in a Wednesday morning session.

"Save My Web Site" will focus on what is necessary to keep your site fresh and visitors coming back.

Go with what works

What is working for other stations? Case studies will be analyzed and attendees will have the opportunity to have their sites critiqued.

"What Streams May Come," Tuesday morning, examines the technology required to stream radio and helps guide you to pertinent exhibits.

Which new innovations and techniques are making the cut from "Razor Blades to Hard Drives?" That's the topic Monday morning. This session will update you on the latest trends in radio production.

Even if power utilities in your state are not deregulated, you and your employees can take advantage of consumer choice through pooling your energy needs — and cut utility costs for your operations with a free NAB member benefit. The session is "Power to the People," Monday afternoon.

Find out who and what is making big news now in digital, in the "ABCs of DAB" on Tuesday morning. The presenter is Randy Odeneal of Sconnix Broadcasting, with panelists from digital audio broadcast developers USA Digital Radio and Lucent Digital Radio.

A meeting of radio minds will take place in the "NAB2000 Radio Idea Exchange," on Monday afternoon. The Internet, promotion, recruiting, small market issues, cluster selling and FCC regulations are sure to be discussed, plus whatever you bring to this session.

Gatherings, ceremonies

With the FCC approval of LPFM, the pending launch of satellite radio and the development of IBOC, the world of radio is changing.

NAB will host a panel to update these developments for managers.

The session "The FCC Retunes Radio: What's Going on With Low Power and Digital Radio?" takes place Monday morning.

Members of the Radio Music Licensing Committee will be on hand to update attendees on the rate court proceedings with BMI and negotiations with ASCAP. "Radio Music Licensing in the New Millennium" is Monday afternoon.

All five FCC commissioners have a key mass media legal advisor. The NAB will host them at the "The FCC Legal Assistants" session, Monday afternoon.

Policy considerations and how the FCC regulatory process works will be discussed, as well as where each advisor's commissioner stand on important issues.

New regs

The FCC's new Equal Employment Opportunity rules require new recruiting, recordkeeping and reporting requirements (see Barry Umansky's in-depth EEO review in the *GM Journal* section of this issue of **RW**). You can hear what these changes mean at "FCC: New Century, New Rules," Tuesday morning.

Other changes are afoot at the commission, not the least of which is electronic filing. Learn more about this at "Access, Internet and Electronic Filing: Are You Ready for the FCC in the 21st Century?" on Tuesday afternoon.

And you'll have an opportunity to question several FCC commissioners at "The Regulatory Dialogue," on Tuesday afternoon.

Joining the commissioners will be Greg Rohde, assistant secretary for communications and information for the National Telecommunications and Information Administration.

EEO rules, *low-power FM, satellite radio, electronic filing, music licensing and help for your Web site are on the agenda.*

All-Industry Opening Ceremony
Monday April 10
9-10:15 a.m.
Las Vegas Hilton, Barron Room

If you want a taste of what the media landscape looks like beyond the world of radio, sit in on the convention opening ceremony.

Viacom Chairman and CEO Sumner Redstone will talk about the opportunities and challenges of the media and entertainment industries in a rapidly changing technological climate.

Redstone

Redstone is touted as one of the first industry leaders to recognize the enormous growth of worldwide demand for entertainment content.

Eddie Fritts, NAB CEO and president, will deliver the State of the Industry Address.

This event is sponsored by Lucent Technologies.

Fritts

How to Go

What: NAB2000

Where: Las Vegas Convention Center, Sands Expo Center, Las Vegas Hilton and Venetian Hotel in Las Vegas

When: April 8-13

Registration Information: Phone (888) 740-4622 or (301) 682-7962, fax (301) 694-5124, or visit *www.nab.org/conventions*

Additional Information: Phone (800) 342-2460 or (202) 429-4194

Cost:
By April 5
Full Convention, Member — $495
Full-Convention, Non-Member —$825
Spouse — $100
Production Workshop Package — $375
Exhibits Only — $150

On-Site
Full Convention, Member — $595
Full Convention, Non-Member — $925
Spouse — $100
Production Workshop Package — $425
Exhibits Only — $200

Exhibit Hours:
Monday, April 10: 9 a.m.-6 p.m.
Tuesday, April 11: 9 a.m.-6 p.m.
Wednesday, April 12: 9 a.m.-6 p.m.
Thursday April 13: 9 a.m. - 4 p.m.

World Radio History

These Sessions Will Help You Sell

Laura Dely

Cluster sales strategies and Internet opportunities top the agenda for the Radio Advertising Bureau Sales and Marketing Conference at NAB2000.

Hiring, training and retaining sales staff will be covered in sessions throughout the three days of the conference, according to Wayne Cornils, vice president of meetings at RAB.

Here are some of the highlights.

Seven sins

A new session focuses on the "Seven Deadly Sins of Cluster Management," led by Broadcast Management Strategies President Lindsay Wood Davis.

Although the rules for selling as a cluster and not as single station are different, many in the industry have not revised their strategies, Davis said.

"People have to understand — commissions are one of the single most important elements of successful cluster selling, and one of the elements that is most ignored," she said. "And it's the one that people ignore because they think it's going to add to their cost of sales. If it's done right — it doesn't."

Davis' session is Wednesday morning, April 12.

This year, radio broadcasters pressed RAB to offer workshops on Internet strategies, according to RAB Vice Presidents Dave Casper and Mike Mahone.

Commissions *are one of the most totally ignored elements in successful cluster selling.*

— Lindsay Wood Davis

Web site design and NTR opportunities on the Internet are topics members have requested.

What's the buzz?

Casper and Mahone said the buzzword that radio people should know is "co-opetition."

"Co-opetition is an especially important model for stations that want to build Web sites and e-commerce revenue," according to Casper.

"Businesses look at companies they once saw as competitors and say, 'Hey, is there some way that we can work together?'" Mahone said.

This kind of re-evaluation might lead to alliances between radio and newspapers or radio and television, they said. The two spoke at the recent RAB 2000 conference in Denver about the strength of newspapers in classified listings, which few radio stations offer on their sites.

"They are one of the most prominent reasons people read newspapers, beyond news," said Casper.

RAB recently sought new partners for its own Web site. The group announced a strategic alliance with First Internet Media Corp., a site development company.

"One of the products that we think they do extremely well is their online coupons," said Mahone. "So we have plans now to use them and partner with them to provide our RAB e-Comm Solution member stations the opportunity to do online couponing through First Internet Media."

Casper and Mahone's session, "How to Make Money on the Internet," kicks off the first RAB session on Monday morning, April 10.

Big money in small places

As an example of successful Web thinking, Mahone and Casper pointed to Jerry Hinrikus, general manager of KSAL(AM) in Salina, Kan., a market so small that Arbitron does not rate it.

"Jerry has some really fine, profitable station Web sites in Salina," Casper said. "An example of his new thinking is that all of his radio news staffers are outfitted with digital cameras. So that tells you that Jerry is now not only in the radio business, he's in what we might have considered the newspaper business."

Dave Casper

Hinrikus will present "There is Internet Money in Small Markets," on Monday afternoon, April 10. He said small-market stations can make big money on the Web.

"Our station's Web site has local news, sports, farm, funeral notice, lost pets, business directories, classifieds, events pages and more," Hinrikus said. "We used these features to sell local client links as well as e-commerce opportunities, which was an important part of our revenue this past year."

Successful strategy

Hinrikus' successful small-market Web strategy is confirmed, not only in his high revenue return but also in a recent Arbitron/Edison Media Research study.

According to Bill Rose, vice president and general manager, Arbitron Internet Information Services, market size does not correlate with buying online, banner ad "clicks," or online spending.

"There are just about the same number of people in the top 25 most populous Arbitron rated markets as there are in markets ranked 26 through 270, but dot-com advertising is concentrated in the big markets almost exclusively," said Rose.

"The dot-coms are missing an opportunity that radio stations in these markets can use to pitch to them."

More Internet strategy will be presented

See RAB, page 19 ▶

See Us At NAB Booth # L5603

DON'T MISS AT NAB 2000 The Convergence Marketplace

SBE Events

Want to know what the Society of Broadcast Engineers is up to? NAB2000 is the perfect backdrop for SBE members to meet the national board and participate in an open forum.

The Society of Broadcast Engineers' Board of Directors Meeting is slated for Sunday April 9 from 8:30 a.m. to noon in the Las Vegas Hilton's Embassy Salon.

The Frequency Coordinators' Meeting will be held Monday April 10 from 1-2:30 p.m. at the Hilton's conference rooms 13-14, followed by the NFL Game Day Coordinators' meeting from 2:45-5 p.m., also in rooms 13-14.

Tuesday, April 11 is a full day for the SBE. Organizers will hold the Ennes Educational Foundation Trust meeting from 9-10 a.m. in the Hilton's conference room 9. An EAS meeting also is slated from 9-10:30 a.m. in conference room 13, while certification exams will be given from 9 a.m. to noon in conference room 12. The Political Convention Frequency Coordination meeting will be held from 10 a.m.-noon in conference rooms 7-8.

Organizers are requesting that all SBE members gather in rooms N249-N251 of the Las Vegas Convention Center from 5-6 p.m. on Tuesday April 11 for a membership meeting.

World Radio History

▶ RAB, continued from page 18

Tuesday afternoon, April 11, in a session that was so packed at the RAB 2000 show that a crowd was turned away: "Do's and Don'ts for Building Your Web Page."

It will be presented by WOW Marketing President Henry Tippe, who asks, "Is your Web site like an ugly dog — one look, and you never want to see it again? A Web site is not a radio station, and pictures of you won't sell anything."

Tippe will show how to build, program and sell a site.

RAB Vice President Roger Dodson said that in today's expanding media market, clients have more places to spend their ad money, and they are more sophisticated in doing so.

"Managers have to be just as savvy as their clients are and know how the rules

Mike Mahone

are changing," Dodson said.

Dodson will present "Sales Management for the Millennium," Monday afternoon, April 10.

Also on Monday, industry veteran Dave Gifford, CEO of Dave Gifford International, will lead "Everything You Need to Know about Hiring Better Salespeople."

He predicts that stations will to have to begin to import sales staff from other markets.

"Before, if you wanted to go after a salesperson who worked for the competition, you went after that individual," he said. "Today, you are the competition, because you own six or more radio stations (in a single market) — you can't steal from yourself."

Distant stars

The result is that stations will have to go outside their markets to tap talented sales people. And this will mean that radio companies will pay for transportation, hotel, food, and other expenses related to interviews conducted with out-of-town sales talent.

Gifford said that while radio stations have the potential sellers in-house, they would be wise to invest in "psychometric" tests, designed to match people to their best and most successful jobs.

"You'd be a fool not to test these people, because you know less about them than you did about your competitors," said Gifford.

Gifford will discuss "12 'Must Have' Requirements For New Sales Applicants" in his NAB session (see sidebar).

Tuesday, April 11, offers several sessions to improve your sales team.

The morning will start with "Recruiting, Hiring and Retaining the Best Sales People," led by RAB Executive Vice President George Hyde. He will advise attendees how to find, hire, train and develop "first quality sales super stars," Hyde said.

Because you own six or more radio stations (in a market), you *are* the competition.

— Dave Gifford

NAB attendees can expect to meet some of the RAB Academy's "top gun" graduates. RAB President Gary Fries is a strong advocate of improved training for radio sales professionals.

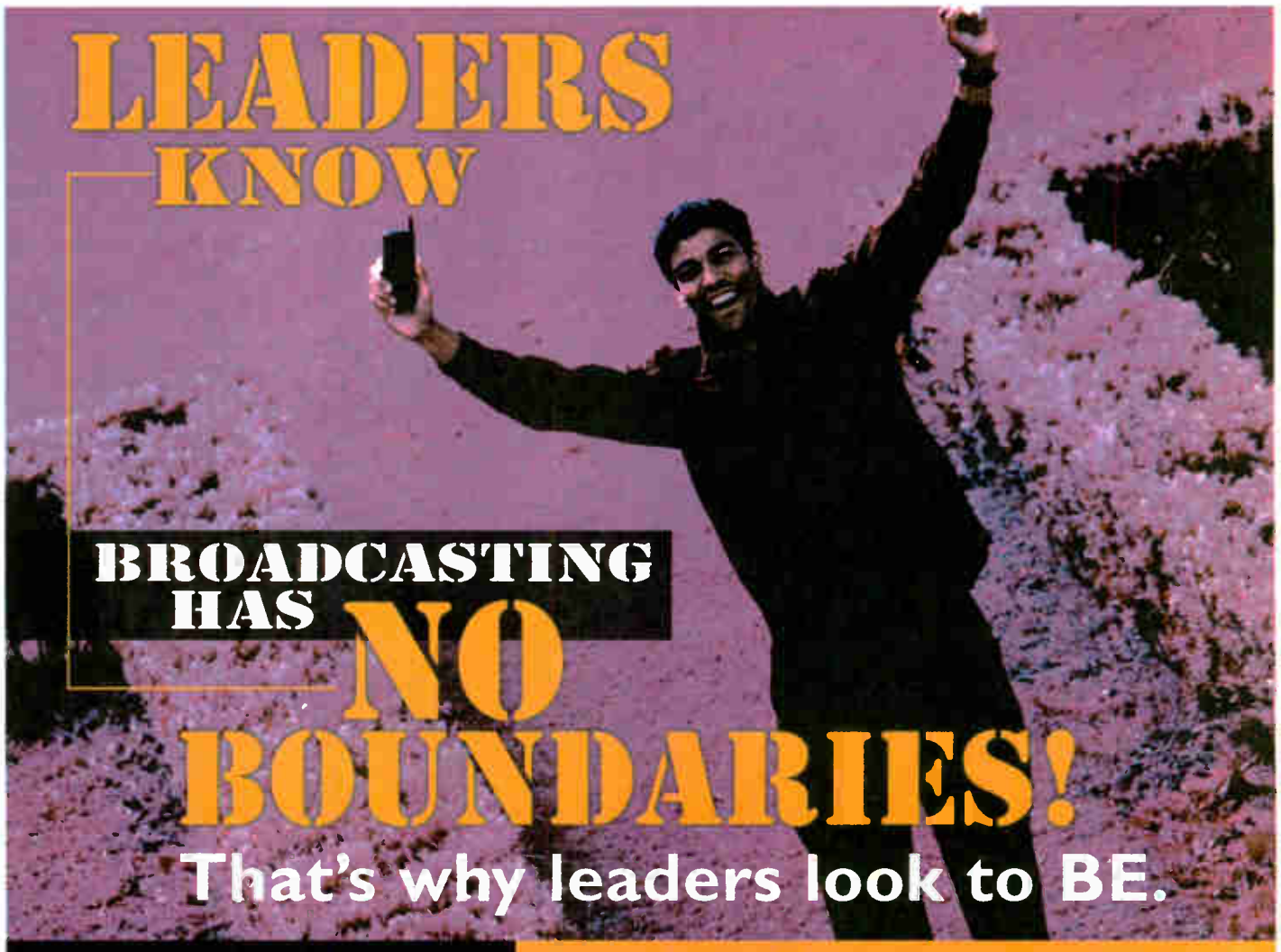
"The big groups spend thousands to send their staffs to conventions - how can they not spend $2,000 on new staff?" Fries said, referring to the RAB Academy's fee per enrollee.

Also Tuesday morning, consultant Gary Fuller will present "Show Me the Money: Collections." According to RAB's Cornils, Fuller is an expert in solving the age-old radio problem: How to ensure station's advertisers pay on time?

RAB Vice President Lynn Anderson will talk about the first, crucial 90 days of a new salesperson's career in "Jump Starting Rookie Sales People's Performance" Tuesday afternoon.

Wednesday, April 12, will feature the session, "E-Commerce Can Mean Big Bucks for Your Station," led by RAB's Mahone and Casper. They said e-commerce is not a foreign language, and it's not that different from what you are doing with your Web site.

"The less you know about gigabytes the better you'll be at dipping into the Internet revenue river," said Mahone.



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World Radio History

Father of Discriminate Processing

▶ DORROUGH, continued from page 12

He co-founded Dorrough Electronics with his wife Kay in 1972. They continue to own and operate the company.

Dorrough made his mark in an area of electronics that involves passionate theories and subjective listener responses. His work influenced other companies, which expanded on discriminate audio processing and have made their own successful products. His own company's role in the marketplace changed during that time.

"Unfortunately, Mike had some very dogmatic theories about processing," said Robert Orban, chief engineer, Orban Inc. "His ignoring signals from the marketplace caused him in the 1980s to lose a market he once owned to other players like CRL, Orban and Texar. His company was reborn as a manufacturer of innovative level-indicating meters, where it remains today."

Orban, who won the engineering award in 1995, said, "While I disagree with many of Mike's theories about processing, I nevertheless respect his pioneering work and his education of the broadcast community about multiband's advantages. I congratulate him on receiving (this) well-deserved award."

Dorrough Electronics introduced the discriminate audio processor in 1972, with separate versions for AM and FM use.

Dorrough's DAP split the audio spectrum into three bands. This resulted in gentle crossover slopes and each band was compressed independently. The bands were then recombined and added to a clipper with a "soft" transfer characteristic.

The importance to radio engineers was that Dorrough's DAP innovation tremendously cut down on spectral gain intermodulation by comparison to existing wideband predecessors. In addition, engineers were now able to adjust all three bands for separate gains, and could also use the DAP as a dynamic program equalizer.

Another audio processing guru, Frank Foti of Cutting Edge, said, "Mike Dorrough has always been an innovator. He explored elements of audio processing long before most others had a clue. The legacy of DAP is well known and well deserved.

"If anything, Mike has always been an inspiration to me as someone who was there in the trenches, had a better idea, and then showed that he could make it happen."

Bob Orban said, "Mike pioneered the commercialization of multiband compression in AM and FM broadcast processing, much as Ray Dolby had pioneered it in 1965 for use in complementary noise reduction systems.

"Without the advertising and marketing resources available to the larger players of the time, like CBS Labs, Mike created a commercially successful three-band processor for on-air processing (the DAP-310) and, almost singlehandedly, made the radio industry aware of the advantages of multiband processing."

There are a lot of good people who have come a long way and have made great improvements to what I did.

— Mike Dorrough

Dorrough remains active in the industry and isn't afraid to give credit where credit is due — just ask him about the state of audio processing in the radio industry today.

"There are a lot of good people who have come a long way," said Dorrough, "and have made great improvements to what I did."

In addition to his work with audio processing, he invented the Dorrough Loudness Monitor with patented technology developed to give broadcast and recording engineers a true indication of loudness, as perceived by the human ear. The audio loudness monitor is used worldwide in radio production, motion picture production, posting, music mixing and dubbing applications.

On the subject of loudness wars in broadcasting, Dorrough said he is not sure if they are a thing of the past.

"I'm hoping they are," he said. "I see some stations that are taking chances and are not pushing (modulation) so hard."

Specifically, he credits Mike Callaghan, chief engineer with Clear Channel Communications in Los Angeles. The group owns stations in that market including KIIS-FM and KXTA(AM).

"Mike has always had to outdo (competing engineers)," said Dorrough. "He does the best job."

Dorrough, who thinks the evolution of digital is the single most important change in audio processing in the past five years, feels it's still too early to tell if there is a need for the processing of Web audio streams.

"I think there'll be a lot of experimentation and a lot of fun times," Dorrough said. Readers who wish to see Dorrough's latest innovations can log onto his company's Web site at *www.dorrough.com*

One trend troubles Mike Dorrough: what he calls the "heavy consolidation" of industry suppliers. "It's like putting a piranha in with a lot of little fish. I've always worried about monopolies."

He said, "If I build a box that's really good, and then a competitor builds a box that's slightly better than mine, I'm forced to build another one that's better than his. Who wins? The public."

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See Us At NAB Booth # L6413

Engineering Award Winners

The NAB established its Engineering Achievement Award in 1959. The following is a list of past winners. Note: NAB separated Radio and TV beginning in 1991; Radio winners are shown.

1959 John T. Wilner, Vice President of Engineering, Hearst Corp., Baltimore
1960 Commissioner T.A.M. Craven, FCC, Washington
1961 Raymond F. Guy, Consultant
1962 Ralph N. Harmon, Vice President of Engineering, Westinghouse Broadcasting, New York
1963 Dr. George R. Town, Dean of Engineering, Iowa State University, Ames, Iowa
1964 John H. DeWitt, Jr., President, WSM Inc., Nashville, Tenn.
1965 Edward W. Allen, Jr., Chief Engineer, FCC, Washington
1966 Carl J. Meyers, Senior VP & Dir. of Engineering, WGN, Chicago
1967 Robert M. Morris, Staff Consultant, Engineering Dept., ABC, New York

Geoffrey Mendenhall

1968 Howard A. Chinn, Director, General Engineering, CBS Television, New York
1969 Jarrett L. Hathaway, Senior Project Engineer, NBC Television, New York
1970 Philip Whitney, GM, WINC, & Supervisory Engineer, Lewis Radio, Winchester, Va.
1971 Benjamin Wolfe, VP of Engineering, Post-Newsweek Stations, Washington
1972 John M. Sherman, Director of Engineering, WCCO, Minneapolis
1973 A. James Ebel, President & GM, KOLN-TV, Lincoln, Neb.
1974 Joseph B. Epperson, VP of Engineering, Scripps-Howard Broadcasting, Cleveland
1975 John D. Silva, Dir., Research & Dev., Golden West Broadcasters, Los Angeles
1976 Dr. Frank G. Kear, Consulting Engineer, Washington
1977 Daniel H. Smith, Senior VP of Engineering, Capital Cities, Inc., Philadelphia
1978 John A. Moseley, President, Moseley Associates, Inc., Goleta, Calif.
1979 Robert W. Flanders, VP & Dir. of Engineering, McGraw-Hill, Inc., Indianapolis
1980 James D. Parker, Staff Consultant/Telecommunications, CBS Television, New York
1981 Wallace E. Johnson, Exec. Dir., Association of Broadcast Engineering, Washington
1982 Julius Barnathan, President, Broadcast Operations & Engineering, ABC, New York
1983 Joseph Flaherty, Vice President of Technology, CBS Inc., New York
1984 Otis S. Freeman, VP & Director of Engineering, WPIX Inc., New York

Bob Orban

1985 Carl E. Smith, President, Smith Electronics, Cleveland
1986 Dr. George Brown, RCA Laboratories, Princeton, N.J.
1987 Renville H. McMann, CBS Technology Center, Stamford, Conn.
1988 Jules Cohen, Jules Cohen & Associates, Washington
1989 William Connolly, President, Sony Advanced Systems, Montvale, N.J.
1990 Hilmer Swanson, Senior Staff Scientist, Harris Corp., Broadcast Div., Quincy, Ill.
1991 George Marti, President & CEO, Marti Electronics, Cleburne, Texas
1992 Edward Edison & Robert L. Hammett, Hammett & Edison, San Francisco

John Moseley

1993 Robert M. Silliman, Silliman & Silliman, Silver Spring, Md.
1994 Charles T. Morgan, VP & Dir. of Engineering, Susquehanna Radio Corp., York, Pa.
1995 Robert Orban, Chief Engineer, AKG Acoustics Inc., San Leandro, Calif.
1996 Ogden Prestholdt, A.D. Ring & Associates, Nakomis, Fla.
1997 George Jacobs, George Jacobs & Associates, Silver Spring, Md.
1998 John Battison, P.E., Consultant, Loudonville, Ohio
1999 Geoffrey Mendenhall, P.E., Harris Corp., Quincy, Ill.
2000 Michael Dorrough, Dorrough Electronics, Woodland Hills, Calif.

Source: NAB

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World Radio History

DON'T MISS AT
NAB 2000
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Amateur Radio Operators' Reception
Wednesday April 12
6-7:45 p.m.
Las Vegas Hilton

Over the years, this has proven to be one of the most popular events at the spring NAB show. This is an event set in a relaxing atmosphere designed just for enjoying the fellowship we call radio.

You can expect to see hundreds of folks — from GMs to CEs to just plain techies at this annual event, sponsored this year by Svetlana.

The Amateur Radio Operators' Reception is open to all NAB2000 attendees. More than just the radio crowd is expected as door prizes, drinks and hors d'oeuvres will be available.

Radio World at NAB2000

Hallikainen

Alexander

Radio World editors and contributors will take part in numerous panels and events during NAB2000. Except where noted, sessions are part of the Broadcast Engineering Conference.

Engineers interested in the potential of Cat-5 cable can sit in with Steve Lampen of Belden Electronics. Lampen, who writes the series *Wired for Sound* in **RW**, speaks about "Transporting Video Signals on UTP Category 5" as part of the Sunday afternoon session "The Foundations of DTV — The Physical Plant."

At the Tuesday morning session "The Foundations of Radio — The Physical Plant," Alan R. Peterson will discuss alternative operating systems for radio automation systems. Peterson is **RW** technical adviser and former editor of *Studio Sessions*, now with Fairfax Public Access Corp.

RW contributor and Technical Adviser Tom McGinley of Infinity Broadcasting Corp. hosts the Tuesday afternoon session "Radio: Optimizing the Signal." Presentations will focus on RF and transmission issues.

Among the speakers at that session are frequent contributors Cris Alexander of the Crawford Group, speaking on "AM Directional Arrays — What to Do When They're Broken," and consultant Tom Osenkowsky on "Emergency Planning for Radio and Television."

Barry D. Umansky of law firm Vorys Sater Seymour & Pease LLP, who writes the column *Broadcast Law Review* in **RW**, will take part in the "The Ad's the Thing: Advertising Regulation for Non-Lawyers" on Wednesday morning, April 12.

Panelists will discuss the spectrum of regulations broadcasters need to know before they air an advertisement. It's part of the Business, Law and Regulation Conference.

Umansky

McLane

RW Editor Paul J. McLane looks ahead in "From the Editor: What's Next in the World of Radio." He speaks Wednesday at 10:15 a.m. during the all-day SBE/Ennes Radio Workshop, "Broadcasting: Getting the Word Out."

Anyone who does research into FCC rules will come across the online rules resource of Harold Hallikainen eventually. Hallikainen, a contributor to **RW**, speaks on "Spectrum for Sale or Rent," during the Wednesday morning session "Regulations: Keeping Pace with Broadcast Technology."

And John Bisset of Harris Corp. is a wealth of information about radio engineering, which he shares with readers in every issue in the column *Workbench*.

At NAB2000, he offers a three-hour session, "Radio Transmitters: A Practical Workshop" on Thursday morning.

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New Services for Radio

▶ OVERVIEW, continued from page 12

Cumming said technologies are providing new revenue streams and enabling broadcasters to provide new services. "NAB2000 is where broadcasters can determine how they can enhance their business with the latest technology," she said. "The show also offers dynamic and informative conferences that cover critical current issues facing radio."

Those issues include the Internet, DAB, cluster management and creative management techniques.

"Broadcasters will also hear from key regulators, including FCC Chairman William Kennard, on public policy that affects their business," said Cumming.

On the floor

As last year, the bulk of companies of interest to radio/audio attendees will be in the North Hall of the LVCC.

"This went over well with attendees who appreciated having these exhibits in one area instead of spread between the two convention centers," said Cumming. "However, there will also be plenty of exhibits in the Sands that will be of interest to forward-thinking broadcasters. That's where the multimedia and Internet companies are."

NAB predicts record attendance. "Our numbers in line with last year when we had the highest attendance ever at 106,372 registrants," said Cumming.

International registrants totaled 22,889 according to 1999 NAB figures.

"On the minds of everybody is equipping for the digital future," said Constantine. "We are long past due for a decision on DAB. There are smarter technologies for moving and transporting audio and everybody wants to take advantage of that and position themselves for the next 10 years."

Kerstin agreed. "Digital is going to be on the top of the list. Many people think low-power FM is going to create a fantastic market. It should be a boost for the radio economy on the supplier side. We'll see how LPFM affects the community in general. It'll be interesting to see how it'll pan out."

Schwieger of BSW said he thinks issues of interest will be any type of activities involving the Internet.

"Whether the broadcaster is wanting to broadcast their signal on the Internet, or maybe offer their services on the Net ... there are programming distribution options out there. I also think DAB and LPFM are issues that will be on attendees' minds."

Some in broadcasting lament that consolidation has reduced the opportunities for radio managers, and engineers in particular, to attend the show. By this argument, a consolidated group owner sends fewer employees than its predecessor individual companies did.

But the spring show remains vital to radio equipment buyers — even more so as attendance at the fall NAB Radio Show has declined in recent years.

And SBE's Butler is upbeat about the outlook for engineers in general.

"From our perspective, the consolidation of radio ownership has created a demand for engineers because companies can afford to have an engineer to take care of the multiple facilities in a market.

"In the past, standalones couldn't afford it. The consolidation of facilities that the combined ownerships are making possible is creating tremendous work opportunities out there."

World Radio History

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World Radio History

LIVE ASSIST & AUTOMATION

Computer Systems Bulk Up

Ken R.

Walking around the NAB exhibition halls, you are certain to see computerized solutions for every radio need.

And, as manufacturers are quick to point out, those solutions have been updated and improved to take advantage of advances being made in computer operating systems, the Internet and networking.

Ted Lantz, vice president of sales for Computer Concepts Corp., said the company will show a new hardware product called EpiCenter.

"Think of it as a master router/switcher for one or many stations using our Maestro digital audio storage software," said Lantz. Maestro includes redundant backup over a wide-area network allowing for transfer of spots, music and jingles among sites with reconciliation. Voice-tracking and news feeds can also be shared among users.

Netia Digital Audio will offer its Radio-Assist family of software products to control traffic, billing, music scheduling and audio storage. With several modules, Radio-Assist can provide various levels of sophistication in the production room, controlled access and Web interface with third-party software.

"We also have something called NA-Conv, which is software that can convert any file format to any other file format, which we sell as part of our bigger package or as a stand-alone," said Tyler Callis, Netia regional sales manager for North America.

"Everything in the broadcast industry is finally moving to glass touchscreens," said Jon Young, vice president of sales for Arrakis Systems Inc.

NAB2000 brings the introduction of two Arrakis products optimized for this interface: Instant 3 Play jingle box and the Revolution Series digital console.

Broadcast Electronics updates its AudioVault line.

Separate device

DigiLink IV is the newest automation/live assist Windows-based hardware and software solution from Arrakis.

"Because it's a separate device and not a PC card, you can lose your computer and not lose your audio," Young said.

AirControl NT 2000 Professional is the newest software for live-assist and fully automated stations available from Germany-based Mediatron Digital. It is structured around plug-in modules available for program scheduling, hot keys, database searches and Internet delivery.

Right Touch is a software companion to Smartcaster, the Smarts Broadcast audio storage system. John Schad, president of Smarts Broadcast, said, "It is a combination of digital automation, traffic, billing and music selection in one package."

"We are showing a broadcast version of ServerSound," said mSoft Inc. Vice President of Sales and Marketing Doug Perkins. "It's a digital asset manager that has been used for audio post-production. It is a good answer for someone who has a mixture of PC and Mac-based systems in house."

On Air Digital USA will promote its Linux-based RadioSuite System, an audio hard-drive playback system. It features software decoders for both MPEG and WAV file capabilities, and can work with Windows-based WAV and MPEG editors and CD rippers.

Pristine Systems will preview NuWave, an audio file recorder offering a fast and easy graphic interface with waveform editing.

"It is Windows-based and will evolve into a suite of products to complement our RapidFire on-air digital audio system," said Boyce Williams, president of Pristine Systems Inc. NuWave also features file transfer to any connected workstation in a network.

360 Systems will show its Instant Replay hard-disk recorder/play system, which provides access to 1,000 cuts of any length.

360 Systems also will exhibit DigiCart II Plus, which combines a hard-disk recorder, mini workstation and digital cart machine into one hardware package.

MediaTouch is demonstrating its touch-screen-based QuicPix, an inexpensive live-assist package. It features 40 instant starts, countdown timers and voice tracking capability. Also in the booth will be OpLog, a an elaborate system for controlling remote events and playing music. MediaTouch now is part of OMT Technologies of Canada.

Broadcast Electronics has a new family of digital audio storage products, according to Vice President of Worldwide Sales Mark Jamieson.

"Vault Express is the standalone PC-based little brother to our AudioVault system. Web Vault is geared to audio streaming and it includes special processing that shapes the sound for the Internet. The Vault^2 is the next-generation large system which is WAN/LAN/Internet-enabled. We scale the technology to the size of the station or group," Jamieson said.

A company that has increased its presence in the United States is German supplier Management Data.

"The new D'Accord Broadcast Studio 3.0 has a modular design and is multimedia capable," said Carsten Geyer of MD. RadioOnAir is the starter module for small stations; it runs under Windows NT.

CBSI is set to show its Digital Universe 2.1, a Windows-based package for digital audio storage that interfaces with its DeltaFlex III business system. As noted elsewhere in this issue, in the story about traffic and billing, CBSI recently was purchased by Wicks.

Eileen Tuuri, marketing manager for CBSI, said the new DeltaFlex III is a customizable software solution for sales management, billing and analysis. The biggest feature is "revenue maximization," which allows for the highest-priced spots to take priority on the logs.

"It is like an airline," said Tuuri. "You can overbook and then decide how you will fill the seats."

Scott Studios is introducing a number of applications including SS32, a touchscreen

See AUTOMATION, page 25 ▶

The New Standard for Digital Consoles

Numix consoles by Logitek give you all of the flexibility you need

- True DSP-based digital mixing and routing
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World Radio History

nétia news

[NAB]

Edition April 2000

NOW THAT IS A BIG DIGITAL AUDIO SYSTEM

Paul Heaton, Syncrotech Systems Design Pty Ltd is obviously very pleased to be awarded the ABC Radio contract.
The ABC (Autralian Broadcasting Corporation) has chosen the Radio-Assist system of NETIA to digitise its network of local and regional radio (Sydney, Canberra, Darwin, Adelaide...). This installation is for 450 workstations and 52 servers.

Colin Knoles (Head of the ABC's Technology Strategy and Development group), Paul Heaton (Syncrotech Systems Design) and Christophe Bornet (NETIA) during the signature of the ABC contract.

More than 60 local and regional radio stations

The ABC was created in 1932 and controlled twelve stations around Australia.
From 1939 until now, the ABC established mobile recording units as far as the Middle East.
With more than 60 radio stations, the ABC has adopted new digital technologies to increase network performance.

Successful evaluation

The technical evaluation period conducted by the ABC took several months. During this evaluation period NETIA and Syncrotech worked hand in hand creating several workstations, on-air stations and servers in both Sydney and Melbourne. Both NETIA and Syncrotech personnel conducted training sessions in these primary cities and after completing a brief training schedule, the ABC were then left to conduct their own evaluation.

The ABC tested the technical and operational parameters of the four competitors. In the end, the ABC chose NETIA.
Christophe Bornet (Regional Sales Manager for Asia & Pacific) and Abderrahmane Bessaih (International Project Manager) played a major part in these evaluations.
This contract is probably one of the most prestigious and important in Australia.

Paul Heaton,
Managing Director of Syncrotech Systems Design, NETIA's distributor in Australia.

World Radio History

IN BRIEF

>>> ***The Web site of Lucien Barrière,*** *realised by NETIA, is ranked 3rd in the 10 best Internet sites of hotel chains. Check it out at www.lucienbarriere.com*

>>> ***Partnership between ABC, Australian Broadcasting Corporation, and NETIA is reinforced.*** *NETIA will deliver 22 new additional stations as well as a server. The total of the first phase of installation will represent 450 stations and 52 servers.*

>>> ***UUNET, the world leader of professional internet has selected NETIA*** *to join its very selective network of distributors. NETIA markets UUNET's turnkey solutions: "Service of Internet Access by Rented Liaison" (SIARL). This SIARL will enable its users to have a permanent access to the Internet, without telecommunications expenses, with technical assistance; all at very attractive rates.*

>>> *After Liege, Verviers and Brussels,* ***RTBF Namur has chosen NETIA products*** *to equip its radio operations center.*

>>> ***Audiotake software receives a new feature: Quadro.*** *This tab makes it possible to simultaneously launch 4 different recordings.*

>>> ***During the Paris - Dakar - Le Cairo 2000 auto race, NETIA*** *equipped a Lap top with the main editing, recording and exporting tools of Radio Assist. The journalist thus could carry out his reports in the heart of the race; edit, mix and export them via Internet through MP3 or Real Audio formats , to the head office of RFI.*

B R O A

NETIA designs the world's first private digital video transmission management system for **i>télévision**

© J.P. Lamirand

Satellite News Gathering Vehicles (SNGV) from the field.

The U-Share package by NETIA provides i>télévision, the new Canal+ group news channel, with access to a fully automatic, remotely-controlled contribution network.

November 4th 1999 has seen the launch of i>télévision, the Canal+ group news channel which viewers can watch via the Canalsatellite digital package. The new channel uses the very latest technological developments in sound and image transmission.

Designed and developed by NETIA, the U-Share software package is a fully automated means for remote control and management of video image transmission. With this totally new system, i>télévision can return all the images taken from its fleet of 29 Satellite News Gathering Vehicles (SNGV) throughout France to its studios in Paris-Montparnasse.

With its new range of U-Share software, NETIA has again proved that it is in the major league of innovative companies in the digital video transmission and broadcasting sector. ●

NETIA assists **BBC World Service** with pilot project

NETIA provided hardware and software for 42 test workstations in the offices of BBC World Service, in Bush House, London. Of these stations 36 are intended for preparation, editing and recording, 6 are devoted to broadcasting radio programmes for Africa and Asia.

BBC World Service broadcasts programs simultaneously in Hausa (African Language) and Urdu (Asian Language) for this pilot project.

In order to allow access to existing sound data, NETIA converted the data stored in the existing BBC World Service DAVE 2000 system , into MPEG2.

Thus, BBC World Service can continue to use the audio files present in its existing sound database, whilst benefiting from the ease of transfer to the MPEG2 format.

NETIA provided its various broadcasting products on stations running under Windows NT. ●

World Radio History

D C A S T

Why **TWR** chose NETIA Software

Trans World Radio has just signed a new contract with NETIA so as to equip its transmission center on the island of GUAM in the Pacific rim.

NETIA has installed the PlayList software (taking care of transmitting automatically 5 playlists 24 hours a day) and planning and editing software.

Douglas Gregson, Project Engineer of Trans World Radio Guam explains why TWR chose NETIA:

"Guam's location makes it subject to earth quakes, tropical storms and typhoons which can interrupt power and cause system failures not normally seen in other environments. We were searching for very reliable software that would return back to the audio program, after a system reinitialization, exactly and automatically where the program should be in the program schedule by the clock.

NETIA is the only company which proposed software which returns to the play list, **playing** at the very moment in the program which will keep the playlist "on time" for the rest of the day. ●

NETIA supplies **HUGE, LINEAR** system at **NOB**

Test platform at NETIA.

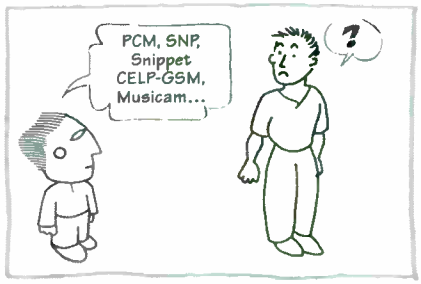
The NOB (Nederlands Omroep-produktie Bedrijf) is an audiovisual production centre. Its television and radio equipment is some of the highest-performing in Europe. NETIA has installed Acquisition Stations at its site. The NOB has decided to work in linear mode. It wants its customers to be able to read and convert files easily into the format they require. This huge system employs **30 Terabytes** of storage.

With the progress made in Information Technology, it is no longer necessary to work in compressed format. Today, linear mode offers radio stations several advantages:

- it is a universal format, read by any workstation,
- data can be transferred with no compatibility problems,
- music stations appreciate linear format for the sound quality. It is the most perfect retranscription of an analog sound. It keeps its purity even after being edited several times.

For its part, NETIA has done all it can to facilitate the arrival of linear mode. It has optimised the performance of its Radio-Assist software to overcome the obstacle of sound file size.

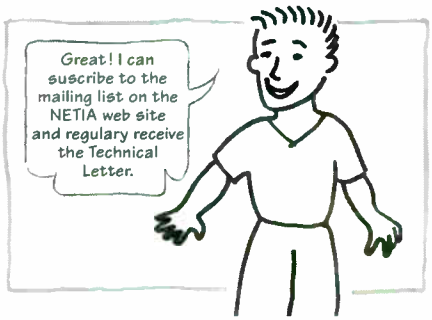
The choices of the NOB and VAR show that NETIA is once again able to meet its customers' requirements: compressed or linear. ●



whether or not you understand...

...any of this...

...we can help!



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NAB The Convergence Marketplace 2000

NETIA wins two awards

Pierre Keiflin and Christophe Carniel receiving the "Masters 1999" awards.

On September 27th 1999 NETIA was awarded by the jury of the "Lettre M", a french economics newsletter, with both the "Master of Technological Innovation" and the "Master of European Integration".

Meet NETIA and discover its new products:

Broadcast Asia 2000,
Singapore Expo Centre,
Stand n° 2L2-04
from 6 to 9 June 2000.

NETIA people

- Tyler Callis becomes Regional Sales Manager for **North America** (e-mail : t.callis@netia.net)
- Pascal Cima, Head of Operations for North America, has set up NETIA's office in **New Jersey.** (e-mail : p.cima@netia.net) The toll free US technical support number is 877.446.3842
- Abderrahmane Bessaih, Head of Operations for Asia & Pacific, has set up NETIA's office in Australia. (e-mail : a.bessaih@netia.net)
- Vincent Bourgarel, *Regional Sales Manager, Asia & Pacific.*
- Marc Henry Dussart, *Broadcasting R&D.*
- Joey Martin, *Project Manager, Operations.*
- Jacques Poujardieu, *Regional Sales Manager, Europe.*
- Julien Roullier, *Project Manager, Operations.*

don't forget www.netia.net

Nétia News
NETIA group news letter

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NETIA Europe - Headquarters
Halle industrielle de Farjou - 34270 Claret - France - Tel 011 33 467 59 08 07 - Fax 011 33 467 59 08 20

NETIA Paris
73, rue de l'Evangile - CAP 18 - 75886 Paris Cedex 18 - France - Tel 011 33 146 07 26 26 - Fax 011 33 146 07 00 26

NETIA Asia Pacific
French Business Center - 89 Neil Road - Singapore 088849 - Tel 011 65 326 0681 - Fax 011 65 227 5030

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PO BOX 966 - Roanoke - Texas 76262 - Toll Free 877 699 9151 - Fax 877 699 9152

World Radio History

AM TRANSMITTERS

IBOC Influences AM Market

W.C. Alexander

Anyone who believes AM is a dying medium should pay a visit to NAB2000, where — to paraphrase Mark Twain — reports of its demise has been greatly exaggerated.

Manufacturers continue to develop new AM transmitters, giving broadcasters real choice in products for this transmission medium.

IBOC DAB is very much on the minds of manufacturers, who say compatibility with any adopted standard is key to ensuring equipment will remain viable.

Many proponents of DAB feel that a digital standard will breathe fresh life into the AM band.

Consequently, a number of new, or recently introduced, digital AM transmitters will be on display.

Leading the way

With the development of the XL-12, Nautel positioned itself at the forefront of IBOC DAB transmitter development. At NAB last year, the XL-12 was on display on the exhibit floor for an IBOC DAB demonstration.

This year, Nautel plans to conduct an on-air demonstration of its 5 kW AM rig, the ND5, showing IBOC compatibility. Nautel also will have its XL-series IBOC DAB/AM transmitters on display.

According to Gary Manteuffel, Nautel manager of broadcast sales, the company has strategic partnership agreements with Lucent Digital Radio and USA Digital Radio for the development of IBOC DAB transmitter technology.

Harris also will demonstrate AM IBOC on the convention floor. The Harris demo will include a complete digital air chain, from digital studio through IBOC DAB transmitter. Attendees will be able to hear the actual IBOC broadcast at the Harris booth.

Harris featured transmitters will include the Gates series of medium wave AM transmitters.

Brian Brown, vice president of marketing for Harris, said, "Harris has been clearly focused on providing future-ready RF transmission, as well as studio and program transport solutions that protect a broadcaster's investment in new equipment. We all know that digital radio terrestrial transmission is not a question of if, but when."

Omnitronix is working on bringing its line of IBOC-ready transmitters to the market, which will be on display at the show, said President David Solt.

Modified design

"We have been working on modifying our current design to handle the wider bandwidth and phase stability required by the IBOC standard," Solt said.

The IBOC-ready AM transmitters will be available soon. Omnitronix also will exhibit its 8 MHz solid-state shortwave transmitter.

Bringing along its highly touted Pulsar solid-state PDM AM line is Energy-Onix, available in 250, 500 and 1000 W, and 2.5, 5, 10, 25, 50 and 100 kW power levels.

"These units represent a combination of sonic fidelity, reliability and cost effectiveness," said Energy-Onix President Bernard Wise. "Stations report that Pulsars sound like FM."

Armstrong Transmitter Corp. also has been busy developing its own digital AM transmitters. The AMS series of compact solid-state IBOC DAB compatible AM transmitters will be introduced at NAB2000.

AMS transmitters, available in 500 W and 1 kW power levels, are conservatively rated for 150-percent positive modulation. They feature hot-pluggable modules and come in a compact 12-inch rack-mountable chassis.

Broadcast Electronics will showcase its new 5 kW E-series AM transmitter. The company said the E-series features technology not previously available, increasing the efficiency of the PA modules, and producing more power at the same price as earlier models.

Nautel's ND5 Solid-State Transmitter

The E-series also features redundant AC supplies, five power levels and optional built-in C-QUAM stereo exciter.

Continental Electronics Corp. will display the 50 kW PowerStar A50I, introduced at NAB99.

The PowerStar series, available in power levels from 1 to 50 kW, is digital ready, features the CEC DSP system, which is at the heart of its modulation process and cross-point power/VSWR meter system.

Maximum loudness

"The DSP system generates the AM signal digitally for maximum loudness and strict compliance with all worldwide audio standards, including the latest IBOC systems" said CEC President David Burkey.

Sender S.A., a Chilean AM solid-state transmitter manufacturer, recently celebrated sales in the United States and Europe.

The company will highlight its line of last-generation AM solid-state transmitters. These 1 to 60 kW products feature built-in audio processing, resulting in simplified installation and reduced up-front costs for the station owner.

Sender General Manager Marcial Zegers said, "The Sender is the most complete AM solid-state transmitter on the market."

LPB will introduce the AM 2000 100 mW Part 15 AM transmitter. LPB President Tom Spadea said the AM 2000 offers an unlicensed alternative to LPFM. Available today, the AM 2000 has a service radius of up to one-half mile.

Among the international attendees traveling to Las Vegas is Digital Radio Mondiale, a consortium of international organizations developing a worldwide digital AM IBOC standard for broadcasting below 30 MHz. In early February, DRM announced an agreement with USADR to cooperate on the development of the standard.

At its booth, DRM member German telecommunications company Deutsche Telekom is presenting audio samples of the new digital AM sound quality and provide detailed technical information on digital AM.

Also exhibiting at NAB2000 in the AM Transmitter category are Crown Castle International, Delta Electronics and Rohde & Schwarz GmbH.

Computers Dominate

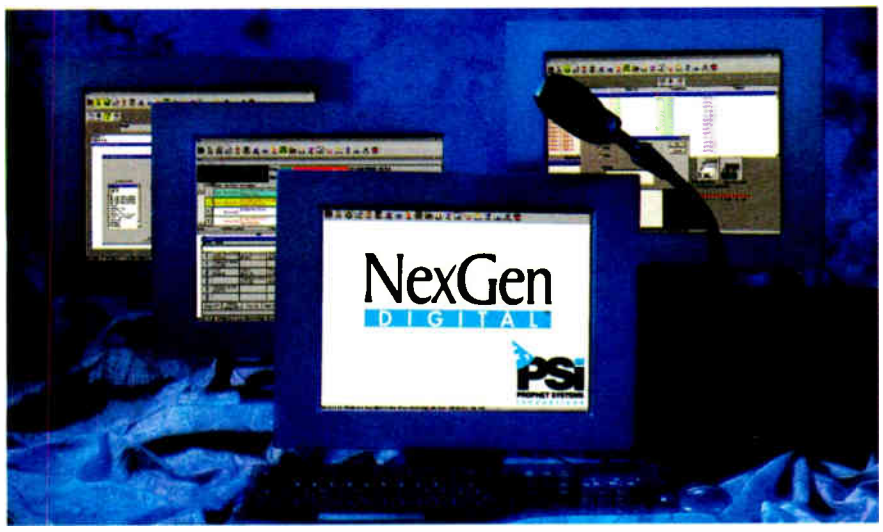
▶ AUTOMATION, continued from page 24

system to handle music, commercials and jingles.

"The screen supplies lots of data including advertiser name, spot out-cue, song title and artist, intro time, trivia, etc.," according to General Manager Brian Chase.

Also new is an Automated School Closing Reporter, allowing stations to streamline what used to be a labor-intensive operation.

"We use Caller ID for verification, voice prompts and security codes," said Dave Scott, president of Scott Studios. "School administrators can convey their weather-related information to the station on the phone. This data can then appear on a studio screen, as e-mail to a pre-determined group of people and appear on a station's Web site or a special site hosted by Scott Studios."



NexGen by Prophet Systems Innovations

Register Data Systems Sales Manager Art White said the Phantom Automation System has been upgraded with higher resolution metering, flat-screen monitors and prioritizing of critical events.

The RDS Millennium Traffic System will be unveiled at NAB2000.

"This one took into consideration all the input from the users of our current System Six package," White said. Register Data Systems also offers Replicator, a "store-forward" device that records programs and can delay them while still recording.

Prophet Systems Innovations will be on hand with its family of audio management products.

"NexGen Digital Broadcast is a WAN system that sends audio over a T1 line to any station across the country," said Jacqueline Lockhart, director of marketing for Prophet Systems.

"It is designed for voice-tracking so broadcast groups can use their best air talent in multiple markets," she said.

Columbine-JDS Systems is showing D-MAS A800, its multichannel automation system, which was recently configured for the radio industry.

Dalet Digital Media will be on hand with several offerings. Robin Wang, director of marketing, said, "Our TeamNews package manages every function in the newsroom from story acquisition to broadcast. A module called Newscast schedules the stories and audio on a database with multimedia applications."

Another Dalet product is TeamRadio, a business management system.

"And Dalet 5.1 Digital Automation has some new enhancements so you can stream your audio on the Internet," Wang said.

LPB will exhibit it Salsa Digital Automation system, available in NT with multi-station, single-system and turnkey packages.

AEV is showing Virtual Radio, a 32-bit multiuser, multitasking automation system. VR provides for audio editing, music scheduling and other chores for live-assist or fully automated stations.

CartWorks is showing its Wav/MPEG system for live-assist, satellite or music-on-hard-disk automation applications.

In the Harris Corp. booth, Enco Systems is showing recent upgrades to its DADpro32 system, including a new library interface with a Windows-type browser for accessing audio cuts, a suite of Web interface tools for streaming audio or text data to a Web site, a new scheduling wizard and a built-in CD ripper.

AEQ SA, maker of the MAR4Win system, will be at NAB2000.

World Radio History

RECORDERS & PLAYERS

Recorders Move Beyond Tape, Discs

Paul Kaminski

Standalone recorders and playback machines have not gone the way of the Edsel just yet.

Despite the proliferation of hard-disk-based audio systems, there are still jobs and budgets that only a standalone unit can meet. And many such offerings — ranging from hand-held digital audio recorders to CD burners to multifunction units — will be displayed during NAB2000.

Dealers have the new Marantz PMD650 Portable MiniDisc.

Digital multitrack

Tascam is displaying three new products.

The DA-78HR is a 24-bit, eight-track modular digital multitrack tape recorder designed for mobile or fixed recording; it is backward-compatible with older 16-bit tapes. The DA98-HR adds AES/EBU digital I/O to the DA-78HR, allowing for quick connections to digital installations and patchbays. It can record eight tracks at 44.1 or 48 kHz; four tracks at 96 kHz and two tracks at 192 kHz.

Rounding out the new offerings will be the MX-2424. This 24-track machine has a standard 9 GB SCSI drive, graphical user interface and multiple I/O options. It is compatible with PC and Mac file formats, using Broadcast .WAV (BWF) and SoundDesigner II audiofiles.

Tascam is also displaying its DAT line, notably the DA-P1 portable DAT deck and the DA-40 and DA-45 studio machines.

Nagra USA is showing its Ares-P solid-state recorder, which, said Nagra representative Dan O'Grady, "Can do everything the Ares-C does. Now the PCMCIA media (cards) will allow the user to record over three hours of continuous stereo audio."

The Ares-P has special mono or stereo plug in microphones, an output for high speed computer download and a headphone output.

Digigram is showing a portable audio recorder, based on the Ares-P platform, called the RCX220.

Neil Glassman, Digigram president said the RCX220 is unique because "It serves as both audio engine for a PC-based workstation or a standalone field recorder." A USB connection allows users to employ Digigram-powered applications without buying additional hardware.

Glassman said, "The PC will see the RCX220 as a Digigram soundcard when connected to the USB port." With the appropriate software, the user can perform cross-fades, punch-ins/-outs, fades, panning, timestretching and scrubbing, in addition to cut editing.

Flash recorder

Digigram technology will also turn up on the Denon stand in the form of the DN-F20R Portable IC Recorder.

This over-the-shoulder portable field recorder boasts no moving parts and captures MPEG Layer II audio to compact flashcards for storage and instant non-destructive editing. An optional Digigram PCX MPEG audio board and Xtrack multitrack editing software allow the field engineer to edit sound data waveforms once encoded to MPEG.

For a high-end, all-in-one hard disk recorder/editor with ISDN interface, Sonifex will be showing its newly re-priced Courier in standard and ISDN models on the Independent Audio stand.

The Tascam DA-78HR is a 24-bit, eight-track modular multitrack recorder.

"The Courier, with its editing capability and transmission flexibility, is a very powerful journalist's tool," said Marcus Brooke, Sonifex managing director.

Inspired look

Marantz dealers will have the PMD650, a portable MiniDisc recorder meant for field acquisition and news-gathering. With a look heavily inspired by the Marantz cassette line — notably the 222 — the PMD650 provides mic phantom power, a 40-second audio buffer and a shallow profile meant for comfortable over-the-shoulder carrying in the field.

360 Systems will show its TCR-8 eight-track digital recorder. Released a year ago as an audio dubber for video, the TCR-8 has many features that make it appropriate for radio needs, too. The unit has a DVD-RAM drive, plus the capability to interchange .WAV files.

Stations looking for a more efficient way to distribute spots, rebuild a record library or otherwise manage the process of duplicating CDs without tying up the production PC, have a number of new CD recorder/burner products to see at NAB2000.

HHB Communications USA will be showing its new CDR850 Plus compact disc recorder. This is an advanced version of the 850 with a balanced XLR digital output and word clock feature, allowing the recorder to lock to a master clock for stable synchronization with other digital audio devices.

HHB Communications President David Beesley said the 850 Plus "is a response to the specific needs of our customers working in all digital setups."

The Microboards StartREC editor/duplicator has the capability to create up to four audio CDs simultaneously at eight-times real-time speed. The StartREC includes hard disk editing tools, CD recorder drives and a high performance reader.

Microboards will also show the Champion series of standalone duplicators, beginning with the Orbit. This device lets the user load an input hopper with blank media, place the master into the CD reader and, without touching any buttons, run a duplication job automatically.

Mediaform is showing its CD-3702, which is deisgned to handle the unattended duplication of 100 CD-Rs.

■■■

Paul Kaminski is news director for the Motor Sports Radio Network and a regular contributor to Radio World.

DON'T MISS AT NAB 2000 The Convergence Marketplace

Career Fair
Sunday April 9
Noon-4:45 p.m.

Got your résumé handy?

Whether you are a student with an eye toward audio jobs, or a seasoned professional with an eye out for new employees, the NAB/BEA Career Fair is a must-see.

The Broadcast Career Fair is presented by NAB's Department of Human Resources Development and the Broadcast Education Association.

Attendees may also want to check out the Broadcast Career Seminar that morning from 10:30 to 11:45 a.m. Broadcast professionals including managers, educators, and others in the industry will dish out advice and opinions.

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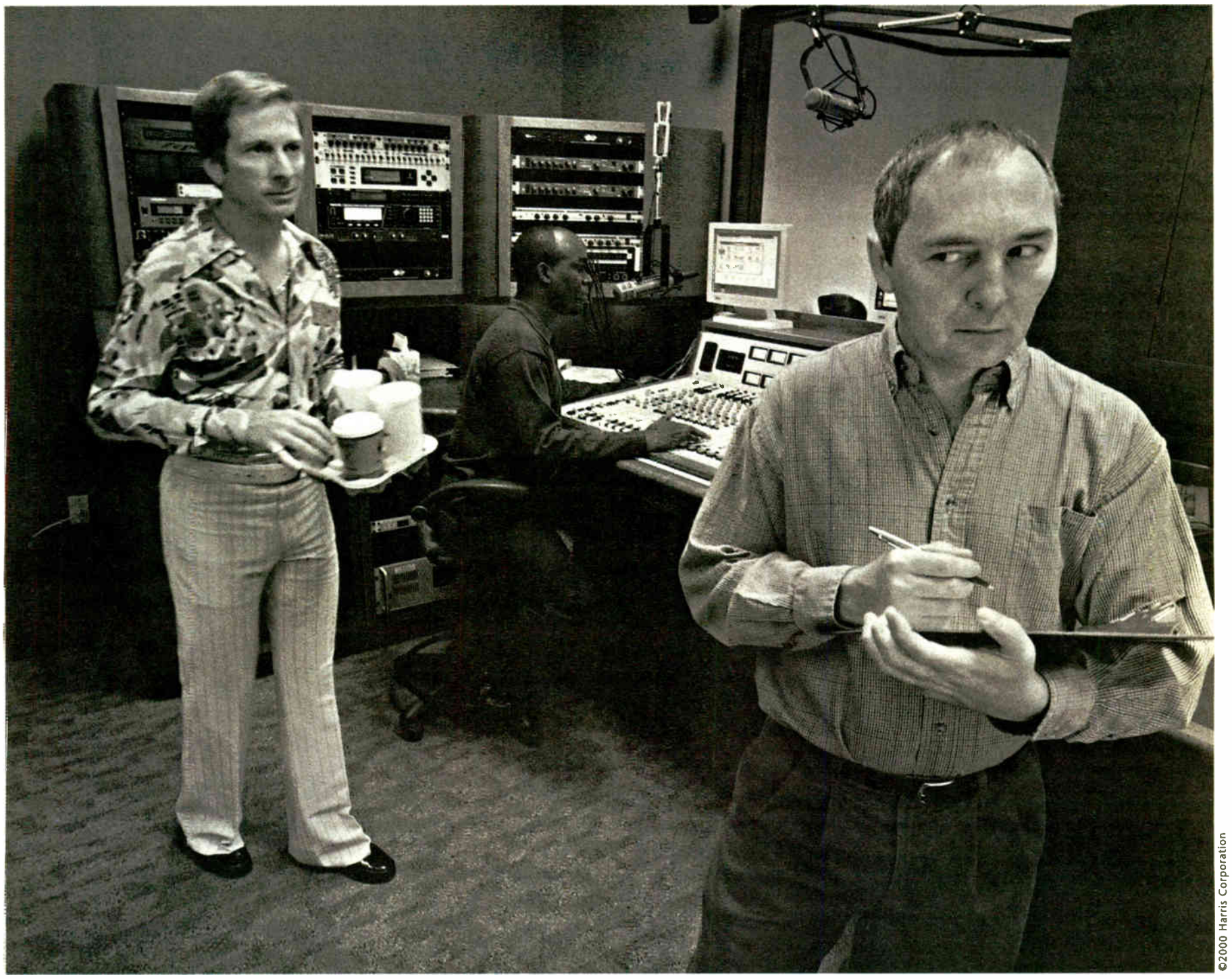

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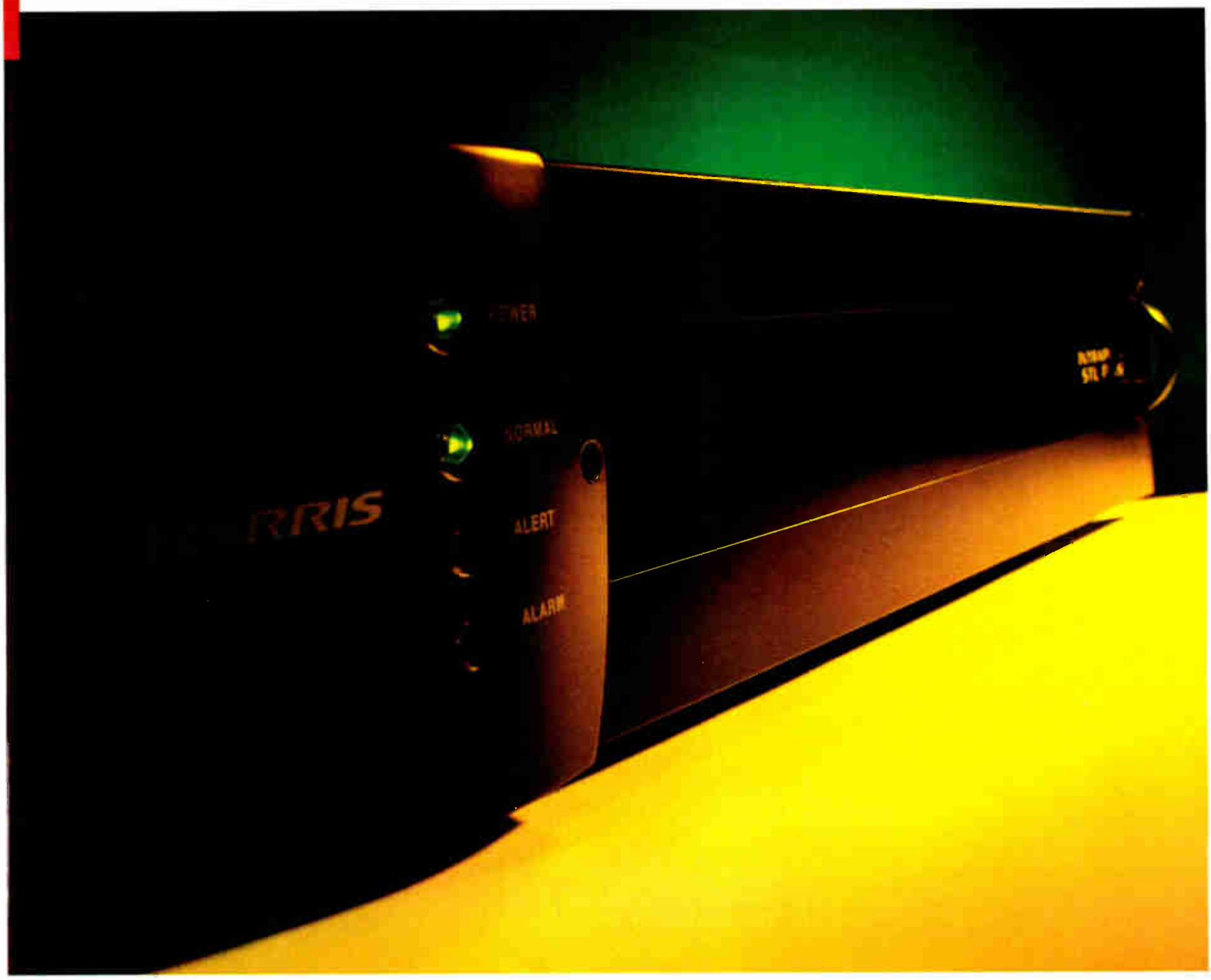

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In today's rapidly consolidating radio industry, the race is on to buy stations. And the pressure's on to cut costs by sharing station resources. The STL PLUS by **Intraplex** is the industry's most widely used *true* digital transport solution, allowing you to link multiple transmitter sites and studio locations and share program audio, data, even telephone services. With a single STL PLUS system, you can handle one-way or bi-directional STL/TSL traffic over any distance or terrain. Consolidate LAN/WANs. And remotely control transmitters and broadcast facilities—for increased efficiency. With STL PLUS, you have the green light for smooth integration of your next station. And the next.

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World Radio History

CODECS & TELCO GEAR

A Little Bit Digital, a Little Bit Analog

Bruce Rogow

Digital or analog?
Why not both?

Manufacturers of codecs, telephone hybrids and those companies offering gear incorporating associated capabilities are mixing and matching digital and analog options.

Telos is rolling out a lineup of new telephony products.

This year's new crop of codecs finds that increasingly units offer POTS and ISDN capability in one box — all with the latest in transmission spec (G.722 and MPEG Layer III). The same can be said for telephone hybrids.

Generating talk

Among the products expected to generate a great deal of interest is the Matrix from Comrex.

This new POTS codec for use on "plain ol' telco service" runs at a fully-duplexed 15 kHz on ordinary dial-up telephone lines.

It adds many features to the established line of codecs such as battery power, and is compatible with the popular Vector and HotLine codecs.

It also can act as the base for an array of plug-in accessories utilizing ISDN and wireless PCS services. With the ISDN accessory, it will talk to G.722, turbo, and Layer III codecs.

Telos Systems comes to NAB2000 with several new products that take advantage of the increasingly digital nature of telephone systems.

Telos TWO, Telos TWOx12 and Telos Series 2101 are DSP-based telephony systems for broadcast.

Telos says these are the first digital phone hybrids that put the superior audio and line signaling abilities of ISDN to use in the talk show environment. Advantages include better hybrid performance vs. analog phone lines, increased on-air audio quality and improved send-to-caller levels.

One of the biggest complaints producers of call-in shows make is the poor quality of the caller hybrids. The concept for Telos is to improve the original signal rather than heavily processing later.

Families grow

Musicam USA will bring the latest in the Prima family — Prima LT Plus and TEAM.

The LT Plus does everything the Prima LT will, including 20 kHz stereo transmission with a built-in ISDN terminal adapter, full average and peak VU meters and AES/EBU digital input/output standard.

The LT Plus can transmit on up to three ISDN lines for point-to-multipoint broadcasts with up to 384 kbps mastering quality audio.

The TEAM is a universal audio transmission system for T1 or E1 leased lines. Its modular construction and support of both 24-bit linear (J.57) and multiple compressed coding standards (J.41, MPEG Layers II and III, and dual-channel G.722) make it ideal for STL use and your multiple audio transmission requirements.

AV Communications Pty. Ltd. will be showing the TieLine Express digital audio codec, which sends studio-quality audio over a standard analog telephone line in real time. Also on offer from the AVC is the TieLine Commander dual digital audio codec, which offers ISDN and POTS connection capabilities.

Following the success of the original Scoop Reporter, AETA Audio will introduce the Scoop Reporter II.

The unit features both ISDN and POTS connections and a very large number of standard features making it a convenient, compatible and cost-effective portable codec for remote broadcasts.

Also from Aeta will be the HiFiScoop3, an ISDN codec with G.722, J.52, MPEG 2 and MPEG 3 compatibility.

Henry Engineering, known for its line of project box solutions to everything around the station, will introduce the new Digistor II, a multi-message digital audio recorder/telco that has numerous broadcast applications.

The included telephone line coupler allows DigiStor II to be used to autoanswer a phone line, so it can be used for station "listener information lines," news and actuality lines or for message-on-hold.

Expanding role

The BCF256 Broadcast Communication Frame from Audio Processing Technology Ltd. is designed to deliver broadcast quality audio over ISDN, direct dial circuits or permanent links such as T1, E1, satellite and microwave.

The Comrex Matrix POTS Codec

Offered as an extremely cost effective solution for broadcast networks, the NXL384 utilizes apt-X technology to provide high-quality audio with negligible coding delay.

An important benefit is the integral back-up circuit, providing the broadcaster with the assurance of program continuity.

Auxiliary data at baud rates up to 9600 offers the user additional control and data transmission features.

Systembase Ltd. is showing the C450xr audio codec, which provides 22.5 kHz stereo at 384 kbps with a coding delay of just 2.8 milliseconds.

From AEQ will be the new TLE-02D, which offers three units packed into one box.

The unit is an ISDN codec, with terminal adapter; a digital hybrid, with echo suppression and frequency extender, for use on analog telephone lines; and a portable mixer, with returns, headphone amplifiers and four-wire connection to use on dedicated circuits and RF links.

Also on hand with ISDN units will be AEV.

JK Audio will show the RemoteMix Sport this year at NAB. This unit adds to their rugged line of compact mixer hybrids providing three mic inputs, three headphone outputs, balanced clean mixer output, VU metering, dialing keypad, and a universal handset interface.

J.K. Audio's RemoteMix Sport

■ ■ ■

Bruce Rogow is chief engineer of KPBS-FM in San Diego.

DON'T MISS AT
NAB 2000
The Convergence Marketplace

Broadcast Engineering Conference Opening
Sunday April 9
9-9:30 a.m.
Las Vegas Convention Center

Broadcast technology developments serve as a backdrop for our industry. Digital studio conversion, coupled with the continuing effects of consolidation, can make the engineer's job difficult.

Radio engineers involved in the transition to digital should plan on attending the Broadcast Engineering Conference Opening, moderated by Lynn Claudy, senior vice president, science and technology, NAB.

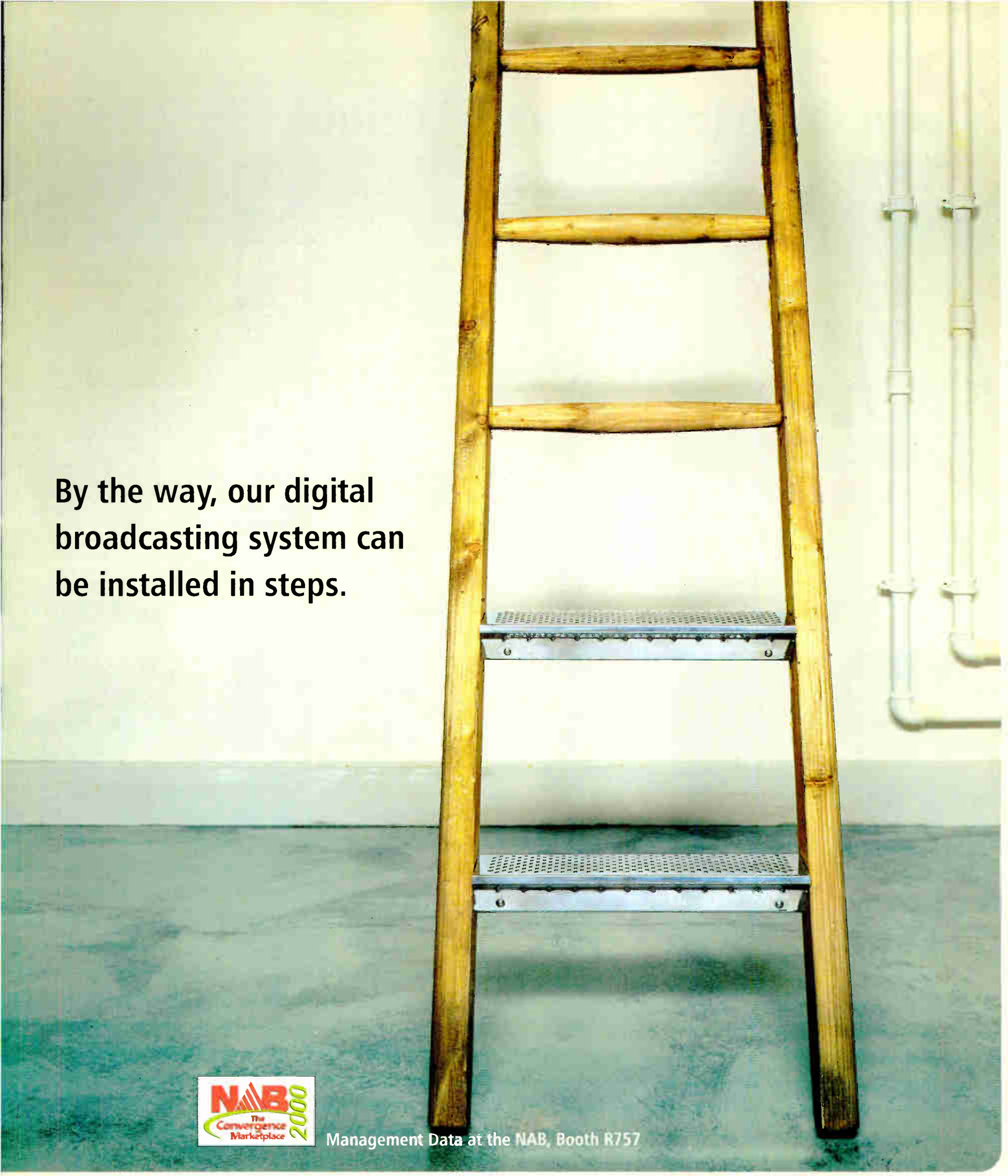
Dale Hatfield

Dale Hatfield, chief of the FCC's office of engineering and technology in Washington, is slated as the presenter at this event, co-sponsored by the Society of Broadcast Engineers.

Hatfield previously served as chief technologist at the agency. Prior to his recent commission positions, Hatfield served as CEO of Hatfield Associates Inc., a multidisciplinary telecommunications consulting firm based in Boulder, Colo.

Hatfield also worked for the National Telecommunications and Information Administration and was the founding director of the telecommunications division at the University College at the University of Denver.

World Radio History



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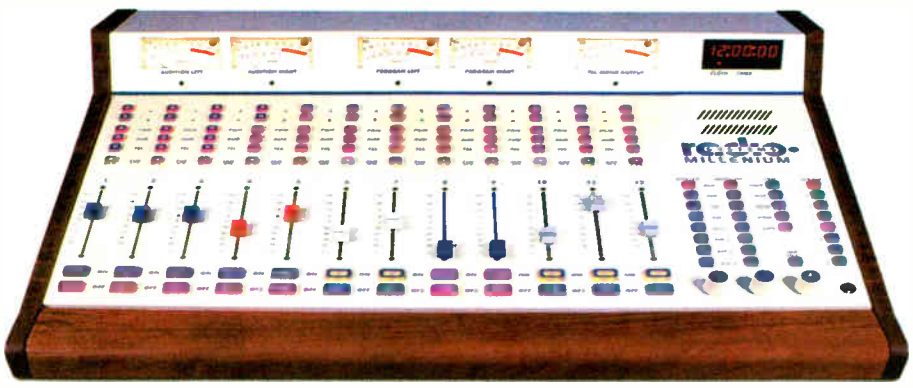
World Radio History

RADIO CONSOLES

Consoles Are Increasingly Digital

Rick Kemp

The common thread for most of the console manufacturers at NAB2000 is continued preparation for the fully digital control room. To accomplish this many are introducing a digital-analog hybrid or some other form of "transition" console.



Analog: The Radio Systems Millenium Console

Manufacturers are using modular designs and plug-in devices that can be analog, digital or a combination of both. Not only does this make transition to all-digital operations easier, it also allows users to customize the board to their operating styles.

For example, a console or control room that may have to accommodate three or more people live for a morning show, may need to be completely reconfigured to single-person operation for mid-day programming and then to a voice-tracked 8 p.m. to midnight show later in the evening.

Digital expansion

Two approaches predominate digital console design: The "virtual" console, which uses a mainframe routing switcher at its core and then branches out to control surfaces, and the more traditional stand-alone console with all its electronics located either inside or close to the main board.

Both styles have advantages and disadvantages. Usually, the mainframe-and-control-surface system will cost more initially than a stand-alone, but by its nature, the mainframe is more easily retrofitted and upgraded than a single console.

NAB2000 attendees will see examples of all these approaches as well as traditional analog choices.

The Wheatstone group of companies has big plans for NAB.

Wheatstone will introduce the D-700 digital audio console, which features total recall, programmable equalization, ducking, sends, DSP options and serial communication with routers and automation systems. Also new is the D-5000 mid-priced four-bus digital console.

Its Auditronics division will introduce version 4.0 of the NuStar digital console. NuStar features AES/EBU real-time sample-rate conversion with a range of 1:2 to 2:1 of the console output sample rate. It can handle professional as well as consumer digital formats, both balanced and unbalanced.

The NuStar DSP mainframe can be rack-mounted and can be located up to 500 feet from the console control surface. NuStar can also accept up to four individual phone modules with four separate mix-minus signals. Input modules are programmable via individual DIP switches on the modules.

Auditronics will also intro the Model 220 modular digital console for on-air or production.

Many modular systems

The third company in the Wheatstone group, Audioarts, plans to show the new RD Series digital console. The RD 12 or RD 20 will be available in 12- and 20-module frame sizes respectively.

Digital: Wheatstone D-700 Module

In addition to being digital, analog or a combination of both, the RD Series also features three stereo output busses, two caller Superphone hybrid modules and a host of additional options. The A/D-D/A converters can be set via internal clock speed for either 32, 44.1 or 48 kHz sampling rate.

Harris and Pacific Research and Engineering will be showing the Impulse console. Part of the Harris-PR&E Airwave line of consoles, the Impulse accepts either analog or digital inputs and can be reconfigured by using internal-input configuration submodules.

It utilizes three stereo program busses. Other features include a built-in talkback mic, 12- or 20-module frame sizes and two off-line telco mix-minus outputs. An optical (340) interface for "semi-pro" digital equipment such as MiniDisc and DAT comes standard on the input modules.

Millenium consoles from Radio Systems come in six-, 12-, 18- and 24-channel configurations and features conductive rubber keypads throughout.

The analog Millenium features program, audition and telco busses. Optional plug-in cards increase console flexibility by adding dual or four output mix-minus and remote selector logic, as well as basic remote control. It also uses high-brightness LEDs to alleviate bulb changing.

Routing switcher

At the heart of the Klotz Digital Vadis system is a digital routing switcher, capable of routing audio signals via fiber-optic cable to control surfaces located in different studios.

In a stand-alone design, Klotz offers the Paradigm digital on-air console. It features five output busses for program, audition, telco 1 and 2 (mix-minus) and cue/PFL. It also comes equipped with RS-422 machine control, which could make this ideal for some production room/digital audio workstation applications as well.

Arrakis will introduce several consoles. Its first product under the new Colorado Digital banner will be the Revolution Series digital console. Revolution uses a rack-mounted audio engine and is controlled via RS-232 serial, allowing control surfaces to be located up to 200 feet from the audio engine.

Basic configuration is 12 A/B analog and 12 digital inputs. Unique to the Revolution is its control surface: either a touch-screen-based "glass console" for complete control of 12 digital and analog channels or a retrofitted Arrakis 12,000 or 20,000 Series console.

This looks to be an extremely versatile system. According to Bob Groome of Arrakis, all Colorado Digital products, including the Revolution Series consoles, feature a 30 day return privilege and "roadside assistance," under which factory support and exchange are available with a 24-hour turnaround.

Revolution is expandable into several configurations, and it will support control logic for SAS routers, as well as Arrakis.

Arrakis has given its 1200 Series analog consoles a facelift, too. According to Groome, features include a new mixer design, built-in telephone hybrids and internal audio patching.

The Logitek Numix console uses a mainframe "audio engine" that can be configured in a variety of ways.

The basic system uses one I/O card capable of eight I/O, a DSP module, communications processor power supply and 19-inch rack enclosure. A larger system can be built from there, using combinations of analog and digital cards — up to 64 mono or 32 stereo inputs.

A fully loaded audio engine can control or support several different control surfaces. The DSP card gives board operators a built-in profanity delay of up to 20 seconds.

Several control surfaces are available,

See CONSOLES, page 33 ▶

Broadcast is a Contact Sport

Combining the great features of our original RemoteMix 3, with a third mic input, a third headphone output, and a host of other new goodies, our new **RemoteMix Sport** Hybrid Mixer is your best choice for professional sports broadcasting. Its compact design and combination phone line/universal handset connection provide unparalleled freedom and ease of use. Simply plug it into any analog line or a digital PBX or ISDN phone and begin the play-by-play.

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World Radio History

▶ CONSOLES, continued from page 32

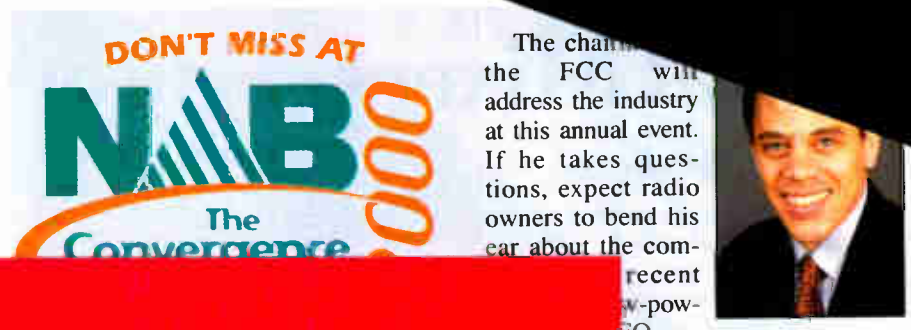
including the ROC 10, ROC 5 and the Virtual Console wedges. Numix consoles can be externally configured via Windows-based Vmix software.

Looking at budgets

New to NAB2000 attendees will be the Autoram Pacemaker IIK Series

Audio Toys Inc. will be showing its Paragon II live sound production analog mixing console. The board features up to 20 stereo output mixes; four-band parametric EQ, noise gate and compression on all inputs; and three-band stereo EQ on the stereo outs and returns.

Among the consoles on offer from



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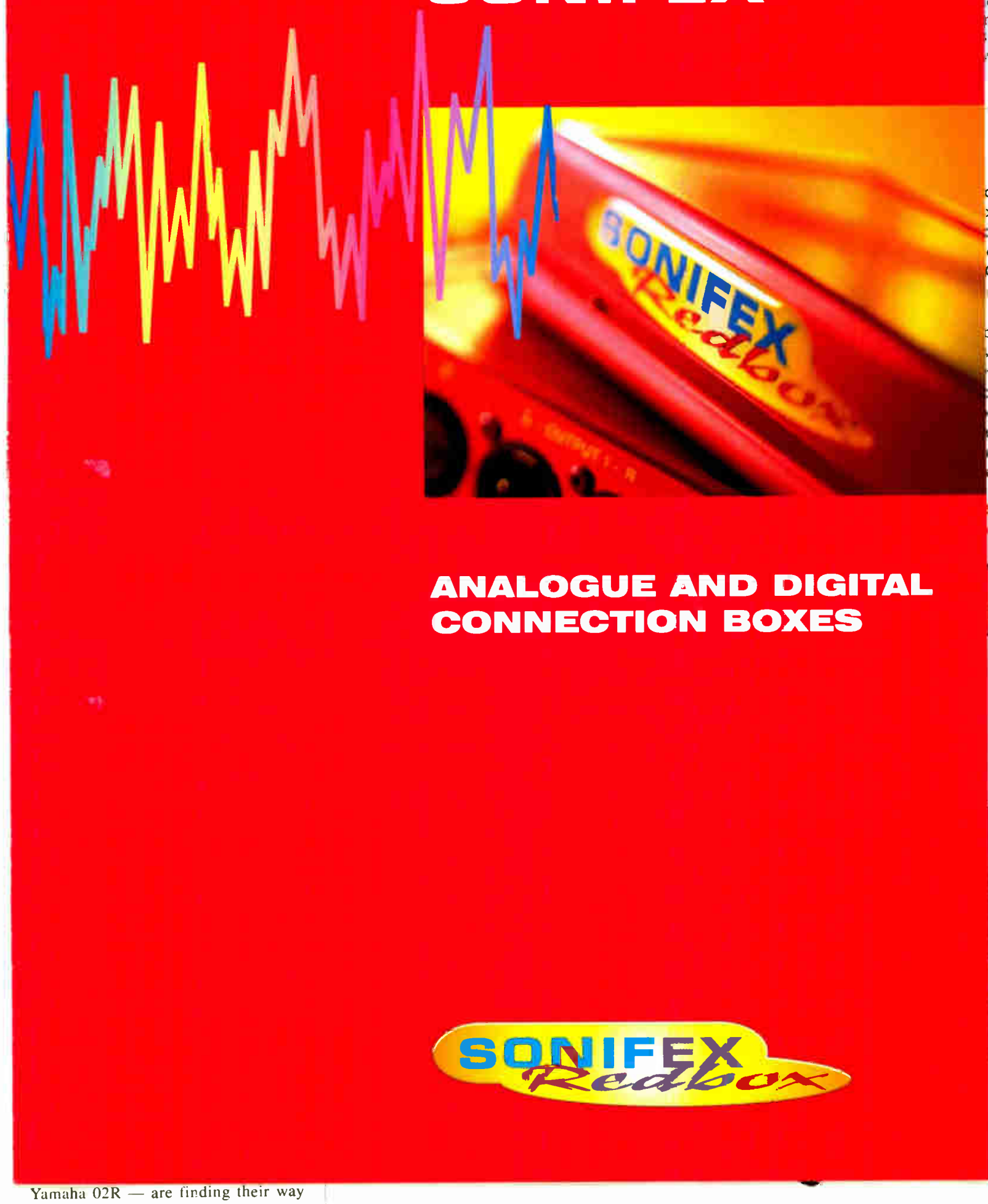

ANALOGUE AND DIGITAL CONNECTION BOXES

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See Us At NAB Booth # R2294

Yamaha 02R — are finding their way into on-air suites.

Mackie will have on offer its full line of consoles, and Otari will show the new Elite+, which combines digital control with analog circuitry.

World Radio History

...'s, Editors Merge

...me in ... new digital aud... cost soundcards and s... ...s that are scaled down fr... ...decessors, but still with plenty ...wer for radio production.

The line between DAW and console is becoming blurred as workstations adopt interfaces more like consoles and mixing consoles take on internal hard drives and data back up.

New versions of audio software, many with console-like interfaces, are sold at a cost lower than ever before. New bundled packages consisting of audio cards and software dot the floor.

Ric Goldstein, account executive at Bradley Broadcast & Pro audio, said attention should be focused on new 24-track hard-disk recorders, such as the new models from Mackie and Tascam.

For less-elaborate production, he said, the stereo 360 Systems Short/cut and the Roland VS1660 offer powerful, compact and great-sounding products.

Workstations

SADiE will debut the Artemis digital audio workstation, capable of up to 192 kHz 20-bit editing and mixing. The A/D is built in and there is AES/EBU digital I/O on every channel.

Entry-level SADiE systems are equipped with eight I/Os to replay 24 tracks of edited audio. It can be configured for up to 24 I/Os.

Roland will promote its VP-9000 Variphase process for real-time manipulation of sampled phrases. This device could well end up in the racks of many production studios.

Elsewhere in the booth, the Roland VS-1680 is now the VS-1880 digital audio workstation. The hardware improvements include 24-bit AD/DA converters and a special "MT Pro" recording mode that increases the number of tracks to 18.

The VS-1880 can burn CD-Rs in the new audio CD Image format and now has a dedicated CD-RW mastering button for quick access. It comes with the Emagic Logic VS and Liquid Audio Liquifier Pro software.

Orban brings the new Version 3 software for Audicy. All systems can be upgraded for $450 per single system license.

Highlights of this upgrade include five new digital effects. It also has a Stereo Toolkit with a mono-to-stereo synthesizer, a new compressor/EQ combination and 5.1 surround effects. A new import/export feature condenses a complete production into a single file.

The CPU tower now supports SCSI CD ROM drives so users can import files from CD or condensed productions from CD-R. Network and secondary drive failures are more securely handed. Better management of customized effects comes from new features to create and name them.

The Akai DPS16 personal studio workstation was recently introduced at NAMM. The unit can do 10 tracks of recording while playing back six tracks. Waveform editing operations can be performed on each track; including cut, copy, paste and time stretch. The Time Stretch function has a variety of algorithms.

The DPS16 includes a six-inch display with a graphic patch bay for easy track selection. One hundred Locate points per song can be named and stored. The workstation has fader and pan controls on each channel.

HD recorders with editors

From 360 Systems comes a new networked audio system designed for broadcast and production applications. The company withheld details until the show.

The Radar-II from Otari has new updates. It is a hard-disk multitrack recorder with 24 channels, 24-bit A/D-D/A converters and optional digital input.

Its waveform editing software also has updates. Now, analog and digital inputs can be mixed. A 96 kHz turbo card is in the works and a 96 kHz AES/EBU I/O card is planned for release this year.

Otari offers Mammoth and AIT drives to cut backup time by one-third. A RAID array with mirror backup for redundant backup to hard disk is another new option.

Automation with editors

The Dalet5.1 digital automation system includes several enhancements to Surfer, the built-in multitrack editor.

"These feature will give stations more flexibility in how they manage their audio libraries," said Robin Wang, director of marketing at Dalet. "It will streamline operations by editing and saving audio while it is recorded, which is great for live events, and improved ease of use for more accurate edits."

Improvements include multiformat mixing and editing; preset zooms; easier adjustment of volume; multiple audio I/Os; editing while recording; time stamping and multitrack locators.

The Arrakis Systems DigiLink DL-3 automation system — with digital editing — has a lower price. Now the system offers 78 or 150 hours of stereo audio file storage and includes networking. The voice tracking software is the same version in the DL-4 and both systems now import WAV files.

Smarts Broadcast Systems will introduce an MPEG production system that

See PRODUCTION, page 35 ▶

See Us At NAB Booth # R1161

World Radio History

Redboxes are a range of budget connection equipment for use in various applications for radio stations, tv studios, home studios, video and recording suites.

RB-BL2 Unbalanced To Balanced Bi-directional Converter

The RB-BL2 is a bi-directional stereo unit for interfacing domestic, or semi-pro unbalanced equipment to professional balanced line levels, and vice-versa.

All connections are on the rear panel. The two XLR-3 electronically balanced inputs have an impedance of 20k ohms bridging and are routed to two unbalanced RCA (phono) outputs with an output impedance of <50 ohms.

The two RCA unbalanced inputs have an impedance of 10k ohms and are routed to two balanced XLR-3 outputs with an output impedance of <50 ohms.

The output gain can be individually adjusted for left and right channels by using pre-set potentiometers accessible through the rear panel.

Audio Specification

Maximum Input Level:	+28dBu
Maximum Output Level:	+28dBu
Frequency Response:	20Hz to 20kHz +/- 0.1dB (600 ohm load, ref 1kHz)
Gain Range:	Unbalanced out 0dBu to -28dBu, ref 0dBu into balanced input
Gain Range:	Balanced out -15dBu to +15dBu, ref -15dBu into unbalanced input

Connections

Inputs:	XLR 3 pin female (Balanced), RCA phono (Unbal)
Outputs:	XLR 3 pin male (Balanced), RCA phono (Unbal)
Mains input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type

RB-BL2-115:	Balanced to unbalanced converter, 115V
RB-BL2-230:	Balanced to unbalanced converter, 230V

RB-SM2 Dual Stereo To Mono Converter

The RB-SM2 consists of two independent converters which will produce two fully buffered and balanced mono line outputs from two stereo inputs.

All connections are on the rear panel. The XLR-3 inputs are electronically balanced with an impedance of 20 kohm bridging. These can be wired unbalanced to accept an output from domestic equipment.

The XLR-3 line outputs are electronically balanced with an output impedance of <50 ohm. The outputs can be wired unbalanced by grounding the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

Output gain adjustment using pre-set potentiometers for both converters allows a normalised mono output from domestic stereo equipment. The potentiometers are accessible through the rear panel.

Audio Specification

Maximum Input Level:	+28dBu	Input Impedance: 20k ohm bridging
Maximum Output Level:	+28dBu	Output Impedance: <50 ohm
Frequency Response:	20Hz to 20kHz +/- 0.1dB (600 ohm load, ref 1kHz)	
Gain Range:	Adjust 8dB loss to 18dB gain, ref. 0dB in on L and R	
Common Mode Rejection:	>66dB typically	
Distortion:	THD @ 1kHz +8dB 0.01%	
Noise:	-100dB unity gain ref +8dB	

Connections

Inputs:	XLR 3 pin female (Balanced, can be unbalanced)
Outputs:	XLR 3 pin male (Balanced, can be unbalanced)
Mains input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type

RB-SM2-115:	Dual stereo to mono converter, 115V
RB-SM2-230:	Dual stereo to mono converter, 230V

RB-MA2 Dual Microphone Amplifier

The RB-MA2 consists of two independent low-noise microphone pre-amplifiers for converting mic level signals to line level, or for driving long lines from microphones to mixing equipment.

All connections and controls are on the rear panel. The microphone inputs are XLR-3 type and are electronically balanced. The input gain for each input can be adjusted individually by a recessed pre-set potentiometer.

The XLR-3 line outputs are electronically balanced and can be wired unbalanced by grounding the non phase signal, allowing you to feed both balanced and unbalanced equipment.

For each channel there are independent switches to control a high pass filter (low frequency roll-off at 125Hz) and to provide phantom power at +48V to the connected microphones.

Audio Specification

Maximum Input Level:	-10dBu	Input Impedance: 2k ohm nominal
Maximum Output Level:	+28dBu	Output Impedance: <50 ohm
Frequency Response:	20Hz to 20kHz +/- 0.1dB (600 ohm load, ref 1kHz)	
Low Frequency Roll-Off:	125Hz @ 6dB/octave	
Gain Range:	Adjustable 36dB to 75dB gain (adjust for each input)	
Common Mode Rejection:	>60dB typically	
E.I.N.:	130dB	

Connections

Inputs:	XLR 3 pin female (Balanced)
Outputs:	XLR 3 pin male (Balanced, can be unbalanced)
Mains input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type

RB-MA2-115:	Dual microphone amplifier, 115V
RB-MA2-230:	Dual microphone amplifier, 230V

RB-SL2 Twin Mono, Or Stereo, Limiter

The RB-SL2 is a stereo, or twin independent mono, VCA limiter for use in news-rooms and other locations where the correct level into recording equipment is required, but not necessarily under the control of an engineer, for example, for overload protection. It can also be used as an inexpensive main output limiter for RSL's, hospital and student radio.

The XLR-3 electronically balanced inputs and outputs can be wired unbalanced to accept an output from domestic equipment. For each channel there is an input gain and a threshold level control. With the limit threshold set to maximum, the input through to output can be normalised using the input potentiometers. Once the unit is acting as a buffer with gain/attenuation, the limit threshold level can be set, with the recovery adjusted for the application. The power LED indicates limiting by flashing.

A rear panel switch changes the unit from dual mono to stereo, when only the pre-sets for channel 1 (left) are active and apply to both channels.

Audio Specification

Maximum Input Level:	+28dBu	Input impedance: 20k ohm bridging
Maximum Output Level:	+28dBu	Output impedance: <50 ohm
Input Gain:	Adjustable 8dB loss to +18dB gain	
Limit Threshold:	Adjustable -8dBu to +28dBu	
Frequency Response:	20Hz to 20kHz +/- 0.1dB (600 ohm load, ref 1kHz)	
Noise:	-100dB unity gain ref +8dB	
Common Mode Rejection:	>66dB typically	

Connections

Inputs:	XLR 3 pin female (Balanced, can be unbalanced)
Outputs:	XLR 3 pin male (Balanced, can be unbalanced)
Mains input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type

RB-SL2-115:	Twin mono, or stereo limiter, 115V
RB-SL2-230:	Twin mono, or stereo limiter, 230V

The units are housed in red anodised aluminium boxes which can be screw mounted to the underside of mixing desks and studio furniture, or rack mounted. The RB-DA6, RB-ADDA and RB-HD6 are in a 1U rack as standard. The RB-BL2, RB-SM2, RB-MA2, RB-SL2, RB-DDA6A, RB-DDA6S, RB-SC1 and RB-MM1 can be rack-mounted by fitting the RB-RK1 rack front kit.

RB-HD6 Headphone Distribution Amplifier

The RB-HD6 headphone distribution amplifier distributes stereo audio to up to 6 different sets of headphones each with their own volume control.

The unit can also receive an override audio signal via a jack socket for each output channel. Plugging in the jack plug will divert the headphone output from the master audio signal to the audio present on the jack plug.

The master volume control adjusts overall level of the 6 outputs and a stereo/mono input select switch sums left and right outputs for a mono input.

Audio Specification

Maximum Input Level:	+28dBu
Input Impedance:	>20k ohm
Output Level:	Drives 150mW into 32-600 ohm headphones

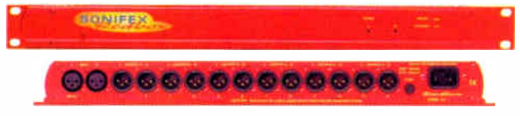
Connections

Main Stereo Input:	L & R XLR 3 pin female (balanced)
Insert Inputs:	6 x 0.25" (6.3mm) stereo jack sockets (unbalanced)
Outputs:	6 x 0.25" (6.3mm) stereo jack sockets
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type

RB-HD6-115V	6 way headphone amplifier, 115V
RB-HD6-230V	6 way headphone amplifier, 230V

RB-DA6 6 Way Stereo Distribution Amplifier



The RB-DA6 is a high performance 6 way stereo distribution amplifier for splitting a source into a number of different outputs. The RB-DA6 has 1 stereo input and 6 stereo outputs. It can also be configured so that 1 mono input can be distributed to 12 outputs by use of a switch which is recessed on the front panel to prevent accidental knocking.

The XLR-3 inputs and outputs are electronically balanced and can be wired unbalanced. Each output is individually buffered so that a short circuit on one output won't affect the others. The left and right input gain controls (normalising) are pre-set potentiometers accessible through the front panel.

Technical Specification

Maximum Input Level:	+28dBu	Input impedance: 20k ohm bridging
Maximum Output Level:	+28dBu	Output impedance: <50 ohm
Frequency Response:	20Hz to 20kHz +/- 0.1dB (600 ohm load, ref 1kHz)	
Gain Range:	Adjustable 8dB loss to 18dB gain (L & R adjust)	
Common Mode Rejection:	>66dB typically	
Noise:	-100dB unity gain ref +8dB	

Connections

Inputs:	XLR 3 pin female (balanced, can be unbalanced)
Outputs:	XLR 3 pin male (balanced, can be unbalanced)
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment type

RB-DA6-115:	6 way stereo distribution amplifier, 115V
RB-DA6-230:	6 way stereo distribution amplifier, 230V

RB-DDA6A 6 Way AES/EBU Digital Distribution Amplifier

If you have an output from a digital mixing desk which you need to route to multiple digital recorders, or you have an output from a DAT machine which you need to route to multiple studios, the RB-DDA6A is the solution you need. The RB-DDA6A digital distribution amplifier is used for distributing digital audio data in AES/EBU format. It has a single AES/EBU audio input which is distributed to 6 outputs at the same level and condition as the input signal.

It can accept input sample rates in the range of 30kHz - 100kHz, and bit rates of 16, 20 and 24 bit. So, it can be used for standard CD audio distribution at 16 bit 44.1kHz, as well as for high quality 24 bit 96kHz recording.

24 BIT 96 kS/s

Technical Specification:

Input Impedance:	110 ohms +\-20% balanced
Output Impedance:	110 ohms +\-20% balanced
Sample Freq. Range:	30-100kHz (32kHz, 44.1kHz, 48kHz, 64kHz, 88.2kHz, 96kHz)
Signal Level:	Balanced Min 3V peak to peak, Max 10V peak to peak.

Connections

Input:	AES/EBU XLR-3 female
Outputs:	6 x AES/EBU XLR-3 male
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type:

RB-DDA6A-115V	AES/EBU digital distribution amplifier, 115V
RB-DDA6A-230V	AES/EBU digital distribution amplifier, 230V

RB-DDA6S 6 Way S/PDIF Digital Distribution Amplifier

The RB-DDA6S digital distribution amplifier is similar to the RB-DDA6A except that it is used for distributing digital audio data in S/PDIF format. It has a single S/PDIF audio input which is distributed to 6 outputs at the same level and condition as the input signal.

It can accept input sample rates in the range of 30kHz - 100kHz, and bit rates of 16, 20 and 24 bit. Uses include audio distribution at 16 bit 44.1kHz from a consumer CD player to multiple digital recorders, distribution of high quality 24 bit 96kHz signals from digital mixing desks to recorders and connection of the output of a DVD player to multiple studios.

24 BIT 96 kS/s

Technical Specification:

Input Impedance:	75 ohms +\-5% balanced
Output Impedance:	75 ohms +\-5% balanced
Sample Freq. Range:	30-100KHz
Signal Level:	Balanced Min 0.5V+\-20% peak to peak.

Connections

Input:	S/PDIF phono
Outputs:	6 x S/PDIF phono
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused

Equipment Type:

RB-DDA6S-115V	S/PDIF digital distrubution amplifier, 115V
RB-DDA6S-230V	S/PDIF digital distrubution amplifier, 230V

All Redbox units can be manufactured as either 115V 60Hz, or 230V 50Hz and have a front panel LED power indicator.

Each unit comes complete with handbook and IEC mains lead. All equipment is guaranteed to be CE compliant.

Dimensions and Weights

	W (cm)	h (cm)	D (cm)	Shipping Weight (kg)
Small boxes	28	4.2 (1U)	10.8	1.4
RB-DA6, RB-HD6, RB-ADDA	48 (1U)	4.2 (1U)	10.8	1.8
RB-RK1	48 (1U)	4.2 (1U)	0.8	0.6

World Radio History

SONIFEX Redbox

SONIFEX

Sonifex has manufactured broadcast equipment for more than 30 years Committed to excellence in design Sonifex has earned a reputation for building high quality, reliable professional audio products. Every stage in the manufacture of Sonifex products is carried out in purpose built head-quarters in the heart of the UK, from initial design to final test and delivery.

Each step in the equipment design, manufacture and quality control is supervised by skilled technical staff With a reputation for back-up and support service which is second to none, Sonifex products are supplied to broadcast studios all over the world

UK :
Sonifex Ltd, 61, Station Road, Irthlingborough, Northants., NN9 5QE. UK
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Fax : +44 (0)1933 650 726
Email : sales@sonifex.co.uk
Internet : http://www.sonifex.co.uk

USA :
Independent Audio, 43, Deerfield Road, Portland, ME 04101-1805. USA
Tel : +1 207 773 2424
Fax : +1 207 773 2422
Email : info@independentaudio.com
Internet : http://www.independentaudio.com

Denmark :
Interstage AS, Phistersvej 31, DK-2900 Hellerup, Denmark
Tel : +45 39 46 00 00
Fax : +45 39 46 00 40
Internet : http://www.interstage.dk

In an effort to continually improve the performance of our equipment, Sonifex reserve the right to alter the product specifications.

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RB-SC1 Sample Rate Converter

Ideal for the transfer of digital audio between different digital equipment, the RB-SC1 sample rate converter standardizes the sample rate of a digital audio signal to one of 32kHz, 44.2kHz, 48kHz, 64kHz, 88.2kHz or 96kHz, or to a synchronizing input, selectable from AES/EBU, S/PDIF or TTL.

Both inputs and outputs can be selected as either AES/EBU or S/PDIF with the resultant digital output level following the switch selection.

24 BIT 96 kS/s

Technical Specification	
Dynamic Range:	120dB
Distortion and Noise:	-114dB THD + N at 1kHz
Connections	
Inputs:	AES/EBU XLR 3 pin female (audio and sync)
	S/PDIF phono (audio and sync)
	TTL BNC female (sync)
Outputs:	AES/EBU XLR 3 pin male
	S/PDIF phono
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused
Equipment Type	
RB-SC1-115V	Sample Rate Converter, 115V
RB-SC1-230V	Sample Rate Converter, 230V

RB-MM1 Automatic Mix-Minus Generator

Some mixing desks do not have a dedicated telco channel to generate a clean-feed, or mix minus, to send to the caller. The RB-MM1 removes the caller's voice from the station output so that it can be sent to the telephone line.

It has inputs for a main stereo programme feed from the mixer and a mono output to the mixer. There are mono XLR connections to and from the telephone hybrid. The level for all of the XLR inputs and outputs can be adjusted by preset potentiometers. The RB-MM1 doesn't need a post fade output from a mixer telco channel - it takes the caller audio from the telephone hybrid, and removes it from the signal digitally. A talkback input is also provided together with a talkback select switch for ducking the talkback to the caller.

Audio Specification		
Maximum Input Level:	+18dBu	Input Impedance: >20 kohm
Maximum Output Level:	+6dBu	Output Impedance: <50 ohm
Common Mode Rejection:	>60dB	
Gain:	+6dBu	
Distortion:	THD @ 1kHz +6dBu 0.1% (C-Message weighted)	
Noise:	-70dBu unity gain +6dBu	
Frequency Response:	20Hz - 4kHz	
Connections		
Inputs:	XLR 3 pin female (balanced)	
	0.25" (6.3mm) jack socket (unbalanced)	
Outputs:	XLR 3 pin male (balanced)	
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused	
Equipment Type		
RB-MM1-115V	Mix minus generator, 115V	
RB-MM1-230V	Mix minus generator, 230V	

RB-ADDA Combined A/D & D/A Converter

The RB-ADDA A/D and D/A converter produces an AES/EBU or S/PDIF level digital audio output from a balanced XLR or unbalanced phono stereo audio input. It also produces a stereo balanced XLR or unbalanced phono output from an incoming AES/EBU or S/PDIF digital input signal.

The unit operates in four modes, master mode, slave mode, auto mode and auto lock mode. In master mode, the unit receives an analogue audio signal, which is digitized and formatted for digital serial transmission. In this mode the necessary clock signals are generated internally from an on board master clock at a selectable rate (32kHz, 44.1kHz, 48kHz, 64kHz, 88.2kHz or 96kHz). In slave mode the unit automatically detects the presence of a digital audio sync signal, if present at the digital input, and synchronizes to it. In the auto mode the unit uses the internal master clock if no sync input signal is detected. The auto-lock mode operates like the auto mode and the unit syncs to the last used sample rate. When operating in sync modes, the power LED flashes whenever the unit is not synchronized to the incoming digital signal.

The analogue inputs have left and right level controls using preset potentiometers and dip switches and the analogue outputs have an output level control, selectable from +12dB, +18dB or +24dB. There are buttons to select either the AES/EBU or S/PDIF input or output for the D/A and A/D sections respectively, together with a consumer professional output format selection. The output bit-rate can be selected from 16, 20 or 24 bits. Inputs of a different bit-rate to the output are dithered. Emphasis can also be switched in or out.

24 BIT 96 kS/s

A/D Section

Audio Specification	
Maximum Input Level:	+28dBu
Input Impedance:	>20k ohm
Dynamic Range:	110dB
Gain Range:	Adjustable +/-3dB on 12dB, 18dB or 24dB input.
Distortion and Noise:	>96dB THD + N at 1kHz
Connections	
Inputs:	L and R XLR 3 pin (balanced)
	L and R phono (unbalanced)
Outputs:	AES/EBU XLR 3 pin male
	S/PDIF phono
Mains Input:	Filtered IEC, 110-120V, or 220-240V, fused

D/A Section

Audio Specification	
Maximum Output Level:	+28dBu
Output Impedance:	<50 ohm
Dynamic Range:	100dB
Gain Range:	Selectable 12dB, 18dB or 24dB output level.
Connections	
Inputs:	AES/EBU XLR 3 pin female
	S/PDIF phono
Outputs:	L and R XLR 3 pin male (balanced)
	L and R phono (unbalanced)
Equipment Type	
RB-ADDA-115V	A/D and D/A converter, 115V
RB-ADDA-230V	A/D and D/A converter, 230V

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SONIFEX

ANALOGUE AND DIGITAL CONNECTION BOXES

SONIFEX Redbox

World Radio History

▶ CONSOLES, continued from page 32

including the ROC 10, ROC 5 and the Virtual Console wedges. Numix consoles can be externally configured via Windows-based Vmix software.

Looking at budgets

New to NAB2000 attendees will be the Autogram Pacemaker IIK Series. Features include all-LED illumination, modular design with DC control to eliminate pops and clicks while changing modules live, modern styling using Penny + Giles faders and desktop-style configuration.

According to Autogram, these consoles are upgradeable to digital I/O with a select number of module configurations.

Fidelipac will be displaying its established Dynamax MX digital and analog on-air consoles.

Nicom is introducing a remote broadcast or small control room console named the Atlantis. The eight-channel mixer features three mic inputs, three stereo line inputs, A/B line-input switch selectable, all in a 19-inch rack-mountable package.

LPB will introduce what it is calling "the first budget-minded console for serious broadcasting." Standard on this console are 10 stereo inputs, a separate cue bus and muting. It will include many standard broadcast features.

Also on tap will be the LPB 7000 series analog console, available in 12- or 18-channel frames. It is modular in design and features three stereo outputs and three mono output busses.

New from French manufacturer Innova-Son is the Digital Live console, which incorporates the features of the Innova-Son Grand Live series with eight additional AES digital I/Os. Originally designed for live sound, Innova-Son is promoting the versatility of the console in a variety of applications from production to broadcast.

Solid State Logic will show the Aysis Air Mobile compact format console, which was designed outside broadcast vehicles and space-restricted studios. Thanks to its channel layering functions, a 96-channel console can be fitted into a 48-fader frame in less than 92 inches of space.

Brisk sales

The R2K console from Ward-Beck Systems Ltd. was introduced at NAB99. Eugene Johnson, managing director and owner of WBS, said that since the console's introduction, "Sales have been brisk with dozens of units delivered and in operation with the Canadian Broadcasting Corp., Telemedia Communications Inc. and many teaching colleges in the U.S. and Canada."

R2K is available in eight-, 12-, 20- or 28-frame sizes. These consoles also include four stereo output busses, six telephone clean feeds, RS-422 machine control and come equipped with control room and studio talkback.

Developments are also under way in the field of production and post production consoles. As broadcast operations become more and more audio-quality conscious, some consoles originally designed for production — such as the Yamaha 02R — are finding their way into on-air suites.

Mackie will have on offer its full line of consoles, and Otari will show the new Elite+, which combines digital control with analog circuitry.

Audio Toys Inc. will be showing its Paragon II live sound production analog mixing console. The board features up to 20 stereo output mixes; four-band parametric EQ, noise gate and compression on all inputs; and three-band stereo EQ on the stereo outs and returns.

Among the consoles on offer from AMS Neve will be the Libra Live broadcast production audio console and the Libra Post post production console.

Harrison by GLW will be introducing its Trio digital mixing solution, alongside the established SeriesTwelve and Pro-950 consoles.

■■■

Rick Kemp is chief engineer for the Journal Broadcast Group in Boise, Idaho.

DON'T MISS AT NAB 2000 The Convergence Marketplace

FCC Chairman's Breakfast
Tuesday April 11
7:30-8:45 a.m.
Las Vegas Hilton

Say one thing about Bill Kennard, he's not afraid to stand up in front of a tough crowd.

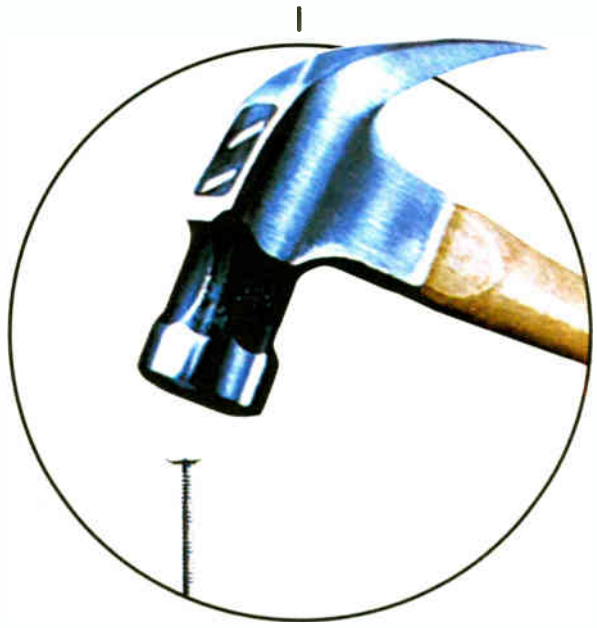
Bill Kennard

The chair... the FCC will address the industry at this annual event. If he takes questions, expect radio owners to bend his ear about the commission's recent actions on low-power FM and EEO.

Kennard will discuss business and regulation at the breakfast in this firsthand opportunity to hear his views on key issues.

This event, moderated by Eddie Fritts, NAB president and CEO, is sponsored by CIT Group/Newcourt.

When you need to nail the sound



COURIER, the portable recorder from Sonifex, is the breakthrough in portable digital audio recording that journalists and sound recordists have been waiting for. The Courier records to and plays back from a PCMCIA hard-disk or flashcard. It records standard mpeg compressed, linear .wav, or broadcast .wav files. With the use of a scrub-wheel, graphical LCD waveform and undo actions, non-destructive editing is the easiest in the business with the Courier. The Courier uses standard camcorder batteries or AA cells, and comes with a power supply/charger that can be used in any country. It's light weight 1.5kg (3lb), so it's not going to be a burden in daily use, and has professional XLR connectors.

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World Radio History

...s, Editors Merge

...me in ... new digital aud... cost soundcards and s... ...s that are scaled down fr... ...edecessors, but still with plenty ...wer for radio production.

The line between DAW and console is becoming blurred as workstations adopt interfaces more like consoles and mixing consoles take on internal hard drives and data back up.

New versions of audio software, many with console-like interfaces, are sold at a cost lower than ever before. New bundled packages consisting of audio cards and software dot the floor.

Ric Goldstein, account executive at Bradley Broadcast & Pro audio, said attention should be focused on new 24-track hard-disk recorders, such as the new models from Mackie and Tascam.

For less-elaborate production, he said, the stereo 360 Systems Short/cut and the Roland VS1660 offer powerful, compact and great-sounding products.

Workstations

SADiE will debut the Artemis digital audio workstation, capable of up to 192 kHz 20-bit editing and mixing. The A/D is built in and there is AES/EBU digital I/O on every channel.

Entry-level SADiE systems are equipped with eight I/Os to replay 24 tracks of edited audio. It can be configured for up to 24 I/Os.

Roland will promote its VP-9000 Variphase process for real-time manipulation of sampled phrases. This device could well end up in the racks of many production studios.

Elsewhere in the booth, the Roland VS-1680 is now the VS-1880 digital audio workstation. The hardware improvements include 24-bit AD/DA converters and a special "MT Pro" recording mode that increases the number of tracks to 18.

The VS-1880 can burn CD-Rs in the new audio CD Image format and now has a dedicated CD-RW mastering button for quick access. It comes with the Emagic Logic VS and Liquid Audio Liquifier Pro software.

Orban brings the new Version 3 software for Audicy. All systems can be upgraded for $450 per single system license.

Highlights of this upgrade include five new digital effects. It also has a Stereo Toolkit with a mono-to-stereo synthesizer, a new compressor/EQ combination and 5.1 surround effects. A new import/export feature condenses a complete production into a single file.

The CPU tower now supports SCSI CD ROM drives so users can import files from CD or condensed productions from CD-R. Network and secondary drive failures are more securely handed. Better management of customized effects comes from new features to create and name them.

The Akai DPS16 personal studio workstation was recently introduced at NAMM. The unit can do 10 tracks of recording while playing back six tracks. Waveform editing operations can be performed on each track; including cut, copy, paste and time stretch. The Time Stretch function has a variety of algorithms.

The DPS16 includes a six-inch display with a graphic patch bay for easy track selection. One hundred Locate points per song can be named and stored. The workstation has fader and pan controls on each channel.

HD recorders with editors

From 360 Systems comes a new networked audio system designed for broadcast and production applications. The company withheld details until the show.

The Radar-II from Otari has new updates. It is a hard-disk multitrack recorder with 24 channels, 24-bit A/D-D/A converters and optional digital input.

Its waveform editing software also has updates. Now, analog and digital inputs can be mixed. A 96 kHz turbo card is in the works and a 96 kHz AES/EBU I/O card is planned for release this year.

Otari offers Mammoth and AIT drives to cut backup time by one-third. A RAID array with mirror backup for redundant backup to hard disk is another new option.

Automation with editors

The Dalet5.1 digital automation system includes several enhancements to Surfer, the built-in multitrack editor.

"These feature will give stations more flexibility in how they manage their audio libraries," said Robin Wang, director of marketing at Dalet. "It will streamline operations by editing and saving audio while it is recorded, which is great for live events, and improved ease of use for more accurate edits."

Improvements include multiformat mixing and editing; preset zooms; easier adjustment of volume; multiple audio I/Os; editing while recording; time stamping and multitrack locators.

The Arrakis Systems DigiLink DL-3 automation system — with digital editing — has a lower price. Now the system offers 78 or 150 hours of stereo audio file storage and includes networking. The voice tracking software is the same version in the DL-4 and both systems now import WAV files.

Smarts Broadcast Systems will introduce an MPEG production system that

See PRODUCTION, page 35 ▶

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World Radio History

▶ PRODUCTION, continued from page 34

adds editing terminals to the Smartcaster System. Multiple WAV files can be edited on-screen and the final product can be converted to MPEG for permanent storage in the system. The terminals can also be used for ripping CDs into the Smartcaster system.

The Smarts editing stations run on PCs using audio cards. They will be marketed as bundled hardware/software units or as software only. The price has not been set.

Soundscape Digital Technology will show its R.Ed, a modular PC-controlled 24-bit hard disk recorder/editor capable of

Yamaha AW4416 Professional Audio Workstation

32 tracks. The company is also displaying the new i-box line of TDIF conversion hardware. One piece, the i-box 8, is a 24-bit AD/DA converter with 24 XLRs. R.Ed systems start at less than $6,300.

Soundscape also will bring a new software and card bundle called Mixtreme PowerPAK 2000. It includes Acid Style music software from Sonic Foundry, Gigasampler, the Emagic Micrologic AV and a real-time reverb from Wave Mechanics, for less than $1,000. It also has a 16-channel PCI audio card with both DSP and RAM on board.

Fairlight is showing its new Prodigy 24-track, 24-bit post production workstation with automated mixing, 16 assignable faders and Surround mixing, as well as the FAME2 24-track, 24-bit digital production workstation and the Merlin 24-track, 24-bit digital multitrack recorder.

New from Mackie Designs Inc. is the HDR 24/96 24-track hard disk recorder with built-in full-feature workstation editing.

Bundles

The Professional CD Factory 2000 package from Microboards Technology already incorporates CD Architect and Sound Forge XP. It now adds PlayWrite MP3 for MP3 to Audio CD conversion and Microboards' HotBurn pre-mastering software for Windows.

Digidesign products will be found in the Avid booth. Paul Foeckler, director of corporate marketing, said, "This will be the first year Avid and Digidesign share the same collaborative network environment via the unity network, which allow video workstations and audio workstation to share medium."

Digidesign will show its new Digi001 system that previewed at last year's AES convention. The software is a scaled-down version of ProTools with 24 channels, a rack-mounted interface that has eight analog I/Os and two mic preamps, S/PDIF I/O and ADAT optical.

At the recent NAMM show, Digidesign brought the beta version of the ProTools software for Windows98. The whole system retails for $995 and is suitable for use in radio production studios that are PC-based, rather than Mac.

Software

Around the beginning of this year, Syntrillium released Cool Edit 2000, a two-track 24/96 editor available for $69 through its Web site. A new frequency filter plug-in is available for $49. Filters include a five-band parametric EQ, notch filter, 10/20/30 band graphic EQ and a "scientific" filter. A second optional plug-in allows Cool Edit 2000 to operate as a four stereo-track multitrack recorder/editor.

The big push for Sonic Foundry is for Vegas Video to complement last year's Vegas Pro multitrack software. For audio, the big news is the $100 lower price tag for Vegas Pro and CD Architect.

Vegas Pro 2.0 will be launched in the late spring with new features. It will have metronome function and envelope lock-to-events capability. Also the XFX 1, 2 and 3 DirectX plug-ins, that are normally sold separately, will now be included.

Merging Technologies recently introduced the Mykerinos PCI Audio Card with PyraMix software. Depending on the speed of the PC, the card can handle up to 64 tracks of playback and simultaneous recording of up to 64 tracks, with sample rates up to 192 kHz and word lengths up to 32 bits.

The software is NT4/Win2000 based, with real-time audio effects. The effects include four-band parametric EQ, 10-band graphic EQ, dynamic processing on up to 16 channels and real-time reverb on up to eight channels. The audio editor with graphical and list-based views can play back an unlimited number of tracks and even mix file formats.

Digigram will bring its next-generation cards, the full duplex PCX924 and the playback-only PCX22.

Features

The PCX924 offers record and playback with balanced analog and AES/EBU or S/PDIF inputs and outputs with 24-bit A/D and D/A converters. Special features include input for direct recording from CD-ROM, AES2 synchronization and a headphone jack for monitoring for $1,665 retail.

The PCX22 playback-only card includes 24-bit converters, balanced analog and AES/EBU or S/PDIF output, an external AES/EBU synchronization input and a headphone jack for $750 retail.

Digigram also announced the development of software to create Dolby Digital multichannel sound with no special hardware. It comes free with the Digigram Xtrack suite of multitrack digital audio editing tools.

Antex Electronics will bring several new and updated cards to the show.

One product is the Broadcaster BX-12e Adapter. It already has four stereo analog outputs and one stereo input. A new feature allows the card to play back MPEG files with different sample rates. In addition, the DSP software allows files to be converted to share a common AES word clock to interface with digital consoles.

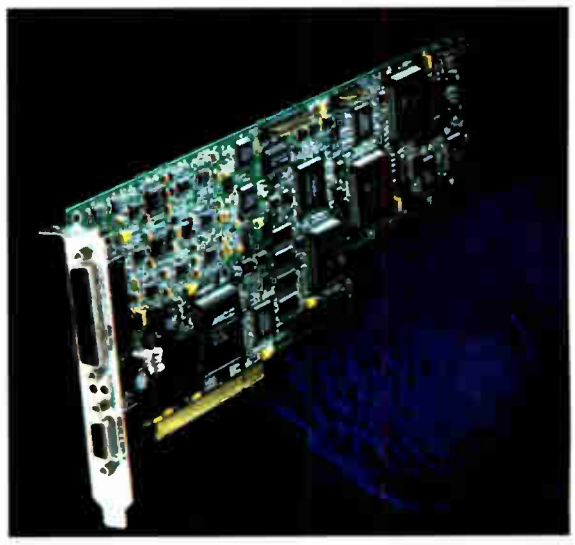
Antex also brings an improved LX-24M card, now with an 80 MHz DSP chip and an analog feed-thru capability for satellite-timed insertions.

Another Antex card is the StudioCard 3000. This is capable of 24/96, with eight channels of I/O and AES/SPDIF outs.

Antex premiers its new Media Client software that records, stores and redistributes Microsoft sound files from the Internet.

"In the future, larger radio networks will require increased analog and digital I/Os to handle the increased variety of feeds and files," said Dave Antrim, director of sales at Antex Electronics.

"Small to medium stations will require simpler function with comparable quality for broadcast/webcast at price points that fit the station budgets. For the long term, Antex is developing smaller, smarter I/O media client terminals that address trends



Antex Broadcaster BX-12e

Different aspects and components of computer technology are merging quickly. Whereas a station used to buy separate systems for automation and editing, the amount of power these combined lower-cost systems have is outstanding.

Eventually, the personal digital editor might be no more than a screen with a drive for backup, a bank of analog I/O and a standard digital I/O.

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World Radio History

Focus on Low Power

...till ...es are ...ney con- tin... ...n of terres- trial ... United States.

Whi... ...s pushed LPFM through ... ...aking process with unpreceden... ...peed, challenges to the new service, both in the courts and Congress, are far from over. Even so, some manufacturers are stepping up their production of LPFM equipment to woo aspiring broadcasters.

As for in-band, on-channel digital audio broadcasting, many manufacturers are working with the developers as the industry waits for its standards committee and the FCC to indicate a course. That could happen later this year.

Work closely

As the technology evolves, IBOC proponents continue to work closely with transmitter makers to ensure broadcasters will be able to buy DAB-compatible equipment when needed.

QEI is one company increasing production of LPFM gear, and it will display a host of FM low-power, solid-state transmitters.

The E-series family of transmitters comes in power levels of 20, 150, 300, 600 and 1,000 W, offering both low power and conventional broadcasters a wide range of choices.

QEI will also exhibit the M-series solid-state transmitters, ranging from 1.2 kW to 9.6 kW, and require less than 50 W RF drive.

Energy-Onix will display its "Perfect Package" for LPFM broadcasters. The package includes the Energy-Onix Maximizer III three-band stand-alone audio processor/stereo generator, an SST-150 exciter/transmitter and SWR FM 1-2 two-bay circularly polarized antenna with a complete transmission line assembly.

Energy-Onix President Bernard Wise said, "Any audio input will be enhanced with the Maximizer III, so the LPFM start up can easily get on the air."

In addition to the LPFM package, Energy-Onix is showing its complete line of FM transmitters, from 10 W to 52 kW.

Italian transmitter manufacturers have not overlooked the LPFM market, with several bringing their new wares to the show.

Manufacturers are working with IBOC developers to get ready for DAB.

Elettronika will introduce the Mira FM transmitter, aimed at the LPFM market. It is available in 30, 150 and 250 W versions and features microprocessor control, an RS-232/RS-485 interface, wideband RF amplifiers, a switching power supply and a touchsceen interface.

Itelco will bring LPFM transmitters from 20 to 100 W. "We can configure a system for any LPFM applicant," said Anders Madsen, vice president of sales and marketing for Itelco USA.

As for solid-state FM, Itelco offers frequency-agile transmitters with power outputs from 25 W to 20 kW, built-in stereo generator and hot-pluggable amplifier and power supply modules.

Tube transmitters offering many of the same features as the Itelco solid-state rigs are also available from the company with power outputs ranging from 5 to 30 kW.

Itelco USA will have on offer two Eureka-147 DAB transmitters at NAB2000 — a 200 W L-band transmitter configured in a compact package and a liquid-cooled 5 kW VHF band III transmitter.

Bext plans to bring along the XPT series of digital-ready FM exciters with power output levels of 20, 50 and 100 W and its new XT 501 high-power 500 W FM exciter.

See FM, page 38 ▶

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World Radio History

FM Manufacturers Power Up for DAB

▶ FM, continued from page 36

Broadcast Electronics will display Plug-N-Play FM20 and FM150 LPFM transmitters; both are designed to get an LPFM broadcaster on the air with minimum effort. Both products will be marketed through Marti Electronics.

Attendees can also look for samples of established BE FM transmitters, including the FM-20T tube transmitter, the solid-state FM-10S, FM-5C and FM-1C1, as well as the Predator digital FM exciter.

Crown will show its low-power FM products.

"Broadcast Electronics always looks forward to the show, the opportunity to meet with our customers, and network with top minds in technology, management and policy," said BE Vice President of Sales and Marketing Mark Jamieson.

"Our strong presence at the Radio/Audio Hall illustrates our long-term commitment to being an integral player in mapping radio's future," he said.

Nicom will promote its NTR 30 FM translator and its latest digital products including FM exciters.

Another veteran exhibitor is Continental Electronics Corp., which will highlight its PowerStar line of FM transmitters.

The PowerStar F1, F5 and F10 solid-state broadband transmitters in 1, 5 and 10 kW versions, incorporate a built-in computer control system with RS-232 interface and hot-pluggable RF amplifiers and the CEC 802B FM exciter.

CEC will also show the 816R line of high-power FM transmitters.

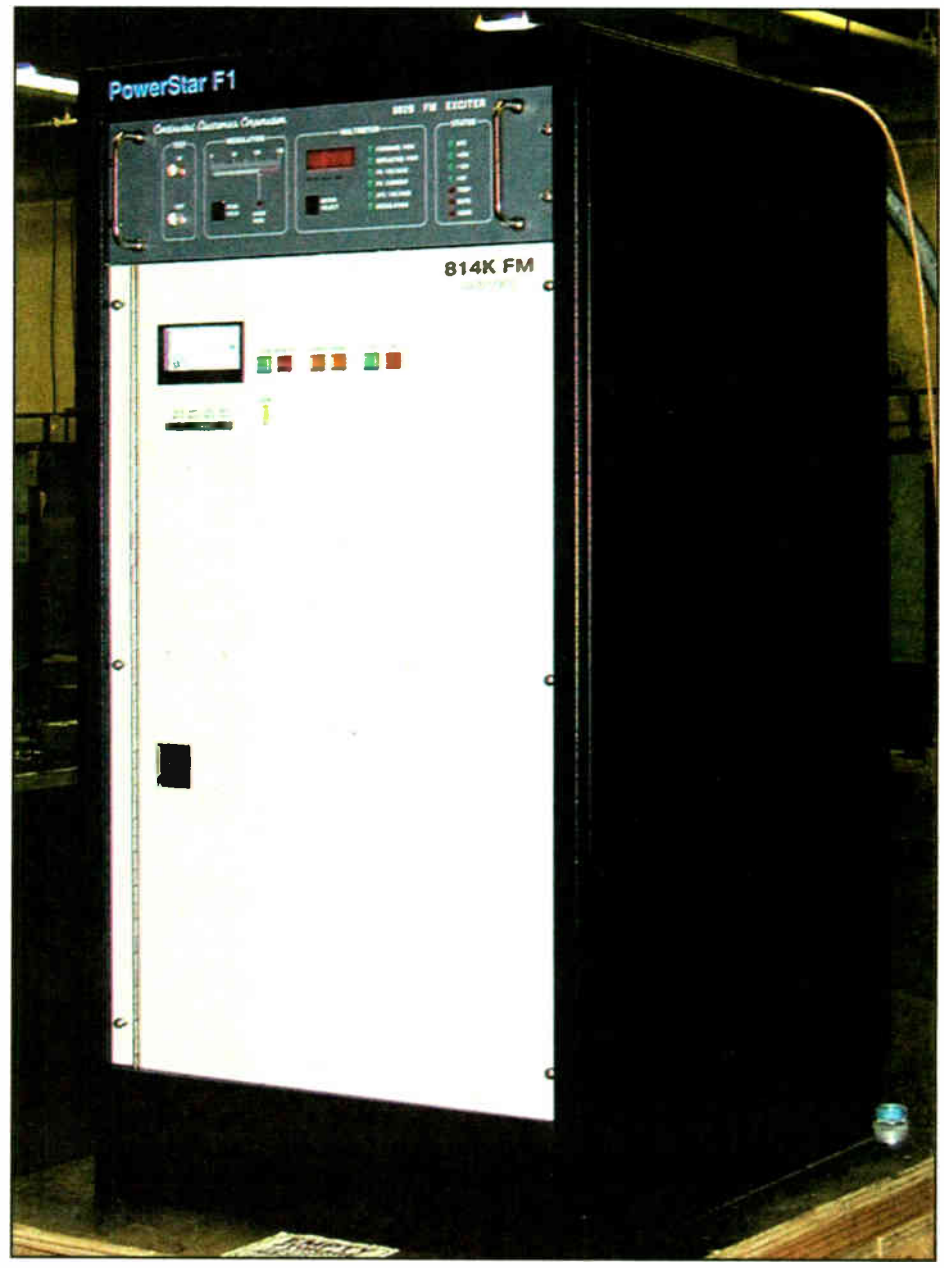
Nautel will introduce a "major new breakthrough" in solid-state FM transmitter technology at NAB2000, said Gary Manteuffel, manager of broadcast sales.

The company offers solid-state FM transmitters in power levels from 3.5 to 10 kW and can combine two 10 kW transmitters for 20 kW of solid-state power output.

"Nautel's single-stage combiner eliminates the heat dissipated by imbalanced loads employed in conventional combiners," Manteuffel said. Nautel FM transmitters also feature the NE-50 Direct Digital Synthesis FM Exciter.

On display for Harris Corp. is a complete off-air FM IBOC digital airchain — from the studio to the transmitter. Attendees will be able to hear actual IBOC digital signals at listening stations on the floor.

"Harris has been clearly focused for a number of years on providing future-ready RF transmission, as well as studio and program transport solutions. Look for displays of Harris's established line of Platinum FM transmitters," said Brian Brown, vice president of marketing.



The PowerStar F1 by Continental

New tube gear

AEV will present a new line of tube FM transmitters with power outputs up to 2 kW. This line of transmitters is designed around the Eimac 3CX800A7 and 3CX1500A7 triodes.

Enrico Antoniazzi, AEV export sales manager, said, "In the design of this equipment, the most important thing is reliability. This goal has been achieved by reducing wiring and looking for popular components easy to find on the market."

Crown Broadcast will bring its complete line of transmitters and translators to Las Vegas. Ranging in power from 1 W to 2 kW, these units feature a built-in audio processor/stereo generator.

Sales Manager Steve Claterbaugh said Crown will bring an operational 1 to 10 W LPFM unit to the show.

CTE will introduce its new VL1000/Plus 1 kW and VL1000 10 kW microprocessor-controlled solid-state power amplifiers. The company touts the units as being maintenance-free, while offering numerous controls and local or remote control monitoring.

From Spain, Link Comunicaciones will show solid-state FM transmitters from 20 W to 10 kW.

OMB America is bringing its new FM Digital Exciter to NAB2000, featuring direct digital modulation, signal processing, low signal-to-noise ratio, low distortion and high linearity.

Amplifier

Richardson Electronics, in addition to providing power tubes and other RF components to broadcasters, will introduce the MTIK 1 kW FM transmitter at the show.

Silicon Valley Power will display its new 10/3000 3 kW FM amplifier, which operates with 10 W input power and features broadband design, remote operation and modular construction. Also on display at the Silicon Valley exhibit will be the 10/1000 1 kW and B-2000 2.4 kW amplifiers.

Technosystem will premier an FM transmitter with modular construction, digital input and full microprocessor control of all features.

Also displaying FM transmitter and exciter equipment at NAB2000 will be A.B.S., Armstrong Transmitter, DB Elettronica, Rohde & Schwarz and Superior Broadcast.

Aztec Radiomedia will be showing its Digiplexer DSP-based FM encoder that includes stereo, RDS and DARC generators with multiplex limiting and clipping.

And for Eureka-147 DAB broadcasting, Larcan will be showing L-band and VHF band III transmitters.

■ ■ ■

Cris Alexander is director of engineering for the Crawford Group.

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World Radio History

MICS & SPEAKERS

Mics, Speakers Abound at Show

Bernie Cox

NAB will see a flood of new products in the microphone, headphone and speaker categories.

Get the backpacks, suitcases and file cabinets ready for a mass of product literature.

No sweat

At NAB2000, AKG Acoustics will feature the CK77 WR sweat-proof lavalier, which features two active and one passive diaphragms, as well as dual and horizontal diaphragms, to cancel all clothing and handling noise.

Also on display will be the C444L sweat- and moisture-resistant head-worn microphone for remote broadcasting and on-air use and the C3000B one-inch large-diaphragm cardioid microphone.

Audio Ltd. will display the RK4 rack system for RMS2020 and RMS2000 diversity wireless microphone systems, and the HXiR a hand-held UHF wireless microphone transmitter.

From beyerdynamic is the SHM 88 miniature shotgun podium microphone. The company also will show its monitoring headphones, on-air headsets, digital microphones and on-air microphones.

Lectrosonics Inc. will exhibit its AM8/4 10-channel automatic mic mixer. The AM8/4 features four assignable outputs, eight mic inputs and two line inputs with RS-232 control.

Micron Audio Products Ltd. will break out the Tram and Sonotrim miniature electret lavalier microphones and accessories along with its line of Tram and Sonotrim microphones.

Neumann will bring the KMS 105 supercardioid vocal microphone.

The KMS 105 offers 145 dB maximum SPL, a 127 dB dynamic range and high-resolution and neutral off-axis response.

In addition, Neumann will display its KM 184 miniature condenser microphone and the TLM 103 large-diaphragm condenser microphone.

PMI Audio Group will represent Studio Projects at NAB2000 as its exclusive distributor.

Studio Projects features three models of condenser recording microphones including the TB-998, a tube dual triode condenser microphone with variable pattern control.

"Studio Projects is expecting to launch other products by mid-summer," said Alan M. Hyatt, president of PMI Audio Group.

"The company is going after several popular recording products having high market demand," said Hyatt.

Also on display from PMI will be the VC1Q by JoeMeek. The VC1Q is a multifunction device with a transformer preamplifier-preamplifier, compressor, EQ, enhancer and de-esser for audio and radio.

For NAB2000, Rycote Microphone will show the Windspoiler, which features a push-on design that removes turbulence from the airflow around uncovered parts of a microphone when using a Rycote Softie with mount.

Sanken Audio Systems will bring a line of microphones such as the CS-3 shotgun, CSS-5 stereo shotgun and the COS-11s miniature lavalier.

Shure Inc. will feature the new SM7A cardioid dynamic microphone.

The SM7A features a frequency response of 50-20,000 Hz, a unidirectional polar pattern, a humbucking coil, bass roll-off and midrange controls, internal air-suspension shock isolation, built-in pop filter and a locking yoke mount.

The show will bring some interesting products from Genelec Inc.

The 2029B digital active monitoring system is a nearfield bi-amplified audio monitor with AES/EBU 24-bit, 96 kHz digital input and standard analog inputs. The system is designed for use with applications that include digital on-line/off-line editing systems, digital broadcast consoles and digital broadcast confidence monitoring.

Also on display will be the S30D active monitor, an upgrade to the S30C tri-amplified active monitoring system.

At NAB2000, JBL Professional will display its LSR25P compact reference monitor. The LSR25P features a bi-amplified monitoring system with a 5.25-inch woofer (100 W) and a one-inch tweeter (50 W) and is designed as a reference for workstations and edit suites.

Marshall's MXL 2003

Miller & Kreisel will feature its MPS-1610P internally bi-amplified main monitor for broadcast, film and music applications.

Active monitoring

Hafler will feature the P1000 Trans-ana compact 1RU amplifier at NAB 2000.

The circuitry of the unit is based on TRANSconductance Active Nodal Amplifier topology, which operates the output stage with full voltage gain, allowing the input stage to operate from a low

See MICROPHONES, page 40 ▶

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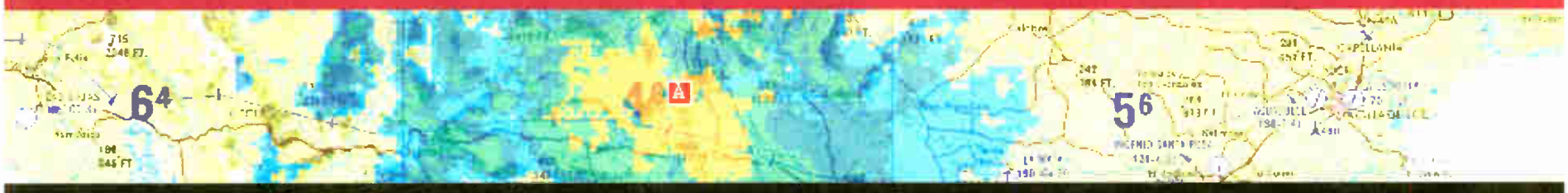

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World Radio History

Transducers All Over the Place

▶ MICROPHONES, continued from page 39

voltage regulated supply. The signal is shifted up in level to the high-voltage section by the driver stage, which forms an active node at ultrasonic frequencies.

The company will also feature its active studio monitoring systems, the TRM6 active monitor and the TRM10s Trans•ana active subwoofer.

The TRM6 is magnetically shielded, based on Hafler Diamond topology Transnova amplifier technology. It is a bi-amplified, two-way system offering a frequency response of 55Hz to 21kHz, +/- 2dB.

The TRM10s is a combination of the Hafler class G Trans•ana amplifier circuitry coupled to a 10-inch subwoofer.

In addition, Hafler will unveil a passive nearfield monitor, the M5, at the show.

The magnetically-shielded M5 is a compact, fourth-order Butterworth, vented, 2-way loudspeaker designed to work alone or in conjunction with Hafler's line of amplifiers

Miking the studio

Marshall Electronics will break out its MXL 2003 microphone for recording applications. A 1.06-inch capsule is coupled through an electromagnetic screen to a FET preamp with a wideband transformer less output. A three-position switch includes bass cut and 10 dB pad. It comes with a shock mount and lists for $299.95.

For NAB2000, Sennheiser has redesigned its studio condenser microphone, the MKH80. The microphone, now named MKH800, has a frequency response extending up to 50 kHz and a dynamic range of 126 dB at a self-noise of only 10dB (A).

The existing mechanical and electrical design of the MKH80 allowed for a frequency response above 20kHz. A single wideband transducer operating on the push-pull principle for low distortion captures the entire frequency range from 30Hz to 50 kHz.

System Wireless will demonstrate its AIS-800 ISO modification of the HM Electronics (HME) RW 800 wireless intercom system.

The AIS-800 ISO provides multichannel communications and interfacing to external intercom systems. This modification permits three talk paths from each of the wireless belt-packs — two of which can be directly connected to an external intercom system. The third path can be used for interface to paging systems, studio announcements or for two-way radios.

The show will bring some interesting products from Telex

The RadioCom BTR-300 is the successor to the Telex BTR-200/RTS 2105 wireless VHF intercom system.

The BTR-300 offers twice the available frequency bands as the previous model.

Improved front end filtering allows the unit to be used in places where interference from other transmitters may be a problem. The additional filtering and channel assignments also allow a greater number of base stations and beltpacks to be used simultaneously. Up to four base stations and 16 separate beltpacks can be used at one time with the BTR-300.

The BTR-300 is compatible with RTS TW, AudioCom, RTS ADAM and Matrix Plus.

Also on display from Telex will be the ENG-100 Portable Receiver. This unit provides 100-channel capability and compatibility with the existing LT-100 beltpack transmitter and the SH-100 handheld transmitter systems.

Creating space

LPB will display its Hayes Spatial One speakers.

The company is promoting itself as a supplier for "everyone from the budget-minded big-market station to the local college going for an LPFM license," said Tom Spadea, president of LPB.

"The Hayes Speakers, at $695 per pair, are the perfect complement to a studio that wants $2,000 sound at a fraction of the price."

Some improvements have been made to the Spatial Ones.

The 4 kHz notch has been filled but the overall tweeter level reduced slightly. The immediate effect is an increase in bass without sacrificing any clarity. Also, the 200 Hz bump has changed by decoupling the enclosure.

The show will bring some interesting products from Electro-Voice.

The N/DYM Series UHF wireless microphone system utilizes ClearScan technology from Electro-Voice to offers frequency agility features found on more expensive wireless microphone systems. This feature allows the systems to operate on one of 10 user-selected frequencies and automates system set-up by finding the clearest operating channel in a RF environment.

"We designed the N/DYM Series UHF wireless microphone system to provide the enhanced performance features of higher priced systems at a lower price point," said Joel Johnson, product category manager for Electro-Voice.

"Users can go into RF-challenged areas secure in the knowledge their show will go on without problems because of the frequency agility feature."

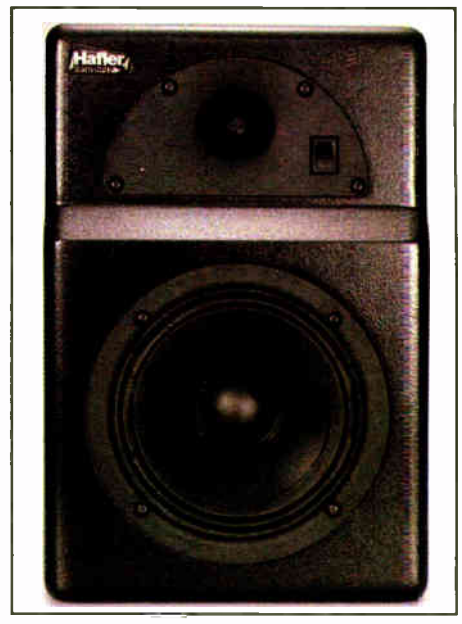
Operation in the UHF frequency band is further enhanced by the Secure-Phase diversity system for clear and drop-out free audio. In addition, the receiver has an adjustable squelch level while the beltpack and handheld transmitters include adjustable Tx gain controls.

The N/DYM Series features six models — two hand-held and four belt-pack units.

Also on display from Electro-Voice will be the ENG 618 Integrated Shotgun/Boom-Pole Microphone.

The ENG 618 employs the K-Tek Boom-Pole technology combined with a Electro-Voice electret condenser microphone capsule to produce a product for broadcast news gathering applications and live audience interviews.

"The ENG 618 is lightweight, collapses into a small package for toting and provides the exceptional sonic performance expected from an Electro-Voice product," said Jerry Falk, product category manager for EV microphone products.



Hafler TRM6 Active Monitor

From all directions

DPA Microphones will demonstrate its Type 3541 omni directional microphone.

The Type 3541 is designed for everyday use in recording studios. The new microphone kit Type 3541 is based on the same large-diaphragm capsule technology as the Type 4040 Hybrid Microphone.

The system is supplied as a complete kit with suspension mount, windscreen and pop-filter as well as the microphone amplifier Type HMA4000 and a microphone cable.

The Type 3541 also introduces a modular capsule and preamplifier system.

The capsule can be separated from the microphone preamplifier and the preamplifier can be exchanged, giving the sound engineer a choice between musical distortion of the Type MMP4000-T tube preamp or total transparency of the solid state preamplifier Type MMP4000-S. Both preamplifiers are included in the microphone kit.

Tannoy will roll out its Reveal Active monitor.

The system combines the Reveal with twin 50-watt amplifiers and a crossover and has a frequency response of 65Hz to 20kHz.

The one-inch soft dome tweeter is matched to a 6.5-inch long throw bass unit. The drive units are mounted on a 1.5-inch thick baffle that is curved to minimize diffraction. Both drive units are magnetically shielded to allow the system to be used close to video monitors.

The list price of the Reveal Active monitor is $899 a shielded pair.

At NAB2000, Audio-Technica will introduce its AT4047/SV large-diaphragm cardioid capacitor microphone.

The AT4047/SV microphone features a transformer-coupled output and utilizes dual, gold-plated and aged large diaphragms for extended frequency response of 20 Hz-18,000 Hz.

The mic features a low self-noise of 9 dB SPL, a dynamic range of 140 dB at 1kHz and ability to handle high SPLs up to 149 dB, 1kHz at one-percent THD. A switchable hi-pass filter and 10 dB pad are included.

To ensure isolation from noise and vibration, the AT4047/SV features a floating-construction element. A new heavy-duty shock mount is included.

The AT4047/SV cardioid capacitor microphone has a suggested retail price of $695. The company will also feature the AT895 adaptive-array microphone system.

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World Radio History

STLs & REMOTE CONTROLS

Fiber STLs, IP Remote Control

Michael LeClair

New developments in studio-to-transmitter link technologies ensure a wealth of choices for NAB2000. More than a dozen manufacturers will offer equipment to get your signals to the transmitter.

At least two new products will be unveiled that utilize fiber optics.

"In crowded markets fiber-optic connection is the direction for STLs," said Richard Cerny, president of Telecast Fiber Systems. "This type of transmission is ideal for co-located studio facilities as well."

Telecast will introduce the new Viper II system, a modular frame that can accommodate from two to eight channels of digital audio at 24-bit resolution providing more than 100 dB of dynamic range on a single fiber. Other options for the Viper II include two-way intercom and Ethernet data links.

Also showing a new fiber optic system will be Multidyne.

The model FTX-195/FRX-195 system is available in either single or multimode versions. The single-mode version is capable of long-distance transmission up to 100 Km and can support up to four digital AES/EBU audio channels.

Calling all STLs

Telephone circuits also have a long history of use as STLs. But now the circuits are digital, and the number of options for connection are as big — or as small — as your budget will allow.

Each year, station STL options increase as digital services get faster and more abundant.

Designed to operate using a full or partial T1 circuit, the STL Plus system from Harris-Intraplex will show off some new enhancements. Now available for the first time is a low bit-rate video coder with possible application as a security camera for an unmanned and remote transmitter site.

Additionally the company will demonstrate a new release of IntraGuide management software that allows monitoring and control of remote STL Plus units in network configuration.

QEI Corp. will be on hand with the established T1 STL, the Cat-Link.

Moseley Associates also will have T1 STL equipment on display as part of the Starlink 9003 series studio to transmitter links.

Linking the signal

Still, perhaps the most popular studio-to-transmitter link remains a line of sight radio link under the control of station engineers.

New development on multichannel digital links continues, prompted by the colocation of multiple radio stations into combined facilities.

Harris STL Plus

"We see a strong demand for digital STLs that can handle more than one radio station," said Ernie Belanger, sales manager of Armstrong Transmitter.

"As group ownership in large markets brings together many stations the STLs have to use spectrum efficiently."

Armstrong will introduce a new digital codec at NAB2000, the DTX/DRX 4. Using ADPCM coding to minimize delay, this new system can convey four channels of digital audio over a conventional 950 MHz auxiliary channel.

A newly redesigned RF amplifier will be on display from Marti, part of Broadcast Electronics. Incorporated into the existing line of 950 MHz band STLs, the new amplifier is wideband, tolerates high VSWR conditions and is designed to be very rugged.

Energy-Onix will show the Roadcaster RPU with 10 user-user-selectable frequencies from 150 to 170 MHz. A duplex version is available for IFB during remote broadcasts.

See STL, page 44 ▶

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arrakis SYSTEMS INC.

BSW
BROADCAST SUPPLY WORLDWIDE

World Radio History

Remote Controls Go IP

▶ STL, continued from page 41

Many other companies will be on hand to demonstrate established digital STL products over 950 MHz or spread spectrum at 2.4 GHz, including Bext, Bi-Directional Microwave, Moseley Associates, QEI Corp., Harris Corp. and TFT.

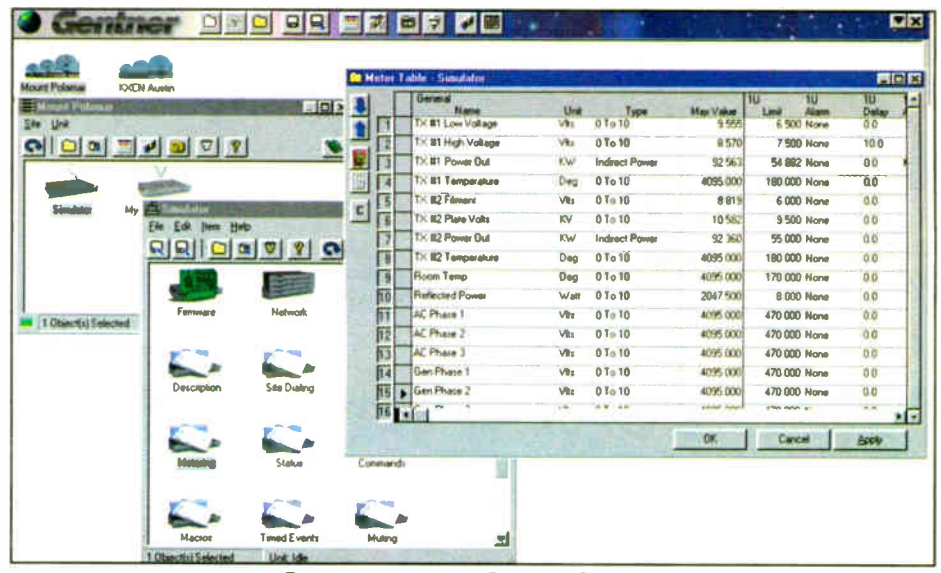
Nicom will promote its line of transmitters, amplifiers and STL systems.

International producers OMB America, Elettronika Srl, and Technosystem SpA alos will show microwave STL products aimed at U.S. and overseas markets from existing product lines.

In addition to getting the signal to the transmitter, there is still the need to monitor and control transmitter sites as well. The newest technology trend in remote controls can be summed up in two words: Internet protocol.

At NAB2000, Aztec Radio Media will release the IP2port, an integrated web, e-mail, and FTP server package that plugs into the serial ports of your remote equipment, allowing monitor and control via the Internet.

"The latest development for remote controls is clearly IP connectivity," said Neil Glassman, president of Digigram, which recently purchased Aztec.



Gentner Remote Control Systems

The IP2port uses a Unix-based operating system for reliability and stability, and can notify operators of transmission problems via cell phone, pager, or even e-mail.

The IP2port features an open-collector, general-purpose interface, as well for equipment without serial control capabilities.

Also showing new remote control solutions based on Internet connectivity will be Crestron Electronics Inc. Using e-Control, an operator can use a standard web browser to connect to remote equipment.

According to Pat Booher, manager of marketing for Crestron, "a unique feature of e-Control is our collection of preprogrammed turnkey software packages to create touch panels or e-mail features."

Internet control is the next trend in transmitter remote control, experts say.

Gentner Communications will debut Lynx software for the GSC3000 remote control system, a new package with many enhancements.

Lynx offers a graphical user interface, full-featured database and macro language to assist in setup and operation of the GSC3000. The GSC3000 also offers IP and LAN/WAN connectivity.

Burk Technology will release a new version of Autopilot for Windows program. Other enhancements to the existing ARC-16 remote control include the Enhanced Speech Interface, which offers a voice help feature for inexperienced operators.

For NAB, Audietem will show the Audemat ITS4 remote monitoring system.

Also showing remote control equipment at NAB2000, from their existing product lines, will be Electronic Associates, Davicom Technologies, Moseley Associates and ABE Elettronica SpA.

■■■

Michael LeClair is chief engineer for the WBUR Group in Boston.

See Us At NAB Booth # R3174

World Radio History

WEBCASTING MADE SIMPLE.

So your station wants to stream audio on the Net and it's up to you to make it work. You've heard the horror stories of unfriendly software, unreliable PCs, noisy audio cards and the dreaded 3am lock-up. There's got to be an easier way.

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World Radio History

ANTENNAS & RF SUPPORT

Floor Holds a Host of RF Products

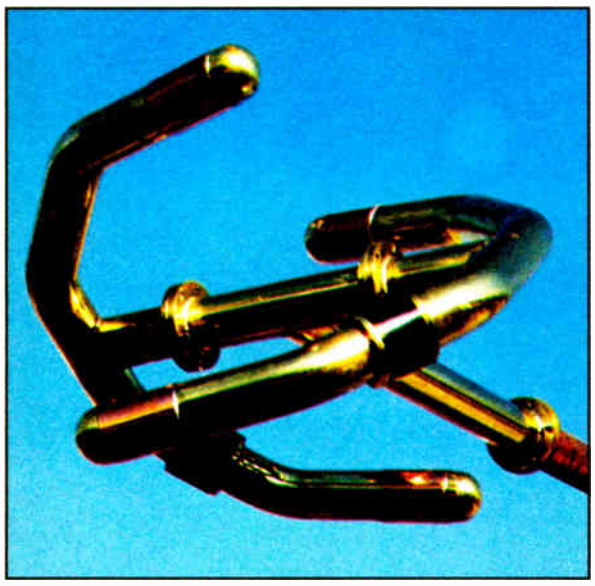
Tom Osenkowsky

Diplexing. IBOC-compatible designs. Software control.

These are some of the areas of interest within the category of antennas and RF support gear at NAB2000.

Jampro will promote the JSWB FM antenna. It has a power-handling capability of 10 kW per bay and a VSWR bandwidth exceeding 10 MHz at 1.1:1.

For an array, the JSWB can accommodate several frequencies with spacing up to 15 MHz. The JSWB features circular polarization, rugged mechanical construction and factory tuning on a similar structure.



FM Antennas by Propagation Systems Inc.

Antenna Concepts Inc. will exhibit Ultra Tracker II, a single-lobe circularly polarized antenna with higher gain than the original Ultra Tracker. The design was inspired by low-power considerations where every watt counts and building signal penetration is a prime goal.

Also on display will be the Ultra Tracker LP, aimed at future LPFM operators.

Since before ...

Valcom Ltd. will feature a vertical freestanding fiberglass antenna for AM broadcasters. Two models are available. The 112-foot model V330112CL2AM is used at frequencies below 1400 kHz while the 74-foot model V33070CL2AM is used at frequencies above that.

Both models employ the VGS36-100A ground screen. These fiberglass antennas can withstand wind speeds of 150 mph. The antenna usually is mounted to a concrete pier with a dozen 5/8-inch stainless-steel bolts.

The units are ideal for rooftop mounting where the roof may serve as the ground plane. A matching unit is employed to obtain an impedance match to the transmission line.

Propagation Systems Inc. will promote its FHR and FMR FM antennas. Using a rototiller design, the FHR and FMR feature an internal feed point and excellent VSWR bandwidth for ice-prone environments.

Electronics Research Inc. will debut the MPX medium-power FM antenna. The profile of the MPX is tailored to high windload applications.

ERI also will introduce its DAC IBOC combiner, which allows a station to use a single antenna to transmit both its standard FM plus in-band, on-channel digital signals.

Nicom LLC will display its BKP950 broadband grid reflector STL antenna for 940 to 960 MHz. The BKP950 has a gain of 18 dB and a semi-parabolic design, and is DC grounded for lightning protection.

RFS Broadcast will be on hand. The company recently announced the installation of a 13-channel FM combining system at the Sky Tower in Auckland, New Zealand.

The installation includes an RFS eight-level, four-sided 904CP panel array, coupled with a 13-channel FM combiner chain and an RFS Rapid Release U Link switching panel.

AM broadcasters that employ directional antennas can take advantage of a new software programmable system controller, the DAC-MOD-2-12/C1, introduced by Kintronic Labs Inc.

This software interfaces with the PLC-based controller series and features a multicolor touchscreen display.

Phasetek Inc. will bring its established line of AM matching and directional antenna phasing equipment to NAB2000.

With vertical real estate at a premium, many FM broadcasters are turning to multiple station usage of a single antenna. To assist, Systems With Reliability (SWR) will introduce its combiner/bandpass filter featuring a successive configuration of quarter wave resonator cavities.

Also at NAB, Andrew Corp. will feature its line of RF support products including Heliax coaxial cable.

Myat Inc. will be on hand. The company makes transmission lines as well as accessories such as elbows, flanges and other necessities.

Dielectric Communications has made news lately, acquiring Harris Broadcast Communications Division's television antenna business.

Late last year, the company also acquired the Mark Products Inc. line of cable pressurization and leak locating products. Dielectric will promote cable pressurization and high-power FM and TV antennas, transmission line and RF systems.

RFS Broadcast will promote its wideband panel antennas, line and RF hardware.

Micro Communications Inc. will exhibit its passive RF components and systems for radio, TV and DTV. The company says its expertise lies in the frequency range from 50 MHz to 3 GHz, in power levels of 1 kW to Megawatts.

Armstrong Transmitter will display its line of FM and TV antennas, made from heavy-duty brass in order to increase structural integrity. They include the FMA-707, appropriate for low-power FM applications.

Extensive support

Technology for Communications International (TCI) builds FM antennas and combiners, featuring broadband systems capable of handling one or more transmissions. It also designs and installs antennas, transmission line and switching for shortwave facilities.

Central Tower Inc. will promote its multifunctional broadcasting structures, which include applications in broadcast and HDTV.

RF support gear is like the plumbing of a radio station — hidden away, not sexy, but absolutely critical — and many companies will be at NAB in this category.

Irte SpA will promote its lines of RF, DAB and STL equipment. Among the products will be the company's parabolic antennas for radio relay.

Kathrein Inc.'s Scala Division will feature several items from its line of products for FM monitoring, low-power FM translators and transmitters, and medium- and high-power FM transmission systems.

Also from Kathrein-Scala are packages including antennas, cables and connectors, power dividers, filters, combiners, preamps, and lightning and surge protectors.

OMB America will display its FM Digital Exciter, featuring digital modulation, low noise and distortion, and high temperature stability.

Rohde & Schwarz GmbH will be at the show to promote its line of antennas and RF support equipment.

Rymsa will discuss its FM antenna systems, FM transmitter combiners, V/S diplexers and connectors, switches and accessories for RF support.

Delta Electronics Inc. will bring its line of RF and AM/FM equipment to the show. Among the company's lineup will be several AM stereo products including the ASE-2 AM stereo exciter, the ASM-1 AM stereo modulation monitor and the CQS-4 C-QUAM synthesizer.

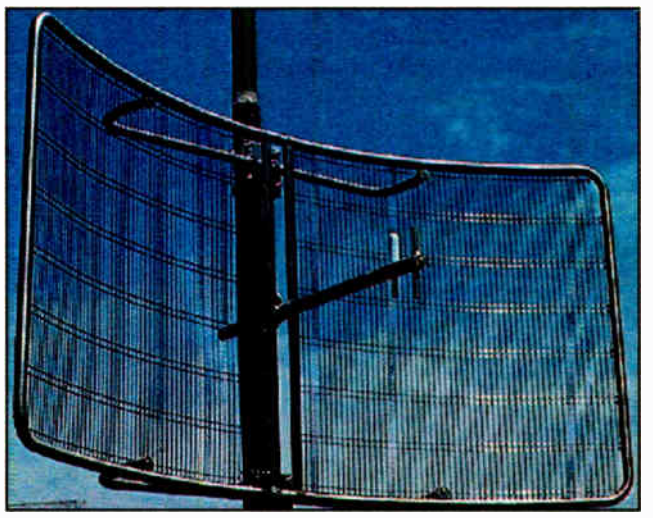
Gorman-Redlich will break out its digital antenna monitors for AM directional arrays. The antenna monitors display ratio readout and a phase reading not disturbed by high levels of modulation.

At NAB2000, Will-Burt Co. will exhibit its Stiletto mechanical mast. The mast features a freestanding height of up to 12.5-meters with payloads of up to 400 pounds. It features possessive retraction and can be stopped to maintain a height in its range of travel.

Dummy loads and more

Altronic Research Inc. will bring its line of RF support products. Among these products will be the Model 6710 10 kW air-cooled dummy load with PC-based digital calorimetry.

Bird Electronic Corp. will promote its Digital Air Series Load along with a host of other RF monitoring and measurement products.



Nicom will display its broadband grid STL antenna.

Honeywell Obstruction will feature its StrobeGuard, an FAA-approved high-intensity lighting system for tall towers.

Flash Technology Corp. is showing its high-intensity dual-obstruction white and red beacons, as well as its red flashing beacon and obstruction light monitoring service.

LeBlanc Broadcast Inc. is a supplier of broadcast transmitters, antennas/combiners and towers for TV and FM stations.

Silicon Valley Power will show its 10/1000 and 10/3000 FM amplifiers, with 1 kW and 3 kW output. They feature broadband design, VSWR foldback, remote operation and modular construction.

In addition, the B-2000 FM amplifier will be on display. The amplifier features up to a 2.4-kilowatt output, 10-watt input, broadband design, VSWR foldback, remote operation and modular construction.

■ ■ ■

Tom Osenkowsky is a consulting engineer based in Brookfield, Conn.

DON'T MISS AT NAB 2000 The Convergence Marketplace

Radio Luncheon and Hall of Fame Presentation
Tuesday April 11
12:15-1:45 p.m.
Las Vegas Hilton, Barron Room

Joyner

The NAB continues its emphasis on community service during NAB2000. Its figures show that local broadcasters contributed $6.8 billion in PSAs and money raised for charity in one year alone.

Cohen

You can help celebrate service at the Radio Luncheon and Hall of Fame Presentation. The coveted NAB Crystal Radio Award winners will be announced, and one of radio's favorite sons — Tom Joyner — will be honored with his induction into the NAB Broadcasting Hall of Fame.

Joyner, dubbed "the hardest-working man in radio," is now a part of the ABC Radio Networks team.

Meantime, Herb Cohen, noted negotiator and consultant, will deliver the Radio Luncheon keynote address.

Cohen, an internationally renowned corporate and government consultant on negotiating strategy, commercial dealings and crisis management, will offer perspective to broadcasters as they do business at the "real-world negotiating table."

This event is sponsored by ASCAP.

World Radio History

THE TAPE CART KILLER

DN-M991RM

NEW FIRMWARE UPDATE

- 10 Hot Starts
- Instant Start
- Auto Cue
- Multiple Display
- Seamless Sleep Mode
- ±8% Playback Speed Control
- Program Up To 25 Tracks
- Multiple Editing Functions
- Rotary Track Selector
- Relay Recording
- Auto Level Rec Start
- Optional Wired Remote RC-650

Let's face it, tape carts have become the broadcast equivalent to dinosaurs and are headed to extinction. With the advent of MiniDisc, why would anyone still rely on an outdated tape cart that, at best, is undependable and offers limited functionality? Good question.

The highly acclaimed Denon DN-M991R MiniDisc Recorder and Player is the logical solution. It packages all the features, performance and reliability that has already established the DN-M991R as the industry leader.

And now, the DN-M991R offers an optional firmware update specifically designed for the broadcast market that promises to expedite the timely demise of the old tape cart machine. Specify DN-M991RM when ordering. For additional information, contact our broadcast specialist at (973) 396-7492.

BALANCED INPUTS/OUTPUTS · HOT 10 START · KEYBOARD ENTRY Q W E A S · ±8% PITCH · AES/EBU IN/OUT

NEW **Airlock:** This new feature prevents on-air talent from from tampering with recorded material even if the protection tab on the disc is left enabled. Now program directors and engineers can program the DN-M991RM to function as a 'playback only' device.

NEW **Visual EOM:** Broadcasters can store secondary cue information such as vendor names or cue points. The secondary cue is stored as part of the track name in brackets. When playback reaches the designated End of Message (EOM) point, the secondary information will display and flash, signaling that the track is about to end.

NEW **Five Minute Skip Search:** This new function allows the user to jump through long tracks in five minute increments and is particularly useful for news gathering and interview applications.

NEW **Display Improvements:** Characters scroll to the left at a rate of ten characters per second–two times faster than standard–for quicker recognition of disc or track titles. Two other rescroll improvements have also been incorporated to further improve the DN-M991RM's versatility.

Denon Electronics Division of Denon Corporation (USA), 222 New Rd., Parsippany, NJ 07054, (973) 396-0810
Denon Canada, Inc., 17 Denison St., Markham, Ontario, Canada L3R 1B5, (905) 475-4085
Labrador, S.A. de C.V., Zamora No. 154, 06140 Mexico, D.F., (52-5) 286-5509

Visit our web site: www.del.denon.com

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The First Name In Digital Audio

World Radio History

OTHER NEAT STUFF

New Products Crowd Exhibits

Flip Michaels

Las Vegas will be hit with a technological tidal wave at NAB2000. The show will fill two convention centers with equipment, tools and services.

Here are a few not included in stories elsewhere.

In the process

Clients familiar with Cutting Edge will note that the company is playing up the Omnia brand in its marketing.

Omnia, a Telos company, will display ToolVox, a digital mic processor that includes EQ, de-essing, dynamics, reverb and mic preamp. It has 100 customizable presets.

The company will promote plug-in modules for the Omnia.fm Digital Audio Processor, and its lineup of audio processors for AM, FM, DAB and the Web.

T.C. Electronic Inc. will exhibit its D22 digital delay, which provides up to 1300ms of delay per channel on two channels, 24-bit AD/DA converters and digital I/O in various formats.

The company will show its DB Max Digital Broadcast Maximizer, with 24-bit A-to-D and D-to-A converters and hardware and software enhancements.

Prime Image Inc. will show its talked-about Cash time processor, which lets stations squeeze additional commercial inventory into each hour.

Aphex is celebrating its 25th anniversary and will display the Model 1100 Termionics Tube Mic Preamp and 1788 Eight-Channel Remote Mic Preamplifier.

The company will also feature its 2020 FM on-air processor in a display that pits it against other popular boxes.

Nicom will show the Poseidon digital stereo generator and audio processor. Nicom, based in National City, Calif., was founded by Franco Piagentini and Carlo Rustichelli. The former managed an Italian company that specialized in building broadcast antennas and accessories for more than 25 years. He began manufacturing antennas and accessories here and started Nicom USA in 1998.

The company also offers transmitters, amplifiers, STLs, mixers and reconditioned test gear.

Orban will promote new Audicy V3.0 software, which adds a networkable system and digital effects to the popular digital audio editor. It will tout its Optimod 6200 processor, suitable for Webcasting, DAB and DTV applications, and the Optimod 9200's new V2.0 software, with presets for AM and SSB high-frequency shortwave use.

CD mastering

MicroBoards Technology Inc. will demo Professional CD Factory 2000, a PC software and hardware bundle at 8X speed that includes CD Architect, Soundforge XP, MP3 software, Hotburn data premastering software, PCI SCSI card and the PlayWrite 8020 Panasonic 8x20 recorder.

It will also exhibit StartREC, a digital audio editor/CD-R duplicator housed in one standalone, rackmountable unit.

ATI will show the DM200-1 and DM200-2 digital monitors, which accept AES/EBU digital audio in 100-ohm XLR and 75-ohm BNC/RCA formats and provide a bright stereo LED level display, stereo headphone outputs and a balanced, stereo +4 dBm analog line output.

Eventide will show its Orville Harmonizer Effects Processor, a multichannel, dual engine, 24-bit/96 kHz device. The Orville can handle four analog and four AES/EBU inputs and outputs.

Benchmark Media Systems will bring the VCA-2, a remote stereo voltage amplifier featuring balanced I/O and control inputs for long-distance control. Benchmark will also bring the AD2404-96 and AD2408-96, which are 24/96 A/D converters with four or eight channels.

One supplier thought of in the radio camp will be talking about video.

Svetlana 4CX5000A

The newest package from NPR Satellite Services includes compressed digital video in a partial- or full-transponder package.

Robert Speir, NPR Satellite Services manager of marketing, said, "We do not believe in 'one-size-fits-all' satellites. We recognize that broadcasters vary widely in terms of size and objectives."

Dawn Satellite will promote its digital satellite downlink products including LNBs, LNAs and feedhorns.

Net tools for radio continue to proliferate.

Broadcast Electronics will take a high profile with its new eStream line, which includes audio processing software applications, streaming bandwidth management tools, and an A-to-D processing PCI card so the user can create files for distribution through RealServer, Microsoft Media Server or MP3 files.

BE says the system lets streaming media producers deliver radio-quality audio content over the Internet or their corporate intranet.

Supplier ednet inc. provides planning, on-site production and encoding — including camera crews, audio interface, encoding equipment and technicians — for live Net Webcast events.

For many stations, non-traditional revenue is the Internet's Holy Grail.

BuySellBid.com uses "co-branding," so stations are partners in the delivery of more than 3 million multimedia classifieds. The company has a network of 1,000 local radio, television and cable station Web sites. Distribution partners earn local Web revenue from classifieds, auctions, personals and online shopping.

BroadcastMusic.com streams more than 360 radio stations on the Internet. The company also streams the One-on-One Sports Radio Network. BroadcastTalk.com features hundreds of live and archived talk shows.

The Audioactive MP3 production studio from Telos Systems is optimized for audio encoding using Fraunhofer compression codecs that support 8 to 256 kbps. The system can convert PCM files to compressed WAV and Microsoft ASF formats.

An Audioactive MPEG encoder is a full system for audio over IP with the ability to stream directly using MP3 multicast or via an intranet.

Wires etc.

Radio Systems comes to NAB with its StudioHub system for wiring broadcast facilities. The StudioHub product makes extensive use of shielded twisted pair (STP) CAT-5 compliant cable.

In conjunction with companion termination and active amplifier components, StudioHub products are a new method to wire and intermix analog and digital signals in a broadcast facility.

To protect electrical devices, Superior Electric will exhibit Stabiline WHR voltage regulators. These are variable transformer-based devices that meet the requirements of radio transmitter protection, offered in single- and three-phase models.

Switchcraft Inc. will show its new AAA Q-G Twist series of XLR connectors, which have only two parts to assemble, and will show a new series of right-angle RCA plugs.

Svetlana Electron Devices' 5CX1500A and B tubes can be used for low-power FM transmitter replacement, as output amplifiers or as a driver IPA for a large amplifier.

The company will exhibit its 4CX3500A and 4CX5000A for medium-power FM transmitter replacements, 10 kW output tetrodes and 3CX2500F3 for AM transmitter replacement.

Equi=Tech Corp. plans to show a redesigned rack power system. It includes a digital voltage readout, visual surge protection indicator and better noise rejection bandwidth.

Pacific Research & Engineering is now part of Harris Corp., and will exhibit its Harris PrimeLine modular studio cabinetry. Units can be enhanced with custom elements. PrimeLine retail prices begin at $4,000. Also new is Harris QuikBilt II furniture, which is easier to assemble and more durable than QuickBilt I.

Talk America Radio Networks offers Stephani Doran's "The Dream Weaver," a show about interpreting dreams early Sunday morning from midnight to 3 a.m. Another show is Jeff Santos's "Born in the '60s," six nights a week, with interviews, music and pop culture.

International E-Z Up Inc. will show its Hut Instant Shelter, which acts as an instant billboard for advertising logos at trade shows, remotes, promotional and community events. A large area provides increased visibility of logo and graphics.

■■■

Bruce Rogow contributed to this story.

Crystal Award Finalists Announced

Community service is radio's forte. The NAB announced 44 finalists for the Crystal Radio Awards competition.

Since 1987, the NAB Crystal Radio Awards have recognized radio stations for their outstanding year-round community service efforts.

Ten winners will be announced during the Radio Luncheon at NAB2000, Tuesday, April 11. The luncheon will also feature the induction of Tom Joyner into NAB's Broadcasting Hall of Fame.

A panel of judges representing broadcasting, community service organizations and public relations firms selected the finalists.

The finalists are:

KCMO-AM-FM, Kansas City, Mo.
KCUE(AM), Red Wing, Minn.
KDFC-FM, San Francisco
KDWB-FM, Minneapolis
KELO-AM-FM, Sioux Falls, S.D.
KGO(AM), San Francisco
KLWN(AM), Lawrence, Kan.
KMBZ(AM), Kansas City, Mo.
KNOM-AM-FM, Nome, Ala.
KOIT-AM-FM, San Francisco
KOZT(FM), Fort Bragg, Calif.
KQKQ-FM, Omaha, Neb.
KSDR-AM-FM, Watertown, S.D.
KUZZ-AM-FM, Bakersfield, Calif.
KVFD(AM), Fort Dodge, Iowa
KWOA-AM-FM, Worthington, Minn.
KXRO(AM), Aberdeen, Wash.
KYNT(AM), Yankton, S.D.
KZQZ(FM), San Francisco
WAXX(FM), Eau Claire, Wis.
WCSY-FM, South Haven, Mich.
WDEL(AM), Wilmington, Del.
WDSN(FM), DuBois, Pa.
WGMS-FM, Washington
WIBC(AM), Indianapolis, Ind.
WICO-AM-FM, Salisbury, Md.
WIVK-FM, Knoxville, Tenn.
WJBC(AM), Bloomington, Ill.
WJR(AM), Detroit
WKHY(FM), Lafayette, Ind.
WLEN(FM), Adrian, Mich.
WLUP-FM, Chicago
WNND(FM), Chicago
WNNX(FM), Atlanta
WPDH(FM), Poughkeepsie, N.Y.
WPEG(FM), Charlotte, N.C.
WRAL(FM), Raleigh, N.C.
WREC(AM), Memphis, Tenn.
WSGW(AM), Saginaw, Mich.
WTMX(FM), Chicago
WTOP-AM-FM, Washington
WUSN(FM), Chicago
WWZZ(FM), Washington
WZZK-FM, Birmingham, Al.

DON'T MISS AT NAB 2000 The Convergence Marketplace

NAB CRYSTAL RADIO AWARDS
for excellence in community service

World Radio History

TEST & MONITORING

Tweaks to Test and Monitoring

Harold Hallikainen

Manufacturers of test and monitoring equipment are concentrating largely on the transition to digital television.

Despite this, many companies at NAB2000 will be showing products that have served us well for several years. Some have made improvements to existing products, often by adding digital signal processing or control functions.

In the next year or two, look for increased activity in test and monitoring for radio as digital audio broadcasting is introduced.

On the level

Ward-Beck Systems Ltd. will show its XTM4 Extended Range Test Meter. This rack-mountable instrument provides simultaneous stereo VU and PPM display of analog, AES or SDI audio. It accurately displays levels from -80 to +30 dBu.

Videoquip Research Ltd. will show the new VP-2D digital audio meter. This stereo LED bar-graph meter displays digital audio (AES/EBU or S/PDIF) levels in the -58 to 0 dBFS range. Ballistics are optimized for digital audio monitoring.

Bird Thruline Digital Power Meter

Videoquip will also show the new MP-204D monitor panel. The monitor panel has both analog and AES/EBU digital inputs driving an internal amplifier and speakers and level meters.

Wohler Technologies will show the LM series of high-resolution audio meters. These are available as 1U or 2U rack-mount units that display two to 24 analog channels or one to 12 AES digital stereo audio streams.

These units are available with 53 or 106 LED segments, resulting in a mid-scale resolution of 1.0 or 0.5 dB respectively. A bar graph has VU ballistics while a "dot" rides above the VU indication with PPM ballistics.

Finally, Wohler Technologies also will be showing the B-1100 Broadcast Audio Silence Monitor. This unit differs from existing units in that it accepts AES/EBU audio as well as analog. In addition to an alarm output, it will switch to an alternate audio source on the failure of the other.

Dorrough will be showing its well-known Loudness Meters.

Making clean signals

WBS will introduce the D8206 digital reference generator with a built-in sample-rate converter.

This "audio generator" generates "tones" from 20 Hz to 20 kHz at continuously variable levels from silent to 0 dBFS. It can lock to an external AES reference. The unit features 20 or 24 bit resolution with sample rates from 22 kHz to 96 kHz.

Last year, TerraSonde won a **Radio World** Cool Stuff award with its Audio Toolbox. This year, the company has put the Toolbox in a 2U rack-mount cabinet billed as the Audio Toolbox Plus.

Audio Toolbox test functions include a sweep signal generator with pink and white noise, stereo dB level meter, frequency counter, impedance meter with sweep, distortion meter and a digital sample scope with X-Y phase capability. The system also includes a time code reader/generator, MIDI generator and analyzer, cable tester, phantom power tester and lots more.

The Audio Toolbox Plus adds a metal case, rechargeable batteries, larger display and PC/Mac interface.

Audio Precision will emphasize its Portable One Dual Domain and System Two Cascade audio test sets. The Portable One Dual Domain is a self-contained audio test set featuring generation and measurement of analog audio, digital audio and digital audio serial interface signals.

Featured for System Two Cascade will be new software for automated testing and quality checking of PC audio, applicable to PC-based digital audio and to sound-card-based PC audio systems. System Two Cascade also handles 96 kHz and 192 kHz sample rate digital audio.

Prism Media Products will introduce the dScope Series III audio test system.

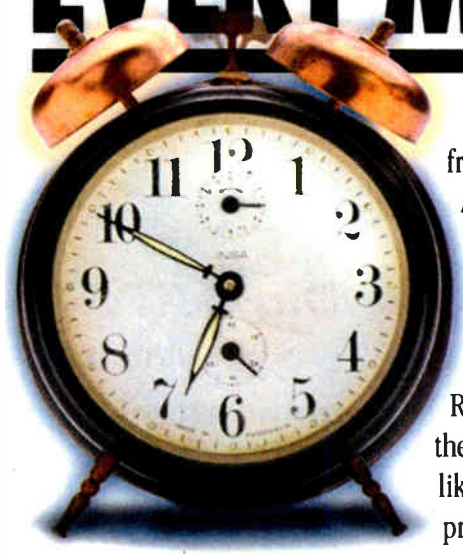
The original dScope used cards that plugged into the ISA bus of a personal computer. The Series III is an external box that uses a USB port to connect to a computer.

Enhanced features

The Series III enhances the audio performance and adds features to the original. It generates two channels of programmable tones, multitones and tone bursts. On the analysis side, it includes a two-channel

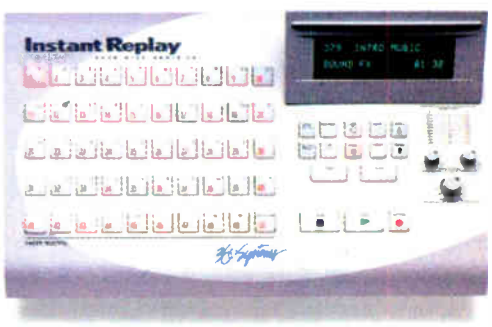
See TEST, page 50 ▶

WAKE UP TO THE #1 MORNING TEAM IN EVERY MAJOR MARKET.



Morning radio should be fresh, alive and spontaneous. And 360 Systems' Morning Team works with you to make it happen.

Wake up your audience and grab them with Instant Replay. All of your best bits are there when you need them — like having 50 cart machines pre-loaded and ready to fire.



Instant Replay®
24 hours of your best audio clips, quips and sound effects, right at your fingertips.

With the Short/cut Editor, you won't drop a beat when you're editing calls, interviews and promos. It's the fastest, easiest two-track audio editor a jock ever rocked a scrub-wheel on. No tape, no computer hassle and no "learning curve"— anyone can use it, and everyone will.

Short/cut™ Editor
Everything you need to get your hottest phone calls edited and on-air in record time.

Timing is everything in live radio and this team helps keep the show moving.

Sound good to you? Save your sanity and let your on-air personalities go crazy.

Morning radio was meant to be fun, and the 360 Systems Morning Team will help you keep it that way.

Thousands of 360 Systems Instant Replay and Short/cut teams are hard at work every day. To find out what that means for you, call (818) 991-0360 or visit our website at www.360systems.com.

We're with you every morning.

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See Us At NAB Booth # R3163

World Radio History

Suppliers Update Test Devices

▶ TEST, continued from page 49

precision voltmeter, two-channel FFT analyzer and sweep analyzer. Audio I/O are both analog and AES3 digital.

There have been many times when I have wanted to alleviate the tedium of performing AM field-strength measurements.

This year, a few companies are showing my ideal package for such tasks: a field-strength meter, a GPS receiver and a data logger.

Aztec Radiomedia, recently acquired by Digigram, is showing the AZ100 FM Navigator. This instrument logs (on a flash memory card) position along with RF level and subcarrier characteristics. Because it is frequency agile, several stations can be logged during a single session.

The companion FM Explorer software provides a number of graphical views of the collected data, but a computer is not required for data collection.

Finally, the serial ASCII data format is available for writing analysis software.

Auditem demonstrated a similar product at NAB99 convention, the Audemat FM-MC3.2, which analyzes FM signals. They also offer an AM version, the AM-MC3.

RF analysis

Belar will show its cool CSA-1 spectrum analyzer. It displays spectrum up to 150 kHz, making it useful for audio analysis and FM composite baseband signal analysis.

Along with its existing monitors, Inovonics will show the new model 520 AM broadcast monitor. The 520 is an AM modulation monitor that can be driven by an antenna or directly by the transmitter. It includes two fixed and two adjustable peak flashers along with an LED indication of modulation level with 2 percent resolution.

Open collector alarm outputs provide indication of -100 percent modulation, +125 percent modulation, loss of carrier and loss of audio. A balanced 600 ohm audio output includes NRSC de-emphasis. An EIA232 port outputs raw modulation information for external analysis or archiving.

Bird Electronic Corp. is introducing the new Model 5000 Thruline digital power meter. This hand-held meter works with existing Bird Thruline elements to provide backlit five-digit LCD indication of average, true average, peak forward and reflected power.

A second display area on the screen allows simultaneous viewing of forward and reflected power; a bar graph display makes transmitter adjustments simple.

Aztec Radiomedia, now part of Digigram, will show the AZ100 FM Navigator.

Digital TV
is occupying a lot of the attention of makers of test gear.

The unit also calculates VSWR, return loss and match efficiency.

In addition, the Bird BPM series of broadcast power monitors should prove useful to FM stations, especially those combining several transmitters into one antenna. The BPM provides a digital display of forward power, reflected power and VSWR. The 10 dB peak to average rating makes it suitable for DTV or combined FM stations.

Once several FM stations are combined, it may make sense to provide a combined monitoring and control system. Along with its existing modulation monitors, QEI Corp. will show its Intelligent Monitoring and Protection System. This system monitors various parameters in an FM antenna combining system, sounds alarms, shuts down transmitters and displays the status of the antenna system.

■ ■ ■

Harold Hallikainen designs transmitter control and lighting equipment for Dove Systems. He operates an online resource about FCC rules.

"Remember that time is money."
– Benjamin Franklin

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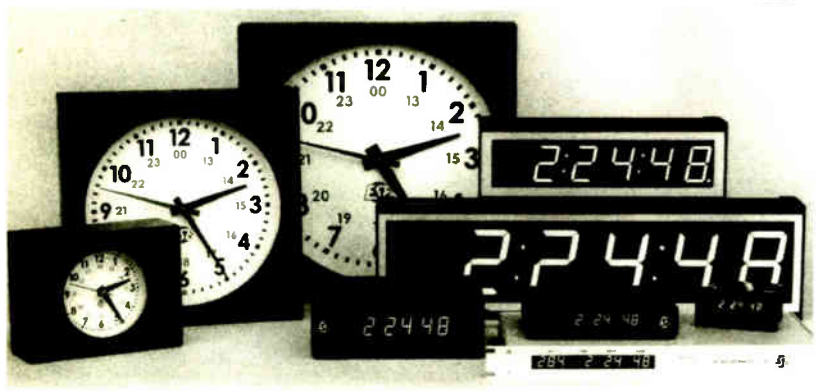

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TRAFFIC & BILLING

Business Software Looks to Net

Ted Nahil

The recent purchase of two established traffic and billing companies by Wicks Broadcast Solutions is likely to be a topic of discussion at NAB2000.

Meanwhile, local- and wide-area networks used for radio traffic and billing software packages and music scheduling systems are being replaced by Internet-based systems that give advertisers, corporate managers and listeners instant access to spot and music information.

David Netz, senior marketing manager for Columbine JDS Systems Inc., said, "The Internet will continue to drastically alter the way traditional traffic and billing is performed.

"Not only will Internet access to traffic systems become available, but the capabilities of traffic systems will need to be enhanced to take advantage of the new Web-based business models such as electronic contracting and electronic invoicing."

Introduced at NAB last year, Spotdata from Columbine JDS delivers the station's invoices to national and local agencies via the Net.

New enhancements to Spotdata are Invoice Archiving, which stores up to seven years of invoices to view or reprint it via the Internet. ColumbineNet is the new Web browser-based version of Columbine's sales, traffic and accounting software.

Acquisition questions

The acquisition by Wicks of both CBSI and Datacount should be of interest at NAB2000, not only to present clients but to the entire industry.

WBS is an affiliate of The Wicks Group of Companies LLC, a New York-based private investment firm that specializes in communications, information and media businesses.

"We are very excited to have the opportunity to acquire two of the best providers of traffic and billing systems in the country," said Pete D'Acosta, president and CEO of WBS.

At press time, officials of both companies were meeting to work out how the deal would affect their products and services.

Prior to the sale, CBSI planned to show a 32-bit version of DeltaFlex III software. Enhancements include increased flexibility for traffic managers in managing avails and positioning spots. Also, it has new reports for the Sales Analyzer option, a tool for sales managers to use in viewing and interpreting client data.

John DeLoach, marketing coordinator for Datacount, planned to

See TRAFFIC, page 53 ▶

World Radio History

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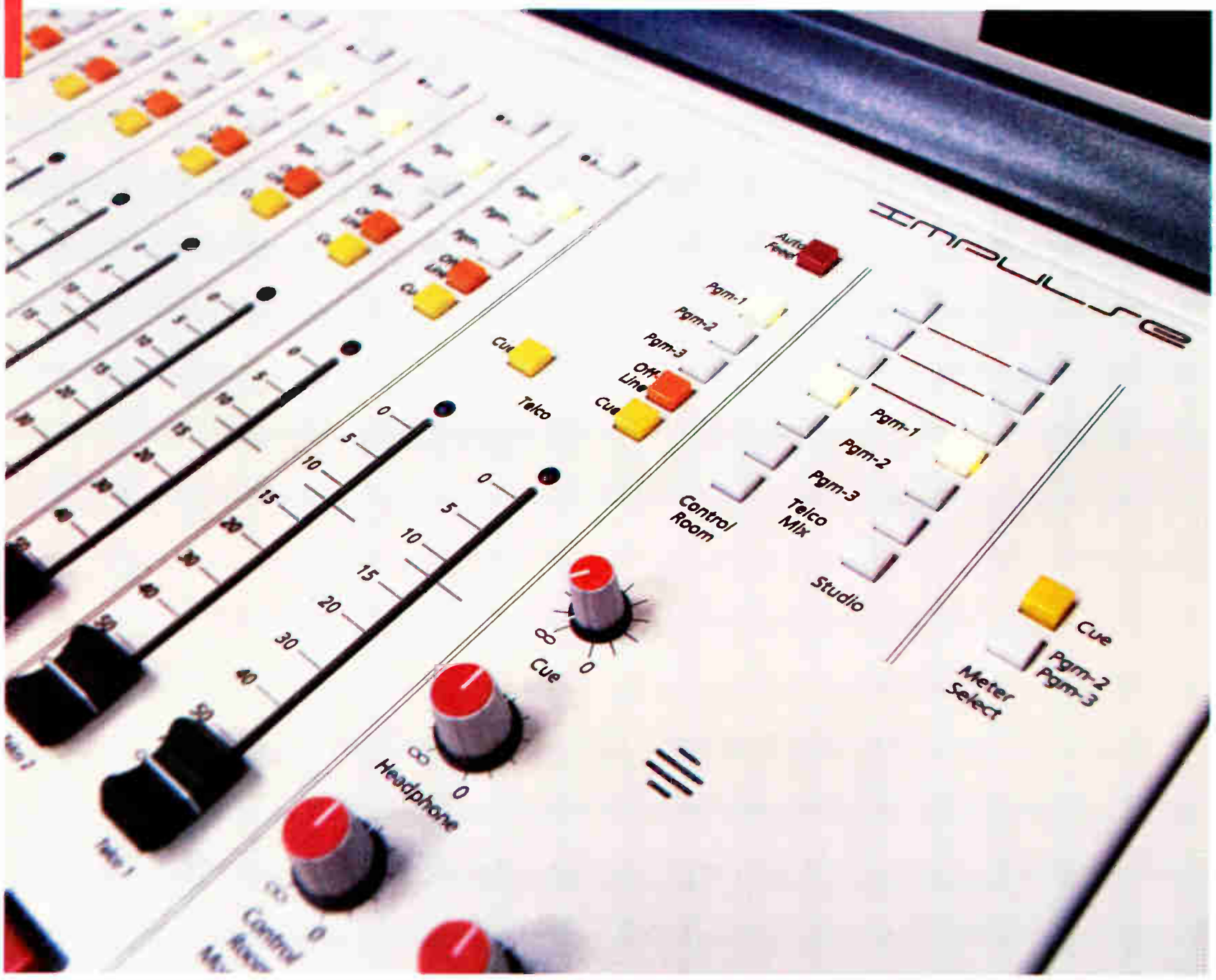
See Us At NAB Booth # R2685

World Radio History

Digital technology at an analog price. It'll be hard to resist an Impulse purchase.



©1999 Harris Corporation

With the need to move to digital on the horizon, it's getting a whole lot harder to justify the purchase of an analog console. Especially when products like the new Harris Impulse Digital Console by Pacific Research & Engineering can accept either analog or digital inputs and reconfigure from analog to digital easily – right in your studio. With the Impulse, you can transition to digital on *your* timetable, while using your current analog sources. And, believe it or not, you can do it for less than the cost of most analog consoles. Plus, you get unique Impulse features like three stereo buses, two mix/minus outputs, comprehensive control room and studio monitoring, opto-isolated control logic inputs and outputs, as well as renowned PR&E quality construction. To find out more, call us today. Or, of course, feel free to act on impulse.

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World Radio History

Traffic & Billing

▶ TRAFFIC, continued from page 50

show the latest version 7.23 of DARTS (Datacount Accounts Receivable and Traffic Software) with enhancements in reporting and the latest version of Superlog.

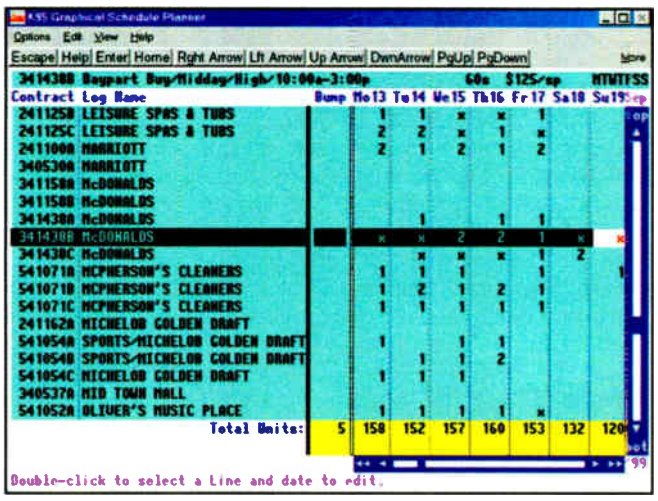
Both DeLoach and Eileen Tuuri, marketing communications director for CBSI, indicated that the companies probably would coordinate booth space, with business software located at the CBSI booth and CBSI's Digital Universe on display at the Datacount location.

A new name is SpotTaxi.com. Central Media Inc. launched the service in January.

The software package delivers radio advertisement audio over the Internet, eliminating the need for dedicated terminals or overnight delivery. SpotTaxi.com has features to streamline the distribution process, including traffic instructions, billing services and customer support.

George Lange, vice president of marketing, said, "We transform the workflow and our application facilitates the entire trafficking process via the Internet."

Register Data Systems will introduce a traffic system called Millennium. Scalability is a key feature. The billing-group system makes it easy to manage several stations' A/R as a single set. The company said the system can handle tower rentals and other non-broadcast items.



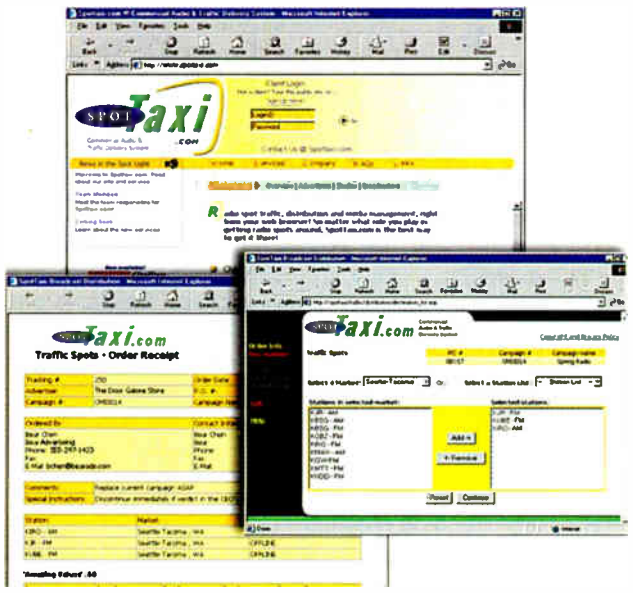
On-Screen Scheduling From CBSI

Visual Traffic from Computer Concepts Corp. has a new Corporate Module. It connects multiple sites and regions to consolidate order entry, corporate reporting and invoicing via a WAN or the Net.

Visual Traffic is a stand-alone product or it can be integrated with other CCC products.

New from Dalet is TeamRadio, an end-to-end advertising management system suitable for groups that manages sales, scheduling and billing. It features a Web-based order entry interface.

Management Data AG of Hamburg, Germany, will show enhancements to its software line that provides integration solutions for small- to mid-sized radio stations. Enhancements are AdCom Manager and AdCom Player import traffic information and manage its playback.



SpotTaxi.com is a Web-based system for distribution of radio ads and traffic info

Management Data's package for mid-sized to large radio stations, D'Accord 3.0, is refined. This NT-based package features an improved scheduling system, new Internet publishing solutions and a media service module for online access to Internet databases.

Web integration of music

Micropower Corp. will show its new, 32-bit scheduling software, Powergold 2000.

This customizable software package performs traffic merges as part of the log creation process. Import wizards allow migration to Powergold 2000 from many scheduling software packages. Look for it at the Radio Express booth.

Multi-Player from Radio Computing Services (RCS) organizes and plays up to four simultaneous stereo channels, making it suitable for multi-station or Internet audio.

Selector for Windows by RCS, the graphical version of Selector, features enhancements for the log editor module, and displays additional stats for a highlighted schedule position, and new filtering options during the log creation and the grooming process.

Selector for Windows introduces new four-hour and split-hour clock modes, printed performance affidavits and a new calculator that determines beats per minute.

Radio you can see

Also from RCS, RadioShow provides continuously changing text, pictures, contests and spots for Internet broadcasts.

A-Ware will introduce Air-Play, a stand-alone Windows-based server. It updates the station's Web page for information about the song that is currently playing.

Air-Play includes user-defined hyperlinks directing viewers to related Web sites or for e-commerce. Air-Play maintains a history of songs played, and lets visitors find out what song will play next.

Pristine Systems Inc. will show its new MusicPlus scheduling software. It also will demonstrate the RapidFire digital broadcast system that encompasses scheduling, production and on-air operations relating to live-assist, walkaway or satellite programming.

Prophet Systems Innovations (PSi) said it will demonstrate advances in its WANCasting for WAN linking. Developed for use with its new NexGen Digital Broadcast and CFS 16 (AudioWizard) systems, WANCasting allows the transfer of data across systems and stations, including audio, VoiceTRACs and traffic, music load and log verification files.

Netia Digital Audio will introduce Music-All, its scheduler and broadcast planner. Music-All can be used as a standalone product or with other software offered by Netia.

Houston-based eWave Networks Inc. will show its technology for the distribution of Internet media content using local advertising insertions that are done at the ISP level.

Xytech Systems Corp. will highlight the enhanced scheduling module for its Enterprise 3.4 asset management system, which allows for time and resource-based views of any mix of resources, including people and equipment, within a facility.

■ ■ ■

Ted Nahil is director of engineering for Salem Communications' seven radio properties in Colorado.

Reach him in c/o RW.

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NAB 2000 Exhibit Hours

Monday, April 10:	9 a.m.- 6 p.m.
Tuesday, April 11:	9 a.m.- 6 p.m.
Wednesday, April 12:	9 a.m.- 6 p.m.
Thursday, April 13:	9 a.m.- 4 p.m.

The following companies of interest to RW readers will display at NAB2000. Information was provided by the companies. Check the on-site program for late changes.

Booths preceded by the letter R are Radio/Audio companies in the Las Vegas Convention Center; L indicates General/TV in the LVCC; S booths are in the Sands Expo Center; M booths are in MultiMedia World at the Sands; I is the Internet@ NAB2000 Pavilion at the Sands; T booths are Satellite & Telecommunications at the Sands; OD indicates outdoor booths.

360 Systems **R3163**
Intro: TCR8 Master Recorder, an 8-track 24-bit synchronous hard-disk recorder with DVD-RAM drive, analog and digital I/O, LTC, VITC, P2 VTR emulation, WAV, SD-II file interchange and editing with crossfades.
Also: Instant Replay 2.0; Short/cut; DigiCart/II Plus.

615 Music Library Production Inc. **R378**
Intro: 615 Music Library Platinum Series now includes 13 discs and features a variety of themes, musicians and overall depth.

A

A&J Cases **I6432**
On Display: Reusable shipping cases and containers with custom interiors and built-to-user-specification cases.

A.B.S. SpA **L3717**

A.F. Associates Inc. **L11522**
On Display: Systems integration services including design, engineering, consulting and fabrication of fixed and mobile television facilities; Do-Able prepackaged ProjectWeb and e-time software-based Internet application for project-based work.

A/D Technologies Inc. **L12580**

ABE Elettronica SpA **R1054**
On Display: Fixed/portable/ENG 1 GHz to 24 GHz analog and digital microwave links; antenna systems.

AccuWeather Inc. **L11576, I 5713**

Acoustic Systems Inc. **L5654**
On Display: Voice-over audio dialogue replacement booths

Acoustical Solutions Inc. **L7338**
Intro: AlphaSorb Barrier/Absorber Combination Wall Panels in combination with AudioSeal Sound Barrier with an NRC of .85 and an STC of 29, achieve sound absorption and isolation; Sonex Contour Ceiling Tiles create a ceiling of beauty with effective sound control and easy t-grid suspension system installation, NRC.80-.90; AudioSeal Sound Barrier can block the transmission of noise through walls, floors and ceilings, a limp-mass material made of high-temperature fused vinyl with no lead fillers.

Acoustics First Corp. **L5215**
Intro: Art Diffuser, a binary array diffuser used to scatter mid-range and upper frequencies, improving clarity without losing ambience, comes in wood or plastic including a fire-rated ceiling-mount version; Cutting Wedge 2000, a stackable version of the Cutting Wedge anechoic acoustical foams, allowing thickness to be increased by adding tiles for lower range absorption where needed. Vib-X, a neoprene isolation material to decouple acoustical spaces, providing the isolation needed to control bass frequencies and outside rumble through structure.
Also: Respond, Geometrix, Sound ChannelsFabric, Bermuda Triangle Traps, Double Duty Diffuser.

Adaptive Broadband Corp. **L7521**

ADC TeleCommunications Inc. **L543**
Intro: Uni Patch, an AES patch-by-exception system with a modular design and RS-422 patching interface for high-usage studio requirements; 500 Series distribution amplifiers allow 20 amplifiers to fit into 2RU and meet all signal distribution requirements, including SD and HD video and digital audio signals and fiber-optic.

Advanced Designs Corp. **L9786**

Advantech **T2138**
Intro: Solid-state power amplifiers (SSPAs), L-band transceiver and related subsystems for satellite and wireless communications applications; 800 W C-band rackmount SSPA is a single 10.5-inch-high rack unit that offers 800 W in C band, 600 W in X band and 250 W in Ku band and includes amplifier module, air cooling system, microprocessor-based monitor and control, power supply assembly and other components; 400 W C-band Hubmount SSPA is a solid-state power amplifier designed for operation in satellite uplink applications, available in both AWMA and AWSA versions.

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Strategic Mktg. Mgr.
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Dorval, Québec H9P 1G1
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514-420-0045
Ext. 209
FAX: 514-420-0073
E-mail: fvandoes@advantech.ca
www.advantech.ca

Advent Communications Ltd. **OD412**
Intro: Mantis flyaway systems for C-, X-, Ku-, K- and Ka-band applications; NewSwift integrated vehicle-mount uplink systems are suitable for all vehicle types and for C-, X-, Ku-, K- and Ka-band applicationss.
Also: Lynx.

AEQ SA **R4066**
Intro: TLE-02D, portable digital communications unit featuring ISDN audio codec terminal adapter, digital hybrid, portable mixer, 4 wires, everything integrated in a single unit and double powering system; MPAC-02, multiformat dual-channel portable audio codec, two independent channels on a single ISDN line, for mono, dual or stereo transmission, up to three commentators and one guest, also with analog telephone line transmition; SYSTEL 6000, 10-line multi-conference system for ISDN, modular conception, allowing configurations from 1 to 10 audio codecs with the corresponding number of terminal adapters.

Aeta Audio Corp. **R2680**
Intro: Scoop Reporter II combines POTS, ISDN, autobattery backup, PC programmability and three-channel mixer; HIFIScoop3 ISDN audio codec features G.722, J.52, ISO/MPEG Layers II and III, two to six ISDN-B channels, full duplex, mono, dual/mono, stereo, joint stereo, AES/EBU, AUX channel, alarm and remote; MIX2000 portable field mixer weighs less than 3.75 lbs., paperback size, featuring M/S decoder and selectable PPM or VU metering.

AEV Srl **R2087**
Intro: Xtreme five-band digital audio processor with nine DSPs features easy recall of 20 preset formats, remote control by PC or modem, FM/AM and TV versions, AES/EBU I/O, top-quality digital stereo encoder; Virtual Radio automation system features MP3 format, Digigram PCX or SoundBlaster audio cards compatibility, WAV support, complete package solutions for five to 10 users enabled for any programming or on-air operation at the same time; Twister Series UHF and 2 GHz STL equipment and tube amplifier from 1 kW to 10 kW for heavy-duty service, synthesized digital exciters up to 60 W.
Also: Broadcasting mixers, telephone hybrids, ISDN codecs, audio processors, stereo encoder, RDS systems and stereo enhancers.

AirCraft Production Music **L9625**
Intro: 100-disc CD subscription service with automatic updates and discounts on all specialty packages; Ads Up Music for Commercials features 660 precut 60-, 30-, 10- and 5-second broadcast tracks available as a license or buyout; MediaCraft features three CD-ROM packages of production music in QuickTime.

Akai Musical Instrument Corp. **R2091**
Intro: DPS12i Digital Personal Studio is a 12-track digital recorder with 20-channel MIDI automatable digital mixer, internal 10 GB IDE hard-drive, 16-bit uncompressed audio at 48 kHz, 44.1kHz or 32 kHz samping rates, Timestretch anc Stretch- Insert; DPS16-16 track Digital Personal Studio Q-link Navigation, 24-bit, 96 kHz uncompressed audio, 6-inch diagonal display, 26-channel internal mixer, 56-bit internal processing, 10 GB internal IDE hard-drive, 24-bit 96 kHz A/D and D/A converter.

AKG Acoustics US **R1396**
Intro: CK77 WR sweat-proof lavalier with two active and one passive diaphragms, as well as dual and horizontal diaphragms, to cancel all clothing and handling noise; C444L sweat- and moisture-resistant head-worn microphone for remote broadcasting and on-air use; C3000B 1-inch large-diaphragm micro-

Radio managers will find booths of interest in the Sands as well as the LVCC.

Model DAI-2 Dial-up Audio Interface
The DAI-2 allows you to perform unattended remote broadcasts from an ordinary telephone. But with the array of features included, its uses are unlimited! The DAI-2 combines a telephone autocoupler, a DTMF tone operated controller, audio switching, alarm sensing and output relays into an extraordinarily flexible system.
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Allen Avionics Inc. **L12410**
On Display: Signal Processing Filters, Audio/Video Transformers, Hum Eliminators.

Allen Osborne Associates Inc. **L12674**

Allied Tower Co. Inc. **R3960**
Intro: Manufactures communications towers.

Altinex Inc. **M8376**
Intro: DAA and DAV Series 1x6 distribution amplifiers, the DAA for stereo audio and the DAV for stereo audio and composite video; VA6802 Interface compact analog computer video interface with audio capabilities with special computer video EQ function that compensates for long cable runs.
Also: Interfaces, distribution amplifiers, switchers, matrix switchers.

Altronic Research Inc. **R2363**
On Display: Model 6710 10 kW air-cooled dummy load with PC-based digital calorimetry.

Amco Engineering Co. **M9064**
Intro: Line of consoles for audio- and video-monitoring applications with a selection of styles, sizes, colors and accessories; vertical cabinets for rackmount or free-standing server applications, available with cooling and other accessories; 48-inch networking consoles.

American Capital Group **L6746**

American Eagle Financial Group **L2208**

American Radio Relay League **LVCC, Grand Lobby #1**

American Tower Corp. **L7357**
Intro: Designs, builds, leases and maintains broadcast facilities, including leasing programs that eliminate capital expenses such as construction, antenna, transmission and RF equipment and upfront costs of preconstruction and maintenance.

Ampex Data Systems Corp. **L2003**

AMS Neve PLC **L9761**
Intro: Encore universal console automation networking options allow program data to be moved among audio consoles in different studios and PC setup of patchbay settings and channel names; StarNet increases studio turnaround and booking flexibility by allowing projects to be stored on a central RAID StarNet controller, accessible from all studios.

AMX Corp. **M9135**

Anchor Audio/ Communications **L11780**
On Display: PortaCom Production Intercom Systems

Andrew Corp. **L12331 & T2538**
On Display: 1.2 & 2.4m SNGs, ValuStar, TRASAR, Heliax and GoStation.

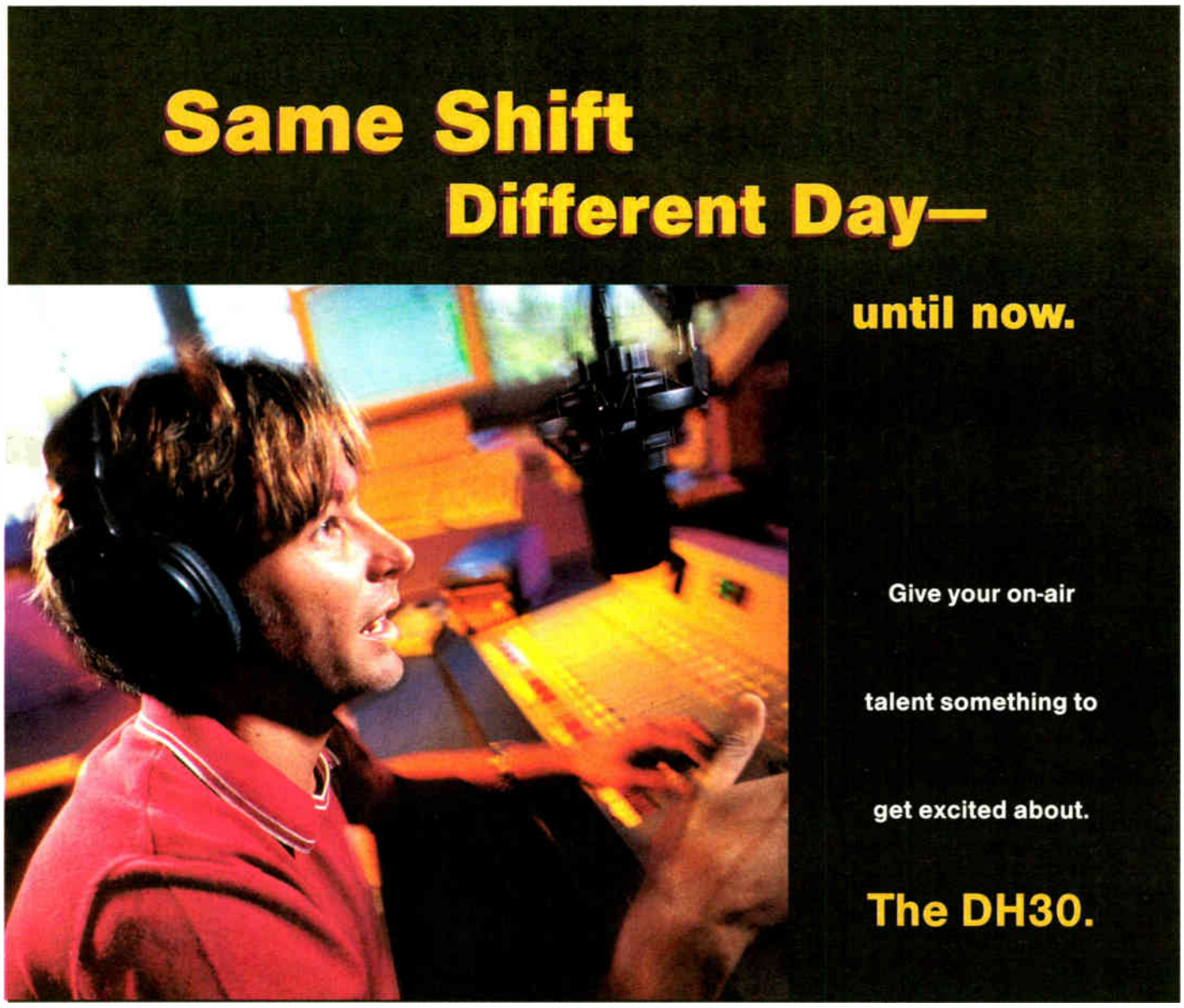
Antenna Concepts Inc. **L11286**
Intro: Ultra Tracker II, single-lobe FM CP antenna, has higher gain than original Ultra Tracker, with same superior building penetration and more robust signal at 60 dBu contour; Ultra Tracker LP, single-lobe performance designed for LPFM where broadcasters can't afford to waste ERP, best building penetration and signal density at the edges of contour.
Also: Blaster, Ultra Blaster, PLSaver, E-Slot, Champion, Spanner, Bull's-Eye, Double and Single Dipole, Dipole Pairs.

Antex Electronics Corp. **R687**
Intro: BX-12e, a multichannel, 20-bit PCI digital audio adapter featuring four independent sample rates, four stereo devices, five stereo outputs and support for MPEG Layer I/II, linear PCM plus AES/EBU/S/PDIF; StudioCard 3000, a 24-bit/96 kHz PCI digital adapter with eight-channel I/O and AES/EBU/S/PDIF, MIDI, plus SMPTE absolute video lock and sychronization; LX-88, a 24/96 multichannel PCI digital audio adapter featuring eight independent inputs and outputs with six virtual devices.
Also: StudioCard 2000; SC-22.

Aphex Systems Ltd. **R2368**
On Display: Model 1100 Thermionics Tube Mic Preamp and 1788 Eight-Channel Remote Mic Preamplifier; Model 2020 FM Processor in an interactive display to compare with other processors; Aural Exciters, compressors, limiters and gates.

API Audio Products Inc. (ATI Group) **R3496**
Intro: 7600 Input Module with processing, EQ, inserts, four aux sends and four busses, includes reissue of the original API 550A EQ and the ability to link several units to create a console via the API 7800 master control module; API 2500 stereo bus compressor for studio or broadcast use, offering compatibility with the AP 2520 op amp and featuring old or new type compression switches and side chain inputs; 500 Series Modules include the 512C mic/line preamp, 525 compressor/limiter, 550b four-band EQ and 560 10-band graphic EQ.

Apogee Electronics Corp. **M8453**
Intro: AD-8000 eight-channel, 24-bit A-to-D/D-to-A converter with Apogee bit splitting, soft limit and UV22; PSX-100 two-channel, 24-bit, 96 kHz A-to-D/D-to-A converter with Apogee bit splitting, soft limit and UV22, as well as built-in AES, ADAT, TDIF and S/PDIF support; Rosetta AD two-channel, 24-bit A-to-D converter with 44.1/48 kHz and 44.1 kHz to 96 kHz versions with AES/EBU, S/PDIF, ADAT, TDIF interfaces, UV22 and soft limit; AP8AD and AP8DA 24-bit, 96 kHz, eight-channel converter cards for Yamaha digital systems with YGDAI or Mini-Y expansion slots and A-to-D with soft limit.



World Radio History

Apple Computer Inc. **M9527**

Applied Digital Technology **L5606**
Intro: ADnet TV for streaming live and on-demand programming over the Internet and providing ad revenues from interactive commercials.

APPRO Int'l Inc. **M9061**

APW Enclosure Products/Stranton **L6330**

Armstrong Transmitter Corp. **R2366**
Intro: AM solid-state transmitters that are IBOC DAB ready and offer 150 percent modulation capability, three power levels, remote controllable, high-efficiency switching power supplies, built-in redundancy, compact size, plug-and-play technology in 500 W and 1 kW models; FM and UHF TV antennas made from heavy-duty brass for superior structural integrity, as well as combiners and filters that are conservatively rated with excellent specifications.

Arrakis Systems Inc. **R1574, I5813**
Intro: Revolution Series digital console with glass interface supports both analog and AES/EBU digital inputs, with dual telephone hybrid drivers; 1200 Series analog consoles feature new mixer design and ultra high audio performance with built-in audio patching system and telephone hybrid driver; 12,000 Series analog consoles feature new mixer design and improved electronics with dual telephone hybrid drivers that enhance telephone control module and talk back options; Modulux, Desk*Star and Radius broadcast studio furniture that allow for quick configuration for left- or right-handed installation; DigiLink IV configurations including all accessories for air and production studios, music on hard-disk, satellite automation, live assist, MPEG-2 editing, scheduling and a third-party scheduling import feature; DigiLink IV for three studios, a complete package system for two on air studios that share a production room; DigiLink III now includes LAN Networking, Trak*Star software and a large 78-stereo-hour hard-disk.

Artel Video Systems Inc. **L1210**
Intro: DigiLink Product Line provides broadcast-quality tranmission of video, audio and data in either single or multiple video signals point to point over fiber optic cable.
Also: DigiLink 1000, 1200, 1220, 8000, MegaWav, and MegaMux

ATCi/Antenna Technology **S5236**

ATI Audio Technologies Inc. **L5211**
Intro: DM200-1 and DM200-2 digital monitors accept AES/EBU digital audio in 100-ohm XLR and 75-ohm BNC/RCA formats and provide a bright stereo LED level display, stereo headphone outputs and a balanced, stereo +4 dBm analog line output; Digital MatchMaker DMM100 and DMM100-BAT serial digital NRZ signal level converters and reshapers that accept multiple formats, XLR, BNC, RCA or TOSLink and provide transformer outputs in all four formats, AC or battery models available; HDA100 battery-powered stereo headphone amplifier is capable of driving most 32- to 600-ohm headphones to very high levels near 120 dB SPL and AC powered.
Also: MicroAmp, Encore, NanoAmp Series of mixers, VU and PPM Meters, Microphone, Line, Turntable, Power Amplifier, analog and AES-EBU digital audio distribution amplifiers; also IHF to PRO interface amplifiers, microphone processors, headphone amplifiers, press box microphone distribution amplifiers, Vanguard Series of 6, 8 and 12 mixer on-air broadcast consoles and the System 10,000 modular plug-in mic, line and distribution amplifiers, NanoAmp Series mono and stereo field and studio mixers and expanders.

Atlas Case Inc. **M9060**
On Display: Cases available in 12 styles.

Audemat Inc. **R577**
Intro: AM-MC3/FM-MC3.2 controlls AM or FM signal deviation and power, optimizing coverage area and reception quality; ITS4/MAC alarm reception software for both remote control and remote monitoring.

Audio Accessories Inc. **L5225**
Intro: Interchangeable Normalized Patchbay; A two-row 48 Mini jack panel with interchangeable normalling schemes on an individual jack basis. Wired to 38 pin Edac connectors.

Audio Developments Ltd. **R2354**

Audio Intervisual Design/DTD **R1493**

Audio Ltd. **R1491**
Intro: RK4 rack system for RMS2020 and RMS2000 diversity wireless microphone systems; HXiR is a new handheld UHF wireless microphone transmitter using a unique infrared switched device.
Also: Wireless microphone systems.

Audio Precision **L3543, S4443**
Intro: Portable One Dual Domain handles testing of analog audio, digital audio and digital audio interface signals, digital and analog I/O, optional IEEE-488 GPIB interface and/or 96 kHz digital sample rate I/O; System Two Cascade is able to generate and analyze analog audio signals and digital audio and interface signals, including 96 kHz and 192 kHz sample rate signals.

Audio Processing Technology Ltd. (APT) **R2390**
Intro: BCF256 broadcast communications frame provides for uncompromised audio communications over dial-up ISDN and permanent digital networks; NXL384 broadcast network transceiver is a cost-effective solution to audio communications over permanent digital networks, available in analog or digital versions and offers benefits of apt-X technology including negligible coding delay and high audio quality.

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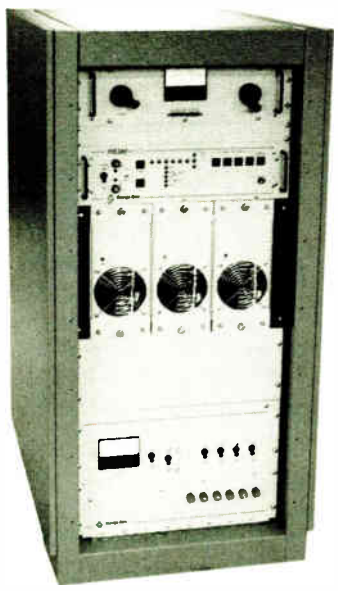

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KPCL	Farmington, NM
WMRT	Marietta, OH
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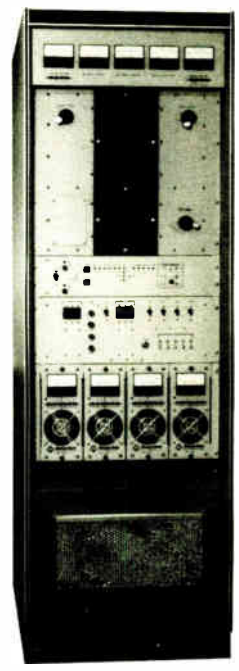

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Audio Toys Inc.
The ATI Group **R3496**

Intro: Pro 6 multimode audio signal processor includes a microphone preamp, filters, EQ, noise gate, compressor and ducker and features high voltage mic preamp (+/- 48V power rails), high- and low-pass filters at 24 dB/oct., four-band fully parametric EQ with peak/shelf switch, all in 1RU of space; 8MX2 mic preamp/mixer consists of eight mic preamps with built-in limiter and an 8-x-2 stereo mixer with 48 V phantom power switch and phase switch, units can slave together for multirack use and monitoring; Paragon II monitor mixing console is a live sound production analog mixing console with up to 20 stereo output mixes, four-band parametric EQs on inputs, three-band stereo EQs on stereo outputs and returns, noise gate and compressor on all inputs and two variable direct outs.

Audioactive/Telos Systems **R2057**

Intro: Audioactive MP3 production studio is optimized for audio encoding via Fraunhofer compression codecs that support bit-rates between 8 kbps and 256 kbps, able to convert PCM files to compressed WAV and Microsoft ASF formats; Audioactive MPEG real-time encoder complete solution for audio over IP with the ability to stream directly using MP3 multicast or via an intranet for live streaming.

Audioarts Engineering **R2081**

Intro: Audioarts Digital is a new digital console featuring 24-bit A-to-D and D-to-A, selectable internal sample rate, analog and digital outputs, machine control and digital mix-minus.

Also: R-17, R-5 and R-60 analog consoles; RD-12/20 digital consoles.

Audiolab Electronics Inc. **L5201**

Intro: TD-5 metal tape degausser erases all audio, video and data information from tape and hard drives including particle tape formats; CDS-2500A is a high-speed continuous-duty conveyer degausser that can erase more than 90 VHS tapes or 144 audio tapes per minute, can erase DVC Pro, DLT, Beta SP and other metal tape formats; DDS-1800 is an automated drawer-style degausser that accomodates tape cassettes and reels up to 18 inches in diameter and 1-inch high and ensures the best and most even erasure by rotating the media within a decaying AC erasure field.

AudioScience **R795**

Intro: ASI4335 PCI soundcard features MPEG compression, four stereo inputs, eight relay outputs and 16 opto-isolated inputs, and one RS-422 input for direct MPEG feed from satellite receiver; ASI4215 PCI soundcard features MPEG compression, four stereo outputs and one stereo input with independent sample rates and format, and both balanced analog audio AES/EBU digital audio input and outputs; Linux audio driver allows all AudioScience soundcards to operate under the Linux OS and to use the AudioScience HPI programming API.

Audio-Technica U.S. Inc. **R2970**

Intro: AT4047/SV large diaphragm cardioid capacitor microphone is designed for studio production, voiceover, on-air and other critical applications in broadcast and offers a warm sound with low self-noise and a wide dynamic range.

Also: AT895 adaptive-array microphone systems; AT4071a, AT4073a, AT815b shotgun microphones; AT822 and AT825 stereo microphones; AT849 stereo boundary microphones; AT804 omnidirectional dynamic field microphones; AT4060, AT4050/CM5 and AT4033a/SM studio capacitor microphones; ATH-M40fs precision studiophones.

Auditem SA **R577**

Auditronics Inc. **R2081**

Intro: Model 220 modular digital console accepts both analog and digital inputs and is designed for on-air or production applications, contains four stereo busses, digital mix-minus, serial control of all functions and DB-25 connectors for I/O interface; NuStar 4.0 modular digital split-architecture on-air console with control surface and separate audio processing rack electronics for ease of installation and configuration changes, features four stereo busses and up to four mix-minus feeds with any combination of analog or digital inputs, features electronic ID displays on every channel and an internal audio router that allows any input source to be routed to any input control channel.

Bellagio

Austin Co. (The) **S5068**

Intro: Planning, architectural design, engineering and construction of new digital broadcast facilities, as well as renovations and expansions of existing facilities for the transition to digital.

Also: Facility location, planning, architectural design, engineering and construction for digital broadcast facilities including move planning and implementation.

Autogram Corp. **R2577**

Intro: Pacemaker IIK console comes in 18- and 28-module main frame sizes, analog and upgradable to digital I/O with a select number of module configurations; Mini Mix console is available in eight- and 12-channel model frames for newsrooms, minivans, production studios and educational facilities; Solution-20 System is a universal accessory system designed to fill the need for additional accesory blocks at any radio station or professional/commercial audio facility.

AutoPatch **M9461**

Intro: Epica-256 modular routing system handles up to 256-x-256 for analog and digital audio and video, as well as computer video with a 300 MHz bandwidth.

Also: Fixed and modular high-performance routing sytems.

AV Communications Pty. Ltd. **R3692**

Intro: TieLine Express digital audio codec sends studio-quality audio over a standard PSTN telephone line in real time; TieLine Commander dual digital audio codec allows users to select ISDN or PSTN for audio transmissions; Pro Solutions Broadcast Box is an audio/video broadcast box that includes 19 new audio/video switchers, distribution amplifiers, level meters, microphone amplifiers, audio converters and more in a compact aluminum extruded black box.

Also: Switching, routing, distribution, signal measurement and amplification products.

Avcom of Virginia Inc. **I12633**

On Display: Spectrum Analyzers; Test Receivers; Power Dividers; Line Amps; DC Block/Inserters

Avitel Electronics Corp. **L13242**

On Display: Signal processing equipment; KAE Corp. VTR mounting shelves and other rack accessories.

Avocet Instruments Inc. **L12955**

On Display: Delay Canceller.

AVP Mfg and Supply Inc. **L13233**

Intro: Rapid punch terminal series AVP audio/AES punch jackfields terminate 18-28 gage cable, have a pivoting cable bar, and terminate two wires per side, even a gage apart; AVP RS-422/datapatch digital jackfield uses rugged bantam audio jacks and keyed data patchcords for polarity protection.

AVS Graphics and Media **L10282**

Intro: MultiBrowse application gives up to 25 users simultaneous access both audio and video feeds from desktop PCs.

Also: ManuScript 2000 Series

A-Ware Software Inc. **R2691**

Intro: MusicMaster music scheduling software for automation systems; MusicMaster Air-Play Web page server informs listeners which songs are being played; RealTime Nexus electronic music log automates reconciliation of last-minute changes.

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AWS Inc. (Automated W eather Source) **L2312**

Axel Technology Srl **R955**

Intro: Nexus 5 modular 16-/24-channel broadcast console, featuring stereo, mono, telco, sub, master and monitor modules and a 22 dB dynamics range, additional features include digital pre-listening, programmable loudspeaker muting, complete intercom system, phantom power supply, chronometer and three programmable controls; Falcon 35 Series five-band digital audio processor with AES/EBU and S/PDIF digital input, digital stereo enhancer, digital stereo encoder and RDS encoder, now available in Web and DAB versions.

Also: Viper MPEG and MPEG-2 digital video server/hard-disk recorder.

Axon Digital Design bv **L2006**

On Display: A-to-D/D-to-A converters; fiber-optic transmitters/recievers.

Azden Corp. **R2666**

UHF and VHF wireless microphone systems including the 400UDR UHF Series of True Diversity, 63-frequency wireless microphone systems for all broadcast applications.

Aztec Radiomedia,
a div. of Digigram **RL1456**

Intro: IP2 Networking features products for remote station and transmitter control via the Internet, standard Web browsers and FTP tools are used to control equipment and update remote audio servers with new programming material; AZ100 FM Navigator is a portable tool with GPS functions for measuring FM radio signals, including MPX and subcarrier components and free PC software is provided for analysis; Digiplexer DSP-based FM encoder that includes stereo, RDS and DARC generators with multiplex limiting and clipping.

Also: RDS encoders.

B

B & B Systems Inc. **L13208**

B&H Photo-Video **L8778/R1489**

On Display: B&H offers an selection of professional format photo, video, electronic photography, pro-audio equipment and supplies.

BAF Communications Corp. **L11055, OD336**

Intro: Tornado digital/analog SNV/ENG combo van on a small platform with a range of point-and-shoot to production capabilities and optional antennas, HPAs and MPEG equipment.

Balboa Capital Corp. **L12839**

Baron Services **L843**

BBC Resources **S3727**

Intro: BBC Resources Consulting offers tailored business and technical solutions specializing in digital television, interactive TV, e-commerce and investment planning with the knowledge of a working broadcaster; Broadband Network Control System is a broadband networked audio router for routing analog and digital audio over local (LAN) and wide area (WAN) ATM networks, incorporating both stereo and 5.1 audio in parallel over the same infrastructure.

Belar Electronics
Laboratory Inc. **R1578**

Intro: Composite FFT Spectrum Analyzer.

Also: AM, FM, FM Stereo, RDS/RBDS Monitors.

Belden Wire & Cable Co. **L8478**

Intro: 7880A 26 AWG, eight-pair AES/EBU snake cable for use with digital audio equipment that fits into standard 25-pin D-sub connectors without stripping the outer jacket;

Also: Video coax for analog and digital SDI and HD; ENG and EFP cables.

Benchmark Media Systems Inc. **L2046**

Intro: VCA-2 is a remote stereo voltage amplifier that features balanced I/O, gain control -100 to +20 dB, low THD+N of 0.002% and balanced control inputs enabling long-distance control; The

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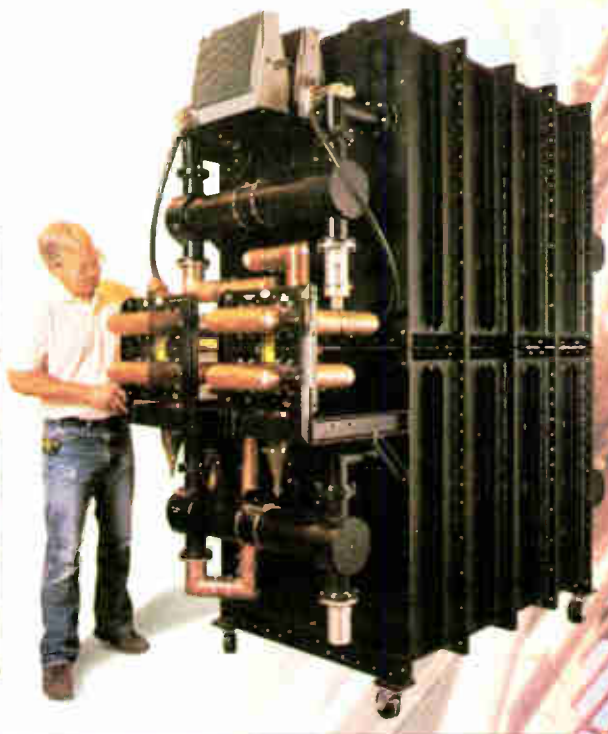

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AD2404-96 24-bit four-channel A/D converter features a 96 kHz sampling rate converter, THD+N performance of -110 dB at -1 dBFS, 120 dB dynamic range, <9 pico seconds intrinsic clock jitter, and PLL; AD2408-96 has eight channels of 24-bit A/D conversion at sample rates up to 96 kHz with THD+N performance at u1dBFS and a 120 dB dynamic range.

Also: Mic preamps; distribution amps; digital converters; meter systems.

Bexel Corp. **L12584**

On Display: Reseller of pre-owned broadcast video and audio equiment from Sony, Panasonic, Sennheiser, Shure, Anchor, JBL, Mackie, Audio-Technica, Clear-Com, warranties extended on most sales.

Bext Inc. **R1065**

Intro: XPT FM Exciter, available in 20, 50, and 100 W; XT 501 FM Exciter/transmitter, 500 W output.

Also: Line of FM exciters; transmitters; STLs; amplifiers; translators; low-power and high-power RF products.

beyerdynamic Inc. **L5207**

Intro: SHM 88 is a true miniature shotgun podium microphone on a gooseneck;

Also: Monitoring headphones, on-air headsets, digital microphones, communication headsets, on-air microphones, interview micropohones, ENG wireless.

BI-Directional Microwave Systems **R3959**

On Display: Bi-Directional Microwave Systems; STL/TSL Transceivers.

Bird Electronic Corp. **R852**

Intro: Digital Air Series Load features new VHF models of the forced air-cooled loads using patent pending technology for high-peak power capability and is available in 10 & 25 kW in VHF and 5, 10, 15, and 24 kW in UHF; Broadcast Power Monitor for forward and reflected power in advanced modulation or multiple carrier applications and features a new higher dynamic bandwidth for increased down scale accuracy and a new rack mountable display with alarm.

Bi-Tronics **L12412**

Boland Communications **L12680**

On Display: Full line of LCD video monitors ranging in sizes from 4-inch to 20-inch; on-screen analog and digital audio meters, on-screen analog and digital audio meters.

Bomar Interconnect Products Inc. **I6021**

Bose Corp. **R693**

Intro: The Bose Wave Radio/CD features rich bass, and clear, crisp sound; The Acoustic Wave Music System features rich, lifelike sound in a compact unit.

Bradley Broadcast & Pro Audio **R2657**

Intro: Bradley Broadcast has been selling professional broadcast and audio products for over 16 years serving the broadcast community, government, education, churches and others.

British Information Services **I5842**

Intro: Free radio news service from London, twice daily updates, available via ISDN or Internet at *www.newsfrombritain.com*

Broadcast Electronics Inc. **R3682, I 6123**

Intro: eStream delivers crystal clear audio via Internet/Intranet, empowers streaming media producers with an advanced PCI card and complete suite of Waves software tools; Vault2 collects, manages and delivers content, offers flexibility in an open system, non-proprietary format with robust LAN/WAN and Internet capabilities; AM-5E includes redundant PA power supplies and offers improved power factor correction, lower power costs, AC line voltage protection.

Also: AudioVault, FM-20T, RTDS, AM-10A, FM-1C1, AM-1A, FM-5C, Marti product line.

Broadcast Richmond **R2393**

Intro: Prewired console harnesses for connecting the console to analog and digital audio sources; Broadcast Richmond provides turnkey audio and RF systems to the worldwide broadcast industry.

Also: Prewired Program Racks for AM, FM and TV; more than 200 integrated and prewired product lines.

Broadcast Software International (BSI) **R562**

New: WaveStation Plus digital automation features advanced Internet connectivity, including dynamic Web page generation that can be used to easily display what's playing, what's coming up, what played recently, weather information and links to other Web pages, comes with BSI WebConnect software to allow for remote control of the automation via regular e-mail; the Plus package can also send e-mail or pager notification of errors, such as missing spots or songs.

Broadcast Store (BCS) **L13208**

Broadcast Supply Worldwide BSW **R3465, L6713**

On Display: Leading independent audio equipment supplier for broadcasters will have a "Spectacular 4-Day Sale" featuring hundreds of audio products on display with some of the year's best prices; BSW will give away thousands of dollars in free equipment in daily drawings.

BroadcastAmerica.com **L7256**

Intro: BroadcastMusic.com streams more than 360 radio stations on the Internet; BroadcastSports.com streams One-on-One Sports Radio Network; BroadcastTalk.com features hundreds of live and archived talk shows;

Also: Internet streaming technologies.

Broadcasters General Store **L6712, R2383**

Intro: Broadcasters General Store supplies radio and television broadcast equipment.

BSP **L3528**

Bulldog Group Inc. **M7464**

Intro: Bulldog 2.6 scalable content management software, which allows the reuse of media assets regardless of file type and platform.

Burk Technology **R3460**

Intro: AutoPilot for Windows monitors and controls multiple sites via PC, creates system logs to record, automates scheduled events and fault recovery routines with user-defined functions; SP-16 Remote Status Panel used in conjunction with the SSI-kit displays remote transmitter chassis.

Burle Industries Inc. **L6912**

On Display: FM power tubes and cavities.

BuyMedia.com **M9470**

New: Provider of business-to-business e-commerce solutions for the buying and selling of broadcast advertising. Members can purchase advertising on virtually any radio or television station in the country. The system is integrated with leading media software systems and is tailored to the unique requirements of each advertising agency and direct advertiser. Brings together advertisers with stations, resulting in streamlined negotiation, enhanced productivity and reduced costs.

BuySellBid.com **MI623**

New: Delivers more than 3 million multimedia classifieds through a co-branded distribution network of 1,000 local radio, television and cable station Web sites. Distribution partners generate local Web advertising revenue from each of four products: classifieds, auctions, e-shopping, and personals.

C

CAD Professional Microphones **R796**

Calculated Industries Inc. **L12838**

Intro: The TimemasterII calculator can be used in video and audio production, athletics and other applications where fast, easy calculations for time-math problems are required.

Calrec Audio Ltd. **R491**

Intro: Alpha 100 digital console features 48 multitrack/matrix outputs, 20 auxiliary busses, eight audio groups, four main outputs, all of which can be surround, stereo and mono simultaneously; M3 remote production and live broadcast console available in two frame sizes — 19-inch rackmountable 10/4/2 and desktop 20/4/2 with input modules types — four auxiliary channels, mix-minus on each channel up to four groups and two main outputs.

Canare **L12978**

Intro: True 75-ohm BNC connectors.

Also: Star Quad mic cable.

CartWorks **R3489**

Intro: CartWorks Wav/MPEG, a live-assist, satellite automation, and music-on-hard-drive digital audio system with CD-quality audio.

Cases Plus Inc. **I6827**

Intro: Carrying and shipping cases for broadcasting and video requirements; Cases Plus stocks the following manufacturers' materials for use in constructing cases: APW ZERO Plastics, Underwater Kinetics and PFC.

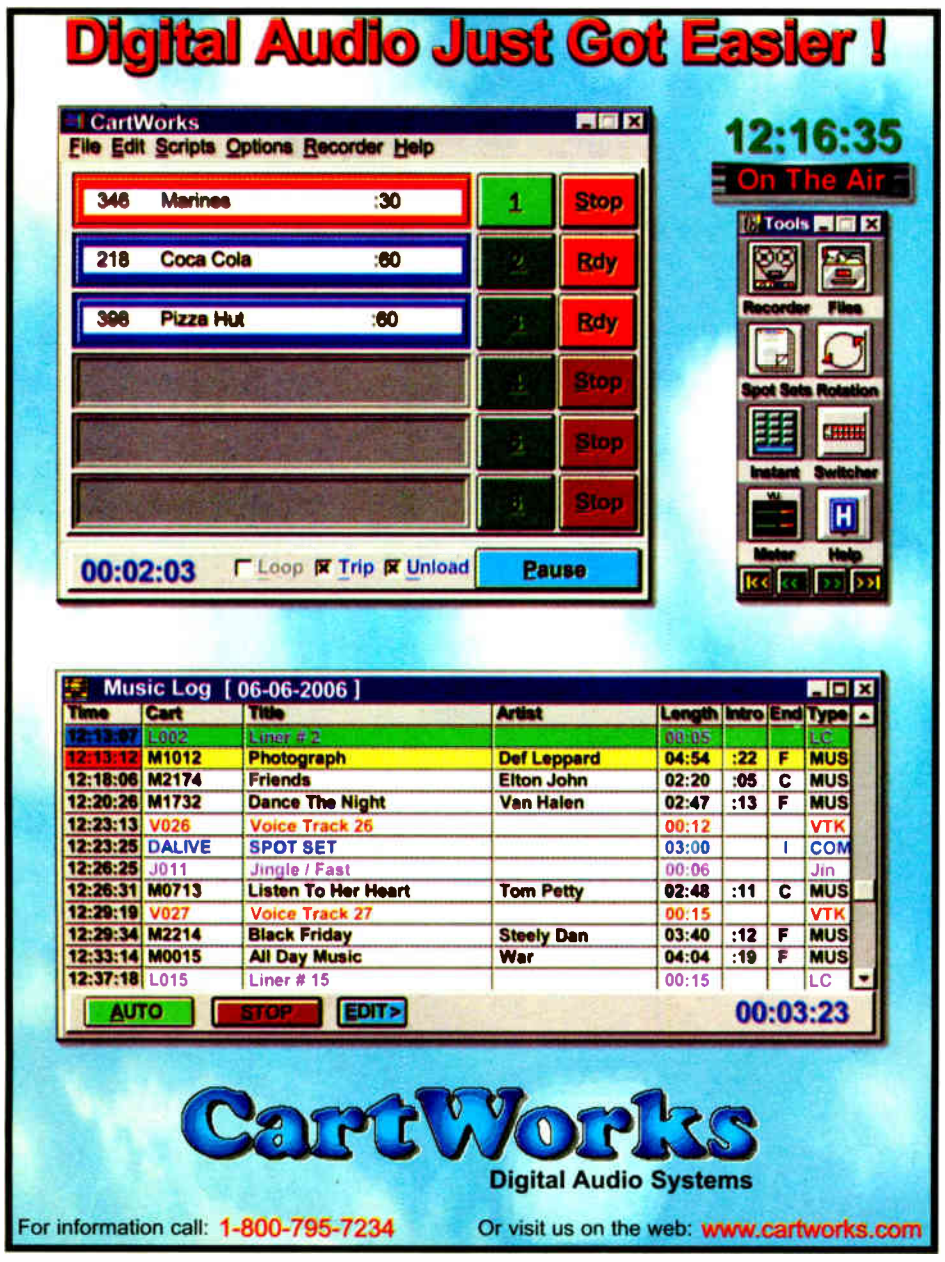
CBSI/Custom Business Systems Inc. **R4086**

Intro: DeltaFlex III business software system offers greater functionality, including a 32-bit implementation and enhancements to "programmable avails" capabilities; Digital Universe release 2.1, adding more overlay, import, voice tracking and security features for an easy-to-use automation system built around uncompressed audio.

Also: Also: Premier, Classic and Elite traffic and billing systems.

Central Tower Inc. **L12974**

Intro: Offers multifunctional broadcasting structures, including HDTV, broadcast, two-way radio, cellular/paging and personal communications; engineering and design services along with planning and management of tower erection.



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Channel Master LLC **T1650**
Intro: Channel Master Elliptical Antennas are receive-only antennas and are available in 70-centimeter, 75-centimeter and 84-centimeter sizes to provide maximum gain with optimum side lobe performance; Channel Master Interactive Satellite Solution is a receive and transmit outdoor unit and is manufactured as a complete, pre-assembled, pretested unit, it is available in 96-centimeter and 1.2-meter sizes.

Chief Manufacturing Inc. **M8957**

Circuit Research Labs Inc. (CRL) **R3197**
Intro: Millennuim.com audio processor includes an internal codec, flexible internal ethernet and assignable IP addresses, along with 32-bit floating-point dynamic audio processing.
Also: Millennium; Amigo FM; Amigo AM.

Clark Wire & Cable **L10986, OD214**
On Display: Bulk cable, connectors, cable reels, boxes, panels and patchbays. Custom termination for a variety of cable assemblies/systems for both field and/or studio application.

Clear-Com Intercom Systems **L10776**
Intro: CC-95 and CC-260 durable single- and dual-ear headsets with smooth, full-range audio response, flexible boom arm with noise-cancelling microphone for left- or right-side use and custom foam-filled ear cushions for acoustic isolation; VOX features for Matrix Plus digital intercom systems allowing any incoming audio signal to access VOX functions, indicate signal presence via intercom-station tally lights, activate call signal functions and to open up preset audio paths; KB-211 and KB-212 speaker stations feature single- and dual-channel wall/console/enclosure mountable stations with microprocessor-based logic and switching, visual and audible call signaling, balanced program input, also comes in KB-211GM gooseneck microphone version.
Also: Matrix Plus digital intercom systems; PL Pro party-line intercom.

Co.El. Complementi Elettronici SpA **R388**

Coaxial Dynamics Inc. **R2668**
Intro: Manufactures RF test and measurement equipment used in coaxial transmission lines and transmitters, featuring R.F. wattmeters and transmitter protection devices, filters and terminating loads for both analog and digital applications.

Coffey Sound **R2693**
On Display: Axcom Deva II 24-bit, four-channel hard-disk recorder for location use with a built in pre-record feature; Zaxcom Cameo 24-bit, 96 kHz digital location field mixer; and ATW U101 diverstiy wireless systems.

Columbine JDS Systems Inc. **L9738**
Intro: Spotdata EI (electronic invoicing) allows outside and in-house agencies to download electronic invoices from broadcasting and cable companies, it uses a secure industry clearinghouse where broadcasting and cable companies send their invoices and agencies retrieve them using a Web interface, once the invoice files are received at the clearinghouse, Columbine JDS consolidates them and sends an e-mail to each agency notifying them that their invoices are ready for download, Spotdata EI provides secure data protection and encryption to protect invoice data as it is delivered to the agency or media buyer; D-MAS multichannel automation system; D-MAS A8800 ingest automation system; MCAS-IV master control automation system; LinkServer; Broadcast Master, Version 7.

CommScope **M9476**
Intro: Cable products for high-speed digital and HDTV applications.

Communications Specialties Inc. **M8968**
Intro: Pure Digital, One Fiber uses all-digital processing and transmission to send any combination of analog video, audio and data signals over one fiber-optic cable.

Compaq Computer Corp. **M8757**

Comprehensive Video Group **L9734**
Intro: EXF pro audio cables feature extended frequency, 100-percent shielded, nickel and gold connectors.

Compropter Inc. **L11076**
Intro: NewsKing for Windows NT uses Windows NT and SQL database for scripting, producing, prompting, assignments and archiving with on-screen text and video viewing and editing of local and/or network feeds;
Also: ENR electronic newsroom system; VoteMaster election returns reporting system.

Computer Concepts Corp. **R1069**
Intro: EpiCenter is designed as a solution for broadcast operations and provides station control by incorporating audio routing and processing, digital audio storage along with virtual console control.
Also: Maestro, Visual Traffic, DCS, NewsRoom, ReeLogger.

Comrex Corp. **R3178**
Intro: The Matrix codec can deliver 15 kHz two-way audio on one standard analog telephone line. and send 15 kHz full-duplex mono audio over ISDN or improve cellular backhaul.
Also: Vector and HotLine POTS codecs; Envoy ISDN Studio; Nexus ISDN Codec.

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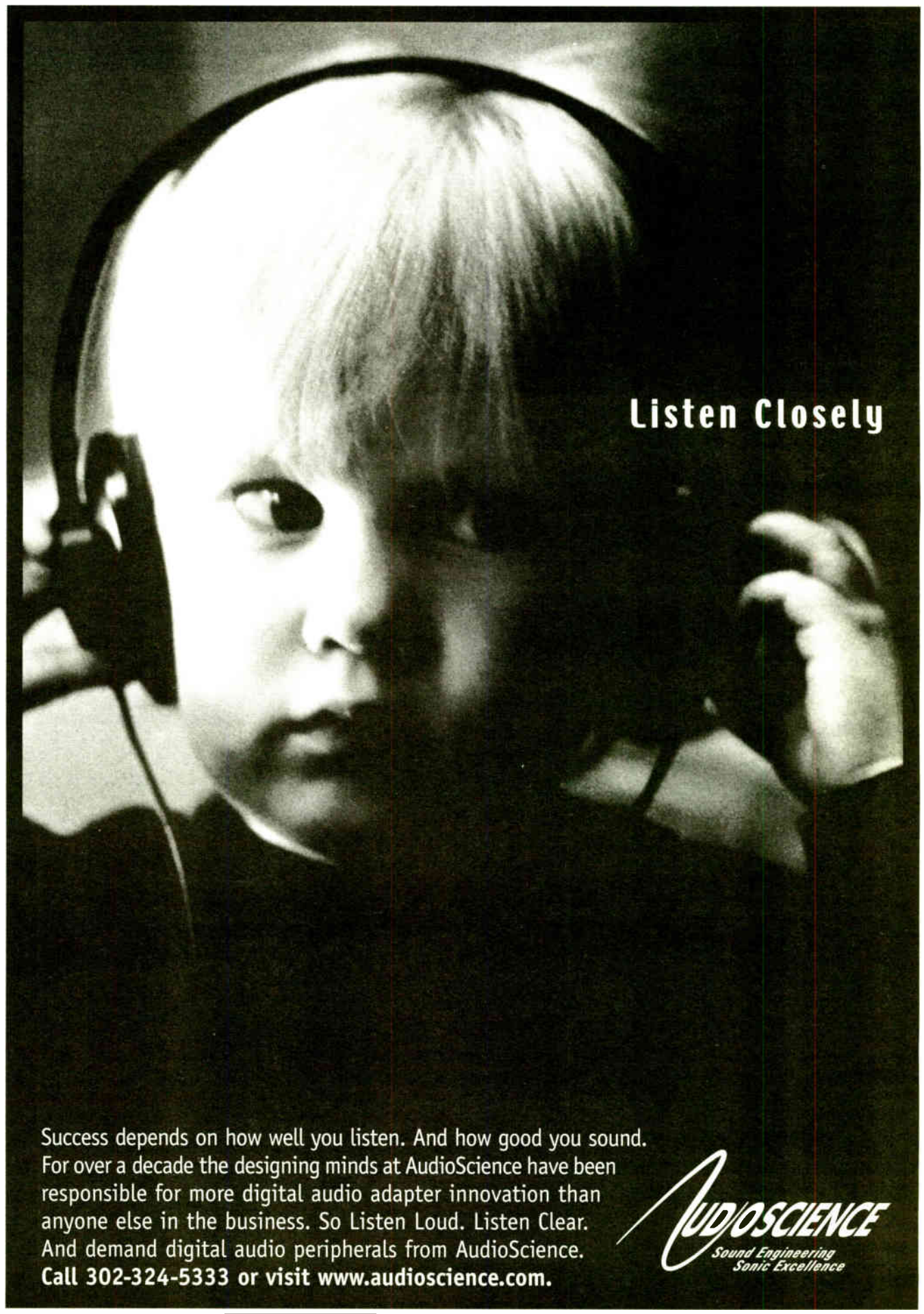


See Us At NAB Booth # R795

World Radio History

Comsat Corp. **T1641**

Comtech Antenna Systems Inc. **T1835**
Intro: 2.4-meter flyaway transmit/receive satellite antenna system for SNG applications in C-, Ku-, and X-band configurations that is supplied with airline baggage checkable transit cases;
Also: 3.8-, 5.0- and 7.3-meter motorized antennas systems.

COMTEK Inc. **L12564**

Continental Electronics Corp. **R2068**
Intro: PowerStar AM transmitter features a high-efficiency design with excellent digital audio performance, CEC exclusive DSP system, and whisper-quiet cooling via low-velocity integrated fans.

Control Concepts Corp. **L6213, S5645**

Cooper Sound Systems Inc. **R3761**
Intro: CS-208 eight-channel mixer with four main and two aux outputs. Model D series eight-channel automatic mixing controller creates instant crossfades between mics and patches into console insert points.

CPI Satcom Div. **L7017, T2345**
On Display: Klystron, TWT and solid-state power amplifiers.

CPI, Eimac Div. **L7017**
On Display: Eimac broadcast triodes, tetrodes and pentodes.

Creative Support Services **M7941**
Intro: 21 new CDs of royalty-free music and sound effects, including updates to the Super Themes, Digital Ditties and Project Platinum libraries; D.A.W.N., Digital Audio Worldwide Network, allows producers to download CD-quality royalty-free music and sound effects with a credid card, contains full-length streamed samples, keyword database and Quicktime 4.0.
Also: 215 CDs with 8,000 tracks of royalty-free music and sound effects.

Crestron Electronics **M10045**
Intro: e-Control two-way Internet access allows for automatic downloads of personal Web content, as well as remote servicing and troubleshooting and monitor and cotrol virtually every electronic device from any Internet-connected PC; STX-1550C touchpanel hand-held, two-way wireless color touchpanel is ideal for controlling virtually any electronic device, including lighting and environmental systems; LC-1000 and CT-1000 touchpanels automatically dim or brighten with room lighting, store and playback WAV soundfiles, and include 10 pushbuttons for frequently used commands.
Also: Touchpanels, control panels, control systems, audio distribution and control.

Crouse-Kimzey Co. **R2567**
On Display: Distributor of broadcast and professional audio equipment for 30 years, with an experienced staff to help with any needs concerning more than 300 lines.

Crown Broadcast **R984**
On Display: Reliable FM transmitters from 1 watt to 2,000 watts. Features include stereo generation and audio processing in a compact, rugged package ready for most broadcast environments.

Crown Castle International **L933**

Vegas Dining

Crystal Group Inc. **M9831**
Intro: CS500 space-efficient (up to 32 can fit in a standard 19-inch rack) industrial fault-tolerant computer chassis; CS600 is a 2RU rackmountable computer chassis that features a six-slot ISA or ISA/PCI PICMG 2.0 compliant passive backplane with a butterfly backplane design.

Crystal Vision Ltd. **L9525**
Intro: Tandem dual audio embedder/de-embedder system with audio delay and sophisticated audio error masking in removable piggyback units.

CTE International Srl **R988**
Intro: VL 1000/Plus 1 kW microprocessor-controlled solid-state power amplifier is maintenance-free and has numerous controls and data facilities with local or remote recording facilities; VL 10000 10 kW solid-state power amplifier consists of four 2.5 kW modules in one cabinet, redundancy output stage, redundancy on power supply, redundancy on cooling system, low power consumption and high performance.
Also: Antennas; passive components.

D

D&C Electronics **R3666**

Dalet Digital Media Systems **R1096, S5722**
Intro: Dalet5.1 digital automation system streamlines radio operations, acquisition to broadcast, and provides tools that leverage and establish Internet presence, and scheduling and editing; TeamNews newroom management system that assists with news acquisition, production and scheduling; TeamRadio advertising management system manages sales, scheduling and billing needs of radio stations and groups, offers Web order entry and multistation management capabilities.

Dan Dugan Sound Design **R3761**

Dana Commercial Credit **L6046**
Intro: Financing solutions for remote broadcast vehicles.

Dasto **R682**

Data Security Inc. **L5204**
Intro: Type III bulk tape degausser for erasing classified information from metal tape.

Datacount Inc. **R1484**
Intro: Datacount 320, new windows traffic system targets corporate, group and station, the files are 100-percent ODBC compliant allowing data export to many software tools, D320 leverages existing technologies including the thin-client/fat-server approach to reporting, and the three-tier client/sever model for user interaction.
Also: DARTS, DARTS EL, Super Log.

DataDirect Networks Inc. **S3427**

Dataworld Inc. **R2660**
Intro: Broadcast MapBooks, newly revised, 11x17 color books, display U.S. station contours by frequency; Internet Accessible Services, engineering studies for AM/FM/TV/Wireless Cable services now retrievable using Internet access and e-mail.

Davicom Technologies Ltd. **R3664**
Intro: MAC Systems monitors conditions at site(s) and will automatically switch to back-up equipment or notify the proper personnel of problems; MAC-NET Software, a PC-based system of collecting and managing alarm calls sent by Mini-MAC and MAC System remote monitoring units; FM power monitors.

Dawn Satellite Inc. **T2635**
Intro: Digital Ready LNBs offer C- and Ku-band, LO stability and phase noise for digital satellite signals; 7892MFC C-band bandpass filter suppresses terestrial interference such as coastal radar or airport altimeter.
Also: Satellite antennas; satellite receivers; LNB; LNA and feedhorn.

DB Elettronica **L3550**

dbx **M8632**
On Display: Compressors/limiters, noise reduction systems, graphic EQs, digital dynamics processors and multiband digital processors for live and recording applications.

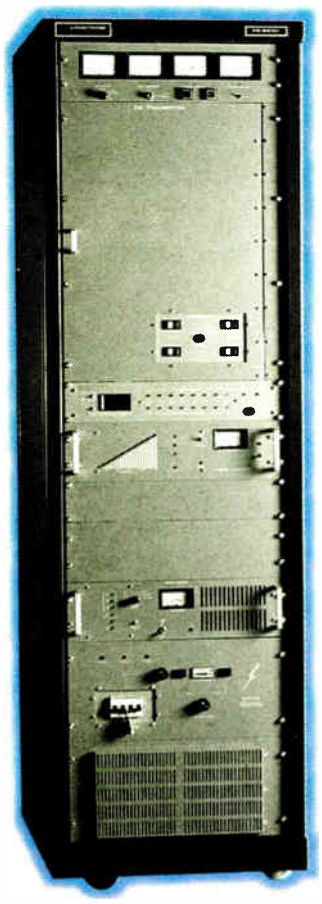
DCM Inc. **L12360**

Delco Wire & Cable Ltd. **S3453**
Intro: Clarity microphone cable is electronic, unshielded and shielded multiconductor.

Delta Designs **L6846**
On Display: Operating consoles; equipment racks and workstations.

Delta Electronics Inc. **R2373**
On Display: RF ammeters; operating impedance bridges; receiver/generators; coaxial transfer switches; AM stereo exciters and monitors; toroidal current transformers.

ARMSTRONG
FM Transmitters



Engineered for Reliability

- Power Levels from 1kW to 30kW
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- Wideband Quarter Wave Cavity for Lowest Synchronous AM
- Solid State Driver with Patch Around Capability
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World Radio History

Delta Meccanica Srl R678

Deutsche Telekom AG T2656
Intro: Satellite Services, offering access to a large amount of satellite capacity for occasional-use transmission from almost anywhere in the world.
Also: Internet audio services, DAB, Shortwave Broadcasting.

DG Systems I6942

Dielectric Communications L8205, R3789
Intro: Designs, engineers and manufactures antennas for FM; combiners, switches, transmission lines, waveguides and dehydrators.

Digidesign, Div. Of Avid Technology L11031
Intro: DigiTranslator adds support for Windows NT to Digidesign's OMFI (Open Media Framework Interchange) application. DigiTranslator now allows cross-platform translation between ProTools file formats an OMFI media file formats.

Digigram Inc. R1456
Intro: PCX924 and PCX22 24-bit PC soundcards for radio, audio production and other applications; Linux SDK has development tools to create Linux applications on selected Digigram soundcards; Digigram multichannel audio encoder software tool for encoding Dolby Digital 5.1 Surround Sound on a PC with no special hardware.
Also: PCXpocket and VXpocket soundcards for laptops.

Digital Audio Labs S5763

Digital Metropolis M9046

Digital Radio Mondiale R793
Intro: Digital quality sound and services for the international radio market, with its AM standard specification currently being evaluated by the International Telecommunication Union.

DK Audio TBA
Intro: MSD600M can function as a complete audio matrix control center where any input can be routed to any output at broadcast quality, and has individual gain control and an optional fader panel.

Dolby Laboratories Inc. L12335
On Display: DP571; DP572; DP562; DP563; SDU4; SEU4.

Dorrough Electronics Inc. L9769
On Display: Dorrough loudness meter

Doty-Moore Tower Services L5217

Dove Lighting Systems Inc. L6730

DPA Microphones/ TGI North America Inc. R683
Intro: 3541 large diaphragm microphone kit offering high sensitivity, high dynamic range, interchangeable solid-state or tube preamp and soloist recording accessories.
Also: Cardioid and omnidirectional microphones and accessories for live sound and recording applications with an emphasis on miniature microphones for theater use.

E

Econco R2682
On Display: Medium- to high-power rebuilt power tubes for radio transmitters.

Edak Inc. T1239
Intro: Lightweight, ruggedized aluminum transit cases; Lightweight, ruggedized aluminum shock insolated 19-inch rack mounted cases; Lightweight, ruggedized aluminum brief cases.

Editware L2306

ednet inc. M9542
Intro: Internet Webcasting provides live audio and video Internet broadcast production, hosting and streaming services to corporate clients, special event production companies and other Web content aggregators worldwide.
Also: Dolby, APT, Musicam and Telos audio codecs.

EDX Engineering Inc. R677
Intro: EDX SignalPro 3.0 for Windows 95/98/NT is a general-purpose wireless design tool for multi-site, area-wide coverage studies, detailed link analyses and multi-point studies, as well as specialized FM and TV broadcast modules for channel allocation studies in the U.S.; AMW 4.0 for Windows 95/98/NT can be used for daytime and nighttime studies, with advanced mapping capabilities, color gradient displays and support for a worldwide GIS database.
Also: AM and FM modules.

Eimac, Div. of CPI L7017
On Display: Eimac broadcast triodes; tetrodes; pentodes.

Electronic Associates Inc. L8843
Intro: DataLab full-featured, small-scale monitoring and control system that provides voice and pager capability for AM, FM and translator systems.
Also: DataLine; RF-Manager; RF-Host; Pocket Monitor.

Electrorack Enclosure Products Co. I7422
Intro: ER2 Broadcast Rack, a 19-inch rack designed for large broadcast applications; Studio Rack for rackmount applications features all-steel 22RU racks with a tempered glass door and choice of maple, oak or pearwood trim.
Also: 19-inch vertical racks.

Elettronika Srl R259
Intro: FM Radio Transmitter MIRA with touchscreen, DC sound quality, S/N ratio 90dB, stereo separation 60dB, microprocessor controlled, 20-150-250 W availability and remote control; FM Amplifier Mod EKA1500, a 1550 W FM

STABILINE® Automatic Voltage Regulators Prevent Transmitter Power Problems

"Dirty" power, like sags, surges, spikes and brownouts, are typically caused by power line disturbances or inadequate distribution systems. Left unregulated, poor power quality can degrade sensitive broadcast electronics in receiving stations, studios, mobile production vehicles and transmitter sites. The result? Equipment failure, software integrity loss, reduced tube life, and poor signal quality.

WHR Series STABILINE® Automatic Voltage Regulators can prevent power quality problems.

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World Radio History

See Us At NAB Booth # R1191

RADIO broadcast products

1200 Console

- NEW - redesigned in 1999
- 5, 10, or 15 channel models
- Fully DC controlled for reliability
- Ultra high audio performance
- Easy connectorized installation
- Modular internal electronics
- Mix minus phone interface

A rugged design with heavy aluminum panels, solid oak trim, 5M operation On/Off switches and full DC control, the 1200 is ideal for On Air, Production, or News applications.

Standard Configurations

1200 - 5S	**5 channels**	**$2,295**
1200 - 10S	**10 channels**	**$3,495**
1200 - 15S	**15 channels**	**$4,495**

(call factory for options)

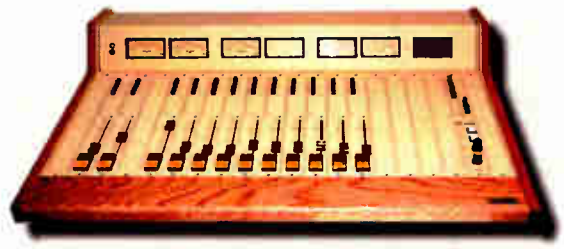
DL4 System II

- NEW - On Air & Production System
- Live On Air, Hard Disk Automation, Satellite Automation, Production, Jingle Box, Segue Editor
- Complete - just add 2 PCs
- Only **$7,995**

The NEW DL4 System II comes complete w 105 hours of audio storage, 7 input play sw software for On Air, and DL4-SCHED for Pr studio system requires only 2 customer sup

12,000 Console

- NEW - redesigned in 1999
- 8, 18, or 28 channel models
- Fully modular design
- 3 stereo output buses
- VCAs remove audio from faders
- Telephone talkshow module option
- Monitor for control room & 2 studios



Modular, reliable, flexible, and powerful, the 12,000 is found around the world from Tokyo to Paris to New York. The 12,000 is perfect for any size market or any radio application.

Standard Configurations

12K8 - 6	**6 channels**	**$4,350**
12K18 - 12	**12 channels**	**$7,075**
12K18 - 18	**18 channels**	**$8,755**

(call factory for options)

DL4 System III

- NEW - dual On Air & Production System
- Live On Air, Hard Disk Automation, Satellite Automation, Production, Jingle Box, Segue Editor
- Complete - just add 3 PCs
- Only **$16,995**

The NEW DL4 System III comes complete 210 hours of audio storage, two 7 input play DL4-AUTO software packages for On Air, and This powerful 3 studio system requires only

Digital Console

- NEW - Revolution Series
- Digital & Analog Radio Console
- Console, Touchscreen, or Mouse Control
- 3 Program & 2 Telephone Mix (-) outputs
- 12 CH, PC Control $3,995
- 12 CH Console $7,995
- 18 CH Console $12,995

A breakthrough in features, performance, and price, this is a black box digital audio console controlled by a familiar Console -or- PC computer. Powerful, flexible, and designed for ease of use, installation, and service, the Revolution is a Colorado Digital Product.

Available April

DL3 Workstation

- #1 selling Digital workstation
- Live On Air, Satellite Automation, Hard Disk Automation, & Productio
- NEW - now includes:
  - Trak*Star editing software
  - Network card and software
  - Large 78 hour drive

From the #1 selling Digital workstation famil world, the NEWLY configured DL3 requires another for Production, then simply install th

DL3 - 78	**78 H**
DL3 - 150	**150 H**

World Radio History

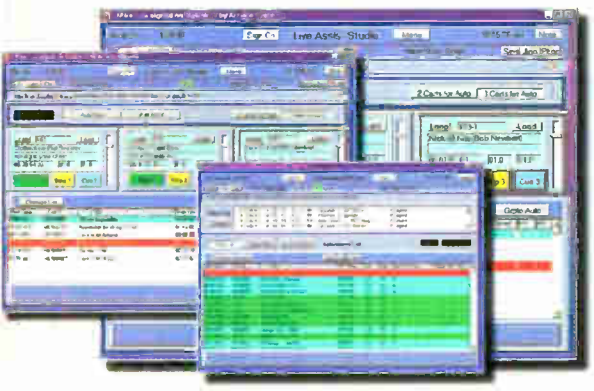
Arrakis Systems inc.
Condensed Catalog

ith a triple play & record DL4 workstation,
cher, 7 input record switcher, DL4-AUTO
oduction and Scheduling. This powerful 2
lied PCs and installation.

Instant 3-Play

- NEW - Instant 3-Play
- Triple Play & Record Jingle Box
- Control from 1, 2, or 3 PCs
- One PC has triple play -or- three PCs have a single play
- Only **$2,995**

Just connect 1, 2, or 3 PCs running our INSTANT 3-PLAY software to our rack mounted digital workstation and you are ready to go. The workstation has 3 simultaneous plays with record. Software setup assigns play control to the PCs. 3 times the power of other Jingle Boxes, the Instant 3-Play provides access to the SAME jingle from 3 places.



ith a 6 play & dual record DL4 workstation,
switchers, two 7 input record switchers, (2)
DL4-SCHED for Production and Scheduling.
3 customer supplied PCs and installation.

Studio Furniture

- NEW - Modulux FLEX-Studio
- One size fits ALL modular design
- Highest quality laminates & wood
- World famous Modulux cabinetry
- In stock, ready for delivery
- Only **$4,995** list price
  (call for other configurations)

The Modulux Flex-Studio is a complete modular studio package that can be configured in dozens of different ways to meet nearly any studio design. It can be assembled left or right handed as well as in all of our standard configurations: 'Short L,' 'Long L,' and 'Unbalanced U.' Complete with racks, access doors, interview table, and much more.

in Radio with thousands on air around the
NO options. Order one or two for On Air,
em.

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• CROUSE-KIMZEY	(800) 433-2105
• BGS (Broadcasters General Store)	(352) 622-7700
• SCMS (Southern Coastal Marketing Service)	(800) 438-6040
• BRADLEY BROADCAST	(800) 732-7665
• CONTINENTAL ELECTRONICS	(800) 733-5011
• RF SPECIALTIES (contact their regional offices)	

For more complete information on any Arrakis product, visit our website at: www.arrakis-systems.com or email: sales@arrakis-systems.com

ARRAKIS SYSTEMS INC. FORT COLLINS, CO (970) 224-2248

prices effective Feb. 15, 2000

World Radio History

MOSFET amplifier controlled by a microprocessor, switching power supply, cos 0,95, low energy consumption, complete redundancy and 20 W input power.

Energy-Onix Broadcast Equipment Co. Inc. **R1389**

Intro: Pulsar 2000, 3000, 4000, 5000, 10000 AM solid-state transmitters with high-efficiency PDMs, modular slide-rail construction and digital capability; Legend 1500C, 2000C, 3000C, 4000C solid-state FM broadcast transmitters, modular construction, slide rails on all 1 kW drawers; Roadcaster is a portable multiple frequency, high-fidelity, VHF/UHF Remote Pick up equipment, available in duplex form.

Also: AM, FM and shortwave broadcast transmitters.

E-N-G Mobile Systems Inc. **L13280**

On Display: Newsgathering equipment vehicles; ENG microwave systems; satellite uplink units.

Enterprise Electronics Corp. **L1931**

On Display: TVDR-2500C; Weather Windows Software.

Equi=Tech Corp. **R2580**

Intro: Redesigned rack power system, featuring digital voltage readout, visual surge protection indicator and increased noise rejection bandwidth; Large-capacity rack power system for use in production trucks and other applications with higher power requirments; Redesigned wall cabinets for turnkey balanced power systems, providing technical power in studios that require hardwired AC.

Ergo 2000 Inc. **I5739**

Intro: E2CKS-7, a 3 RU (5.25-inch) sliding shelf with keyboard, trackball and 18-inch TFT/LCD flat-panel monitor; ServerSwitch + 8, an eight-channel KVM switch that can daisy chain up to 128 CPUs using one keyboard, trackball and monitor.

ERI-Electronics Research **R3166**

Intro: DAC is an in-band/on-channel digital/analog combiner that combines analog and digital modes for simultaneous transmission; MPX FM antenna for medium-power, high windload applications.

ESE **L11233**

Intro: PC-471 is a PC card that accepts ESE or SMPTE time code and sets the computer clock; PC-EIS and PC-NIS is time sync interface software for sharing and distributing accurate time in Ethernet and Novell Network environments.

Also: ES-185A, ES-101 and ES-102 GPS Master Clocks, LX-5100 Series Self-Setting Analog Clocks, ES-244 Audio Level Interface.

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Euphonix Inc. **R2388**

Intro: System 5 is a 24-bit/96Hz digital audio console with a user-friendly control surface using a patented control knob; CS3000B Broadcast Series of digital-control analog mixing consoles are configurable from 24 to 40 faders, 12 buses assignable from all channels for mix minus or clean feeds.

Eutelsat **T726**

Eventide Inc. **R4069**

Intro: Orville Harmonizer Effects Processor is a multi-channel, dual engine, 24-bit/96 kHz processor with four analog I/Os and four digital AES/EBU I/Os and multi-channel reverbs; BD500 Broadcast Delay is a stereo eight-second obscenity delay with optional AES/EBU digital I/Os, featuring automatic catch-up and multiple, user-configurable dumps; VR208HF Hi-Fi Logging Recorder records programs at up to 14 kHz bandwidth.

EVI Audio **L9366**

Intro: R100 Diversity Wireless Microphone System offers a choice of handheld, bodypack, lavalier, headset and guitar wireless systems, operates in the range between 174.100 and 185.350 MHz on single custom-tuned frequencies and can be rack mounted; ENG 618 Integrated Shotgun/Boom Pole Microphone is a hypercardioid electret condenser microphone and handheld boom combination for news gathering or audience interviews; RE90L Ultra-Miniature Condenser Lavalier Microphone is omnidirectional with a frequency response of 50 to 18,000 Hz and phantom power capability.

The Las Vegas Hilton

eWave Networks Inc. (Formerly ADC Labs) **M6855**

Exabyte Corp.

On Display: Exabyte's Mammoth tape drives and tape libraries.

Exeltech **T334**

Intro: DC/AC sine wave power inverters.

Extron Electronics **M8727**

F

Factum Electronics AB **R859**

Intro: DAB service provider for local commercial radio stations as well as national broadcasting entities; DRC100 audio compressor and DRC generator for DAB, developed in cooperation with the Swedish Broadcasting Corp.; DBS100 software platform for DAB, packed mode and PAD.

Fairlight **R1180**

Intro: Prodigy 24-track, 24-bit post production workstation with fully automated mixing, 16 assignable faders and Surround mixing; FAME2 24-track, 24-bit digital production workstation with a fully automated mixing control surface, networking, file exchange with common DAW formats and Surround mixing; Merlin 24-track, 24-bit digital multitrack recorder offering a dedicated controller, expandable to 48 tracks, networking and file exchange with most common DAW formats.

Fantastic Corp. **M10352**

Intro: Channel Editorial Center, the CEC version 2.0 software system lets businesses create multimedia information paths to integrate and communicate with employees, customers, and suppliers; Channel Management Center, CMC version 2.0 broadcast platform permits network operators to offer broadband multimedia services to the business and consumer markets.

Fidelipac Corp. **R2674**

Intro: Dynamax MX Consoles, both digital and analog, are on-air consoles designed for dependable operation and ease of use; DCR 10 digital cart machine uses 2MB floppies, ZIP drives or Magneto Optical drives as recording media for IDs, commercial spots, PSAs or longer-play requirements up to six hours; Studio accessories such as studio warning lights, both standard and custom, bulk tape demagnetizers, and NAB broadcast cartridges.

Also: Dynamax MX Consoles.

FirstCom Music **L11652, R3668**

On Display: Eight libraries and up-to-the-minute contemporary music.

Flash Technology Corp. **R2671**

Intro: High-Intensity Dual-Obstruction Light features both white and red beacons that operate from a single shared power source; Red Flashing Beacon is less than one-half the weight and wattage of traditional beacons; Obstruction Light Monitoring service monitors tower lighting with automatic field service dispatching available.

FM Systems Inc. **L5833**

Forecast Consoles Inc. **S2941**

Fraunhofer Institute IIS-A **R381**

Fresh Music Library **L6346**

Intro: Buy Out Music Library, 62 CDs of production music for video, audio, multimedia, broadcast and the Web; Buy Out Sound Effects Library, 12 CDs of production sound effects and production elements.

G

Garner Industries **L7023**

On Display: Degaussers and bulk tape erasers.

Gefen Inc. **L7038**

Intro: USB100 Extender extends any USB-compatible peripheral device by up to 300 feet using standard CAT-5 cables; USB2411 KVM Switch enables a user to work on two different USB-compatible computers from the same keyboard, video and mouse; CAT 5-2000 Extender extends any keyboard, video and mouse combination up to 300 feet and is compatible with USB, VGA, ADB and PS/2 devices; SFX Net SFX Locator Software organizes, locates, auditions and transfers sound-effect cues from hard drive into the user's digital audio workstation and also runs on both Mac OS- and Windows-based PCs; 360 Sound Effects Library, a new sound effect library with five CDs of ambient sounds captured in 360 degrees to enable audiences to experience the sound as if they were actually there.

Gene Michael Productions **L7022**

Intro: Production Music Library has more than 100 CDs of production music, terms are buy out and blanket license with a 30-day no-risk preview policy.

Genelec Inc. **R1393, M7672**

Intro: 2029B Digital Active Monitoring System, a compact, nearfield bi-amp audio monitor with AES/EBU 24-bit 96 kHz digital input and standard analog inputs, with applications that include digital on-line/off-line editing systems, digital broadcast consoles and digital broadcast confidence monitoring with optional subwoofer available; 2029A Digital Active Monitoring System, a compact, nearfield bi-amp audio monitor with 24-bit/48 kHz S/PDIF digital interface and standard analog inputs, that can be used with digital audio workstations or digital broadcast consoles with an optional subwoofer available; S30D Active Monitor, upgrade to the S30C, tri-amp active monitoring system, features extended bandwidth to 50kHz and LF cut-off of 36 Hz with optional 24-bit/96 kHz digital input, suitable for broadcast production and commercial post-production.

Also: 1029A, 1030A, 1031A, 1032A, Active Bi-Amp Monitors, S30C, 1037B, 1038A/AC, 1034B/BC, 1039A Active Tri-Amp Monitors, 1091A, 1092A, 1094A Active Subs.

General Instrument Corp. **L3123**

Gentner Communications Corp. **R1581**

Intro: Lynx software for the GSC3000 that provides enhanced graphical user interface, full-featured database, scheduled applications, enhanced macro language and start-menu enabled.

Also: SPH10, DH20, DH22, DH30, TS612 and ScreenWin for TS612.

GeoVideo Networks **L2632**

Gepco International Inc. **L5660**

Intro: The 5596 series is a 110-ohm AES/EBU digital audio cable optimized for 96 kHz requirements.

Also: Serial digital coax; multi-core coax; triax.

Global Communications Solutions Inc. **T2140**

Intro: Netlink M4 Portable Inmarsat Terminal, among the newest generation of portable satphones that provides voice, fax and a variety of data modes up to 64 kbps.

Globecomm Systems Inc. **T1727**

Intro: WorldSpace Processed Feeder Link Station gives broadcasters the ability to distribute programming via the WorldSpace Direct Digital Satellite Radio System.

World Radio History

If time is money, what could you get for an extra radio commercial every ten minutes?

If you're in the radio business to make money (and who isn't) you need

"Cash"

Through an exclusive time-shifting process, Cash creates additional broadcast time to sell. It does it in real time, right on the air. It does it without reducing program content. It does it without affecting pitch or creating a "chipmunk effect," It does it in stereo or mono. It does it in variable amounts, adding from zero to five minutes, within two minutes to two hours.

Cash, from Prime Image - you don't need one unless you want to make some.

Prime Image
The Digital Video People

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See Us At NAB Booth # L10186

World Radio History

GMPCS Personal Communications Inc. **T2027**
Intro: WorldCommunicator, a portable ISDN mobile satellite transmitter for SNG; Globalstar, using CDMA technology and bent pipe design; Capsat Messenger, a portable ISDN mobile satellite transmitter for SNG for use with the new Inmarsat M4-ISDN service.

Golterman and Sabo Inc. **M8353**
Intro: Manufacture and install fabric-covered acoustical wall panels, ceiling tiles and baffles, along with wall and ceiling diffusers to reduce or diffuse reverberated sound.

Gorman-Redlich Mfg. Co. **R3388**
Intro: Model CRW weather NOAA weather radio with any three of the seven weather service frequencies, that, upon receiving alerts, demutes the speaker, closes a relay and gates 600 ohm audio to rear terminals; Digital antenna monitors for AM directional arrays display a true ratio readout and a phase reading not disturbed by high levels of modulation.

Graham Patten Systems Inc. **L2010**

Groove Addicts **R3390**
Intro: Original music, sound design, underscore and imaging services for radio, film, television, music videos, trailers, logos, bumpers, spots.

H

H.L. Dalis Inc. **L11778**
Intro: Belden's bundled 1855A and 1505A cables, designed for digital transmission; Panduit, the Pan-Quik L35E hand-held printer creates custom or serialized labels, wire markers, heat shrink markers and network labels.

Hafler **M8669**
Intro: M5 features small passive 5-inch speaker with tweeter; FG-P1000U features a small P1000 with 50 W per channel and headphone jacks.

Hammer Storage Solutions **S3431**
On Display: Sledgehammer Pro12 FC-FT storage subsystem.

Hannay Reels Inc. **L8676**
Intro: Live cable for broadcast and pro-AV applications; AVX series reels feature welded channels for stacking; AVC 1500 Series reels with manual rewind that have spring actuated pinlocks and spring tension brakes; AV Series reels are constructed of rugged steel and offer a matted finish and a removable side-mounted panel that allows for customization of XLR and/or BNC connector patterns; Audio/Video Cable Reel Catalog provides information and updated specs on audio/video cable reels.
Also: Cable reels.

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Hanson Engineers Inc. **L6923**
Intro: Radio Broadcast System Integration offers the integration of broadcast systems including antenna, transmitters, control and monitoring and satellite TVRO.

Hardigg Cases **L12637**
On Display: Shipping cases that are lightweight, airtight, watertight, widely used by the broadcast industry in over 350 standard COTS sizes.

Harris Corp.
Broadcast Communications Div. **L6524**
Intro: DAB ITIS products include D-ACE audio encoder and data interface, D-SMUX service multiplexer, D-EMUX ensemble multiplexer and D-CAST2 modulator; Turnkey digital studio solutions feature digital audio storage and production systems, digital consoles, IBOC-ready STLs and all the accessory equipment needed to make a transition to digital; Recent upgrades to Enco's DADpro32 include a new library interface with a Windows-type browser for accessing audio cuts, a suite of Web interface tools that allow users to stream audio as text data to a Web site or server, a new scheduling Wizard for scheduling for satellite-based formats, integration of ActiveZ/DCOM technology for interface between scheduling, traffic and automation functions and a new built-in CD ripper for entry of CD tracks; An off-air AM/FM IBOC digital radio airchain, from digital studio through transmitter, features transmitter lines including Gates Series MW transmitters and the ZCD digital solid-state FM transmitters.

Harris Corp.
Intraplex Transmission Solutions **L6524**
Intro: The Intraplex STL PLUS, now IBOC-ready for the transport of CD-quality DAB, provides automation backup protection for STL T1 links; the Intraplex CrossConnect System automatically switches critical traffic to an alternate path in the case of transmission link interruptions.

Harrison by GLW Inc. **R1569**
Intro: Trio, brings quality and scale to a digital mixing soution.
Also: Pro-950.

Henry Engineering **R3389**
Intro: Digistor II solid-state digital audio recorder that stores up to 16 minutes of audio, eight messages and is ideal for "network news delay," and includes Telco Coupler for auto-answer "listener info lines."
Also: Matchbox II; USDA; Twinmatch; Mixminus Plus; Superlay.

Herman Electronics **S4441**
Intro: Kings audio connectors.

HHB Communications USA LLC **R2360**
Intro: The HHB CDR850 PLUS professional audio CD recorder features a balanced digital ouput on an XLR connector, which adds to the signal interfacing of the CDR850, incorporating balanced XLR and balanced AES/EBU digital input; Orange Book-compatible CDR80 Silver and CDRW80 discs; MO 640 and MO 640 direct overwrite 3.5-inch MO disks.
Also: HHB Radius and Classic tube processors; Advanced Media Products.

High Tech Industries **L12833**

Hitachi Software **M9438**
Intro: Design, manufacture and sale of hardware/software solutions for the meeting and presentation industry including interactive front/rear projection whiteboards and data/voice conferencing software.

Honeywell Obstruction Lighting **R3767**
Intro: StrobeGuard is FAA-approved high-intesity lighting system for tall towers.

Hosa Technology Inc. **L5629**

Hotronic Inc. **L9243**
Intro: Model AU51 broadcast audio delay/SDI-analog converter is 20-bit broadcast-quality and accepts analog or digital audio signals and simultaneously outputs the delay audio in both analog and digital and extracts the audio signal from embedded SMPTE 259M SDI signal.

I

iBeam Broadcasting **S5225**
On Display: iBEAM Network delivers broadcast-quality streaming audio and video over the Internet.

IBM Corp. **L3337**

IDT - Impact Développement **R571**
Intro: The Digital Virtual Processor is the first FM broadcast sound processor to run on FFT. The technology allows the processor to analyze the signal and process at 96 kHz, floating point DSPs ensure precision without any loss of information.

IDX Technology **L9031**
On Display: Batteries, chargers, power supplies.

illbruck/Sonex **R2356**
Intro: SonexClassic Panels acoustical foam panels; SonexTextile, fabric-covered acoustical foam panels, in 6 colors to match virtually any décor.

Image Video **L7310**
Intro: SDI and AES Signal Presence Alarm System monitors any number of audio and video signals, individual detectors continuously monitor video and audio signals from various sources.

IMAS Publishing Group/ Radio World **R3759, L5202**
Intro: IMAS Publishing Group, parent of Radio World, is the number one publisher of audio/video technology magazines worldwide. Publications are written by and for audio and video professionals. With a portfolio of 18 publications worldwide, more than 250,000 industry professionals rely on the IMAS family of publications for useful and timely information. Visit our booths R3759 and L5202 to subscribe or for advertising information.
Also: Radio World (US, International, Latin America), Official NAB Daily News, Pro Audio Review, Audio Media (US, Europe), Realisa-SON (France), Sound and Vision (Germany), Broadcast & Production (Brazil, Italy, Francophone, China), TV Technology (US, Japan, Latin America), TV Technology & Production (Asia/Pacific, Europe) and Produktion & Technologie (Germany).

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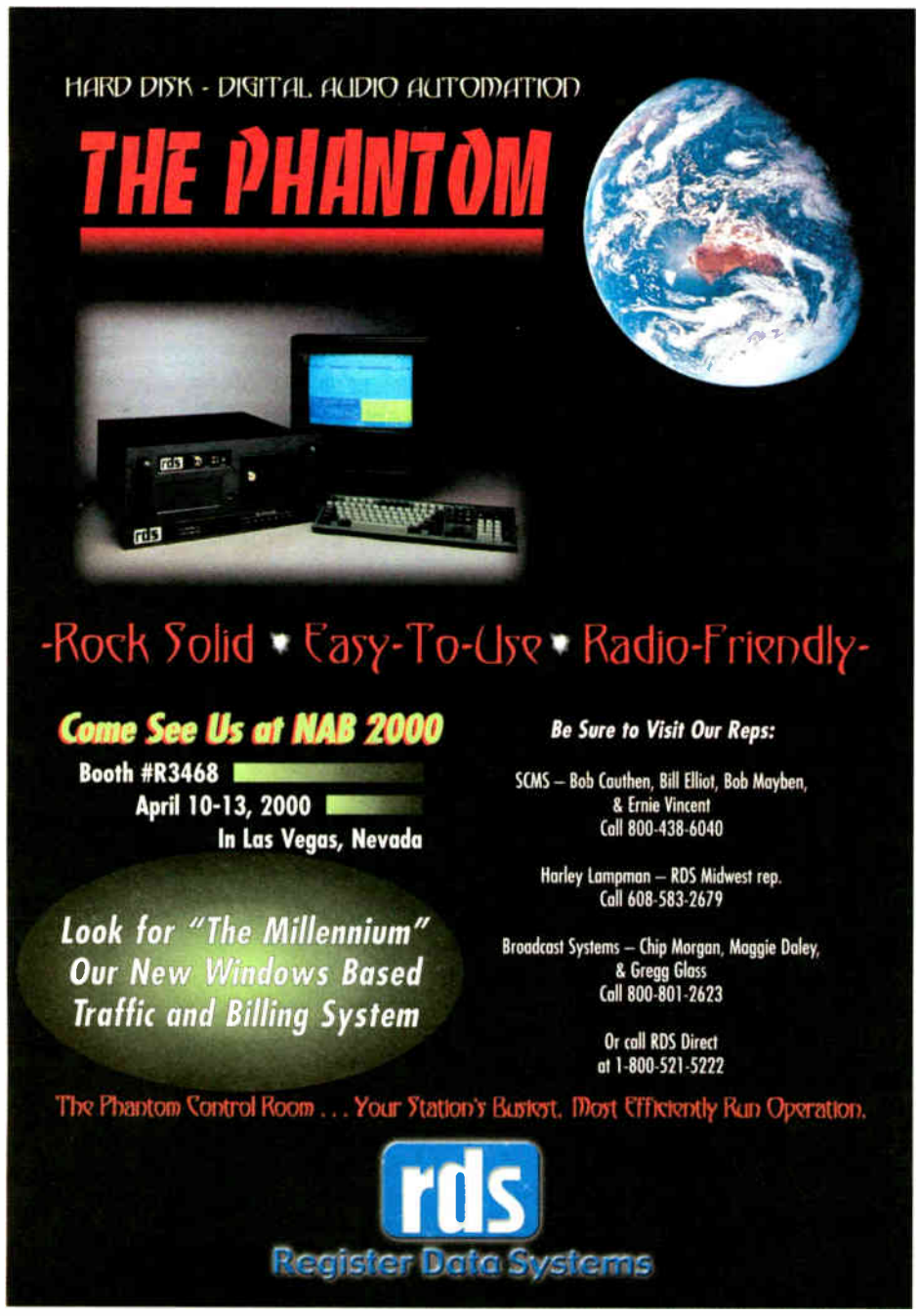
Independent Audio **R2294**
Intro: Cedar for Windows V2 includes major revisions and upgrades to



World Radio History

many of the restoration modules, which include declock, decrackle, dehiss, NR3 noise reduction, phase correction, buzz and hum removal, D/EQ dynamics and spectral analyzer.

Industrial Acoustics Co. Inc. **R4060**
Intro: Noise-Lock Doors feature finish hardware, glass and glazing with STC ratings up to 64 and guarantee infield noise reduction; Noise-Lock Windows feature glass and glazing with STC ratings to 59 and guarantee infield noise reduction; Accutone Studio Environments are acoustic environments for recording, voiceover and music.

Innova-Son **L7530**
Intro: The Digital Live Console incorporates the features found in the Grand Live series with eight additional digital I/Os in AES format.

Inovonics Inc. **R2978**
On Display: On-air processing systems for AM and FM; FM stereo generators; family of David processor/generators; AM and FM off-air modulation monitors; RDS/RBDS encoders and decoders; FM translator receivers.

Intel Corp. **I7133**

Intelsat **T2350**

Intelsis Sistemas Inteligentes SA **L931**

International Cellulose Corp. **L1749**
On Display: K.13, SonaSpray acoustical finish.

International Communications Products Inc. **T1446**
Intro: DCR-972 Digiceiver is a multifunction data/audio MCPC satellite receiver that features store and forward capability, and is used for news, radio and financial data/audio distribution by digital satellite.

International Datacasting **T1638**

International E-Z Up Inc. **R339596**
Intro: International E-Z Up Hut Instant Shelter features a larger area for increased visibility of logo and graphics with gable-pitched patented E-Z UP truss systems in four sizes and ideal for cool shade and instant recognition; E-Z Up Eclipse Instant Shelter has improved version of the original E-Z UP, custom graphic capabilities and 22 colors, provideS cool shade to radio and TV personnel; International E-Z Up P.O.P. Stand Instant Shelter is available in two sizes, special feature includes portability as well as lightweight powder-coated frames which display your company name with customized graphics for in-store displays and information booths.
Also: Dome, Wedge Express, Cabana, Pyramid, Instant Table, Monitor Stand.

International Towers Inc. **L4451**

Irte SpA **S5227**

ISIS Group **L1510**
On Display: Routing and protection switchers; DAs; compact additive mixer/router for remotes.

Itelco Inc. **L3243**

J

J.L. Fisher Inc. **L13163**
On Display: Fisher 16-foot to 29-foot microphone booms; Fisher jib arms and crossarms.

Jampro Antennas/ RF Systems Inc. **L5622**
Intro: JSWB is an FM broadband sidemount antenna ideal for multi-user applications requiring excellent bandwidth for combining two or more FM frequencies on a common antenna.

Janson Design Group LLC **M8945**
Intro: Architecture and acoustic design for broadcast facilities, including production studios, on-air studios, audio recording and related production.

JBL Professional **M8632**
Intro: LSR25P Compact Reference Monitor features a compact bi-amplified monitoring system with a 5.25-inch woofer (100 W) and a 1-inch tweeter (50 W) that provides a reference for workstations and edit suites.
Also: 440 and 4200 Monitors.

JFA Consulting Group LLC **L3628**

JK Audio Inc. **R3659**
Intro: RemoteMix Sport combines the features of the RemoteMix 3 telephone hybrid mixer with new features including three mic inputs, three headphone outputs and headphone cue input; Innkeeper 1x Digital Hybrid is a solution for getting audio in and out of analog phone lines, combining caller ducking, AGC and 50 db transmit/receive separation.
Also: THAT-2; RemoteMix 3; RemoteMix 3x4; QuickTap IFB; RemoteAmp; Innkeeper 1.

JLCooper Electronics **S5547**

JMR Electronics **M8351**
Intro: Fortra 3U rackmounts accommodate ten 3.5-inch HH SCA disk drives, either SCSI or FC-AL, with hot-swappable components, is EMI and product safety compliant and provides data security, capacity and high-transfer speed.

JVC Professional Products Co. **L12118**

K

Kapell and Kostow Architects **I6829**
On Display: Architecture, interior design, site evaluation, feasibility studies, analysis and space programming.

Kart-A-Bag **S3335**
On Display: Super600; Tri-Cart 800; Kartmaster HD 500S.

Kathrein Inc., Scala Div. (formerly Scala Electric) **L10251**
On Display: Antennas and filters.

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Kavouras, a DTN Co. **L1437**
On Display: Triton RT; Storm Pro; StromWatch; MetWork FileServer; StormSentry PC.

KD Kanopy Inc. **R3791**

KDD R&D Laboratories Inc. **I5740**
Intro: Vision-SW improves the efficiency and fault tolerance of duplex digital transmission systems.

Killer Tracks **L4851**
On Display: Killer Tracks Music Library provides high-quality music for radio, television, film and event production.

Kings Electronics Co. Inc. **L9621**
Intro: Digital Audio (AES) Interconnect System meets SMPTE 276M requirements, has up to 56 audio jacks per patch bay, connectivity similar to Kings video jack product line and high-density design.

Kintronic Labs Inc. **R1565**
Intro: Model DAC-MOD-2-12/CI software programmable directional antenna system controller is a multicolor touchscreen display interface for the PLC-based controller series; Custom AM directional antenna phasing cabinet for multitower AM directional antennas for IBOC/DAB; AM multiplex unit designed for IBOC/DAB, weatherproof matching and filtering permitting transmission of two or more radio stations on a common antenna.

Kline Towers **L12966**
On Display: Kline Towers designs, fabricates and erects guyed and self-supporting broadcast towers and also provides redesigning and reinforcing of existing towers and antenna support structures.

Klotz Digital **R3798, M7173**
Intro: VADIS is a variable audio distribution and interface system that provides for digital processing and distribution of audio signals as well as transmission via fiber-optic cable; VADIS DC's audio console is based on the VADIS digital audio router, providing a means to control the router from one or more VADIS DC mixing console surfaces. Spherion audio console is based on the technology of the VADIS DC console and it delivers functionality, features and looks required in broadcast audio applications.
Also: Paradigm.

Kramer Electronics USA Inc. **M9857**

New York, New York

L

L&S Radio Communications **R671**
Intro: CHIRplus_BC is a superior broadcast planning tool for analogue and digital services that assures efficient, top-quality and fast RF design; MULTIlink, microwave link planning and optimization software has available extensions that include point-to-multipoint module; SPECTRAplus, a database solution for integrated spectrum management that supports licensing, billing, workflow management, deadline management and statistics.

Laird Telemedia, Div. of Tower Products **L7056**

LARCAN **L12355**
Intro: Digital transmitters offer UHF solid-state and IOT, up to 75 kW average power, VHF solid-state up to 6 kW average power, digital radio for DAB and Eureka 147 radio for L-BAND and BAND III.

Leader Instruments Corp. **L7051**
Intro: LF 982 digital RF signal level meter operating in VHF, UHF, FM, CATV and SAT bands and featuring C/N, spectrum display, video/audio outputs and measure modes that include OFDM, 8-VSB, QAM-16/32/64, QPSK and analog.

LeBLANC Broadcast Inc. **L12355**

Lectrosonics Inc. **L5812**
Intro: DSP4/4 four-channel DSP audio processor with 12 EQ filters, notch filtering, feedback extermination and compressor/limiter and delay; AM8/4 10-channel automatic mic mixer with four assignable outputs, eight mic inputs and two line inputs with RS-232 control.

Leitch Inc. **L9328**
Intro: The Integrator AES/EBU audio router offers hot-swappable modules, optional redundant power supplies, capability to mix different signal formats within the same 4, 6, or 8RU frame.

LEMO USA Inc. **L6333**
Intro: Connectors for mics, triax, fiber, hybrid; Patch panels for HDTV and custom designed cable assemblies for the audio and video industry.
Also: Connectors, mics, triax, fiber and hybrid.

Liberty Wire and Cable Inc. **M8477**
Intro: CommScope 1524 110 ohm AES/EBU cable for inwall and snakes; Broadcast-quality cable assemblies that are hand-made and hand-tested.

Lighthouse Digital Systems Inc. **L1927**
Intro: Modular II A-D/D-A signal converter for audio and video in a 1 RU frame that holds four modules or a 2 RU frame that holds 16 modules.

Lightning Control Systems Inc. **L12663**
Intro: Uninterruptible Power Systems range from 250VA to 4500Kva and include shut-down software and monitoring of critical operations on numerous operating systems.

Lightning Eliminators and Consultants Inc. **L9143**
Intro: Sandwich Block TVSS units offer no solders, PCBs or wiring between protector elements; DAS lightning protection for towers and high-tech buildings; Chem-Rod grounding system offering low impedance.
Also: Strike prevention for towers and buildings.

Lightware Inc. **L9755**

Linear srl **L1727**

Link Comunicaciones SA **R759**
Intro: Solid-state FM transmitters from 20 to 10,000 W; Studio-transmitter links from 140 to 1700 MHz; Digital stereo generators for Radio Data Systems.

Link Electronics Inc. **L13255**
On Display: D/A and A/D conversion.

Liquid Audio **I6433**
Intro: Liquid Player 5.0 plays digital music formats and offers FastTrack Security, HTTP Streaming, improved track organization, CD burning, album artwork display and a liquid plug-in for RealPlayer G2.

LNR TrexCom **T2541**
Intro: V2245 dual C- and Ku-band 1:N satellite frequency converter system configurable up to 1:8 redundant capabilities; Trekker Super Light provides voice/fax/data plus Internet access using minimum trandponder bandwidth.

Location Sound Corp. **R1791**

Lodestar Towers Inc. **L12355**
Intro: Radio and television turnkey broadcast facilities offering design, supply, installation, commissioning, maintenance and site management; Site services include new site acquisition, zoning, building permits, new buildings, standby power systems, towers, antenna systems for FM, NTSC, DTV, sales/leaseback of existing towers and maintenance and monitoring of site facilities; Restrengthening towers.

Logic Innovations Inc. **S5960**
On Display: IP Encapsulator Data Gateway.

Logitek Electronic Systems Inc. **R3170**
Intro: IO8D is a digital I/O card for the Logitek Audio Engine that doubles the number of I/Os on each card resulting in increased resolution and sample rate; IONet is a LaserSnake network card for the Logitek Audio Engine that allows 64 audio channels to be shared between audio engines and connects via fiber optic cable; VmixNet is software for

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Logitek Digital Consoles allowing faders and router inputs to be controlled over a TCP/IP network.

Also: Numix, ROC-5 and ROC-10 Digital Consoles and audio metering products.

LPB Communications Inc. **R2370**

Intro: 7000 Series Console features three stereo busses and a mono mix, 24-36 inputs, tape outs, remote start on every input, four muting circuits; Signature III Series Console uses rotary faders including heavy-duty mechanical switching, remote starts 18-36 inputs and two stereo busses; Salsa Digital Automation has satellite, automation, live/studio assist, available in NT with multiple-station, single-system packages and turnkey installations.

Also: Hayes Spatial One monitors, AM/FM transmitters, portable radios.

Lucent Digital Radio **R357**

Intro: The Lucent Perceptual Audio Coder (PAC) for use in IBOC, SDARS and Internet broadcasting.

Lysis SA **M7064**

M

Mackie Designs **M9373**

Intro: HDR 24/96, a 24-track hard-disk recorder with built-in workstation editing; professional non-linear unit can be hooked up with any analog or digital console or used as a stand-alone, provides creative tools without requiring investment in an expensive computer-based workstation; Interfaced with Digital 8-Bus console, the One Vision/One Software system makes digital recording and editing affordable; Plug-ins from Antares, Drawmer, Massenburg, and T.C. Electronics.

MAGMA **M8959**

Intro: Slot CardBus PCI Expansion System is a mobile chassis that provides a professional mobile system and is available with or without an Ultra 2 SCSI controller card; 6 Slot PCI Expansion System is a practical, durable expansion chassis that can be used as a desktop or rackmount unit and can be shipped with a 300 W ATX power supply. 64-Bit 7 Slot PCI Expansion System offers a fast transfer rate of 264 MB per second and can be shipped with an ample 300-watt power supply and extra cooling.

Magnum Towers Inc. **R673**

Management Data Software Engineering AG **R757**

Intro: D'ACCORD Broadcast Studio digital radio software is a turnkey solution that fits radio stations of all sizes; DigAS NewsPlayer2 dedicated to the broadcast of audio, text and combined text/audio playlist items.

Manhattan Production Music **L5429**

Intro: *www.mpmusic.com* is a user-friendly Web site featuring detailed music searching and real audio samples of music libraries.

MapQuest.com **M9468**

Intro: MapWire is an online, 24-hour map source for media use that includes a library of completed maps plus a unique system that allows you to create or order custom maps.

Marshall Electronics Inc. **L12634, T2632**

Martinsound Inc. **R582**

Media Concepts Inc. **L9231**

MediaFORM Inc. **M7670**

Intro: cdDIRECTOR is an automated network-attached CD imaging, mastering and duplication system with in-line color printing and remote client access, offering simplicity and versatility in any production environment; 3703I and 3703T line of NT-based, integrated duplication/printing systems built on varying components of the existing automated product line; CD-3702 delivers simple operation and unattended duplication of 100 CD-Rs and the system provides dependable, unattended duplication of data or audio CDs.

MediaTouch **R374**

Intro: Ready to Go Radio, a solution bringing together music and automation and harnessing the power of the internet; QuicLogger, a PC-based audio logger records two stereo or four mono feeds, recorded audio may be retrieved via a Web page; Newsware, a newsroom solution that integrates text and audio that connects remote reporters and stations via the Internet.

Also: OpLOG 2000 Enterprise System; QuicPix Radio Studio.

Mediatron-Digital Audio Systems **R3995**

Intro: AirControl for Internet radio automation system specially designed for the needs of Internet radio with e-commerce functions for additional revenue through click and buy; VoiceEngine, plug-in module for the mediatron AirControl NT Radio automation system for automated speech announcement through text-to-speech.

Megatrax Production Music Inc. **I6436 & R2257**

Intro: Unlimited Classics, 105 fine classical music pieces for production use; The Promo Collection is a production music library for film, television, advertising and multimedia with thousands of fresh cuts in every style; Lounge Deluxe is a blend of retro lounge cuts featuring exotic mambos, kitschy cha-cha's, archive TV styles, 1960s spy themes and more.

Merging Technologies **R2594**

Intro: PyraMix Virtual Studio 3.0 is a Windows NT4.0/2000 PC-based audio workstation that employs 32-bit signal processing for sonic integrity with unlimited tracks of hard-disk playback with 64

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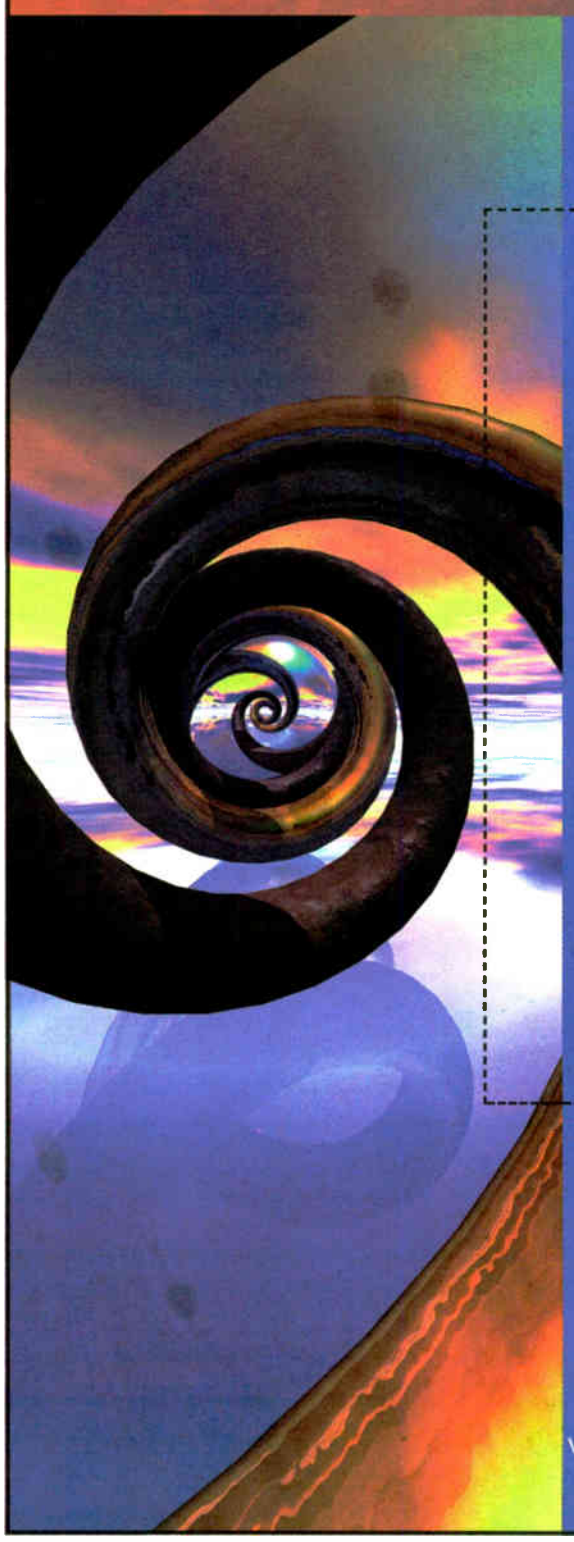

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live inputs and outputs, DirectX support and built-in CD mastering included with crossfade editor and up to 64 x 64 automated mixing grid with Surround, stereo and mono mixing; The Sphynx Audio Interface with 8 inputs and outputs of 96-kHz/24-bit audio has a choice of sync sources including video/(PAL/NTSC), AES/EBU, wordclock, ODI and S/PDIF.

Also: Keops audio card/PyraMix.

Merlin Communications International Ltd. **T1927**

MGE UPS Systems Inc. **I7130**

Intro: Comet features the lowest line noise on any large UPS and has a small footprint, low operating cost and track record of reliability; EPS6000 UPS was designed to accommodate the high surges associated with the new generation of digital IOT-type transmitters and provides clean output power; Galaxy 3000 UPS incorporates the best features of a true online UPS in a smaller package, ideal for small studios, control rooms and microwave links.

Micro Communications Inc. **L10374**

On Display: N+1 and N-1 combiners; UHF/VHF combining; RF systems; Antennas.

MicroBoards Technology Inc. **S4572**

Intro: StartREC is the first digital audio editor/CD-R duplicator that is housed in one standalone, rackmountable unit with all the features of a standalone editor and the power of a CD-R duplicator; Professional CD Factory 2000 is a PC software and hardware bundle at 8X speed and includes CD Architect, Soundforge XP, MP3 software, Hotburn data premastering software, PCI SCSI card and the PlayWrite 8020 Panasonic 8x20 recorder.

Also StartREC; Professional CD Factory 2000.

Micron Audio Products Ltd. **L11873**

Intro: Tram and Sonotrim miniature electret lavalier microphones and accessories, providing complete repair and rebuild services for all Tram and Sonotrim products.

Microsoft/WebTV **S4920**

Microspace Communications Corp. **T439**

Intro: Velocity File Forward is a satellite-based point-to-multipoint file delivery product that features small antenna technology and an inexpensive pay-by-the-file pricing structure.

Microwave Service Corp. **L5333**

Middle Atlantic Products Inc. **M10164**

Intro: Edit Center is versatile studio furniture for production or post facilities, featuring forced air-cooled equipment racks, and available in graphite or cherry finish; Multidesk System 2 is a studio furniture system with stock components that are user-configurable providing unlimited furniture layouts to fit any room.

Also: MRK and VRK series equipment; racks; rackmount accessories.

Milestek Inc. **S3250**

Miller & Kreisel Professional **S4175**

Miranda Technologies Inc. **L3330**

Modulation Sciences Inc. **L12552**

MOHAWK/CDT **L11933**

On Display: AES/EBU Audio Cable.

Moseley Associates Inc. **R3174**

On Display: MRC-2 Remote Control System; MRC-1620 Remote Control System; MasterController for Windows; Starlink SL9003T1 digital transmission system; Stalink SL9003Q digital studio-transmitter link; Starlink SL9001SS link; PCL 6000; DSP 6000.

mSoft Inc. **R3691**

Intro: ServerSound is a digital asset management system using a browser, making it cross-DAW and platform, accessed via local network or Internet, includes a disk array loaded with owned libraries; Pro/Master software automates "mastering" of audio from CD or tape to ServerSound, digitalized audio is quickly separated to track/index by duration of silence and then linked to database.

Multidyne Video & Fiber Optics Systems **L9144**

Intro: DVM-2000 12-bit video fiber-optic system supports 12-bit video and 24-bit audio transport over fiber-optic cable, exceeding RS-250C short-haul and broadcast specifications, the system will support one video and up to six audio and data channels, applications include STL, studio to studio, studio to CATV head-end, distance learning, satellite up and down links, common carrier transport, telco circuits and back-haul feeds from special events.

Musashi Co. Ltd. **L208**

Intro: Log Motion MDC-100 is a system that remotely controls video disk recorders with various operations relating to record and play.

Musicam USA **R2685**

Intro: Prima LT Plus is a full-featured stereo codec with 24-bit A/D and D/A converters, accepting up to three plug-in ISDN terminal adapters for contribution-grade audio transmission or point-to-multipoint broadcast operation without external hardware; Prime LT is a high-performance stereo codec with simplified user interface, one digital interface slot, and accepts one ISDN BRI or other DIF card; TEAM is a modular T1/E1 audio multiplexing transmission system that can send or receive up to six stereo or 12 mono program feeds over T1 or E1 and has an Ethernet port for streaming audio for Internet or LAN/WAN feeds.

Also: Prima Series; RoadRunner; StudioFone; FieldFone.

MYAT Inc. **L5613**

On Display: Coaxial transmission lines; components and accessories; wideband UHF transmission lines; hybrid-less power combiners.

N

N Systems Inc. (NSI) **L13212**

On Display: Super Pod ENG helicopter system.

Nada-Chair **S5457**

Intro: Acti-Vest is a photojournalist-style vest with a back support integrated to permit the user to sit anywhere comfortably; Back-Up is a unique solution that uses reverse pressure from the knees to support your back; Sit-Pack, for those who need an oversized fanny pack for equipment, offers back sling support for sitting comfortably anywhere.

Nagra USA Inc. **L5603**

Intro: ARES-P Solid-State single-hand operation recorder features PCMCIA Flash media, G 722, MPEG Layer II compression, three hours recording time, mono or stereo plug-in microphones, headphone output, high-speed computer download.

Nalpak Video Sales Inc. **L11074**

On Display: Tuffpak is a tripod shipping case, available in 17 sizes; Alumakart is a production cart that is lightweight and compact; Pelican cases are shipping and handling cases, water and air-tight, with a lilfetime warranty; Accuchart; Creative Controls, Magli.

National Semiconductor Corp. **L3720**

On Display: Manufacturer and supplier of semiconductor products and analog technologies that include Interface products supporting SMPTE 259M and LVDS, Op-Amps designed for video and audio applications; A/D converters used in a variety of broadcast applications.

Nautel Maine Inc. **R3182**

Intro: Nautel XL60 AM/IBOC DAB transmitter, a 60 kW solid-state transmitter offering extra headroom for hybrid digital and full-power AM, 155 percent positive peak modulation at 50 kW, modular on-air serviceability, dual exciters with auto changeover and 84 percent overall efficiency; Nautel FM solid-state transmitter technology; ND5 solid-state AM transmitter offering digital transmission compatibility, 140 percent positive peak modulation at 5 kW, modularity, on-air serviceablility, dual exciters with auto changeover and 75 percent overall efficiency.

Also: XL12 12 kW solid-state AM/IBOC DAB transmitter.

NDS Ltd. **S4138**

Nelson Custom Cases **M8740**

Intro: Shipping/Storage Cases are protective, custom designed and reusable for use in TV, audio/video sales and are also available for delicate electronics exhibited at national and international trade shows.

Nemal Electronics International Inc. **L13120**

Netia Digital Audio **R3160**

Intro: Radio-Assist software for radio stations covering all the processes necessary for the running of a radio station from acquisition to broadcast; Insider uses an in-house network to give radio staff direct access to documents in the database and provides streaming audio technology for instant listening; Internet Radio offers a live performance of the company's products, including the processes of production, broadcasting via satellite and reception of a radio program on the Web.

Network Electronics AS **L1627**

Intro: Flashlink is a fiber-concept for optical signal distribution and multiplexing via fiber between buildings, towns and countries with plenty of new models available; VikinX.64 is a 64x64 family of analog and digital routers for both audio and video, offers new features on router families 32x32, 16x16, 8x8 and 16x2 with new front design; HD Routers come in sizes 16x16

World Radio History

and 8x8 and include automatic bit-rate detection between 143 Mbps-1.5, builds 19-inch 2RU, frame only 0.39 inche.

Network Music LLC **L6738, S5373**

Intro: OFFICE Volumes 94, 95 and 96 are collections of "office" sounds that include coffee room sounds, tape recorders, water fountains, briefcases, chairs, desks, tape dispensers, pencils, sharpeners and office atmosphere.

Also: Network Production Music library, Short Trax library, Network Classical library, Network Sound Effects library.

Neumann/USA **L7530**

Intro: KMS 105 supercardioid vocal microphone offering 145 dB maximum SPL, reduced handling noise and sensitivity to plosives, 127 dB dynamic range and high-resolution and neutral off-axis response.

Also: KM 184 miniature condenser mic with a cardioid pattern, transformerless circuitry and a 20 Hz to 20 kHz frequency response; TLM 103 large diaphragm condenser mic with a cardioid pattern, single diaphragm, transformerless circuitry and a 20 Hz to 20 kHz frequency response.

Neutrik USA Inc. **L12139**

Intro: BNC Connectors now feature a non-locking friction fit connector; Minilyzer is a palm-sized analyzer for audio analysis.

Also: Speakon, Powercom.

New England Satellite Systems Inc. **T1445**

Newpoint Technologies Inc. **T1347**

Newtec America Inc. **T1941**

Nicom LLC **R1787**

Intro: Poseidon digital five-band audio processor with 30 pre-programmed/10 custom equalization curves, digital input (AES/EBU-S/PDIF) digital stereo enhancer and generator, nine DSPs for power and Win 98/NT or satellite control; Atlantis 8-channel mixer offering modularity, an external switching power supply, conferencing, talkover, talkback, inputs that include three mic, 10 various line, two telephones and phono, and five outputs; BKP950, a 940-960 MHz broadband STL grid reflector antenna contructed of stainless steel with low windload and a high gain semi-parabolic design.

Non-Stop Music Library **S3424, L6747**

Intro: More than 600 themes in 20 categories, film and stage, swing, Xtreme and comedy with no piece of music over 4 years old and 6 to 10 update CDs per year with annual and needle drop available; Ded Good Music Library has more than 150 themes of Euro pop, dance, club and industrial music available exclusively in the U.S.;

Also: Twenty years of experience in writing and producing custom music for TV broadcast, news and commercials, owns a state-of-the-art, 16,000 sq. ft. facility, has seven composers.

Northern Technologies Inc. **L5830**

Intro: DMK Series of transient voltage surge suppressers (TVSS) offer protection for AC circuits with a small footprint; MMK Series provides "brute force" protection by diverting power outages and preventing damage to sensitive equipment; TCS-HWR Series, a hardwired two-stage TVSS designed for a 15 or 20 amp AC circuit, providing protection and filtering for sensitive equipment.

NPR Satellite Services **R1159**

On Display: Satellite space segment (audio, data, compressed video) to network design and digital conversion, NPR Satellite Services can tailor a package to meet your requirements.

NS Microwave **L3420**

On Display: Remote control of ENG truck, helicopter tracking, m/w links.

NSN Network Services **R2581**

On Display: The satellite networking division of Clear Channel Communications is building the world's most advanced satellite delivery platform available to the radio industry; Next-generation satellite services updates; Offerings include Supercarrier, KEL Audio, InSat Broadband-on-Demand and WAN Protection Services. Installed client base of 6,000+ nodes world-wide; company operates and supports networks in more than 16 countries.

Nucomm Microwave Inc. **L5451**

NVISION **L543**

O

OMB America **R2688**

Intro: The FM Digital Exciter directs digital modulation, signal processing, low S/N ratio, low distortion, high linearity and temperature stability.

Also: FM transmitters, radio links, antennas, connectors.

Omnia, a Telos Co. **R2057**

Intro: ToolVox digital microphone processor is an integrated digital microphone processor that features dynamics, EQ, de-essing, reverb and high performance preamp, with up to 100 customizable presets; Omnia Plug-in modules give users the ability to extend the power of their Omnia.fm Digital Audio Processor; Omnia.fm all-digital, DAB-ready Omnia family of FM, AM and Internet audio processors with unique DSP algorithms.

Omnimusic **L6529**

Omnitronix Inc. **R2667**

Intro: Digital, solid-state AM medium-wave transmitters from 500 to 100,000 W; Digital, solid-state shortwave transmitters from 3-7 MHz and 1-10 kW; Digital, solid-state AM medium-wave frequency-agile transmitters that change frequency in one second, up to 50 kW.

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On Air Digital USA **R694**
Intro: RadioSuite-Linux based audio server plays linear and MPEG audio using non-proprietary sound cards Ultimate Digital Studio II-Control of audio hard drive systems, CD changers, satellite feeds and other devices. WarpCoder/Player/Streamer-Windows based MP3 encoders, customizable players and streamers. OAS-Basic music scheduling system, buyout.

Opamp Labs Inc. **L10073**
On Display: Video/audio amplifiers including distribution, microphone, equalization, line, voltage control; routing, assign and matrix switchers; five models of mult boxes.

Opus I Production Music **S3303**
Intro: Production Music Library contains more than 400 compact discs and spans music of all styles and genres.
Also: JW Media; Kosinus; Soundstage; No Boyfriend; Gung Ho!; Readymade.

Oracom **T2240**
Intro: Element Manager/Oraview produces network management products for broadcasting systems, with a line of Element Managers, monitors and controls through a Web browser and customized software.

Orban **R3686**
Intro: Optimod 6200 audio processor designed for the requirements of Webcasting to create the Optimod sound on the Internet, digital radio (DAB), and digital television (DTV); Optimod 9200, featuring new V2.0 software with presets designed for AM and SSB high-frequency shortwave broadcasting; Audicy digital audio editor has new V3.0 software that features a networkable system and new digital effects;
Also: Optimod Processing, Audicy digital audio editor.

Otari Corp. **L9741**
Intro: Radar II HDR multitrack recorder, providing simultaneous 24-track/24-bit recording with editing and multiple sync capabilities; Advanta BP, combining application-specific features and software with GPI/O capabilities.
Also: UFC-24; MX-5050 BIII; MTR-90.

P

Pacific Bell **T1556**

Pacific Radio Electronics **L6147**
On Display: Stocking distributor for products by ADC, Amphenol, Belden, BGW, Caig, Canare, Cooper Tools, Elco, Kings, Mid Atlantic Audio, Mogami, Neutrik, PermaPower, RDL, Switchcraft, Telex, Trompeter, Tyton and 100 other product lines.

Doug Enderson
Nat'l Sales Mgr.
969 N. La Brea Ave.
Los Angeles, CA 90038
323-969-2035
800-634-9476
FAX: 323-969-2053
E-mail: info@pacrad.com
www.pacrad.com

PanAmSat Corp. **T2332**

Panasonic Broadcast & Television Systems Co. **L8236**

Path 1 Network Technologies Inc. **M9776**
Intro: PG1 is a professional multimedia gateway that features Path 1AEs patent-pending TrueCircuit that bridges industry standard interfaces for video, audio and data with the Gb Ethernet network; PS100 is a rack mountable real-time 10/100Base-TX Ethernet switch with either eight or 16 ports and quality of service guarantees supporting Path 1 Network Technologies Inc. with TrueCircuit virtual circuit capabilities; TMG is a multimedia gateway that features Path 1AEs patent-pending TrueCircuit technology supporting video, audio and data with guaranteed signal quality over standard Ethernet/IP networks.

Peace Corps **M9733**
Intro: PSAs from an international volunteer organization serving 70 developing countries in areas such as education, small business development, agriculture, health, community development and the environment.
Also: Public Service Announcements

Penny & Giles Studio Equipment Ltd. **R2270**

Penta Laboratories **R2565**
Intro: A selection of electron tubes used in broadcast equipment, most popular are the 3CX & 4CX series; The improved 4-400CG (Graphite Anode) replaces the 4-400C and 4-400A.

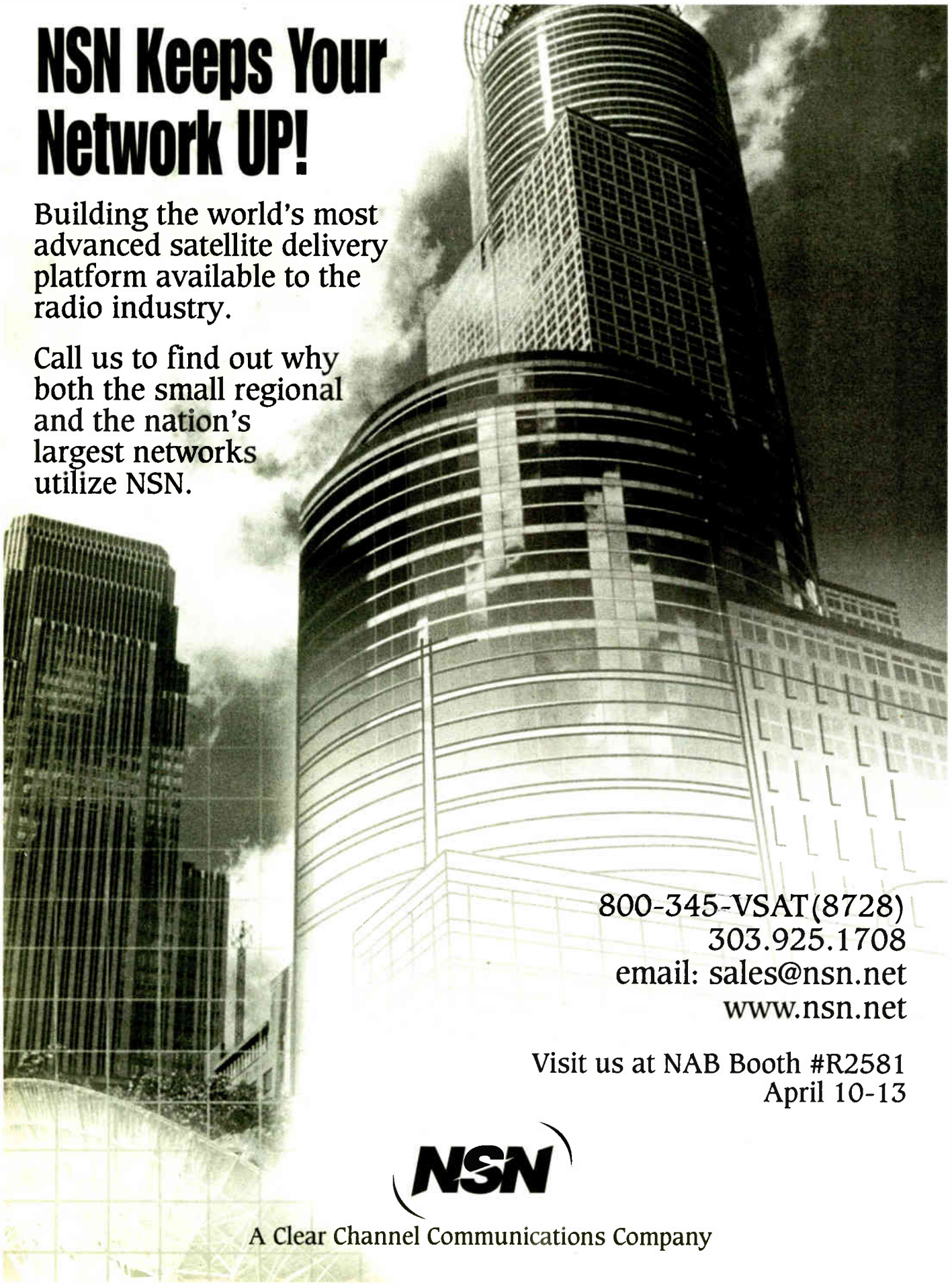
PFC **S5365**
Intro: #2000 is a 4-wheel Handtruck that has a 300-pound capacity and folds for easy storage or transport.

Phasetek Inc. **R4089**
Intro: Switching systems and overpower controls.
Also: AM/MW antenna phasing systems; antenna tuning units, diplexers and associated parts.

Pineapple Technology Inc. **R2596**

Pioneer New Media Technologies Inc. **S4657**
On Display: DVD-V7200; DVR-S201.

PixelTools Corp. **M9540**
Intro: TransMux software transport multiplexer/demultiplexer capable of transcoding MPEG streams to a program or system stream and vice versa; EmbeddedMpeg libraries for including a MPEG video or audio format into an application.
Also: SimpleDVD; ExpertDVD.



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Continuing a 50 year tradition of state of the art sound quality and precision manufacturing, Studer proudly presents the On Air 2000 MkII. Featuring "Touch N Action", a familiar, straightforward touch-screen interface with programmable rotary controls, it is easy to learn and simple to operate. Call the Studer office nearest you for a detailed product booklet or to arrange a private demonstration.

The On Air 2000 MkII also features:

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- Remote control from automation systems
- "Studer Sound" AD and DA converters
- Customizable per user/show, password protected (20 users)
- Snapshots can be stored on PCM/CIA cards
- A/B select on mic / line / AES inputs (6x1 optional)
- Selectable channel EQ, and output bus limiting
- Built-in clock/timer with ext. sync option
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Options include:

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- Studio talk-back box or custom made turrets
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PixStream Inc. **L3113**

PMI Audio Group **R2292**
Intro: VC1Q JoeMeek is a multi-function device with a transformer mic-preamplifier, compressor, EQ, enhancer and de-esser for audio and radio; The Studio Projects TB-998 is a tube dual triod condesnser microphone with variable patten control for recording and on-air.

Porter Case Inc. **M8947**
Intro: The Porter LCD/AVcase is a patented hard-side wheeled airline-size carry-on case with a built-in cart that carries 200 pounds on top as well as soft four-inch ball bearing wheels, a combination lock and a 42-inch extension handle; The Porter Elite is a smaller hard-side airline-size wheeled carry-on with built-in cart that carries 200 pounds and is identical to the large Porter Case, conveniently fitting under an airline seat.
Also: Porter Case.

Potomac Instruments Inc. **R2677**
Intro: The 1900 Series MW Antenna Monitor features a continuous true ratio, stable readings in presence of modulation and remote controls; FIM-41 MW Field Strength Meter covers 540 kHz in two bands; FIM-71 is a VHF Field Strength Meter that covers 45-226 MHz; FIM-72 is a UHF Field Strength Meter that covers 450-960 MHz.
Also: AA-51A Audio Analyzer; AG-51 Audio Generator.

PricewaterhouseCoopers **S5876**
On Display: Professional audit, finance, HR, management consulting, outsourcing, tax and legal services for the entertainment, media and new media industries.

Prime Image Inc. **L10186**
On Display: Cash time-shift processor reduces program time to create additional content time.

Jim Aldrich, VP Ops.
662 Giguere Ct.
Ste. C
San Jose, CA 95133
408-867-6519
408-926-5177
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Pristine Systems Inc. **R1161**
Intro: Pristine RapidFire Digital Broadcast System, encompasses scheduling, production and on-air operations, while accomodating live assist, walkway and satellite programming.

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Pro-Bel **L12908**
On Display: Freeway, TX 320, TX 310, MAPP, Accent

Production Garden Music **L5938**
Intro: Music StreetProduction Library is a 15 CD library that includes New Rock, Country, Nu Jazz, Retail, Olympic, World and Funky, and is compatible with 10-, 30- and 60-second tracks; MSE Production Library is a versatile, new, broadcast/multi-media library that includes Rock, Grooves, Jazz, Fusion, Retail and Comedy and is compatible with live instruments for 10-, 30- and 60-second tracks.
Also: Broadcast Series 100; A/V Series 200; Air Assault.

Professional Label Inc. **L9754**
Intro: All types of labels for DAT, status labels, custom printing of logos and glossy cardboard sleeve labels; CD labels with free "CD Widget" applicator and matte, glossy, light blue jewel case inserts for the front and back of jewel cases; Label Producer for Windows has all media format label templates pre-formatted and ready for use with all laser/inkjet labels.
Also: Labels.

Professional Sound Corp. **R3392**
Intro: PSC M4mkII is a portable ENG mixer that operates from a NP-1 battery and provides power for a wireless and comes with a boom pole mounted remote control; Wind Boss microphone windshields utilize the universal shock mounting system and accept any microphone.

Professional Sound Services Inc. **S3435**
Intro: Lectrosonics UCR210D/UM250b provides high-output synthesized UHF wireless for ENG/EFP and 256 switchable channels;
Also: Wireless; DATs; microphones.

Promusic Inc. **L6546, S4543**
Intro: Production Music is a music library with all styles of music with custom-pick selection of CDs.

Propagation Systems Inc. (PSI) **L9086, R1495**
Intro: The FHR and FMR Rototiller FM Antennas provide internal feed point and excellent VSWR bandwidth for applications that require relative insensitivity to icing.

Prophet Systems Innovations **R3189**
Intro: NexGen Digital Broadcast features WANcasting, voicetracking, and scalability; CD/Extractor allows users to record cuts and music notes at a fraction of the time and cost, without distortion and features built-in levelers and tones to assure original integrity; NexGen Digital Entertainment uses centralized management and complex computer automation for show control and event management.
Also: AudioWizard.

ProSource/BMI **L11878**

PSSI, Production & Satellite Services Inc. **T2143**

Pulizzi Engineering Inc. **S3433**
Intro: IPC 3300F provides a remote reboot of equipment via direct link, modem, TCP/IP, Ethernet or Token Ring with password protection, Windows GUI, includes up to 80 individually named ports, EMI/RFI filtering and surge suppression; TPC 2562 provides 120V or 240V, 16A reduntant dual power input with auto-switching between primary and secondary sources and includes under-

World Radio History

voltage sensing for both sources, Latching-Hysteris, EMI/RFI filtering and surge suppression; The TPC 4000/MTD provides three-phase 120/208 input, 120V one-phase output, 30A in a 1U high chassis, EMI/RFI filtering, surge suppression, remote on/off control and remote emergency power-off I/O ports.

Q

QEI Corp. **R2678**

Intro: Intelligent monitoring and protection system that monitors and controls combiner and antenna networks used in multi FM station applications; M-Series solid-state FM transmitters with power levels from 1.2 kW to 9.6 kW and requiring less than 50 W RF drive; The Quick-Link II is a spread spectrum, stereo, digital radio system, frequency operation from 2400-2485 MHz.

R

Radio Computing Services (RCS) **R3674**

Intro: Selector for Windows, and Linker, its companion, is a new version of the classic favorite for music scheduling for event planning and promo rotation for radio or internet stations; Radio Show is an Internet tool that provides continuously changing animated graphics and links to advertiser or artist sites plus title and artist postings; Multi-Player allows the user to run four radio or Internet-only stations from one computer.

Also: Master Control NT, Internet Voice Tracking, Burli Newsroom Editor.

Radio Express Inc. **R2084**

Intro: Radioplay Dance Express, a weekly music service featuring new dance releases from around the world; Radioplay Tropical Express, a weekly music service featuring new salsa, meringue and cumbia music from Latin America; D-FRAG production music library offering production music and effects for spots and promos; American Top 40 with Casey Kasem; The Countdown with Walt "Baby" Love; Gospel Traxx with Walt Love; Cyber Buzz, daily one-minute features via the Internet on wired culture and urban technology; The Country Oldies show, a two-hour weekly show hosted by veteran country programming expert Steve Warren; Atlantic Crossing, a weekly two-hour acoustic New Age, contemporary and traditional indigenous music from Ireland, Africa, the Andes and Asia ; Jingles by Thompson Creative now available outside the U.S.; Powergold 2000 music scheduling software for Windows 95/98/NT.

Radio Systems Inc. **R2663**

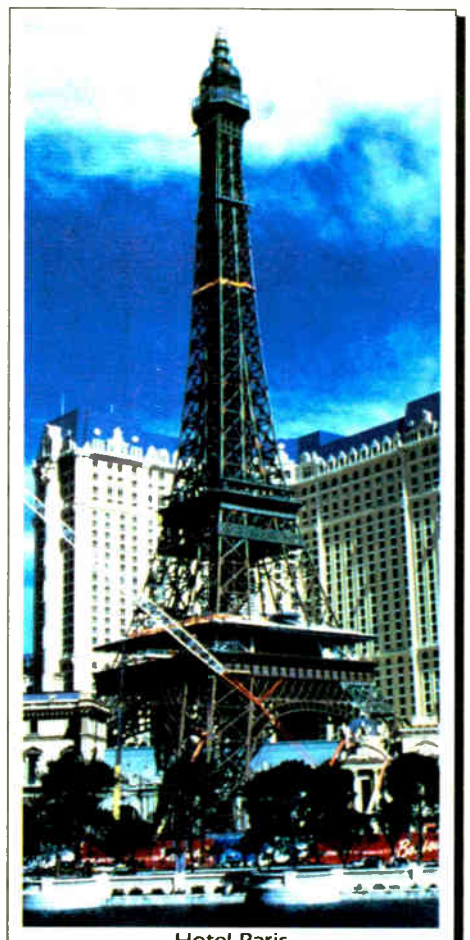
On Display: Millenium line of broadcast consoles, clocks and timers, distribution amplifiers, telephone interfaces and StudioHub integrated analog/digital wiring product line that includes wiring 'hubs,' distribution, headphone and mic amps, routing switchers and CAT-5 adapter cables for virtually any type of broadcast gear.

Radio World **R3759, L5202**

See our listing under IMAS Publishing.

Radyne ComStream Corp. **T1450**

Intro: IntelliCast 2000E Digital Broadcast Receiver allows transmission of digital video, audio or data, applications include distributing broadcast-quality television programs, IP video/audio streaming, Web caching or digital computer data files to remote sites; IBR.45 Internet Broadcast Receiver allows transmission of digital data, applications include distributing broadcast-quality television programs, IP video/audio streaming, Web caching and digital computer files to remote sites; MediaCast Satellite PC/Server Receiver Card adds DVB funtionally to the next-generation, multimedia PC, bringing video, audio and information directly to PC users via satellite, it also operates in SCPC or MCPC mode.



Hotel Paris

RCI Custom Products **M8032**

Intro: 30 Pak Panel Packages, bulk packaging and pricing on blank panels, vent panels and security covers; Press Mults BM-30T, BM-24 and BM-AV offer model year 2000 improvements on Press Mults.

RDL

Radio Design Labs **R2954, L12510**

Intro: RU-AEC1 AES/EBU digital audio converter with 24-bit/ 96 kHz capabilities with Sure-Lok Auto recovery technology; RM-MP 12, a 12-channel audio monitor panel with speaker, headphone jack, external output, VU LED on each channel and overall level meter in 1RU.

RealNetworks Inc. **I7439**

Intro: Advertising Extension for RealServer 7.0 offers advertising revenues and opportunities for online media broadcasters, such as the ability to place and rotate ads along with a streaming media presentation.

Also: RealSystem G2; Real Broadcast Network; RealGuide

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Register Data Systems R3468
Intro: Millenium Traffic System Windows-based traffic and billing system that can handle multiple stations including tower rentals and other non-broadcast rental items.
Also: The Phantom; The Replicator; System 6 Traffic and Billing.

RF Technology/
Continental Microwave L13235
Intro: Integrated Satellite Earth Stations offer digital and analog video and/or audio transmission as well as VSAT networks for business data. communication networks, telephone systems and Internet IP applications.
Also: SNG Flyaway/Vehicle: Broadcast Transmitters; ENG/Fixed Microwave.

Paul Brett, VP Sales & Mktg.
16 Teta Pl.
Norwalk, CT 06854
203-866-4283
Ext. 301
FAX: 203-853-3513
E-mail: sales@rftechnology.com
www.rftechnology.com

RFS Broadcast L12366
Intro: A variety of wideband panel antennas suitable for providing customized coverage.

Richardson Electronics Ltd. L6413
Intro: MTIK is a 1 kW FM transmitter; AIR5D is a remote digital audio console by Omnicast;
Also: Power tubes; sockets; audio products; transmitters.

Rip-Tie Inc. L12572
Intro: Rip-Tie Cable/Wrap attaches permanently to any cable or wire to keep connections organized, available in many different sizes and colors; CinchStrap - EG cable organizer has a brass grommet giving the user the strength of a metal fastener to attach this cable organizer to a rack or cart allowing a quick release and gentle hold of a hook and loop cable management strap; New Econo Series includes EconoWrap, EconoCatch, EconoCinch and EconoEG.
Also: CableWrap; CableCatch; CinchStrap; and Rip-Tie Lite.

Rohde & Schwarz GmbH L4758

Rohn Industries Inc. L13252
Intro: Tall Towers for DTV, a 1,000-foot tower with 7-foot 6-inch face spread and 2,000-foot tower with 10-foot face spread.

Roland Corp. U.S. R2063
Intro: VP-9000 VariPhrase processor, capable of real-time manipulation of sampled phrases for pitch, time and format via MIDI while maintaining sound quality; VS-1880 digital studio workstation self-contained digital hard-disk recorder/mixer with 18-track playback, 24-bit A/D-D/A converters, faster CD mastering, available bundled with free audio production and publishing software from Emagic and Liquid Audio; VSR-880 digital studio recorder features V-Studio technology in a rack with eight tracks of 24-bit hard-disk recording, 128 virtual tracks and optional effects.

Rules Service Co. L6612
Intro: FCC Rules and Regulations are available on CD ROM and can be purchased individually or in packages; Patent and Trademark Rules and Regulations are available on disk or loose-leaf.

Russ Bassett S6051
Intro: Media Max features flexible drawer cabinets designed to hold mixed collections of tape and disk formats; Pro Matrix are open shelf cases that utilize wall space to store media; Gemtrac is a high-density tape and disk storage solution that uses 25 feet of floorspace and can hold up to 9,540 4mm tapes, 7,644 audio cassettes or 10,660 CDs.

Rycote Microphone
Windshields Ltd. R2254
Intro: The Windspoiler's push-on design removes turbulence from the airflow around uncovered parts of a microphone when using a Rycote Softie with Mount, improving wind attenuation with zero signal degredation; New design features of the Modular Supension system include easier adjustability, enhancing the benefits of a suspension that can be custom-rigged to suit individual work styles.

RYMSA
Radiacion y Microondas SA R3194
On Display: Antennas; combiners; power splitters; filters; switching boards.

S

SADIE Inc. R369
Intro: Professional digital audio and video equipment for the radio production, film and video post production, and mastering industries. The company has offices in the United Kingdom, Nashville USA (SADiE Inc.) and Germany (SADiE GmbH). SADiE, Inc. supports a network of dealers throughout the world.

Sanken Audio Systems R1493
On Display: CS-3 shotgun mic; CSS-5 shotgun stereo mic; COS-11s miniature lavaliere mic.

Satellite Engineering Group T1653
Intro: Prodelin 3.7-meter satellite antenna, an eight-segment glass fiber SMC prime focus with quad-feed support, C-band gain 41.5 dBi and Ku-band gain of 50.7dBi for Az/El or polar mount types; California Amplifier PLL LNB, a C-band phase-locked loop LNB, featuring noise temperatures of 20 to 40 degrees.

SBS Technologies Inc. M9728
Intro: SBS PCI expansion units add PCI slots to a computer and are available in four-, seven- and 13-slot versions.

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...at a cost savings means real value in any broadcast market. But don't take our word for it or let our 25-plus years in the business cloud the issue. Try these or any of our first-quality products at your station at no risk with our no-fault, 30-day return policy,

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Schulze-Brakel GmbH **R954**
On Display: Microphone wind screens.

Scott Studios Corp. **R4093**
Intro: Scott 32 touchscreen on-air audio system for Windows 2000, Linux and DOS, separate commercials for Internet Webcasts; Auto School Closing Reporter, an auto phone answering machine using Caller ID and security codes to collect school closing info that outputs to laser printer, computer screen and HTML to Web site. AXS3 digital audio system for music from hard drive, satellite formats, cart replacement, live assist or automation.

Seamount Technology **L5756**
Intro: AES and analog audio balanced patchbay products, patch cords and cable assemblies; Distribution/breakout panel systems provide flexibility and utility in inter-connecting cable assemblies.

SED Systems Inc. **T2532**
Intro: Uplink stations transmit voice/data to satellites for transmission to large regional audiences; Network management systems manage and operate satellite networks; Satellite test systems operating on industry-standard communications busses and with intuitive user interfaces for accurate and repeatable measurements.
Also: Uplink stations.

SENDER SA **R1496**
Intro: One to 60 kW compact solid-state AM transmitters offer high-modulation capacity, modular construction.

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Sennheiser Electronics Corp. **L7530**
Intro: MKH800 condenser microphone for studio, broadcast and film recordings with features such as the capability of handling new high-fidelity audio storage mediums (Super Audio CD and audio DVD), frequency response extending up to 50 kHz, dynamic range of 126 dB and a self-noise of 10 dB.
Also: EK3041 U wireless mic receiver for field or broadcast use with 32 selectable frequencies, PLL synthesis and HiDyn plus noise reduction; EK3052 wireless bodypack in-ear monitor system for field or broadcast use with 16 switchable frequencies, hi-dyn plus noise reduction and a frequency response from 45 Hz to 15 kHz.

Shiron Satellite Communications **T2245**
Intro: InterSKY System combines DVB-S technologies in the forward link enabling two-way network communications via satellite and provides asymmetric content delivery with standard IP-based system, supporting data, video and voice transmission; Remote Gateway integrates an L-Band VSAT modulator and DVB-S receiver into a ground terminal and supplies two-way Internet, Intranet and private WAN satellite connectivity based on standard DVB/MPEG-2 protocols.

Shopping

Shively Labs **L5813, R1074**
New: Low-windload UHF/FM Radome with a five-meter actual-size static display; FM IBOC Digital FM bandpass filter.
Also: An assortment of FM and UHF antennas; services from preliminary pattern studies to manufacture of hardware aimed at maximizing coverage.

Shure Inc. **L5617**
Intro: SCM410 four-channel automatic mixer featuring balanced in/out, peak limiter, master level control, 1/2-rack size and the company's IntelliMix circuitry for minimization of audio problems.
Also: U/UC wireless; FP portable mixers; SM microphones.

Sierra Automated Systems **R2380**
Intro: 32KD analog and digital audio routing system, with up to thousands of inputs and outputs; 64000 analog and digital router with 256 x 256 capability and hardware and software control panels; 32000 analog router with mixing, mix-minus generation, intercom and IFB.
Also: 16000; 16000D.

Sierra Design Labs **S5515**

Sierra Video Systems **L4654**
Intro: Yosemite large-sized digital and analog video and audio routing switchers ranging from 64 x 64, 96 x 96 and 128 x 128 with analog and digital components for facilities migrating from analog to digital.
Also: Sierra and Tahoe routing switchers.

SierraCom **T1447**
Intro: 38 GHz connection series radio for short-range access applications.
Also: Point-to-Point microwave radios.

Sigma Electronics Inc. **L9376**
On Display: Routing switchers; distribution amplifiers; signal processing.

Silicon Valley Power Amplifier Corp. **R2697**
Intro: 10/3000 FM amplifier (3 kW) with 10 W input, broadband, VSWR foldback, remote operation, modular construction, one person installation and a three-year warranty; 10/1000 FM amplifier (1 kW) with 10 W input, broadband, VSWR foldback, remote operation, modular construction, one-person installation and three-year warranty; B-2000 FM amplifier with up to 2.4 kW output, 10 W input, broadband, VSWR foldback, remote operation, modular construction, easy installation and a two-year warranty.

Smarts Broadcast Systems **R3491**
Intro: The Right Touch, a touch and play system for music, spots, jingles and liners using a Windows operating system and flat touchscreen technology; Smarts NT server offering storage media for all audio, including full music libraries, and providing redundant backup of all audio data in a station; Smarts EditPro, a digital editor that automatically transfers audio from CDs into a Smartcaster digital system.
Also: Digital Program Director music selection program. Smartcaster digital audio; Smarts billing accounting and traffic.

Solid State Logic Ltd. **R2074**
Intro: Aysis Air Mobile features a compact format console for outside broadcast vehicles and space-restricted studios with channel layering function, enabling 96 channel console in a 48-fader frame less than 92 inches wide.

Solutions Custom Furnishings **S5760**
Intro: Crescent is a modular ergonomic furniture system that includes a desk (three sizes), separate monitor bridge (height adjustable) and equipment racks; Pod is a modular ergonomic furniture system that has an add-on desk section to increase its size, the pod has a motorized height adjustable monitor bridge; Custom consoles are designed, fabricated and manufacturered to users specifications.
Also: Arc; Accent; and Duo.

Sonic Desktop Software **M7740**
Intro: SmartSound, an soundtrack creation software package.

Sonic Foundry Inc. **S5157**
Intro: Vegas Video is a multitrack digital video and audio editing system that provides tools such as compositers, filters and transitions with real-time editing and rendering and directly saves to popular media formats.
Also: ACD products lines; Sound Forge 4.5; Vegas Pro 1.0; Soft Encode; SIREN; Stream Anywhere; Co Architect; Noise Reduction; Acoustic Mirror; Direct X Audio Plug-ins.

Sonic Solutions **S5531**

Sonifex/Independent Audio **R2296**
Intro: Courier ISDN portable hard-disk audio recorder version 2.5 software records MPEG, BWF, AIF or WAV audio files to PCMCIA hard-disk or flashcard and features scrub-wheel graphical editing facilities and built in ISDN, GSM; Redbox RB-ADDA is a combined A/D and D/A converter and produces an AES/EBU or S/PDIF digital audio output from a balanced/unbalanced stereo audio input and vice versa, I/O level

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control, consumer/pro output selection, 16-, 20- or 24-bits, 24-bit 96 kHz compatible; Redbox RB-SC1 sample rate converter; Redbox RB-HD6 six-way headphone distribution amplifier; Redbox RB-MM1 automatic mix-minus generator.

Also: Redbox analog and digital connection equipment.

Sound Devices LLC **R3661**

Intro: MixPre is a portable, two-channel microphone preamplifier/mixer for field production and features phantom power, metering, headphone monitoring, limiters, slate microphone, 1 kHz tone oscillator and is powered from two AA batteries or external 5-14 VDC; MP-1 is a two AA battery-powered microphone preamplifier with transformer-balancing, 12V or 48V phantom power, 66 dB of gain in stepped increments, a high-pass filter and limiter; USBPre is a portable digital interface for computer audio production for USB-equipped PCs and Macs with two inputs selectable from microphone with phantom power, line, instrument, or auxiliary level and monitoring capability.

Sound Ideas **L7527, R3766, S4116**

Intro: Sports Series offers close-up of game action with both indoor and outdoor stadium crowd sounds of up to 100,000 spectators; PowerSurge high-voltage two-CD source for electrical sparks and arcs, zaps and crashes, large impacts and explosions, weather and natural disasters; Just Birds & Animals digital two-CD collection of individual bird and animals sounds, and a variety of key ambiences.

Soundscape Digital Technology Inc. **I6939**

Intro: R.Ed features a 32-track 24-bit recorder/editor with a DAW from Soundscape operating on a Windows 95/98 or NT and features up to a half-terabyte storage on IDE drives, third-party plug-ins are available.

Soundtracs USA **R669**

Intro: DS3 digital production console features 64 channels, four-band equalization, dynamics, 25 motorized faders, 24-bit, 48 kHz (96 kHz optional) sampling rate conversion, 32 output busses with limiters for stereo LCRs and 5.1 formatting.

SpaceCom Systems Inc. **T2242**

Intro: SpaceCom Systems uplinks audio, video and date transmissions. The radio satellite network includes redundant teleports and satellites, and new FM Quad digital technology for a range of radio broadcasters.

Spacecraft Components Corp. **L11586**

Intro: Audio snake connectors, circular and rectangular connectors, that can handle up to 106 channels.

SpotTaxi.com **I6830**

Intro: Seattle-based Central Media Inc.'s new application, an integrated Web-based system for the management and distribution of radio advertising and traffic information, simplifies the spot approval and delivery process, offering advantages in speed, cost-efficiency and automation for ad agencies, production facilities and radio stations.

Staco Energy Products Co. **L5205**

On Display: TreStar Se series three-phase UPS; Unistar II SG series 1-phase UPS.

Stainless Inc. **L5913**

On Display: Fabricates and installs guyed and self-support towers up to 2,000 feet, provides analysis and modifications of existing towers and engineering and DTC studies.

Storeel Corp. **L10139**

Intro: Storage systems for tape formats featuring mobile, static, adjustable shelves, top-quality steel, 12 standard colors; Room Stretcher high-impact styrene custom designed units for small formats; Stor-Max versatile steel shelving, mobile and static for storage needs including tape formats, office filing, small equipment and warehousing.

Studer North America **R4073**

On Display: D950 digital mixing system; On Air 2000 digital broadcast console.

Superior Broadcast Products **R1487**

On Display: FM transmitters; Broadband antennas.

Superior Electric **R1191**

Intro: Stabiline WHR voltage regulators are variable transformer-based devices that meet the application requirements of radio transmitter protection, offered in single- and three-phase models for AC systems up to 660 VAC; SW UPS systems are offered in 1000 VA to 3000 VA capacities in both cabinets and rackmount configurations, available for either 120 VAC or 240 VAC single-phase applications; PPC Series Portable Power Conditioners.

Sure Shot Transmissions Inc. **L3629**

Svetlana Electron Devices Inc. **R2854**

Intro: Svetlana 5CX1500A & B can be used for low-power FM broadcast transmitter replacement, as an output amplifier or as a driver IPA for a large amplifier; Svetlana 4CX3500A, 4CX5000A are for medium-power FM broadcast transmitter replacements, and 10 kW output tetrodes are designed for longevity; Svetlana 3CX2500F3 is for AM broadcast transmitter replacement, has flying leads for easy mounting during replacement.

Swedish Wahlberg & Selin AB **OD300**

Switchcraft Inc. **L5213**

Intro: AAA QG Twist Series, a XLR connector with only two parts to handle and assemble, available in 3 through 7 pins/contacts, black and gold finishes, plastic or metal handles. 3502RA Series RA RCA Plugs-right angle plug features heavy-duty handle, large cable clamp for accommodating large OD cable, available in black and gold finishes.

Do More, Spend Less

"Scott Studios Saves My Stations $45,000 per Year"

Doug Lane, owner and GM of WWDL (FM), WICK (AM) and WYCK (AM), Scranton and Wilkes Barre, PA says he "saves more than $45,000 per year with Scott Studios' Voice Trax automation. While the investment was major for a small family company like ours, ***the pay back was fast and real***. And the savings are year after year after year.

"Unless we are running evening baseball or Friday night high school football, we close the building at 6PM and operate unattended until 5:30 the next morning.

"We use several independent announcers to record Voice Trax for us, along with our regular staff. Even me! We operate both live assist and automation."

Normally, each announcer records a fresh show every day. Scott's exclusive Voice/Music Synchronizer guarantees every song plays only with the correct voice track. If a jock gets too busy and doesn't do their show in time, Scott's unique Voice Trax System automatically airs evergreen standbys that sound right! Doug says, "No one but Scott Studios has this great fail-safe feature. Scott Studios' System provides a separate specific generic Voice Trax for every track for every hour and every day of the week in case someone can't track their show in time."

Scott's Voice Trax recorder is the industry's easiest to use: most tasks are done with just one button. The mouse and keyboard are seldom touched. Voice Trax take only seconds per cut to record. Scott's AutoPost makes announcers sound better and minimizes Voice Trax re-cuts. Experienced jocks don't waste time checking their work because they hear their voice and surrounding music and spots in context while recording.

Doug Lane, Owner and GM, WWDL, WICK and WYCK, Wilkes-Barre and Scranton, PA

Doug's stations have used Scott Studios' Voice Trax systems for many years.

The Scott System is radio's most user-friendly. You get instant airplay or audition of any song simply by spelling a few letters of its title or artist. You see when songs played last and when they'll play next. You also get voice tracking while listening to music in context, hot keys, automatic recording and graphic waveform editing and scrub of of phone calls, all in one computer!

Stations can lock the door and go home with confidence. Scott has exclusive watchdog circuits that make our systems more self-healing and reliable than others. Scott predicts many problems ***before*** they occur, usually as soon as logs are done. Scott also pages people who can make last minute adjustments off-site by modem (if needed).

After a year of trouble-free operation, Doug Lane says, "It was fun to get five calls at the studio over the Holidays from out of town PD's and GM's wanting to speak with me because they heard me 'on the air'. Guess what? I wasn't even there! They were amazed at our Voice Trax and Scott's accurate Time Checks too. Actually, they were 'very impressed'!

Doug is now installing Scott's automated temperature announcer. He says, "Scott's features are great. The savings are even better! I wouldn't want to run my stations without Scott Systems!"

Scott Systems are delivered with your music library pre-dubbed, plus time-saving CD rippers that digitally transfer music to hard drive in seconds, no-dub instant LAN spot uploads from Sonic Foundry multi-track production, MPEG and uncompressed digital audio (at a compressed price) and a week of Scott School training of your whole staff ***at your station***. You get Cart Walls for instant requests, a phone recorder with waveform and audible scrub editing, the ability to record Voice Trax in your air studio while listening to your music in context in headphones, title and artist displays for your website, time announce and Cat. 5 audio wiring for fast installation. Scott's SS32 System can feed different spots to webcasts or second stations, run satellite formats and ABC's LocalMax. Scott Studios offers optional auto-transfers of spots and Voice Trax to distant stations over Internet or WAN, wire capture and newsroom editors, unattended school closing reports and 24/7 live support via toll-free cell phones.

Scott Studios' unequaled money-saving features mean more U.S. stations use Scott than any other digital air studio systems (5,500 workstations in 2,250 U.S. Stations and nine of the top ten groups). See our web site and toll-free phone at the right.

See Scott's NAB Radio Booth R4093 and Video Booth L2506 at the LVCC.

Scott Studios

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SWR-Systems With Reliability Inc. **L11866**
Intro: Combline bandpass filter is designed with a successive configuration of quarter-wave resonator cavaties, iris coupled with probe tuning, available in limited models in the second quarter of 2000.

Symetrix Inc. **R3663, M9727**
Intro: Professional analog and digital audio signal processors for the broadcast and sound reinforcement markets. Products include equalizers, vocal processors, mic preamps, compressor/limiters, mic/line mixers, and audio amplifiers.

Systembase Ltd. **L6246**
Intro: C450xr audio codec provides 22.5 kHz stereo at 384 kbps with a coding delay of 2.8ms, suited for DAB STLs, which include AES/EBU digital I/O, audio monoising and automatic ISDN backup.
Also: C400xr stereo ISDN/X.21 codec; C310xr ISDN/X.21 codec; C100xr stereo X.21 codec.

Systems Wireless Ltd. **L12964**
Intro: Advanced ISO system (AIS) provides multichannel talk control and improved interfacing for the HME 800 and Vega Q Plus wireless intercom systems; UCR2100 portable diversity receiver is a frequency-agile battery-powered compact receiver that can be matched with any Lectrosonics 200 series wireless transmitter.

T

Tadiran Scopus Ltd. **M10135**

TAI Audio Inc. **S4439**
Intro: Lectrosonics UCR210D/UM200C UHF frequency-agile wireless receiver/transmitter with blocks of 256 frequencies in 100 kHz steps, smart squelch, battery operated/Ext DC power receiver; PSC M4 MKII 4-channel portable audio mixer that is 15 percent smaller than the M4A+, offers internal power distribution for wireless mics, boompole mounted remote control (channel 1 level) and a Porta Brace case; PSC Press Bridge, a portable press distribution box with two mic- and one line-level inputs with independent level controls, 12 mic-level transformer isolated outputs, 12-hour operation on two 9V batteries, VU meter and internal tone oscillator.

Talk America Radio Network **L2272**
Intro: Stephani Doran's "The Dream Weaver," after-midnight weekend programing, callers tell about their dreams; Jeff Santos "Born in the '60s," 11 p.m. to 1 a.m. weeknights, interviews, music, pop culture.

Tally Display Corp. (TDC) **L12982**

Tannoy/TGI North America Inc. **R683**
Intro: PROTO-J is a compact, moderately priced playback monitor with a wide, flat frequency response, provides dynamic sound quality and accuracy; Reveal Active is a budget-priced playback monitor that provides detailed, dynamic sound with a wide, flat frequency response.

Tascam **L12944**
Intro: DA-78HR, the first MDM with 24-bit capability, designed for fixed installations or mobile recording, application specified integrated circuit technology to allow backward compatibility with 16-bit DTRS tapes, improves modulation and error correction code algorithms; DA-98HR is designed for post-production, features AES/EBU digital I/Os for instant integration into digital patch bays or DAWs, can be controlled with standard DTRS remotes, or via serial 9-pin; MX-2424 is a 24-track, 24-bit digital hard-disk audio recorder/player that features a built-in 9 Gigabyte SCSI hard drive, a graphical user interface and multiple I/O options.

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TC Electronic Inc. **R1059**
Intro: D22 digital delay offers up to 1300ms of delay per channel (on two channels) and features 24-bit AD/DA converters as well as a complement of digital I/Os including AES/EBU, S/PDIF and wordclock BNC 75ohm; DB Max Digital Broadcast Maximizer, features 24-bit A-to-D and D-to-A converters, other hardware and software enhancements.

Techflex Inc. **L12550**
Intro: Flexo expandable sleeving is a lightweight jacketing for bundling and protecting wires, cables and hoses, and is part of a line of braided expandable sleevings.

Techni-Tool Inc. **L8845**
Intro: Winter 2000 Catalog is free with 328 pages of tools, transport cases, rework/repair equipment, test instruments and static control; Fiber-Optic Cleaning Kit is designed for benchtop, control room or field use for on-site cleaning of hand oils, cable lubricant and contaminents from fiber-optic cable and connectors; Tec-Cut Mini-Electronics Pliers are hot-drop forged from the finest steels, hand induction treated, hand sharpened and meet Mil-Spec requirements with a 57-63 Rockwell hardness cutting edge.

Technology for Communications International (TCI) **L848**
On Display: DigitalPLUS Models 888, 861 and 831 UHF antennas; turnkey installation services.

Technosystem SpA **L2019**
On Display: FM transmitter features modular construction, and is suitable for digital input with full microprocessor control of all features.

TecNec **L7056**
On Display: Distribution amps, switchers, routers, cables, connectors, adapters, patch panels, wall plates, line amplifiers.

Tektronix Inc. **L913**

Telecast Fiber Systems Inc. **L13275**
On Display: Python Multi-channel Distribution System, Sidewinder Fiber Optic ENG/SNG System, Adder Audio/Intercom/Data Control Mux/Demux, DiamondBack Utility/Video Multiplexer, and RingNeck Field Production Dial Tone Extender.

TeleCast Group AS **L1823**

Teledyne Electronic Technologies **T326**
Intro: Traveling Wave Tubes are high-power broadband TWTs for mobile, fixed-site and flyaway applications in C-, X-, Ku-, DBS-, C/Ku-bands, Tri-Band and Quad Band.
Also: SNG and DSNG TWTs.

Telestream Inc. **L8475**

Television Engineering Corp. **L5627**
On Display: Remote vehicles for live news broadcasting and remote production, including Eagle Eye camera system, IFB-19A controller and custom consoles for field laptop editing; truck products include vehicles for ENG, DSNG and remote productions.

Telex Communications Inc. **L9366**
Intro: Radiocom BTR-300 wireless VHF intercom system offers increased frequency band availability, improved front-end filtering and simultaneous use of up to four base stations and 16 beltpacks; RTS Model KP-32 keypanel offers 2 RU with 32 level keys (30 intercom talk/listen assignment, one call waiting respond/clear and one headset/microphone switching), DSP and biaural headset operation with left/right signal assignment and 90mm-depth.

The Venetian

Telos Systems **R2057**
Intro: TWO x 12 is a multi-line digital talk show system designed for fast-paced production that delivers quality audio from either POTS or ISDN phone lines and includes two independent hybrids, unique icon-based visual call management; Telos TWO digital dual telephone hybrid is for applications that require clear audio from dial-up telephone lines, includes conferencing, 20-bit A/D conversion, connects to POTS or ISDN telephone lines; Telos Series 2101 Talk Show System is a talk show management tool with routing capabilities that allow reassignment of multiple lines across multiple studios, up to 96 lines using T-1 or 120 lines using E-1.
Also: Zephyr and Zephyr Express digital network codecs; digital telephone hybrids; talk show systems.

TerraSonde **R2372**
Intro: The Audio Toolbox multi-function professional audio test and acoustic analysis devices, combines more than 30 functions in a precision test product. Includes timecode generator/analyzer, RTA, SPL, signal generator, sample scope, impedance meter, THD, sweeps, memories, speaker/mic polarity tester, MIDI.

TFT Inc. **R3252**
Intro: Professional equipment for the wireless telecommunications industry since 1970.

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The Model AF610 is single channel with internal switch selectable PLL (synthesized) tuning. Features include continuous LINE and controlled SPKR output. The SPKR and RELAY outputs are enabled by tone detector circuits that monitor for 1050 and 1650 HZ tone signals. A rack mount (1¾") version is available and the AF610 can be a component of the AFC3 multiple receiver chassis.

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The DTMF-16 TouchTone® Decoder

DTMF-16c shown with optional rack mount

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The DTMF-16 is perfect for interfacing networks to your automation, controlling remote satellite receivers, repeaters, etc. Connect it to an audio source and its outputs will operate whenever there's a tone. With a list price of only $199, the compact & rugged DTMF-16 can be put almost anywhere to provide the remote controls that you need. For more info, contact us or your favorite broadcast supplier.

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Fax: 360 . 428 . 6719

BROADCAST tools inc.

World Radio History

Thermodyne International Ltd. L11655
Intro: SlimLine transit cases give sensitive equipment protection with greater mobility and are available with steel bearing wheels and heavy-duty telescoping handle; Quadra-Flex has eight elastrometric shock mounts that are installed onto double obliques in the four corners of each rack pack, allowing it to withstand vibrations delivered from any angle.
Also: Shok-Stop; Rack-Pack; SlimLine; QuadraFlex.

Thomson Components and Tubes Corp. L6733

Toner Cable Equipment Inc. T1032
Intro: Ortel Lightlinks 3112M and 4112M series provide high-performance solutions for the distribution of digital broadcast satellite service for L-band.

Tower Engineering Consultants Inc. L5219
Intro: Tower evaluation, inspection, analysis and design services.

Transoft Networks M9864

TRF Production Music Libraries L6412
Intro: Cobra releases include Classical Echoes and The Living Planet orchestral compositions; Dennis releases include Jingles Vol. 7 with pop, jazz, comedy, sports, ambient and boogie, Film Drama 4, Holiday Memories featuring featuring travel themes, A Country Life featuring nature and pastoral themes, and Science & Chemistry; Musictrack releases include Action/High-Tech/Corporate, Action & Drama, Latin/Funk/House, and Ambient Moods; PowerSound releases include New Age rhythmic themes with a Third World ethnic flavor, Alternative Rock, Reggae/Calypso, Action/Drama ; Pyramid releases include Bluegrass, Movie Magic, Sports Rock, Alternative Rock, Swing & Ska; Stock releases include Powermax action themes, Jazz & Blues and Jingles In Stock 2 featuring a variety of categories.
Also: More than 500,000 selections of productions.

Trompeter Electronics Inc. L6913

Turner Audio R761
On Display: Professional audio equipment.

U

UNIMAR Inc. R672

United States Broadcast L13239, OD630
Intro: A selection of mobile trucks, including 10-foot to 53-foot expandos, as well as used audio and video gear.

USA Digital Radio Inc. R3457
Intro: iDAB technology for AM and FM radio will provide consumers with CD-like audio, near-perfect reception and data services.

Utility Tower Co. R3488
Intro: Custom and standard towers, auxillary equipment, installation services, turnkey services, modifications and analysis of existing towers.

V

Valcom Ltd. R680
Intro: AM Broadcast Antenna is a free-standing fiberglass construction that eliminates the need for large amounts of real estate.
Also: Antennas and ground screens.

Valentino Production Music Library L6822
Intro: Valentino Millennium music library; Valentino Action impact sound effects library.

Veetronix Inc. L12320
Intro: 06 Series Switch is a hermetically sealed dry-reed switch that has proven to be reliable and durable with test units still operating after more than 20 million actuations.

Vega L4260
On Display: Wireless microphones; wireless intercom, wireless IFB systems.

Viaccess S4576

VideoHelper Inc. L7053
Intro: Noise Generator is a four-CD design element package that features 1900 sound elements with hits, noises, whooshes, and drones.
Also: Noise Generator.

The Ever-Expanding Strip

Videoquip Research Ltd. L9653
Intro: RS-88AES eight input, eight output AES/EBU digital routing switcher features XLR connectors for all I/Owith external AES/EBU timing reference input; Dual digital audio-format converter offers each channel independently selectable for AES/EBU-to-S/PDIF or S/PDIF-to-AES/EBU conversion, one-half rack space, and internal power supply; MP-204D monitor panel offers complete four-input stereo monitor, including two stereo analog inputs on XLRs, two AES/EBU digital inputs, each with XLR and BNC connections, internal amplifier and speakers, advanced metering with assignable levels and balanced audio outputs.
Also: Phase 3.

V-Soft Communications R2290
Intro: Probe v. 2.0 provides expert-level propagation prediction using Longley-Rice, TIREM, PTP, FCC, coverage and interference maps, population with demographics; Terrain3D, 3D terrain modeling, radio path analysis and propagation over 3D terrain; FMCont for Windows FM frequency search for FM and LPFM, FCC minimum spacings as well as contour-to-contour protection, allocation tables and maps.

Kate Michler, Bus. Associate
1600 Picturesque Dr.
Cedar Falls, IA 50613
319-266-8402
800-743-3684
FAX: 319-266-9212
E-mail: kmichler@v-soft.com
www.v-soft.com

W

Walters-Storyk Design Group Inc. S4017
On Display: Architectural and acoustic design of professional media facilities including space planning, architectural design build drawings, acoustic details, systems integration, design and install.

Ward-Beck Systems Ltd. R3763
Intro: D8205 adjustable gain DDA features local or remote gain trim or volume adjustment of all AES/EBU digital audio signals, creates mono sum with a built-in sample-rate converter and generates best tones using 22 kHz to 96 kHz operation; D8208 dual-channel digital-audio amplifier features level matching for two AES/EBU audio signals, creates a mix of the two channels for use as a 2x1 synchronous AES switch; XTM4 extended range test meter features simultaneous stereo VU and PPM displays to measure analog, AES/EBU or SDI embedded audio signals, reads levels from -80 dBu to +30 dBu, has a phase indicator, comes with a rackmount package and built-in headset driver.
Also: RAV24; PODS; 8200 Series.

Weather Metrics Inc. L11483
Intro: Weather Cam provides live weather and camera images on a Web site; Internet Weather provides live weather data to Web sites.

WebPresence Inc. R3398
Intro: WEBNTR.com helps advertisers generate revenue online with applications that allow centralized content management for a single station or a nationwide radio group; WAP Aware

World Radio History

WEBNTR.com wireless phones and PDAs, allows stations to deliver content to listeners while on the move.

WebRadio.com **M9737**
Intro: WebRadio.com is an Internet Radio Community Destination that provides turn-key Webcasting solutions for broadcasters to deliver audio/video content over the Internet, featuring unlimited bandwidth, unlimited streams, streaming packages that include hardware, software and support, and comprehensive encoding services.

Wegener Communications Inc. **L11051**
Intro: Unity IP MediaPump (combined with Compel MediaPlan) transmits and receives video, audio and data clips from satellite and stores them internally on a hard drive for playback via Compel.

Wenger Corp. **M7667**
Intro: Acoustical doors designed specifically for built-in construction; V-Room is suitable for studio/broadcast isolation booths and control rooms that feature modular construction for easy relocation or resizing, optional virtual acoustics provide simulations of 10 acoustical enviroments.

Wheatstone Corp. **R2081**
Intro: D-700 digital audio console with total console recall, programmable EQ, sends, ducking, limiting, DSP options, full serial communication with routers and automation systems; D-5000 is mid-priced four-bus digital audio console with analog and digital inputs and outputs; ATC-1 is digital AES audio router with 256 in/256 out.
Also: D-600, A-6000 digital and analog radio consoles.

Whirlwind **L7433**
New: PA-1 portable, battery-operated, professional-quality stereo headphone monitoring amplifier; PA-2 pager-sized, personal headphone moniter with high gain and signal quality suitable for in-ear monitoring.
Also: Presspower2; Pressmite; and Qbox.

WhisperRoom Inc. **S5359**
Intro: SE 2000 Series are portable sound isolation enclosures in nine sizes and two levels of sound isolation.

Who Did That Music? Library **R3390**
Intro: Thousands of titles reflecting a range of contemporary musical trends, including several libraries, such as Who Did That Music, Gravity, Ignite, Revolution, MindBenders and EuroGrooves.

Will-Burt Co. **L13226**
Intro: Stiletto mechanical mast features a free-standing height of up to 12.5 meters with playloads of up to 400 lbs., also features possesive retraction and can be stopped to maintain any height in its range of travel.

Winemiller Communications Inc. **L3416, OD430**
On Display: Model 9800 controller and software; ENG/SAT trucks and vans; microwave systems, including links and receive sites.

Wing Enterprise Co. Ltd. **R3397**
Intro: The Nash Music Library consists of royalty-free production music and contains more than 150 CDs/1,600 titles.

Winsted Corp. **L10137, S3550**

Wireworks Corp. **L13100**
Intro: TEC256 is a computer-based cable tester designed for multicable testing with PC-based software that can test up to 256 points for opens, shorts, crosswired and resistance in less than one second.
Also: Audio, audio/video and control cable assemblies for the audio, theatre and broadcast industries, with more than 1,000 standard products including multi-pin disconnectible cabling components (3-50 channels), transformer-isolated microphone and speaker cables and testers, and custom configured engraved panels.

Wohler Technologies Inc. **L6761**
Intro: High resolution 53- or 106-segment tri-color LED bar-graph level meters that provide high resolution in a compact space, available in analog or digital, including SDI, and also available with Dolby AC-3 decoders.

Wolf Coach Inc. **L12948**
On Display: B3 ENG van; FastTrack SNG van; WolfPac ENG; Power Truck SNG/production; and Defiant Series.

X,Y,Z

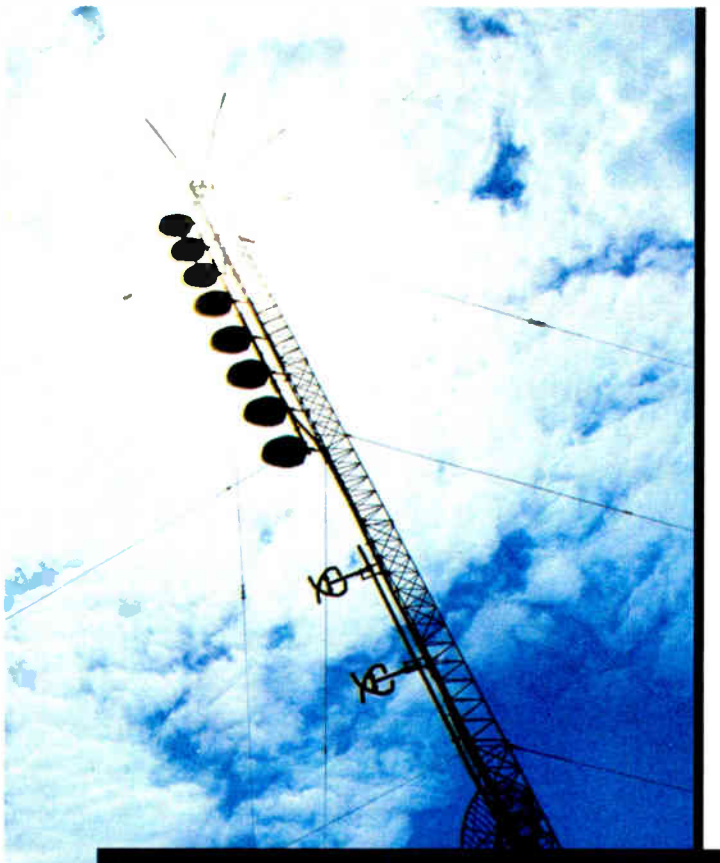
Xytech Systems Corp. **I7430**
Intro: The newly enhanced scheduling module within Xytech's Enterprise 3.4 asset management system allows time and resource-based views of any mix of resources, including people and equipment, within a facility.
Also: Xytech Enterprise 3.0 Facility Management Software.

Yale Electronics Inc. **L8678**
Intro: CommScope Technical Training Courses are workshops dealing with theory, application and hands-on connector training held at Yale Electronics that address integration of fiber-optic and copper cable in broadcast envirnonments.
Also: Cable-CommScope, Canare, Mogami, Mohawk, Connectors-Amphenol, Canare, Lemo Tropeter, Patchbays-ADC

Z Technology Inc. **L2606**

Zack Electronics **L8674**
Intro: Broadcast Connection Catalog has more than 500 products, including wire, cable, connectors, test equipment, racks, enclosures, featuring Belden, Kings, Neutrik, APW/Strantron, Switchcraft and Leader.

Zaxcom Inc. **L13231**



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Or visit us on the Web at www.gentner.com.

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World Radio History

BROADCAST SCHOOLS

Tenn. Students Train for Radio

Eric Shoars

This is one in a series of occasional profiles of schools that offer broadcast programs.

When you tell a new acquaintance that you work in radio, chances are they'll ask, "Oh, are you a DJ?"

But there is more to radio than being a jock, and educational institutions that want to attract broadcast students know it.

The Radio-TV/Photography program at Middle Tennessee State University in Murfreesboro provides future broadcasters with such a multifaceted foundation.

"Cross-pollination is the philosophy of MTSU's Radio-TV/Photography program," said Associate Professor Dr. Thomas Berg. "We prepare students for a variety of different avenues so they have choices.

"We try to discourage the 'on-air only' attitude. The main thing is that our graduates have a complete portfolio."

MTSU Photo by Ken Robinson

Students walk by the new library at Middle Tennessee State University in Murfreesboro, Tenn.

More than jocks

Certainly, a large percentage of those students pursuing a radio career are, in fact, seeking an on-air position. But sometime in the future, they may want to pursue employment possibilities in station management.

The Radio-Television program at MTSU blends theoretical approaches to the students' learning. Students choose a specialty area that best fits their career goals. Those areas include electronic media journalism, electronic media production, electronic media management and digital animation.

Graduates will be armed with skills that are valued by today's radio industry.

"In my opinion, there are more opportunities in radio sales than television sales, especially in entry-level positions," Berg said.

MTSU does not offer any courses in radio engineering.

The sales curriculum stresses sales but also covers on-air, news, production, promotion and traffic functions. The theory is that in today's marketplace of consolidated stations and cluster selling, sales reps have an understanding of the products they are selling.

The curriculum covers sales, news, production, traffic and promotion.

MTSU radio majors have the opportunity to get extensive laboratory and on-air experience, too. The Internet is used by the instructor and students in the classroom environment. The Radio Operations course, for example, relies heavily on Web sites of Lexus-Nexus, Airwaves and Arbitron.

Hands-on equipment

The MTSU Radio-Television laboratory environment features a mobile production lab, audio production lab and electronic newsrooms — although, at this writing, MTSU does not use a full-scale digital audio management system.

MTSU features cart machines, turntables and compact disc players in its classroom environment. No reel-to-reel machines are used here. Students record radio production and news audio assignments into a computer, then assemble and edit their audio using the FastEdit program by Digital Audio Labs, a digital waveform editing application.

Middle Tennessee State University has two radio stations on campus: WMTS-FM and WMOT(FM).

The former is a 200-watt campus station supported by the student government. University students, regardless of major, can obtain on-air experience on this 24-hour station at 88.3 MHz.

WMOT is a 100 kW National Public Radio affiliate at 89.5 MHz. MTSU radio majors, after displaying proficiency and a good work ethic at WMTS, are given an opportunity to gain more experience at WMOT.

That work includes being exposed and mentored in upper-echelon positions at

See SCHOOL, page 90 ▶

MARKET PLACE

Denon MD Firmware

At the behest of broadcast networks, including National Public Radio and Voice of America, Denon Electronics has made a firmware enhancement available for its DN-M991R MiniDisc Recorder and Player.

The features are in a new model, the DN-M991RM, which retails for $2,499. They also will be offered as an update kit for $230.

Among the new functions is an Airlock feature, which prevents talent from tampering with recorded material and allows PDs to set the machine as a play-only device.

The Denon MD deck offers new options.

The deck lets users store secondary cue information such as vendor names or cue points on the MD. When playback reached a designated EOM point, the Visual End-of-Message text will flash.

A new five-minute skip search function lets the user search through long tracks more quickly, which is useful in news and interview applications.

Other improvements include better scroll speed and long name display.

For information contact Denon Electronics in New Jersey at (973) 396-0810 or visit the Web site at www.del.denon.com

Portable Broadcast Booth Available

A new portable broadcast booth allows engineers to tune it for specific acoustic performance.

The booth is by Industrial Acoustics Co.

Vice President of Architectural Products Ken DeLasho said the Quad Series is suitable for voice-overs, studio broadcast, recording and music practice.

The booth is formed of eight-inch-thick construction: a four-inch shell and four-inch inner lining with absorptive and diffusive material.

Varying the proportions of that material allows the room to be adapted easily to various purposes.

A range of sizes are available, as is customization. Typical delivery time is eight weeks.

For information contact the company in New York at (718) 931-8000 or send e-mail to info@industrialacoustics.com

World Radio History

Big City Radio Installs Wheatstone A5000s

A three-station, single-frequency simulcast in southern California uses three **Wheatstone** A5000 consoles to serve an area from Ventura County to northern San Diego County.

Big City Radio installed the mixers at KLYY(FM), simulcasting a Spanish music format on three stations at 107.1 MHz.

Engineering Manager Kent Kramer said one air studio feeds all the transmitter sites. A second console is for production, a third is used for imaging promos, liners and IDs.

Kramer cited the console's mix-minus, stereo busses and phone module, plus its ability to convert from analog to digital later.

Elsewhere, Wheatstone announced delivery of Audioarts consoles to **Three Angels Broadcasting** in West Frankfort, Ill., and **WRKI-AM-FM** in Brookfield, Conn.

For information, contact Wheatstone in North Carolina at (252) 638-7000 or send e-mail to sales@wheatstone.com

Bonneville Picks Audemat

Bonneville International purchased the **Audemat** MC-3 to monitor and measure broadcast signals.

Director of Engineering Talmage Ball called it "the first unit that allows field-strength measurements to be taken as fast as you can drive." It can monitor up to 99 stations and is a precision mod monitor.

Ball said the company wanted to verify signal contours on all of its stations and check contours of competing stations.

"This information can be archived and recalled at a later date," he said, allowing Bonneville to create a baseline of performance and do quarterly checks efficiently.

"For example, we recently did over 300 measurements on 17 stations — more than 5,100 field-strength readings — in the Washington, D.C., area in less than four hours."

Onboard GPS and mapping also let Bonneville verify actual coverage of stations it plans to purchase, down to the neighborhood level, simply by driving around a market.

"Afterwards we can check modulation characteristics including all components of the composite signal, and check various components of the audio signal."

The system is used widely by regulators and broadcast networks in Europe.

For information, contact Audemat in Massachusetts at (978) 392-2110 or send e-mail to danrau@compuserve.com

"Who's Buying What" is printed as a service to our readers who are interested in how their peers choose equipment and services. Information is provided by suppliers.

Companies with news of unusual or prominent sales should send information and photos to: Radio World Managing Editor, P.O. Box 1214, Falls Church, VA 22041.

From left: Audemat Vice President Dan Rau, WTOP-AM-FM Engineer Art Rose, Bonneville Director of Engineering Talmage Ball and WTOP Engineer Dave Garner pose with the MC-3.

See Us At NAB Booth # R562

World Radio History

Learning the Trade

▶ SCHOOL, continued from page 88

the radio station. Berg encourages students to get involved with the radio stations and provides feedback on their performance and progress.

Berg says one challenge of the educator's job is to stay current with the changing technology demands of the radio industry, including digital audio management systems.

'It was easier selling radio as a career choice in 1974 than it is now.'

"The state of Tennessee is going through a major budget crisis right now, so funding to colleges and other state agencies is down."

Tennessee does not have a state income tax.

Berg says MTSU has put a hold on updating its equipment and is seeking help from private sources — the industry — to obtain the equipment the program needs.

"With mixed success," he added.

The real world nearby

The program, Berg said, has a strong relationship with the industry.

With Nashville nearby, the program and students are close to radio and television stations, recording studios and industry professionals.

In Berg's view, this proximity helps in several ways. It puts MTSU's brightest future broadcasters on the doorstep of prime broadcasting opportunities. It helps industry professionals gain a sense of the university curriculum and lets them give feedback to MTSU instructors.

"The industry that we deal with does value what we are doing," said Berg.

Industry interaction with broadcast programs is a big plus. Instructors can stay current on changes in the industry and pass that information to students. With all the regulatory and technical changes in broadcasting, students must be able to adapt.

A tough sell

What is the biggest challenge in recruiting people for careers in broadcasting?

"Confusion," Berg said. "It was easier selling radio as a career choice in 1974 than it is now. Students today have more options, more choices than ever before.

"I think they're overwhelmed. Part of our job as instructors and advisors is to remove that confusion."

Middle Tennessee State's Radio-TV/Photography program has an enrollment of 2,400. About 10 percent are radio majors.

Berg said many students don't recognize the potential of radio as a career, often opting for the higher-profile television and cable industries.

Another challenge is not industry-related but generational. Berg said the "Generation X attitude" is a problem.

"Showing up when you feel like it won't do it in today's industry."

For information on the Middle Tennessee State University Radio-TV/Photography program, call Thomas Berg at (615) 898-5867.

■■■

Eric Shoars is head of the Radio Broadcasting department at Riverland Community College in Austin, Minn., and general manager of KERC, the department's Internet radio station.

Broadcast Menu

Here is a sampling of courses available to MTSU Radio-Television students:

Radio Station Operations
Theory and techniques of sound production, recording, microphones, taping and board equipment. Analysis of creative efforts and responsibilities in writing, production and direction.

Broadcast Announcing and Performance
Introduction to the responsibilities and skills required of the individual performer in preparing, announcing and narrating of various types of materials for television and radio.

Electronic Media Sales
Theories of marketing and selling the intangible products of the electronic media industries. The fundamentals of positioning, theory and use of ratings, and local, regional and national buying and selling strategies are presented.

Electronic Media Production
Development of techniques, program organization, audience, analysis, recording and directing through projects. Provides practical conceptual knowledge of the problems and procedures followed in planning and producing programming.

Electronic Media Management
An analysis of the problems involved in planning, building and operating an electronic media facility including personnel, internal control systems, business ethics, community relations, sales and promotion. Case study method is involved.

MARKET PLACE

Harris Intro's Studio H Furniture

Harris Broadcast Communications has expanded its product offerings for radio with a line of affordable control- and production-room furniture, called Studio H.

Harris is the exclusive distributor of the Studio H line, manufactured by The Broadcast Studio Furniture Co.

Available from Harris' Broadcast Center, the Studio H line can be assembled in approximately four hours, with only a crescent wrench and a screwdriver, and can be shipped directly to the broadcaster via UPS. Studio H also can be customized to fit specific needs.

Features of Studio H include a lot of vertical rack space, robust construction, protected edges and corners, time-saving optional pre-assembly of modules that ship by padded van, and color and trim options.

Studio H is available in a variety of configurations. Retail prices begin at approximately $1,295 for a simple layout.

For more information, contact Harris Corp. Division at (800) 622-0022 or visit www.harris.com

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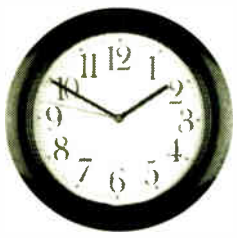
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World Radio History

READERS FORUM

Low-Power FM: Readers Speak Up

*In a potentially historic move, the FCC in January gave thumbs-up to the creation of new 100- and 10-watt FM radio stations in the United States. (**RW**, Feb. 2).*

*Reaction to this decision has been immediate and varied. In this issue and issues to come, **RW** will print letters and opinions from our readers on this topic. We will also continue to publish longer Guest Commentaries from those involved in the debate.*

We welcome other points of view. Write us at radioworld@imaspub.com *or at the address on the inside last page.*

Dear **RW**,

I've been following the LPFM debate in **Radio World** for almost a decade now and I have to admit that I don't see what the fuss is about. I don't see LPFM changing anything because it doesn't strike at the problems that either the advocates or the dissenters have.

The dissenters say that LPFM stations will cause interference to additional stations, and in great part this is untrue because the current FCC regulations regarding contours aren't being changed.

Yes, a few chips here and there might be eaten out of existing stations' listening area, but not substantial ones. And they won't be substantial, because in most locations, it will be impossible to fit LPFM stations into the band under the current interference statutes.

Likewise, LPFM advocates claim that these stations will give a voice to many people who are not being heard, and provide music that isn't currently available on the dial.

But if it's not possible to shoehorn LPFM stations into the dial, and the stations that are shoehorned in are so close to the existing station's contours that interference is a worry, those LPFM stations are not going to be audible, and a station without an audience is no station.

Don't get me wrong; I am a fan of the LPFM authorization. I was a big fan of the old Class D allocation as well, and think it was a terribly bleak day when the FCC removed it. But the reason radio is lacking in diversity is not a lack of stations; it's a superfluity of stations all playing the same thing.

There are so many stations and so much competition that it's becoming necessary to divvy bandwidth coverage up into smaller pieces, and that is not a good sign.

I don't have a solution for the problem, mind you. Either we need more bandwidth for greater channel capacity (and it's quite possible that DAB will wind up giving that to us in the long run), or we need more area that isn't currently being served by radio (and short of invading Canada, I don't see this happening).

Or we need to eliminate some of the existing stations on the band, which clearly isn't going to happen either. But in spite of the Reagan-era FCC policies, bandwidth is a natural resource, and just like our national forests, it needs to be protected and conserved. We have allowed our radio forests to be pillaged and logged too extensively for too long and now we are reaping the harvest that results.

Scott Dorsey
Owner/Engineer
Kludge Audio
Williamsburg, Va.

Dear **RW**,

Regarding the article "FCC Says Yes to FM Low Power" (Feb. 2):

Tell Eddie Fritts to just shut up. I've heard enough whimpering and whining from the likes of big-business advocates like him about the little folk — the common people — owning broadcast properties.

He says, "It's a sad day for radio listeners." Well, Eddie, it was a sad day for listeners when the FCC permitted semi-monopolistic multimillion dollar corporate megamergers of broadcast properties.

You have nothing to whine about. Your big boys already own the biggest piece of the pie, at least in my town. Venture capitalists who don't know diddley about broadcasting have all but ruined the industry for those of us who love radio for the sake of radio and not for the big bucks you've inflated the industry with.

And where were you to object when Congress and the FCC decided to auction public property, the radio spectrum in the United States, to the highest bidder? So the broadcast industry is now being run according to the golden rule: He who has the most gold makes the rules.

Quite frankly, I've been discouraged about my limited ability to participate in the broadcast industry. As one who has dreamed about broadcast station ownership, I find myself now limited to being the pawn of some corporate board. I say a hushed hurrah to LPFM.

The only thing better for the American radio listener would be forced divestiture. There's no reason for any single owner to own more than one AM, one FM and one TV license in any given community. We all have to deal with limited resources. Broadcast corporations can do the same. Decide what is the best use of the little bit of spectrum you have and do your best with it.

Get a life Eddie, and let the rest of us have a life too.

Ray Lenz
Spokane, Wash.

Bandwidth *is a natural resource, and just like our national forests, it needs to be protected and conserved.*

— Scott Dorsey

Dear **RW**,

Eddie Fritts' comment that LPFM is a sad day for radio listeners shows just how out of touch he is with local radio programming.

Mr. Fritts, having LPFM broadcasters create and deliver local programming content and local diversity is the greatest move to happen for the radio listener since the early '20s and '30s. I, for one, am tired of all my local AM stations using syndicated programming for 50 percent or more of their broadcast day.

And I'm insulted when these same radio stations — with one exception, all-news KTRH(AM) — air a 30-second news update from an outside news source each half hour and call that local news coverage. For the most part, these are novice news readers that barely stumble through their 'cast.

And trying to find news on the FM band is even worse. Not one commercial station has a real news department with reporters, etc. Newscasts are just rip-and-read by a morning-show sidekick.

And as far as programming diversity on FM, it's the 500 safest songs in a given format presented by liner card readers and 16 to 18 units of commercials and sales promos an hour.

I can't remember the last time I heard some real public service programming on either band. Even the PSAs are usually for national campaigns or part of a radio station sales promotion. Add to that the transition to automation on overnights and weekends by top-rated stations and you've got a stale product and minimum responsiveness to the community.

It's an outrage that the public airwaves are no longer serving the public, but rather just a license to print money for a handful of radio fat cats.

Low-power broadcasters, because they will be primarily cause-driven mom-and-pop (or son-and-daughter) operations, by their very nature will be a fresh and vibrant voice in the community.

Yes, compelling radio on the band by micro broadcasters will further erode the already dwindling market shares of the major stations, but the listening public will come out winners with real local programming and diversity.

With satellite radio just months away, there is no longer going to be a need for local stations giving us national formats. I think the time has come to reshuffle the entire radio industry — outlaw national formats, dismantle the major radio groups and give us 200 LPFM stations in a market.

Gene Tognacci
Houston

Dear **RW**,

I have an idea regarding the howl from the radio industry about the new LPFM. There might be a way out of this problem.

Back some 60 years ago, there was the first FM band. That was the old 45 MHz band. There were stations on that band from 1939 to the last one going off that band in 1950. In 1946, FM was moved to its present place. The reason was to kill it.

See LETTERS, page 94 ▶

World Radio History

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World Radio History

Workbench

Radio World, March 29, 2000

Manage by Wandering Around

John Bisset

You may have heard of management by wandering around. With the warmer weather, now is a good time to apply this technique to your transmitter site.

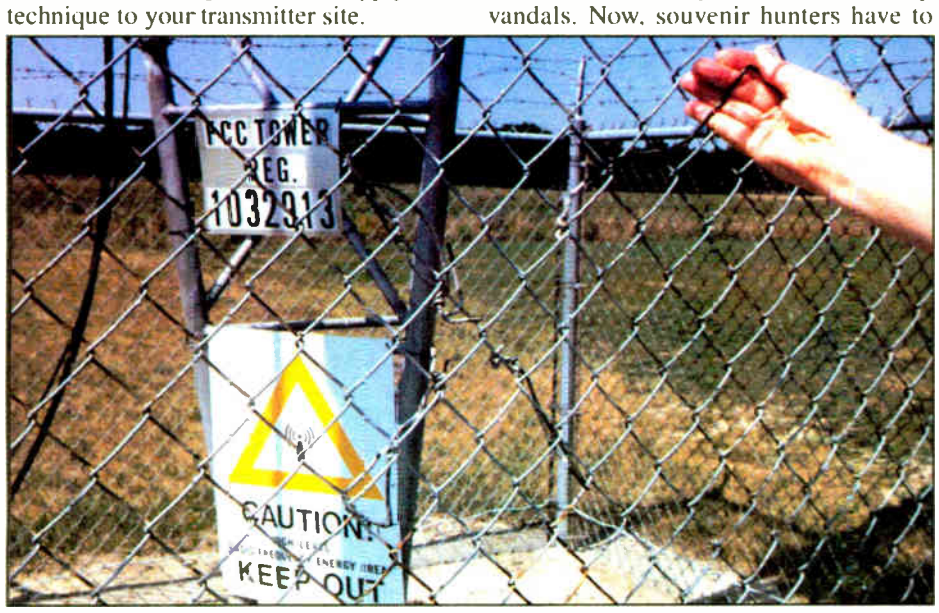

Figure 1: Affix signs on the tower to thwart thieves.

If you have an assistant or an engineering intern working with you, bring 'em along.

Before you get to the site, grab a camera and notebook. It's easier to explain problems to your manager with a picture. The notebook will help document the work that needs to be done.

Charge your assistant with correcting problems. You can show him exactly what is wrong and what needs to be done, and make a written notation so he'll have his marching orders.

Signs and sealant

Take a walk to check on the tower.

Figure 1 shows how Bruce Blanchard, CE of WSCL(FM) in Salisbury, Md., affixed his tower registration number and RFR signs directly to the tower.

The hand in the upper right of the picture shows the heavy wire that was cut by vandals. Now, souvenir hunters have to scale three rows of barbed wire to get a sign to hang in their dorm or bedroom.

Check to make sure your signs are intact. Bruce's tower is grounded, and not used for AM, so there's no shock hazard, though that alone might deter thieves!

Inspect lines going up the tower, their ground kits, copper strap and lighting conduits. How does the paint look? Is it faded, peeling?

If so, look into a paint job when the weather gets better.

This is a good time to prevent the intrusion of nesting insects. If you have dishes at the site, spray the outside of the LNB feedhorn with bee killer. The spray lasts for several weeks to a month, and the smell alone will deter bees from nesting.

Use the spray liberally under the eaves of your transmitter building as well.

If you have an AM facility, do the same with the coupling networks or "doghouses."

Open them up and clean them out. Use RTV or an equivalent silicon or foam sealant to plug holes. Your coupling networks can look as good as new with just a little maintenance now.

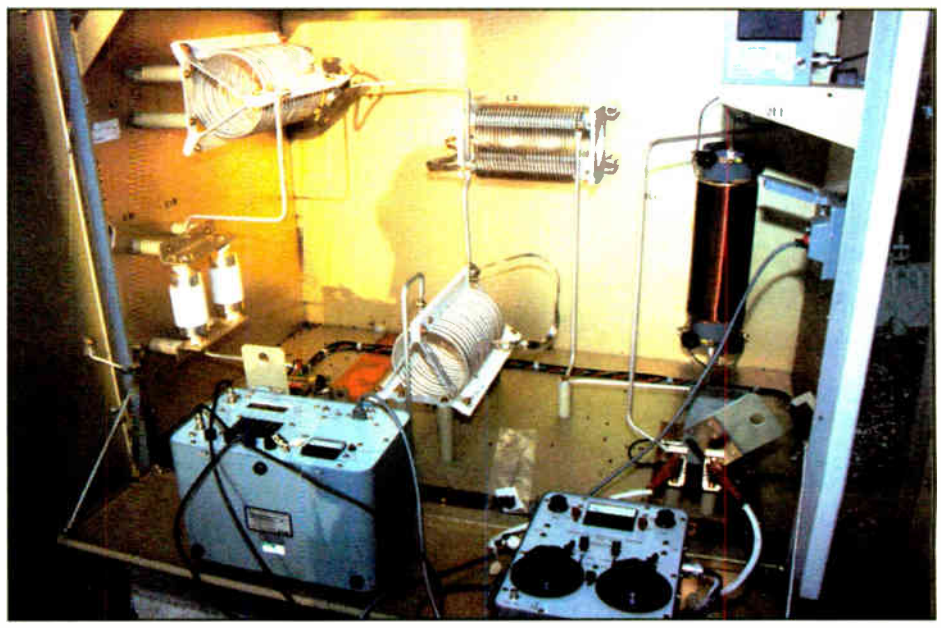

Figure 2: Block cable entry holes to keep coupling networks looking new.

Figure 2 shows a three-year-old network, which was recently opened to do an impedance sweep.

It looks as nice as the day it was delivered! But all the cable entry holes were sealed, and the door gets a regular spritz of bee killer.

Speaking of the AM in Figure 2, if you have the equipment, it's not a bad idea to at least check the operating impedance for each tower. Keep these numbers handy, both the network input impedance and the tower impedance. They can be helpful when you are troubleshooting summertime lightning damage.

As you walk around, keep your eyes open for potential problems such as the erosion seen in Figure 3.

Exposed transmission lines, radials, lighting or control wiring are accidents waiting to happen — especially when the farmer gets his bushhog rolling to mow your field. It's best that you find these problems first.

Check tower locks and gates. If the locks are rusted, replace them. There is nothing more embarrassing than trying to open a fence gate with an FCC inspector standing in your shadow.

If you need to replace the locks, consider the type that allows you to set the combination. Setting all the combinations the same makes entry easier, and

See WORKBENCH, page 94 ▶

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World Radio History

Workbench: Grab Your Walkin' Shoes

▶ WORKBENCH, continued from page 93

should you need to change the code, that's simplified as well; you're not buying new locks.

A word of caution on combination locks: Get into the habit of resetting the combination and locking it on the fence or gates while you are working.

If you don't do this, any passerby can copy down the combination or steal the lock. Your security system is breached!

A fellow engineer got me into the habit years ago of resetting the combination lock to 0-0-0-0 when it was locked. This makes it more difficult to decipher the code, especially if you lock the lock by just turning one tumbler!

If you use air conditioning systems at your site, now is a good time to change the filters.

I remember one site where the filters were black. They hadn't been changed in years. The engineer had no idea that there were filters inside those big boxes on the roof. That the air conditioner would still run is a testament to their design engineers.

This is the season to keep an eye on outside air handler filters. Pollen can clog the filters quickly. Checking them on a monthly basis for the next couple of months to keep the system running efficiently.

Once inside your air handler, inspect the fan or blower motor belt. If it is cracked, glazed, or showing threads, it's going to fail; get it replaced. Routine maintenance on air-conditioning systems is a must, especially if you have a closed system with no means of backup air.

Next issue, we'll wander around inside the transmitter building.

■■■

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is a district sales manager for Harris Corp. Reach him at (703) 323-8011.

Submissions for this column are encouraged, and qualify for SBE recertification credit.

Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com

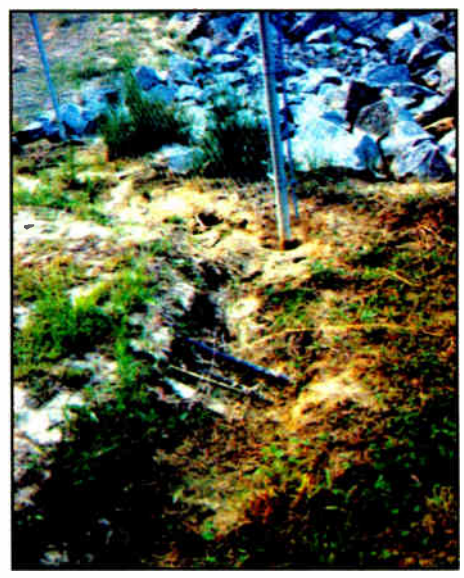

Figure 3: Exposed transmission lines are accidents waiting to happen.

Low-Power FM Letters

▶ LETTERS, continued from page 91

There were no receivers at that time for those stations that moved, but they were made anyhow.

I think as a station owner, it would be wise and prudent to reopen those frequencies again to low-power FM. It would move this problem out of the congested FM band and bring relief.

Also, open a market to make receivers to get these stations. This idea will relieve the pressure. I think you will find a lot of the two-way stations are now up in the UHF bands. And this will be great PR for the United States and will solve a problem.

Saul Nowitz
Bridgeport, Conn.

Dear **RW**,

Curious your opinion piece in the Feb. 16 issue, "Low-Power Winners and Losers," should omit the most important "loser" in the LPFM debate: commercial FM listeners.

Without third-adjacent protection of the FM band, channel crosstalk will make it difficult for either operator (FM or LPFM) to maintain the consistent quality of their FM signal that listeners have come to expect.

Is "marginal interference" to the commercial FM band a justifiable defense for the FCC to lower technical interference protection standards in the name of diversity? I think not, most FM broadcasters think not, and certainly the NAB thinks not. That's why we have taken to the courts and Congress to stop this ill-conceived LPFM plan.

James U. (Jim) Steele
President
Radio Kings Bay Inc.
WKBX(FM)
Kingsland, Ga.

Dear **RW**,

I would like to offer an opinion on the LPFM issue that has been stirring up so much controversy.

Tell Eddie Fritts to just shut up.

— Ray Lenz

Why do so many people believe LPFM would open the door for *more* pirate broadcasters? The entire reason LPFM is so great is that it would allow people who *might* broadcast without a license to actually apply for a legal permit to do so. Certainly the "I can't get a license anyway" excuse would be dissolved.

It seems a logical deduction that pirate stations would decrease in number — if the operators could obtain licenses.

In all honesty, I cannot foresee teenagers hooking up their portable CD players to transmitters for kicks. I do see LPFM as being much like amateur radio is — made up of responsible people with licenses to enjoy the radio spectrum.

Jeremy Preece
Chief Operator/Assistant Engineer
KFMB-AM-FM
San Diego

Dear **RW**,

Thank you for your continued support of the broadcast industry with your fine newspaper.

I am surprised that Mr. Fritts would dictate to the American radio listener what days are bad for the airwaves. I consider most bad air dates to be those where a radio station in any given community takes more interest in "chasing the leader" in their market instead of putting energy into any given community 12 miles outside of their trusteeship.

I would challenge any broadcaster to inspect their public files to look for the name of that community outside of simply filing away gratuitous PSA cards.

In my teen years in the late '70s, KOHM(FM) was a 250-watt station serving the families and students of Monterey High School, Lubbock, Texas.

It was a joy to share morning assemblies and concerts with my parents at dinner since they tuned in to hear what I was experiencing earlier in the day. I was able to fill in the conversation with what my eyes detected.

That small station eventually turned into a powerhouse now operated by Texas Tech University and is filling Lubbock's airwaves with classical music, selected jazz and NPR tidbits. The changeover is a story in itself too lengthy to include in this letter.

I commend Commissioner Kennard on the FCC's decision concerning LPFM particularly where small isolated school systems are involved. In a time where parents and educators are complaining about the role of the family in the campus environment, LPFM is a welcomed tool as it was for my family many moons ago.

Inevitable interference aside, I have heard a few broadcasters complain that LPFM will split up the "pie." This may not be a valid argument. The interested prospective LPFM broadcaster will simply buy flour to bake strudel for their community if not baking a new crust.

Anthony Garza
Engineer
Beomuse Broadcast Engineering
Lubbock, Texas

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World Radio History

INTERNATIONAL UPDATE

In Europe, Virgin Rides 3G Wave

Michael Hedges

The momentum of technology continues to spur companies to set up high-tech joint-venture projects. One project in Europe is a case in point.

Last August, Ginger Media, owner of London-based Virgin Radio, joined with mobile telephone system manufacturer Ericsson to announce testing of a program over a third-generation mobile network.

3G mobile phone networks, not commercially available until 2002, use the Universal Mobile Telecommunications System (UMTS) protocol, a wireless data transfer protocol designed to download at data rates from 384 kbps up to 2 Mbps.

Mobile terminals

Most PC modems download at data rates of 56 kbps or less, while the current mobile phone download rate is 9.6 kbps. UMTS makes near CD-quality audio streaming possible from every mobile phone, or "mobile terminal" as it is called in the terminology of 3G.

UMTS networks are another leap in sophistication from current digital networks. The key to the applications developing for 3G systems is Internet protocol, which allows packet switching, allowing more data to be moved at greater speeds.

Market statistics indicate considerable potential for systems able to ensure high-speed, high-quality downloads.

In 1998, global sales of mobile phones exceeded 100 million. And in a report on digital behavior by Forrester Research, forecasters predict the number of people in Europe with mobile phones will reach 99 million by 2003, double the number today. Also doubling by 2003 to nearly 60 million will be the number of people with Internet access.

But the key prediction for both mobile networks and radio broadcasters is that, in five years, nearly 30 percent of Internet users in France, Germany, the Netherlands, the United Kingdom and Sweden will access the Web through non-PC devices, such as mobile telephones and personal digital assistants.

According to UMTS Sales Manager Richard Carter, Ericsson has made a significant investment in exploring this high-tech future. The venture with Ginger Media is part of the important process of understanding what end users want.

"With UMTS technology, the mobile operator has the capability to deliver 384 kbps data to the telephones. That is raw capacity. What we look for are killer applications," he said.

Carter cited end-user surveys and noted that the mass market, not the business market, will drive 3G applications.

Significant trends

In Europe, Carter said, the growth in short-message sending (SMS), also known as instant messaging, is in the 40-percent to 50-percent range. "It is not just kids in clubs sending messages to their friends. We see the growth of verbal applications, like doctors in hospitals," he said.

According to Carter, the market in Japan has also advanced in SMS. The Japanese mobile system, he said, is quite different and offers few wireless application protocol servers providing users with pared-down Web content through mobile phones. There are 2 million users with a 25-percent growth in revenue.

This mass-market strategy is also a youth market strategy. Ericsson has a clear product target — personal stereo/radio sets like the Sony Walkman. Twenty years after hitting the market, these products still sold 100 million units in 1999 in the United States alone.

Carter said Ericsson would like to have 15 applications tested by 2002. The two ongoing tests at the Guildford, England, research site are broadcast CD music and the Virgin Radio broadcasts.

An important element in 3G technology is called Bluetooth. Developed by Ericsson, IBM, Intel, Nokia and Toshiba, Bluetooth is a low-cost, very-short-range radio link between a mobile phone, a mobile PC or other portable devices.

Bluetooth means no cables. "Because of Bluetooth, the consumer will wear an earpiece and keep the terminal in a pocket," Carter said. Cordless headsets are one application, as are using a portable PC as a speakerphone and sending instant photos and videos from any location.

Multimedia evolution

Like other mobile phone manufacturers, Ericsson looks toward 14- to 19-year-olds as early adopters of these new applications.

"Look on the streets of London and you see all these kids using mobile phones," said Carter. "We know they use SMS. We also know they like to download MP3 files and share them with their friends. It is the evolution of the Walkman into multimedia."

Virgin Radio is an attractive partner for Ericsson in this project. As a highly targeted youth-appeal radio station, it has the marketing strength to get the message out and be the message.

Lee Roberts, who works with Ginger Media's marketing strategies for new technology, said a number of factors influenced their interest in the project.

Virgin Radio coverage is limited to London. As in most European countries, expansion in the current AM or FM spectrum is limited.

"The Internet allows us to leapfrog the current broadcast model, migrating from analog to digital," Roberts said.

Roberts said he sees growth for Virgin

A 3G personal digital assistant could be part of the future of radio.

Radio outside the United Kingdom. And he said 3G technology overcomes problems with digital audio broadcasting, which is in use in the U.K.

"It (DAB) is 12-year-old technology," said Roberts. "3G moves beyond digital radio; it is mobile, content rich, great sound, not moving pictures but color. Digital will add six to 10 stations per market. 3G will add 1,000 access points." He said DAB does not provide a return path for revenue.

For Roberts, it is all about content.

"No content. No growth," Roberts said. He said Ginger Media intends to rule the world in content production and, with that, marketing exploitation.

Specific product

"We produce eight hours on shortwave for Levi Strauss & Co. We can produce a specific radio product for either a specific advertiser or, through 3G technology, a specific person," Roberts said.

Interactivity, often cited as a consumer demand, is not necessarily an element Ginger Media considers important. According to Roberts, radio is a passive medium and companies have overlooked the interactivity argument.

"Five percent of our radio listeners phone in to our radio stations and 5 percent of those are the people who will always call," he said. "Advertisers may benefit from interactivity, but the benefit for radio listeners is minimal."

As with the advent of any new technology, questions remain about how consumer behavior will develop. Ginger Media sees a migration from local to global media. But, said Roberts, 20 years from now people will still be listening to the radio while shaving in the morning.

Tim Crook, a media studies professor at Goldman College in London, said he thinks more broadly about the subject of communication and new technology. While 3G mobile communications may only be a small technical step, he said he views it as a huge leap in social interaction with media.

"The potential of the 3G mobile phone is that it could be a mobile/portable digital radio with the lateral text and information of DAB," said Crook. "When this is combined with Internet and e-mail access, then it opens up the possibility of engaging with Webcasting as well."

The interest of Ginger Media is simple — to be the first in the United Kingdom to talk about it. Ericsson's, however, is to reach everyone in the world.

■ ■ ■

Michael Hedges, a media consultant, reports on the industry from Geneva, Switzerland.

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World Radio History

WIRED FOR SOUND

How Fires Influenced NEC Code

Steve Lampen

Did you know that a pie cooler has cost you, or may soon cost you, thousands of dollars? In large installations, it may cost you tens of thousands.

If that's not enough to make you keep reading, I don't know what is!

In our last installment of *Wired for Sound* in the March 1 issue, we discussed the discovery of Teflon and mentioned a property that, almost overnight, had everyone clamoring for some of this magic material.

That property was its inability to burn. It would melt, but it would not act as fuel for a fire.

Phone fire

This story of burning plastics really starts on Feb. 27, 1975, at 12:25 a.m., when fire was reported in the cable vault at the AT&T central office switching terminal at 13th St. and Second Ave. in New York City. For the next 16 hours, firefighters attempted to control the blaze.

No one died, but toxic fumes from burning wire insulation sent 175 firefighters to the hospital. The fire put 170,000 phones out of service in a 300-block area.

A 4,000-person Bell System task force was put into service to rebuild the facility. In 22 days, working in 12-hour shifts, they expended 562 man-years to get everything back in operation. The job required 1.2 billion feet of service wire and 8.6 million feet of cross-connect wire.

Fatal circumstances

The second and more public incident was a fire at the MGM Grand Hotel and Casino in Las Vegas on Nov. 21, 1980. According to subsequent accounts, it started with a small fire in the kitchen of a closed "deli" restaurant.

A compressor that cooled a pie storage rack overheated. This small fire quickly spread to the wooden ceiling tile and the vinyl and polyurethane-cushioned booths.

Soon the entire restaurant reached flashover, at which time balls of flame were spreading into the casino area. Some gamblers were hesitant to walk away from their bets, until the toxic fumes overcame them.

Soon the flames passed to the highly flammable clear plastic ceiling suspended over the casino.

The eventual stampede to the exits prevented many people from getting outside. One taxi driver I talked to said he was pulling up to the entrance at that point only to see patrons being pushed *through* the plate glass doors.

According to media reports, the toxic smoke was drawn up the elevator shafts, up special earthquake ducting and into the plenum drop ceiling, where it was pulled out by the air conditioning system and fed to the rest of the hotel.

Of the 85 people who died in the 1980 tragedy, 65 were above the first floor, the actual location of the fire.

Twenty-two people died from toxic fumes in the hallways and stairways. Twenty-five more died in their rooms. The filtered air vents had successfully "scrubbed" the smoke and soot from the air — but left the deadly toxic fumes. The patrons only needed to block their doors and air vents with wet towels or work their way to the roof.

A total of 85 people died, and 600 more were injured. Sixty-five of the bodies were above the first floor, the actual location of the fire.

The hotel had passed fire inspection only six months before.

NEC

In these instances, the key problems were burning toxic materials, and, in the MGM Grand fire, the effect of a closed-loop air-conditioning system.

One group follows such fires closely: the National Fire Protection Association in Quincy, Mass. It produces a book called the National Electrical Code, the bible of fire prevention. It addresses almost every aspect of building design, construction and flammability, with emphasis on wire and cable.

In the pages of **Radio World**, you have read details about the NEC over the past year or so, in articles by Charles "Buc" Fitch. That series is set to resume shortly. And you can obtain a copy of the NEC codebook by calling (800) 344-3555.

The only problem with the NEC is that it is voluntary. This is a guidebook, intended to be used by those who need a basis for safe building construction.

The association is not a government body. The NEC does not have the power of law. Some cities or counties may not use the NEC guidelines. Other jurisdictions — Chicago and Las Vegas spring to mind — think the book is not strong enough, and have instituted their own guidelines.

Too many cooks

This situation can lead to weird circumstances.

For instance, I was involved in the design phase of a state college in northern California. By coincidence, the campus crossed the line between two counties, so the state fire marshal and fire marshals from two counties argued over what to do.

One county essentially didn't care, and said you could do whatever you wanted. No, no, the other county said, you must go by the NEC codebook.

Oh, no, said the state guy, everything wire and cable must be solid Teflon!

The chief engineer of the facility and I had to sit back until they came to an agreement. Eventually, after months of wrangling, they opted to follow NEC recommendations.

So let's take a look at what their choices were and what they decided.

Wire and cable products are made from a fairly small list of materials. Metal conductors are certainly fireproof, and melt at temperatures many times that of the thermoplastic or thermoset compounds that cover them.

Cables can be tested for flammability by a number of tests, and the results put each cable into one of a number of groups.

These groups are the tip of a very big iceberg. We'll get to that in our next installment.

■■■

Steve Lampen is technology specialist, multimedia products, for Belden Electronics Division in San Francisco. His book "Wire, Cable, and Fiber Optics for Video and Audio Engineers" is published by McGraw-Hill. Reach him at shlampen@aol.com

MARKET PLACE

Site Offers Free Topo Data

French software developer ATDI has created an Internet server containing a repository of free cartographic information, such as image maps, topological data and digital elevation models.

The service is intended to help communications engineers visualize the size of a network on a standard map, but is useful for other research.

Engineers can download a 1,600-foot-resolution digital elevation model and the associated map at 1/1,000,000 for any area in the world.

The company also offers a 300-foot resolution for the United States, with 1/500,000 associated maps.

ATDI specializes in radio wave propagation simulation. Visitors also can download free software to help make calculations with the cartography, obtain optical visibility studies on the terrain and search for transmitter sites.

To access the service, visit www.atdi.com

For more information, contact Jerome Sicart at ATDI in France via e-mail to atdi@atdi.com *or fax the French Technology Press Office in Chicago at (312) 222-1237.*

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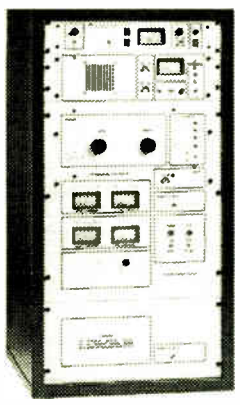

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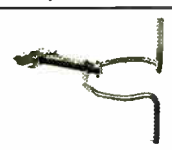

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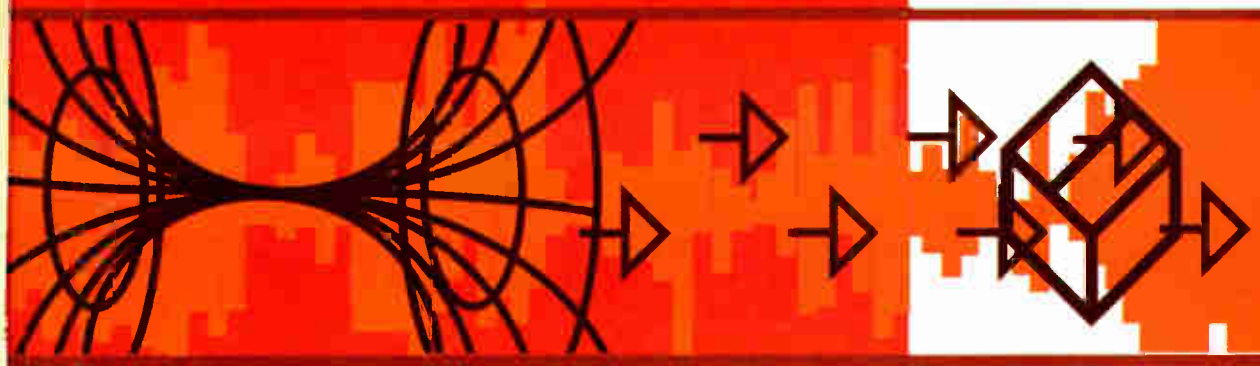

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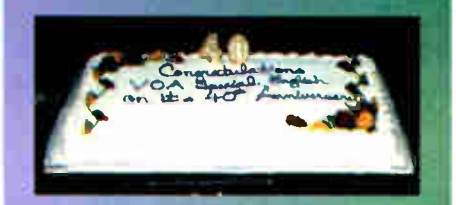
GM Journal

Radio World — Resource for Business, Programming & Sales — March 29, 2000



Luckoff: San Fran's No. 1 GM

Bill Mann

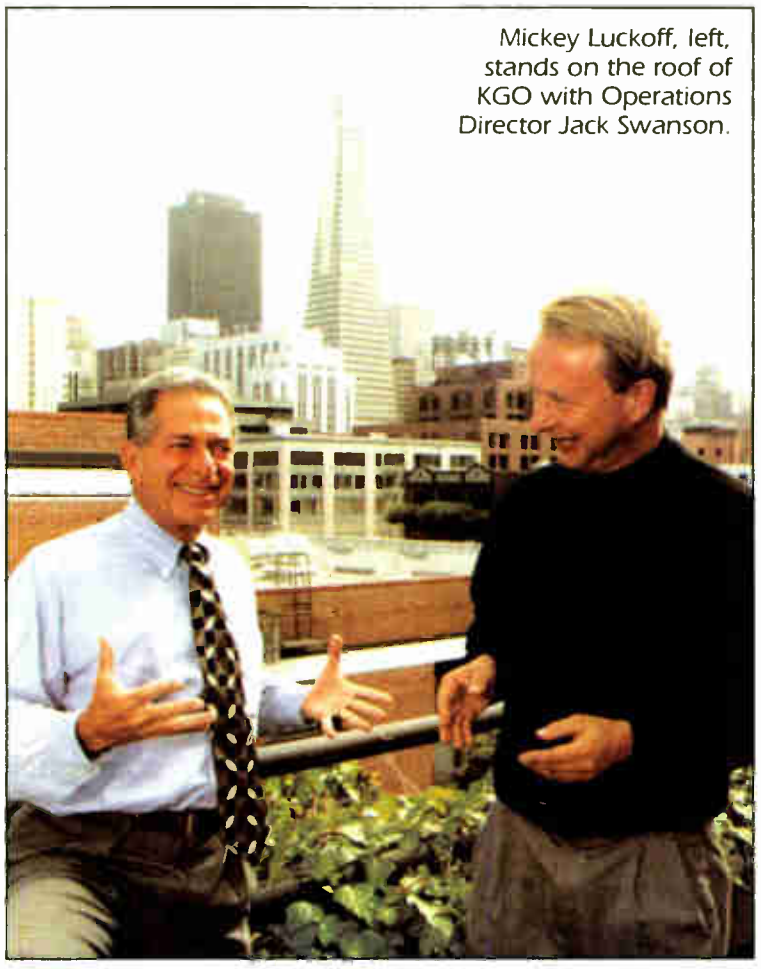
What is it like to be the GM of the top-rated station in a major market for an unprecedented 86 straight ratings periods?

"I'll tell you what it's like," said Michael Luckoff, GM of San Francisco's 50,000-W news/talker KGO(AM).

"I feel like there's a bull's eye painted on my back each day I go to work," he said, taking a page from Intel Chairman Andy Grove's book, "Only The Paranoid Survive."

Luckoff, 63, known in broadcasting circles as Mickey, is nothing if not competitive, which explains why he's a survivor.

When asked, Luckoff confirmed that all the other GMs of Disney's major-market stations have been replaced or have resigned since the company took control of ABC Radio three years ago.



Mickey Luckoff, left, stands on the roof of KGO with Operations Director Jack Swanson.

Success

It also explains why the San Francisco station, which now commands as much as $4,000 for a 30-second spot on morning drive, has been such a consistent money-maker in Luckoff's quarter century at the helm.

By any standards, the past year has been especially remarkable for Luckoff and KGO. Last fall, the NAB awarded it the Marconi Award as Best Major-Market Station. It's KGO's fourth Marconi under Luckoff's helm.

In early 1999, he received a lifetime achievement award from an industry programming magazine. In November, Luckoff's veteran morning drive personality, Jim Dunbar, Luckoff's predecessor as KGO's GM, was the first San Francisco radio personality inducted into the Radio Hall of Fame (**RW**, Nov. 10, 1999).

The dominant Bay Area news/talk station celebrated its 75th birthday in March, the same weekend it staged its 20th annual Leukemia Cure-a-Thon, a weekend-long "radiothon" that has raised $6.5 million for leukemia research, Luckoff's favorite charity.

Luckoff also is general manager of two other Disney-owned AM stations in the Bay Area: conservative talker KSFO(AM) and KMKY(AM), "Radio Disney," a child-oriented station.

KSFO(AM), along with KGO, placed in the top 10 (all listeners 12-plus) in the fall Arbitron ratings for the San Francisco-Oakland Metro.

Luckoff, past president of the California Broadcasters Association, is especially proud of his achievement of 86 consecutive ratings "books" without a loss — on an AM station, no less.

"That's never been done in a top-15 market. I love to win," he said, allowing a smile to cross his usually taut face. "I hear the view from second place is horrible."

KGO's 1998 revenues totaled $32 million, according to BIA Financial Network statistics. While '99 revenues are yet to be released, Luckoff indicated that 1999 was a stellar year for KGO.

"Radio in the Bay Area, which is the home of Silicon Valley and all those 'dot-com' ads, is thriving," said Luckoff. "Radio sales are up 30 percent year to year, and January to January, they were up 50 percent in this market."

"Silicon Valley has had a huge effect on radio this past year, especially in this area," said Luckoff. Disney is his third corporate boss at the station. KGO shares a building with Disney's KGO-TV, located near famed tourist attraction Fisherman's Wharf.

"It's a very healthy situation now, with radio embracing the dot-com business — it develops new revenue streams for our industry. We're always looking to update our Web site, and we encourage our advertisers to put their Web addresses in their ads. That way, they're dot-com businesses, too."

Luckoff said that even before the Net, KGO "has practiced interactivity with our listeners for a long time.

"Want to know where to get a book by an author who's been on one of our talk shows? We have a listener line, and now there's our Web site. Want to know more about a guest? It's there, too. I believe we had the first listener-services department in the country."

Critical element

And in an age of shrinking radio news departments, one of Luckoff's lieutenants, PD Ken Berry, told **RW**, "Every year when Mickey goes to ABC budget meetings he has to fight the battle all over again to justify funding our fully staffed news department, something we consider critical to our success."

Hearing this, Luckoff smiles and agrees.

"Let's just say I present convincing figures and arguments that support our heavy commitment to news."

How is Disney different from KGO's previous corporate owners?

"I do a lot more reports now," Luckoff said with a game smile.

Luckoff takes credit for previous owner Cap Cities' 1996 purchase of KSFO(AM), legendary San Francisco call letters and a station previously owned locally.

"I was pretty persistent that we needed to own a second talk station in this market," Luckoff said. "Finally, one day at the NAB show, my boss took me aside and said, 'That station you want to buy in San Francisco? Go ahead and buy it.' It got me off his back."

Immediate success

"Hot talk" KSFO(AM) under Luckoff achieved almost immediate success by positioning itself as a direct rival of KGO, even though the two sister stations' studios are only 20 feet apart. Talk personalities on the stations are instructed not to mention the other's call letters.

Luckoff's long-time operations director, Jack Swanson, said of the two stations, "I want them to be bitter rivals. I want it to be a fight to the death."

The strategy has worked, and the KGO-KSFO(AM) combo soon dispatched its chief talk rival, CBS Corp./Infinity Broadcasting Corp.'s KPIX-AM-FM, three years ago. Luckoff had snatched KPIX's top ratings draw, then-relatively unknown Dr. Laura Schlessinger, away from news-talk KPIX four years ago, and the station soon went out of business.

The brutally competitive Luckoff also won a bidding war with KPIX to retain one of KGO's talk personalities, Shann Nix.

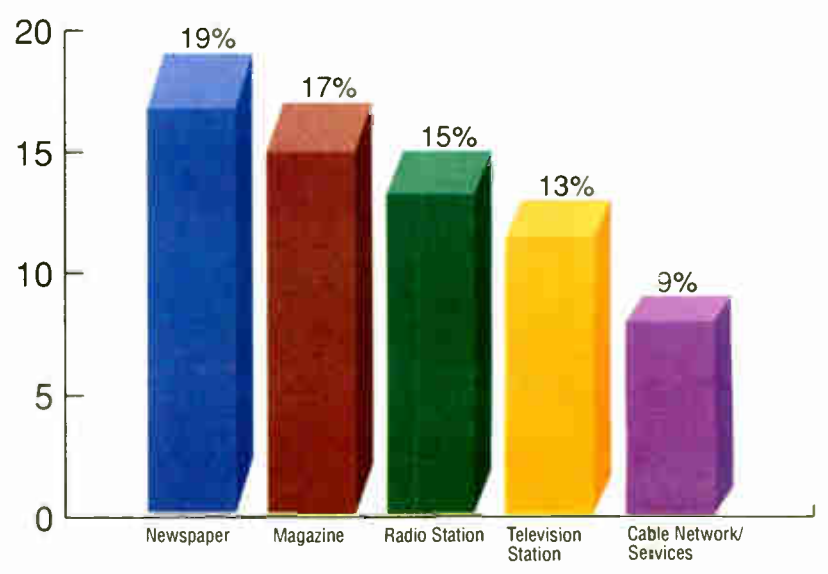
Even Luckoff's chief rivals give him grudging praise.

"You have to respect Mickey for what he's done for his station for so many years," said Ed Cavagnaro, news

See LUCKOFF, page 108 ▶

Percent of online adults in top-10 radio metros who visited the following media outlets' Web sites

Among adult online users, 15 percent visited radio station Web sites, a percentage slightly lower than those who visited a magazine or newspaper site, and slightly higher than TV or cable sites.



Data Sources: Scarborough, top-10 radio metros, online adults 18+; Interep Research March 2000.

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BROADCAST LAW REVIEW

A Primer on the New EEO Rules

The Commission's Revised Equal Employment Opportunity Program Imposes New Reporting Requirements and Broad Outreach Efforts

Barry Umansky

On Feb. 2, the FCC released the 93-page text of its revised EEO regulatory program.

When effective later this spring, these rules and policies will require most radio and TV broadcasters, cable companies and other "multichannel video programming distributors" to perform broad outreach for all full-time job vacancies.

The rule revisions also impose new reporting requirements and compel broadcasters to engage in significant recruitment efforts.

For most broadcasters, these new "zero tolerance" rules signal an increase in EEO paperwork and recruitment obligations.

Additionally, the new EEO regulatory system places broadcasters in greater enforcement jeopardy in that complaints and petitions may be filed against stations throughout the license term — not just at license renewal time.

Beyond anti-discrimination

No one takes issue with the need for all businesses — broadcast and non-broadcast — not to discriminate when it comes to employment. Discrimination plainly is illegal and no responsible broadcaster should commit it or tolerate it.

However, for some time there has been a debate over the constitutionality of affirmative action-related EEO regulations of the commission.

The new rules are the reformulation of EEO rules that were suspended following the D.C. Circuit Court's 1998 decision in *Lutheran Church-Missouri Synod v. FCC*.

This decision held that the previous rules were unconstitutional. The court found that the rules pressured stations to maintain a workforce that mirrors the racial breakdown of the geographic area where the station is located and, thus, required that racial considerations be involved in station hiring decisions.

The court further stated that the former EEO rules compelled licensees to hire "with an eye toward meeting a numerical target" and "resulted in individuals being granted a preference because of their race."

Industry initiatives

Following the court decision and the commission's suspension of its EEO rules and policies, a multitude of broadcast organizations and groups stated their intention to still recruit women and minorities for job openings.

Additionally, several industry efforts have been made to foster new employment opportunities for women and minorities and to help increase minority and female ownership of media properties.

These efforts include funds to train and mentor women and minorities and to provide sources of broadcast investment capital for women and minority entrepreneurs.

FCC tries again

But the FCC chose to try again to adopt a lawful EEO regulatory system. Arguing that the new rules are designed to be "race-neutral," and require only "simple outreach efforts," the commission contends that the new EEO regulatory system is constitutional and would survive court review.

This statement will be put to the judicial test in court challenges to the new rules. Some parties have stated their belief that the new rules still will coerce stations to make hiring decisions based on the race and gender of applicants. As of this writing, several organizations have gone to court to seek review of the FCC's EEO rules.

Efforts also are being taken to have the commission or the courts "stay" the effective date of the rules pending judicial review. Absent a stay of the rules, the rules will become effective as early as April 15, unless there are delays in some administrative issues involving the approval of the new regulations and paperwork requirements.

The new 'zero-tolerance' rules signal an increase in EEO paperwork and recruitment obligations for most broadcasters.

Efforts have been made to foster new job opportunities for women and minorities.

Let's review how these new rules will affect radio broadcasters. Despite some parties' efforts to challenge the rules, it is essential that all "non-exempt" radio broadcasters prepare now to begin continuous compliance with the new rules. Only stations with fewer than five full-time employees are exempt from the full panoply of requirements brought about by the new EEO rules.

Because the commission now gives stations various "options" to demonstrate compliance, individual stations may have unique questions and need specialized guidance to comply with the new EEO regulatory scheme.

Most stations must comply

All "station employment units" with five or more full-time employees must comply with the recruitment, filing and recordkeeping requirements.

Every station employment unit, no matter what size, has an obligation not to discriminate on the basis of race, ethnicity or gender. "Station employment unit" refers to a station or group of commonly-owned stations in the same market that share at least one employee.

Local group owners (or those involved in LMAs) therefore cannot claim small-station treatment by maintaining that each station in a station combination employs a small staff.

Job openings for recruitment

The recruitment requirements apply to all full-time employees, including lower-level employees. Full-time employees are those who work at least 30 hours per week and are paid for their service.

Recruitment is not required for internal promotions, for temporary employees or for interns. But, if temporary employees or interns are hired permanently, they must be hired subject to recruitment.

As for part-time hires, broadcasters need only "substantially comply" with the recruitment requirements. "Substantial" compliance is not well defined; but the commission has noted that stations are not required to notify "requesting organizations" of part-time vacancies — only full-time vacancies.

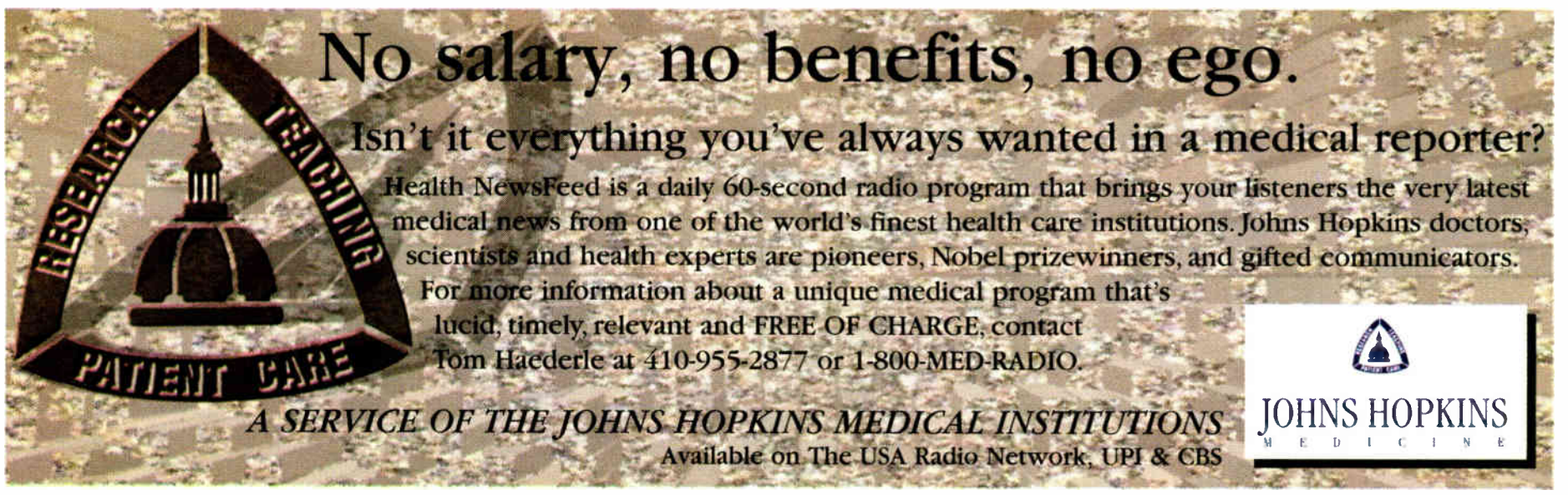
Also, the commission recognizes that sometimes there may be circumstances where recruitment may not be a feasible option, such as when an on-air employee abruptly resigns from the station and a new hiring decision must be made immediately.

The basic obligation of the new EEO program is for broadcasters to widely disseminate information about full-time job openings to ensure that all qualified applicants, including minorities and women, are able to compete for jobs in the broadcast industry.

The two outreach options

Broadcasters must implement either the commission's "Supplemental Recruitment Measures" (Option A, page 106) or design their own "Alternative

See UMANSKY, page 102 ▶



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Inside the FCC's New EEO Rules

▶ UMANSKY, continued from page 100

Recruitment Plan" (Option B, page 106). Both options include outreach requirements and record-keeping requirements.Each option is described in the accompanying sidebar.

Electing an option

All broadcasters must file with the commission and place in their public file a statement as to their election between the two approaches (Supplemental Recruitment Measures or Alternative Recruitment Program) within 45 days of the effective date of the new rules.

The commission is preparing a form to be used for the initial election. Any broadcaster that does not receive a copy of the form by mail may obtain one from the commission or from your communications law firm.

A broadcaster may change his or her initial election when each Statement of Compliance is due, but must adhere to its election until the filing of the next Statement of Compliance.

When efforts fail

If it appears that, despite a broadcaster's outreach efforts, an excessive number of hires or interviewees are coming from inside, "word-of-mouth" recruitment sources, the broadcaster should reconsider whether its outside recruitment efforts achieve a sufficiently broad outreach and attract qualified candidates.

For stations in LMAs

If a station is subject to a time-brokerage agreement, the licensee's Statement of Compliance, Form 396 and EEO public file report will include data concerning only its own recruitment efforts for full-time positions and not the efforts of the broker.

If a licensee is a broker of another station or stations, however, its recruitment activity concerning full-time positions at the brokered station(s) should be included in the data on which the licensee-broker's own reports are based concerning its own station.

For newly purchased stations

If there has been a substantial change of ownership, the new licensee must consider only the recruitment efforts it conducted concerning full-time positions during the period it controlled the station.

EEO and religious stations

Religious broadcasters may establish religious belief or affiliation as a qualification for all radio station employees.

Religious broadcasters who establish religious affiliation as a qualification for a job position will not be required to comply with the FCC's specific recruitment requirements for that position.

Greater jeopardy for stations

In order to verify compliance with the EEO rules, the commission may send inquiries to licensees and perform random audits, including on-site audits. Each year the FCC will randomly select for audit approximately 5 percent of all radio licensees.

The commission may also conduct an inquiry if sufficient evidence exists of a possible violation of EEO Rule.

A variety of sanctions would be

See UMANSKY, page 106 ▶

Complaints *and petitions may be filed against stations throughout the license term, not just at license-renewal time.*

FILING REQUIREMENTS

1. EEO public file report

The EEO public file report contains all of the job vacancy and recruitment information required by either the "supplemental recruitment measures" or the "alternative recruitment plan," depending on which option was selected.

The EEO public file report must be submitted to the commission in two instances:

- When submitting a renewal application, the EEO public file report covering the previous year must be submitted as an attachment to Form 396; and
- For stations subject to mid-term reviews, the EEO public file report for the year preceding the mid-term review must be filed.

If a broadcaster has a Web site for its station, it must post that station's EEO public file report on the site at the same time that it places it in the station's public file.

2. Statement of Compliance (FCC Form 397)

Every two years, except in the renewal year when a broadcaster must file a Broadcast Equal Employment Opportunity Program Report (Form 396), all radio licensees with five or more full-time employees must review their EEO programs and file with the FCC a Statement of Compliance to indicate whether they have complied with the commission's EEO rule during the two-year period prior to the date of the Statement.

The Statement of Compliance must therefore be filed every second, fourth and sixth year of the license term. The Statement is the new FCC Form 397.

The first radio Statement of Compliance after the effective date of the new rule will be due on June 1, 2001, to be filed by radio stations in the District of Columbia, Maryland, Virginia and West Virginia, whose licenses expire on Oct. 1, 2003. Thereafter, radio stations in the Dec. 1, 2003, renewal group will file by Aug. 1, 2001, and so on for all renewal groups.

3. Broadcast Equal Employment Opportunity Program Report (FCC Form 396)

Form 396, to be filed with license renewal applications, will be modified to include the new EEO requirements. On this form your station will report the existence and details of any discrimination complaints.

The Form 396 will continue to include a box in which a licensee may indicate whether it is part of an employment unit that employs fewer than five full-time employees. But, the FCC deleted the box that previously gave licensees located in areas with minority labor forces of less than 5 percent an exemption from filing EEO program information.

Sections pertaining to local labor force statistics and alternative labor force statistics have been eliminated. Also eliminated are sections concerning the number of minorities or female hires and the number of recruitment sources contacted, and the number of minorities and women who have been promoted.

4. Annual Employment Report (FCC Form 395-B)

The new rule reinstates the requirement that broadcasters file annual employment reports (Form 395-B). The form has been revised, however, to reflect the new rules.

Although employment profile data will continue to be collected in the annual employment reports, the commission stated that it will no longer use that information to screen renewal applications or to assess compliance with the EEO program requirements. Instead, the commission says it will use this information simply to monitor industry employment trends and report to Congress.

Form 395-B must be filed by September 30 of each year. Stations are no longer required to retain copies of Form 395-B in their public files.

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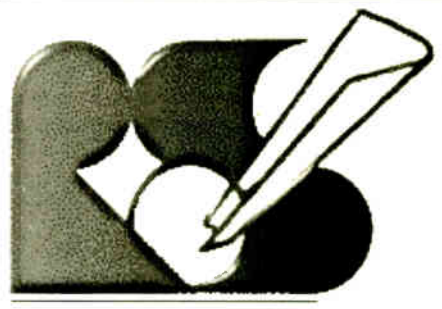

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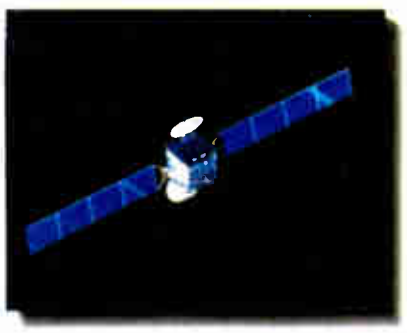

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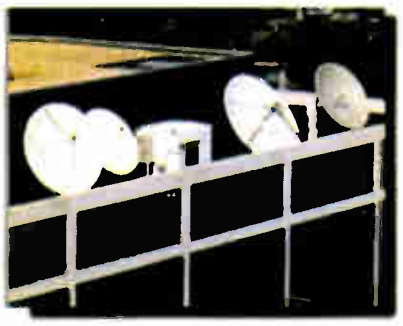

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Command Audio Is Audio on Demand

Flip Michaels

A thousand years from now, when our descendants look back on this generation, they might learn that we were the last to live in a world lacking personal customization and the first actually to experience it.

In Redwood City, Calif., one company is banking on the concept. After a December 1999 launch in Phoenix and Denver, Command Audio plans to roll out what it calls the world's first mobile, commercial version of an audio-on-demand service.

Command Audio hopes to be available nationwide, and plans to enter the top 50 markets by 2001. Its target: America's 120 million commuters. The company is currently in negotiation with stations in 8 major markets. Craig said CA expected that those deals would close by the end of March.

"The primary benefit for people is that the Command Audio service puts you in control of the news and information you want to listen to," said Chairman and CEO Don Bogue.

NTR for stations

The benefit to station owners is the revenue potential possible in leasing subcarrier frequencies to Command Audio, and the ad revenue stations may realize when Command Audio enters their market.

"We don't take advertising — we're not in competition with them for their revenue stream. And we pay them, a lot, for advertising and for sub-carrier acquisition," said spokesman Wilson Craig.

Craig said that CA will negotiate subcarrier leases with each station in each market. Rates will vary according to market conditions and circumstances unique to the stations, according to Craig.

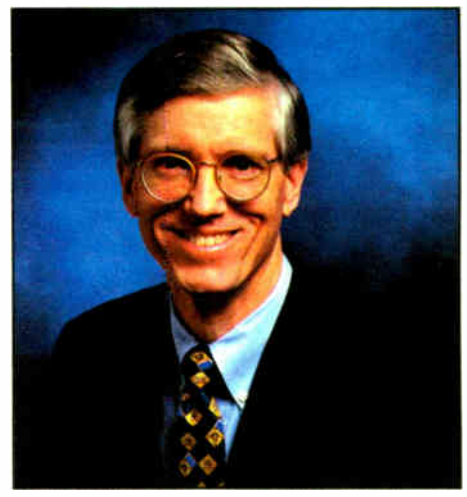
Command Audio Receiver

The company, a spinoff of technology developer Macrovision, is backed by more than $25 million in venture capital from a group that includes Texas Instruments, Hambrecht & Quist and Paul Allen's Vulcan Ventures. These early investors joined a new round of financial backers, led by Canaan Partners and includes Chase Capital Partners, Todd US Ventures and Motorola, who together announced an infusion of $56 million on Jan. 18.

"We are especially gratified by the continuing involvement of our early-round investors," Bogue said of the new funding.

Command Audio has teamed up with Thomson Consumer Electronics to sell wireless receivers for $199. The units will capture a digital signal delivered via a network of satellites and FM subcarriers and satellites.

In January Command Audio also announced that Motorola will integrate the service with its iRadio in-vehicle platform. The iRadio initiative will provide in-vehicle information and entertainment services to motorists through agreements with major car manufacturers beginning next year, further extending CA's reach.



Don Bogue, Command Audio CEO

This is an audio demand service similar to the home environment services TiVO and Replay offer, which in recent months have begun to move personalization from the desktop computer to the couch.

"Where we are different is that we provide a wireless on-demand audio solution that can be utilized in the car, yard, anywhere," said Bogue.

Monthly fee

Subscribers pay $14.95 monthly and can program their units to scan incoming data feeds of more than 300 audio shows, storing up to eight hours of selected programming at a time.

"People lead very full lives and would like the ability to use their commute time to explore their own interests on their own schedules," said Bogue.

"We offer access to programs that may be unavailable in your local market or that previously had been available only on television. Programs such as 'Nightline' with Ted Koppel, 'The NewsHour' with Jim Lehrer and 'The Nightly Business Report.'"

Programs will include continually updated local traffic, weather, news, sports, business, finance and programs on topics such as personal investing and home improvement.

In addition, Command Audio will feature spoken-word versions of print media, such as The Wall Street Journal, Business Week, Time, Sports Illustrated, People, Popular Science and Scientific American.

Mobile e-commerce

In Command Audio's plans is the idea of in-car electronic commerce. Billing and address information would simply be stored in a Command Audio system and could be transmitted by cell phone connection to a central server to complete a transaction.

The service could also be incorporated into the car's dashboard radio receiver; as well as combined with a cellular telephone.

"We have met with several hundred (beta) users who have been extremely receptive to the Command Audio service," said Bogue. "Our research shows that there is an appetite among them for making their commute time more enjoyable."

For more information, visit the Command Audio Web site at *www.commandaudio.com*

■ ■ ■

Flip Michaels is director of multimedia Development for WITF Inc., Harrisburg, Pa., and can be reached at flip_michaels@witf.org

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RAB 2000

Denver • February 16-19, 2000

RAB2000 hit an all-time high attendance record in Denver: 2,512 attendees. "This year's conference was the biggest RAB event ever. We are very pleased with this year's record turnout," said Wayne Cornils, RAB vice president, meetings.

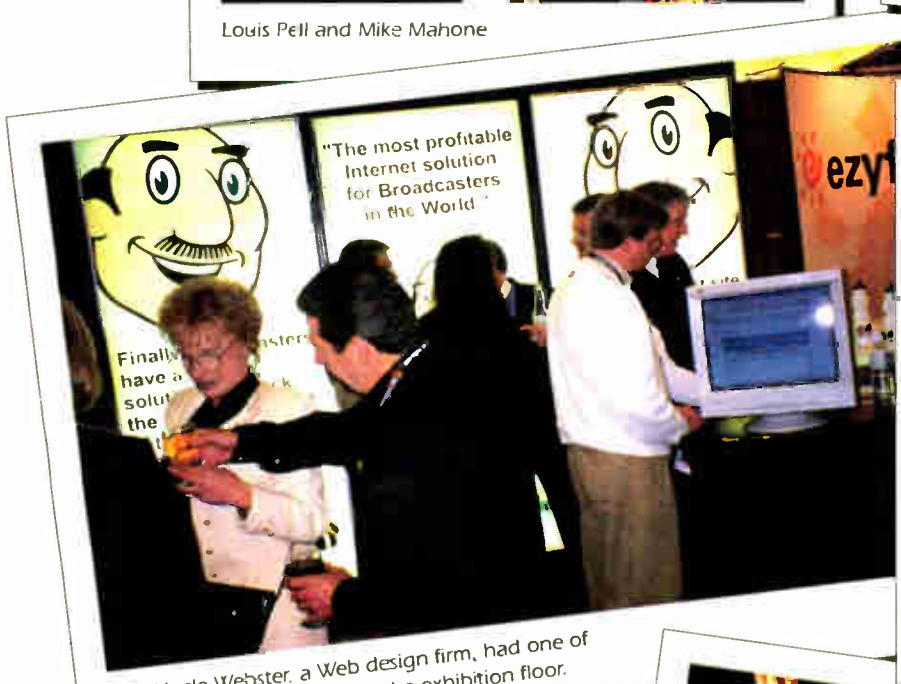
Another record fell at RAB2000: RAB President Gary Fries announced that radio earned 8.2 percent of all advertising revenue in 1999. Fries made the anticipated, but stunning, announcement at his "State of the Industry" address to RAB members at the conference. "If we can do 8.2 percent, we can do 9, we can do 10 percent — the sky is the limit."

Fifty-eight exhibitors crammed the floor — nearly two-thirds of them "dot-com" or software companies. Wicks Broadcasting announced it had bought both CBSI and Datacount, both companies that exhibited at the show.

Another announcement of note: Susquehanna Radio announced a deal with RadioWave.com that will allow the company to insert distinct ads into its live broadcast signal and Net streams.

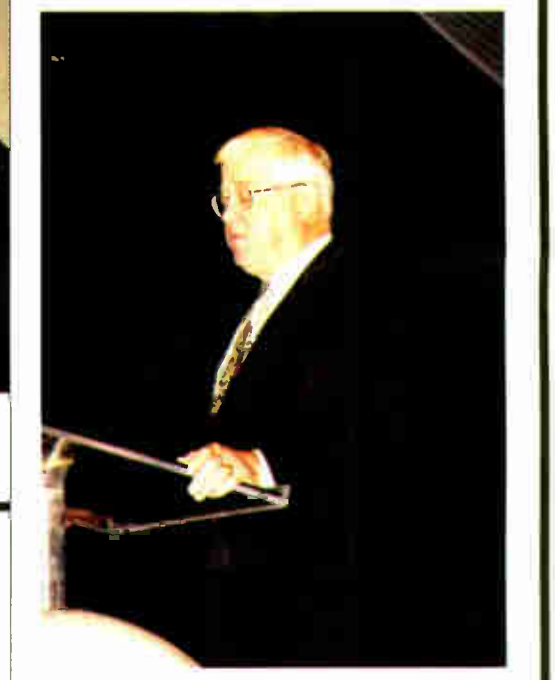
Louis Pell and Mike Mahone

AOL Vice President Charles Warner's Internet keynote address caused harrumphs when Warner made an offer to 'save' radio through an alliance with AOL. The speech closed with some pointed questions from Emmis CEO Jeff Smulyan to Warner.



Uncle Webster, a Web design firm, had one of the busiest booths on the exhibition floor.

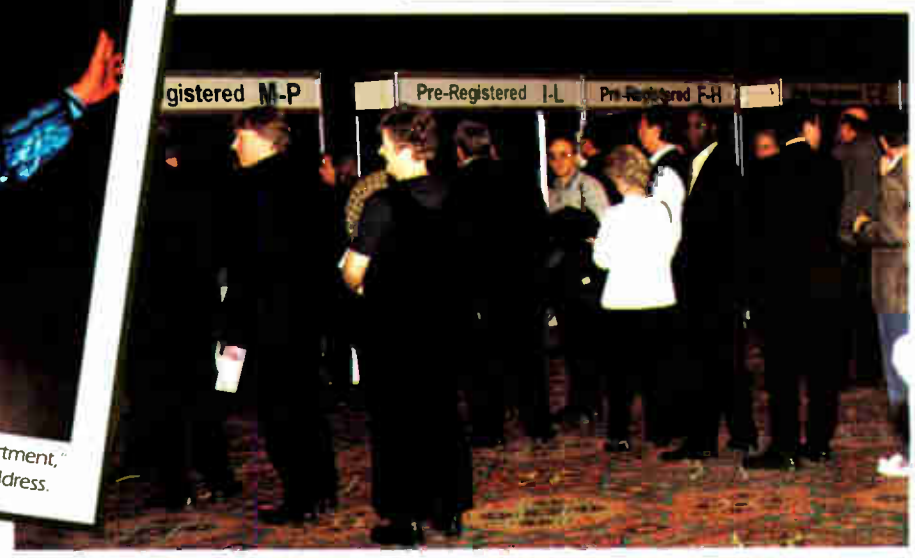
Molly Glasoe, Sandusky Radio, Bellevue, Wash.; Steve Sandman, AMFM Inc., Colorado Springs, Colo.



RAB President Gary Fries speaks at the RAB press conference.

Susan Hoffman, Sandusky Radio, Bellevue, Wash.; Dick Rakovan, RAB Senior Vice President, Stations, Chicago

Peter Glen, author of "It's Not My Department," was a bolt of energy in his keynote address.



Registration at Adams Mark Hotel, Denver

World Radio History

SUPPLEMENTAL RECRUITMENT MEASURES

OPTION A: ALTERNATIVE RECRUITMENT PROGRAM

Outreach Requirements Menu Choices for Broadcasters:

(1) Stations must provide notice of full-time job openings to all qualifying organizations that request such notice, if the organization is one that regularly distributes information about employment opportunities to job seekers or refers job seekers to employers.

(2) Depending on the size of your employment unit, you must select two (for employment units with five to 10 full-time employees) or four (for larger employment units) of the following longer-term recruitment activities, and complete those activities within a two-year period:

- Participate in at least four job fairs by station personnel with substantial responsibility for hiring decisions;
- Host at least one job fair;
- Co-sponsor at least one job fair with business or professional organizations in the community (the membership of which includes substantial participation of women and minorities);
- Participate in at least four activities sponsored by community groups active in broadcast employment issues, such as conventions, career days and workshops;
- Establish a station internship program;
- Participate in general (as opposed to vacancy-specific) outreach efforts, such as job banks or Internet programs;
- Participate in scholarship programs for students pursuing a career in broadcasting;
- Establish training or mentoring programs designed to enable station personnel to acquire skills that could qualify them for higher level positions;
- Participate in at least four events or programs relating to career opportunities in broadcasting sponsored by educational institutions;
- Sponsor at least two events in the community designed to inform the public as to employment opportunities in broadcasting;
- List each upper-level opening in a job bank or newsletter of a media trade group whose membership includes substantial participation of women and minorities;
- Participate in other activities that the licensee has designed to disseminate information about employment opportunities in broadcasting to job candidates who might otherwise be unaware of such opportunities.

Recordkeeping Requirements:

(1) Collect, but do not submit routinely to the commission:

- A list of all full-time vacancies filled during the preceding year, identified by job title;
- The recruitment source(s) used to fill the specific vacancy (including organizations entitled to notification of vacancies, which should be separately identified), including the address, contact person and telephone number of each source;
- Dated copies of all advertisements, letters, e-mails, faxes, etc., used to fill each vacancy;
- Documentation necessary to demonstrate performance of supplemental outreach initiatives, *e.g.*, job fairs, mentoring programs;
- The total number of interviewees for each vacancy and the referral source for each interviewee; and
- The date each job was filled and the recruitment source that referred the hiree.

(2) Place the "EEO public file report" in the station public file each year. The report must include the following:

- A list of all full-time vacancies filled by the station employment unit during the preceding year, identified by job title;
- For each such vacancy, the recruitment source(s) utilized to fill the specific vacancy (including organizations entitled to notification of vacancies, which should be separately identified), including the address, contact person, and telephone number of each source;
- A statement as to whether they have elected to utilize the supplemental recruitment measures provided in the EEO Rule;
- The recruitment source that referred the hiree for each full-time vacancy;
- Data reflecting the total number of persons interviewed for full-time vacancies during the preceding year;
- For each recruitment source used in connection with any such vacancies, the total number of interviewees referred by that source; and
- A list and brief description of supplemental recruitment measures undertaken during the preceding year.

OPTION B: ALTERNATIVE RECRUITMENT PROGRAM

Outreach Requirements:

If a broadcaster forgoes the Supplemental Recruitment Measures and designs its own "broad and inclusive" outreach program, he or she must demonstrate that its program is "inclusive," meaning that it disseminates job vacancy announcements widely throughout the local community.

So, if a broadcaster elects to design his/her own program rather than utilizing the supplemental measures, the station must collect data tracking the recruitment sources, gender and race/ethnicity of its applicant pools so that the broadcaster, the public and the commission can evaluate whether the program is effective in reaching the entire community.

Recordkeeping Requirements:

(1) Broadcasters designing their own "broad and inclusive" outreach programs must collect, but not routinely submit to the commission, the following:

- A list of all full-time vacancies filled during the preceding year, identified by job title;
- The recruitment source(s) utilized to fill the specific vacancy, including the address, contact person, and telephone number of each source;
- Dated copies of all advertisements, letters, e-mails, faxes, etc. used to fill each vacancy; and
- For each recruitment source used for any full-time vacancy during the preceding year, the total number of applicants generated by that source, the number of those applicants who were female, and the number of those applicants who were minority, identified by the applicable racial and/or national group with which each applicant is associated.

(2) These stations must place the "EEO public file report" in the station public file each year. It must include the following:

- A list of all full-time vacancies filled during the preceding year, identified by job title;
- The recruitment source(s) utilized to fill the specific vacancy (including organizations entitled to notification of vacancies, which should be separately identified), including the address, contact person and telephone number of each source;
- A statement as to whether they have elected to utilize the supplemental recruitment measures provided for in the EEO Rule; and
- For each recruitment source used for any full-time vacancy during the preceding year, the total number of applicants generated by that source, the number of those applicants who were female, and the number of those applicants who were minority, identified by the applicable racial and/or national group with which each applicant is associated.

FCC EEO Changes

▶ UMANSKY, continued from page 102

imposed for EEO rule violations. They include admonishments, reporting conditions, forfeitures, short-term renewal of license or designation for hearing for possible revocation of license or denial of renewal.

The general public may file EEO complaints throughout each station's license term, based on the Statement of Compliance or the contents of the public file.

Complaints raising a properly documented potential violation of the EEO Rule would be investigated by the FCC or referred to the EEOC, as the FCC deems appropriate.

Again, enforcement activity would not be deferred to the end of the license term.

While time will tell whether the FCC's revised EEO regulatory approach is constitutional, it is essential that broadcasters begin now to establish station policies and practices that will comply with the reformulated EEO rules.

■ ■ ■

Barry D. Umansky, former deputy general counsel of the National Association of Broadcasters, is with the communications practice group at Vorys, Sater, Seymour and Pease LLP in Washington, D.C.

Reach him via e-mail *bdumansky@vssp.com*

Vorys Sater attorney Thomas B. Magee assisted in the preparation of this article.

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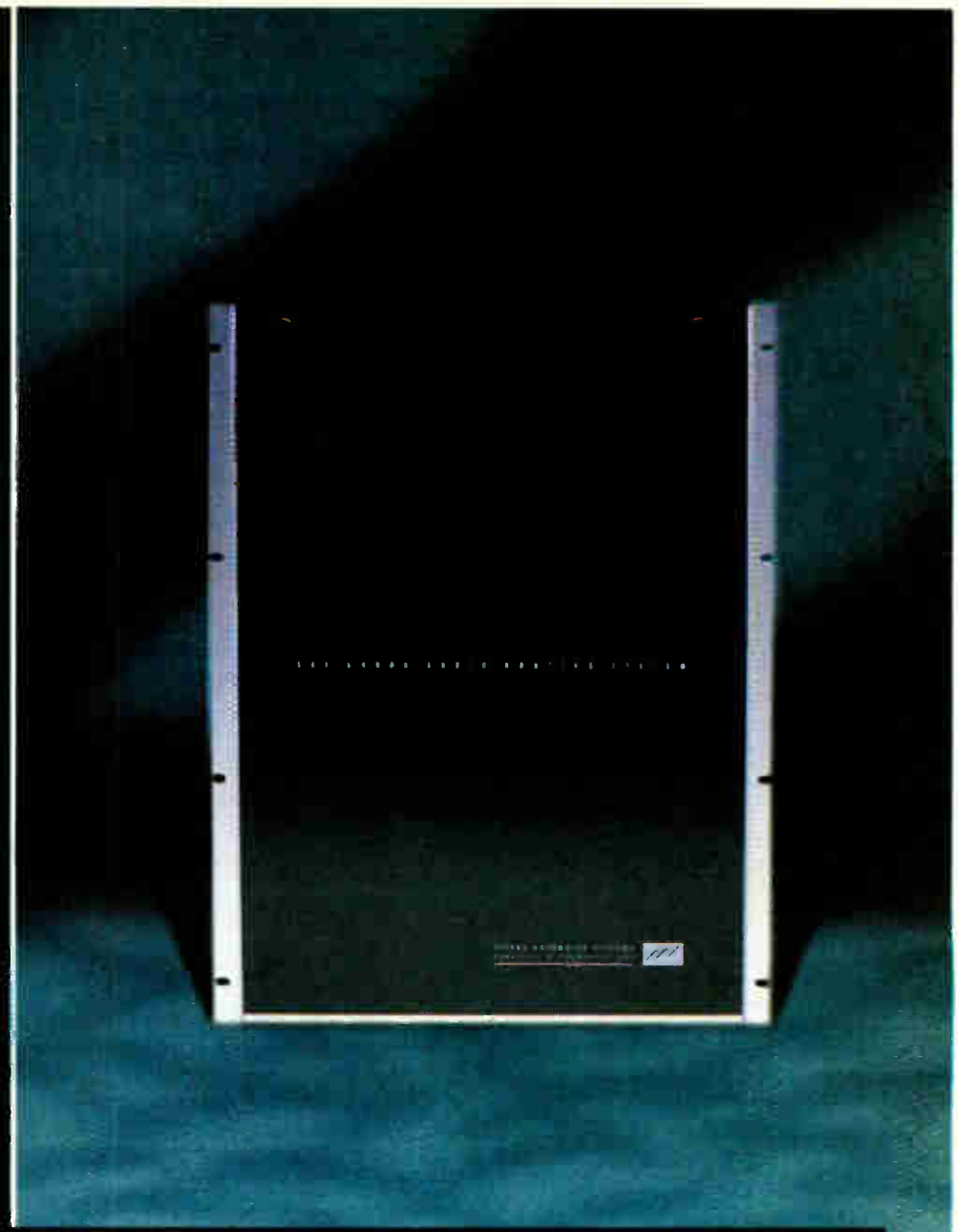

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World Radio History

Luckoff: SF's No. 1 General Manager

▶ LUCKOFF, continued from page 99

director at all-news KCBS(AM), whose station has trailed just behind KGO for years in the Bay Area ratings race.

Luckoff said finding good radio talk talent is one of the most difficult parts of his job. But, he said, "I guess I have pretty good ears."

It's known that no one gets on KGO's air without Luckoff signing off on it.

"Good talk hosts are rare; music DJs are a dime a dozen. You don't put talented people on the air and just let them go," said Luckoff. "They have to be focused. But you have to let them be creative and you have to put them in the right time slot."

Luckoff's core belief is "make it local." He credits KGO's popularity to the fact that, "Listeners will always want to know what's going on in their local community. Local hosts are what works best."

In fact, with rare exceptions, one of the trademarks of KGO under Luckoff is that the GM has long resisted running syndicated programming in favor of local talk talent, with one notable exception — Schlessinger, who is heard on KGO from 1-4 p.m. weekdays.

Why did he make Dr. Laura the exception?

"I agonized over that decision," said Luckoff. "But she's the 500-pound gorilla in talk radio right now, and she delivers female demos."

While he's justifiably proud of his achievements, Detroit native Luckoff also plays down his role. He was once quoted as saying, "It's the news/talk format that we started here just before I came to KGO that's the real key to our success. I could leave tomorrow, and the format would keep us on top. It's bigger than any manager, bigger than any talk personality." Luckoff said that's still true.

One San Francisco newspaper columnist has dubbed the 50,000-W talker "Mickey's Mouth Club."

Luckoff and his wife of 39 years, Jane, live just north of San Francisco in Marin County and have three grown children aged 31 to 38.

Luckoff waves off any talk of retirement, and, on two occasions, Luckoff tried to be his own boss.

He once tried to buy powerful talk station KFBK(AM) in Sacramento, and six years ago, he came "within hours" of purchasing San Francisco classical station KDFC-FM.

"I couldn't buy anything today," he said philosophically and with a tone of regret. "Stations today are too pricey."

No doubt that's fine with Disney, which is obviously more than content to let Luckoff and KGO add millions a year to the corporate bottom line.

Does the savvy veteran manager have any advice for his peers in today's faster-paced world that often seems to operate on "Internet time"?

"The key isn't to work longer hours," said Luckoff, who already puts in extra-long days. "The key is to work smarter."

■■■

Bill Mann is RW's San Francisco correspondent.

Mickey Luckoff

'I hear that the view from second place is horrible.'

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VOA's 'Special English' Turns 40

As the Voice of America began its entry into digital technology, it celebrated the 40th anniversary of an ongoing radio experiment.

The experiment, called "Special English," was designed for people for whom English is a second language. The daily news and feature programs arguably are among the most popular broadcast by VOA.

While other broadcasters may try to jam as much information as possible into a 30-second report, and use jargon that might not be easily understandable, VOA takes a different approach with "Special English."

"Special English" is limited to a vocabulary of 1,500 words and is spoken at a rate about two-thirds the rate of mainstream broadcasters, according to Marilyn Christiano, chief of the special English division at the VOA.

(Left to Right) Marilyn Christiano, Sanford J. Unger and Marc B. Nathanson at the VOA's 'Special English' 40th Anniversary Ceremony

Our (reading) rate is nine lines per minute.

— Marilyn Christiano

"It's hard to say. Compared to some jocks out there — they talk so fast, I don't know that anyone has ever measured them. But our rate is nine lines per minute," Christiano said.

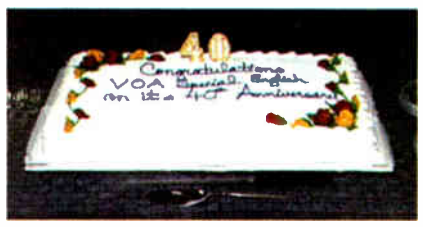
The broadcasts began on Oct. 19, 1959, and continue today. Hundreds of testimonial letters and e-mail messages from listeners praising "Special English" reach VOA headquarters each month.

The first impression, to a native English speaker, might be that this sounds like "baby English." That's what American embassies told VOA when they heard the first broadcasts.

The format is simple; the content isn't. The limited vocabulary, short sentences and slow pace of "Special English" also have an unintended salutary benefit: Individuals and English teachers around the world record the programs to help students of the language learn American English.

This effort seems to transcend international tension between the United States and other countries. Rep. Benjamin A Gilman, (R-N.Y.), read this excerpt from a listener in Teheran, Iran, into the Congressional Record:

"It was summer 1993 that I started listening to your programs, and during that first summer, I really had a great improvement in my English speaking, especially my accent.



"Many times I wanted to write letters to you but I was afraid, because I was not sure I could write what was in my heart. I thank you because you did something that no one could do. I suffer from visual problems, so your programs with their independence of vision helped me a lot."

More on "Special English" is available at the VOA home page at *www.voa.gov/special*

— Paul Kaminski

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DIGITAL DOMAIN

The Skinny On DVD-Audio Specs

Mel Lambert

If the rapid acceptance for professional and now consumer Digital Versatile Disk (DVD) wasn't striking fear into copyright holders, a derivation aimed at the audio industry will attract attention soon.

With up to 17.1 Gigabytes of available data-storage capacity, the current DVD-Audio specification provides for at least six channels of 96 kHz sampling and a 24-bit resolution.

The hot buzzword in the audio industry is "24/96." A growing number of affordable mixers, workstations, software, multitrack and mastering recorders are accommodating longer word length and higher sampling rates.

Many record labels are mixing new material or remixing vintage material in the new 5.1-channel surround-sound format. Some labels are mixing with custom-developed microphone arrays using techniques designed to show off the virtues of this new format.

DVD-A's future is in a state of flux due to its delayed release pending the resolution of copyright concerns. The audio industry at large seems wary of supporting a format that has yet to surface, thus explaining the absence of compatible players on the market.

But it holds plenty of promise.

DVD-A and DVD-V

The six loudspeaker designations for DVD-Audio — left, center, right, surround-left, surround-right and subwoofer — are identical to those adopted by the motion-picture industry for the familiar Dolby Digital, DTS and SDDS soundtrack formats used with DVD-Video.

Playback on home video theater systems equipped to handle DVD-Video product should streamline the acceptance of the new audio format. The people with four-channel Dolby surround-encoded material — discrete left, center, right and surround channels — can easily upgrade their systems to handle DVD-Audio. With the addition of a second rear-surround channel, plus a subwoofer, consumers soon can

See DVD, page 118 ▶

PRODUCT EVALUATION

Coles Ribbon Talks Up a Storm

Carl Lindemann

Most popular omni field mics can fail in noisy environments. Whistling winds and the din of a crowded convention floor can drown out the reporter's voice. A better solution is available and may keep the reporter from trying to yell over the interference.

The Coles 4104 ribbon microphone for commentators was designed by BBC engineers in the 1950s to cut through unwanted ambient sound. It has been imported stateside for a couple of years, and is marketed to reporters doing ENG.

The peculiar but distinctive microphone might not have the appeal as other omni mics, but the Coles works where omni mics cannot.

The Coles has a gnarled chocolate brown handle that looks a little like a candy bar. On the top, a spherical bulb houses the ribbon element.

Around that bulb are two windscreens. The top one filters breathing from your nose. The other is a "washable plastic hygiene screen" to allow the mic to rest at the optimal distance from the upper lip.

The 4104 connects to recording equipment via a standard XLR connector. The whole thing comes in a foam-lined, hard-shell plastic case.

This strange-looking mic could cause the interviewee to lose concentration. It has an unnerving look reminiscent of a medical diagnostic device.

Old-fashioned engineering

The noise-canceling effect does not come from electronic wizardry. Rather, the frequency response is perfect to capture the voice and ignore other frequencies.

The sound of the mic is rich. The ribbon responds best in the low-to-mid range. The proximity effect could make it "boomy," but the upper lip rest prevents that. The figure-eight pickup pattern of the mic allows for excellent face-to-face dialog recording.

According to the specs, the 4104 cannot reach above 12 kHz, but the highs do not sound muted.

I like the personality and character the mic imparted on my voice. The strong mids helped project an authoritative, "newsy" tone.

To put this mic to the test, I headed to a nearby location guaranteed to have howling winds.

My first attempt to use the mic with a Sony MZ-R55 MiniDisc recorder was disappointing. Being a dynamic device, the ribbon is sensitive to the phantom power running through the mic jack of the MD. The solution is a cable with a capacitor in-line to block the DC current.

A reporter uses the Coles mic with a Sonifex Courier.

Once the phantom power was removed, my voice remained quite intelligible despite the blowing wintry gusts of wind.

I found the output to be a bit low, though I did not have to push the recording levels on the MD too high to get an adequate signal. The handling noise was nonexistent.

For comparison, I brought along the beyerdynamic MCE 58, which is my latest favorite mic. There was a significant difference between the two mics.

The MCE 58 was more susceptible to interference, even though I wrapped it in a jumbo windsock. This interference was not a surprise. The advantage of an omni microphone, its ability to pick up sound 360 degrees, becomes a disadvantage in the wind.

The 4104 mic has its limits. A full gale might be heard. The specs note good performance in winds up to 40 mph. That figure seems conservative, though I did not have a windspeed indicator handy.

Lighter wind

A curious claim about the Coles is that the design can filter out breath noises.

Breathing properly in front of a microphone is a skill that must be learned. The concept of eliminating the need to be mindful of breathing was intriguing. While the mic reduced breath noises, it

See COLES, page 114 ▶

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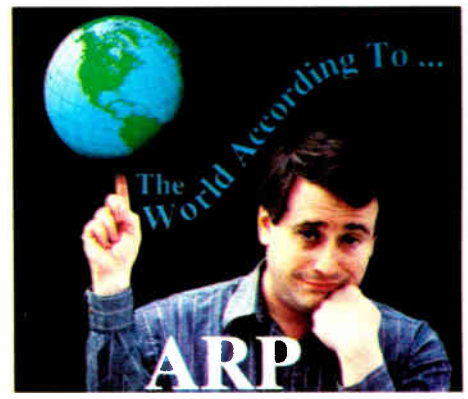
World Radio History

Stand Up, Fall Back, Get Dressed



Alan R. Peterson

It is good career advice to have something to fall back on when the well runs dry. Nowhere is this truer than in radio in the new century.

I recently delivered my annual pep talk at the Intercollegiate Broadcasting System (IBS) annual convention and conference in New York, an event I have enjoyed participating in since 1991.

Each year, I share some tall tales about my early days at the mic, along with strategies on how to get noticed by the industry, how to create a good audition tape and other survival tips needed to land that first gig.

However, this year, I will lead off with a few words dealing with what to do when the work is not there.

Nice knowing you

The staff at radio stations is smaller and works harder than it ever did before, but that does not mean there is no turnover. New employees still come and go for a variety of reasons.

One thoughtless slip-up on the air guarantees a trip out the front door. Ignoring the spot in the production box that should have aired 10 times this morning means not being employed this afternoon. Telling the boss, "I don't believe in voice tracking and I'm never going to do it," means you are toast.

Nobody is safe when the new owner comes in. Just about everybody has found that out since 1996. The folks that have been successfully employed at the same place for four years are either extraordinarily lucky, very good at what they do or a legacy in the community. It is unlikely that a newbie will be able to rack up this kind of experience right out of the gate.

This is why there must always be some other kind of extra skill in the back pocket, ready to bring in an income when the mic becomes a distant memory. Just be sure to know what you are doing in that secondary skill, for reasons I will explain in a moment.

Where to go

Radio salespeople have it knocked. If they can sell something as intangible as a slice of time moving through space at the speed of light — or to put it another way, a *60-second radio spot* — they can be hired almost anywhere to sell nearly anything.

Engineers can take weekend classes to brush up on computer knowledge and likewise take on a position with a high-tech company anywhere. If all you can do is touch a computer screen and talk into a mic, your options dwindle down to, "Please drive up to pick up your Happy Meal."

The industry is already saturated with wedding deejays, so that will not work. Hanging out that consultancy shingle might be a good bet, but you will be up against some huge competition and most corporate radio operations are going to do things their way without your help anyway.

Selling consumer electronics is a safe occupation, especially if you know the gear. Just be ready for all those customers telling you, "Gee, what a nice voice. You ought to be in radio."

"You think I *want* to be here, lady???"

No, if there is something I am going to share with our future broadcasters, it will be to do the best work they can, but be ready to change gears with a useful occupation in case things do not work out.

A random check of the Sunday Washington Post reveals more ads for bricklayers than broadcasters. At $19.50 per hour, ex-jocks could earn a radio-like weekly salary just by slinging some mortar. Plus, they could bring a radio to the job site and tune in the moron that took their job at the station. Throwing bricks at a radio can be therapeutic.

Too blue-collar? There are numerous marketing, public relations and association jobs out there. Employment with projects to fill in the fine and practical arts is always available.

Readers would have spotted the pasty-white, out-of-shape, 40-year-old photographer in his undies.

Throwing bricks at a radio can be therapeutic.

Which leads me to my point — If you are going to do anything, for goodness sake, *do it right*.

Smile and put a shirt on

One of my fallbacks is photography, and my work appears frequently in **RW** and its sister publications. In 1997, one of our magazines asked me to do some close-up pictures of vacuum tubes for a special editorial focus on that topic.

The better part of a Saturday was spent setting lights, trying some creative angles, playing with a laser pointer to highlight the internal structure of the tubes, but nothing impressed me as a good shot. Even before the slides were sent out, I could tell none were going to be "grabbers."

A restless night ensued due to my dissatisfaction. Out of frustration, I got out of bed at 1 a.m. to try some more pictures with a medium-format camera — one that takes two-by-two-inch slides for better clarity.

The bigger camera forced me to think differently. Ideas flowed better and I felt enthused. My way had less issues to deal with and each pic felt better than the shot before it. The roll was done and I was pleased with my work. Until the pictures came back the next afternoon.

No, they were not ruined. In fact, they were clear and gorgeous. You could pick out every detail in the tube surface and the inside construction, which was the problem.

There, reflected in the getter flash, the mirrored surface on the interior of the glass envelope, was the unmistakable image of me holding my camera, suffering from pillow-hair and wearing nothing more than the white briefs I went to bed with — not even a bathrobe.

Had the slide been enlarged to the dimensions of the magazine cover, readers would have easily spotted the reflection of this pasty-white, out-of-shape, 40-year-old photographer in his undies, totally oblivious to the situation. Needless to say, that batch of slides never made it to the desk of the editor.

I begged one more day to reshoot the roll and handed in my slides late. I still made the issue, but not with the pictures I wanted.

I learned the lessons always to wear black when doing close-up photography, take a breather for a while before shooting that second roll, and maybe have something *else* to fall back on when your first fallback is a disaster.

At least I wasn't laying bricks. Building a wall in my briefs would just be asking for trouble.

■ ■ ■

Alan Peterson writes from Fairfax Public Access Corp., Fairfax, Va. FYI, one tube slide was sent to a British photography magazine for inclusion in its what-not-to-do column. It has not been published yet.

PRODUCT GUIDE

Affordable Sampler From E-MU

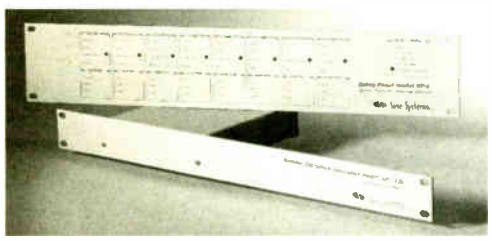
E-MU's new ESI 2000 is a professional sampler that retails for $995. The two-RU sampler has 64 voices of sampling, four outputs and a SCSI port, and supports up to 128 MB of RAM.

It can do DSP functions including time compression/expansion and pitch change, and has several editing tools. The SCSI interface can download libraries from E-MU and Akai.

For an additional $495, the turbo option kit increases the number of analog outputs to 10 and adds S/PDIF interface and two stereo 24-bit effect processors.

For more information contact the company in California at (831) 438-8612 or check out the Web site at www.emu.com

try to control yourself...



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World Radio History

4104 Mic Creates Unique Sound

▶ COLES, continued from page 111

was not removed.

I did not do torture tests on the 4104 to find out how rugged it is. According to the specs, the element is almost indestructible. The head is stuffed full of foam, protecting the ribbon from the environment.

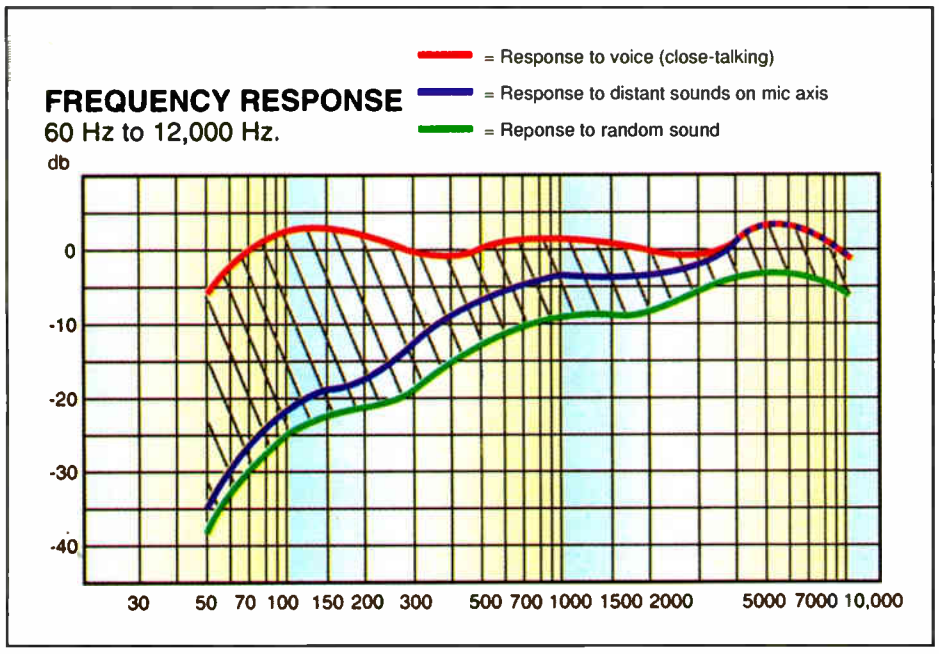
I spoke with a company rep, and the only vulnerability the company has seen is where the head attaches to the handle in older 4104s. Coles now manufactures the mic with a stronger neck. The mic is not fragile, something I fear with a ribbon mic in the field.

At $660 list, the Coles 4104 is more expensive than most field mics. This mic is for specialized applications.

The 4104 can make the difference between getting usable or unusable sound.

■■■

Carl Lindemann is a frequent contributing writer to ***RW****.*



Coles 4104 Mic Frequency Response Chart

Product Capsule:
Coles 4104
Ribbon 'Lip' Mic

Thumbs Up
✓ Sturdy ribbon design
✓ Excellent ambient noise rejection
✓ Rich unique sound

Thumbs Down
✓ Expensive
✓ A little fragile in the field

Coles mics are available in the United States through Independent Audio in Maine at (207) 773-2424 or visit www.independentaudio.com

PRODUCT GUIDE

Containers Delivered Express

Equipto Electronic Corp.'s "Express Line" service will ship any of its vertical racks, 15-degree sloped-front consoles, workstations and instrument cabinets within five days of order.

Many Express Line products can be ordered in Equipto's 12 standard

colors, and with accessories including shelves, drawers, panels, panel mounting angles and hardware.

For more information or a catalog, contact the company at (800) 204-RACK or visit www.equiptoelec.com

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The Vocalist VR from DigiTech adds up to four parts of harmony vocals.

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The Front and Back of the DigiTech Vocalist VR

Chordal harmonies can follow the chord progression from any device, such as a keyboard, using MIDI.

Scalic harmonies are produced based on selected scale, the selected interval and position of the scales that is sung.

The "scale smooth" option allows the user to choose if the VR bends between notes or to wait until the singer hits the next scale tone before changing the harmony structure.

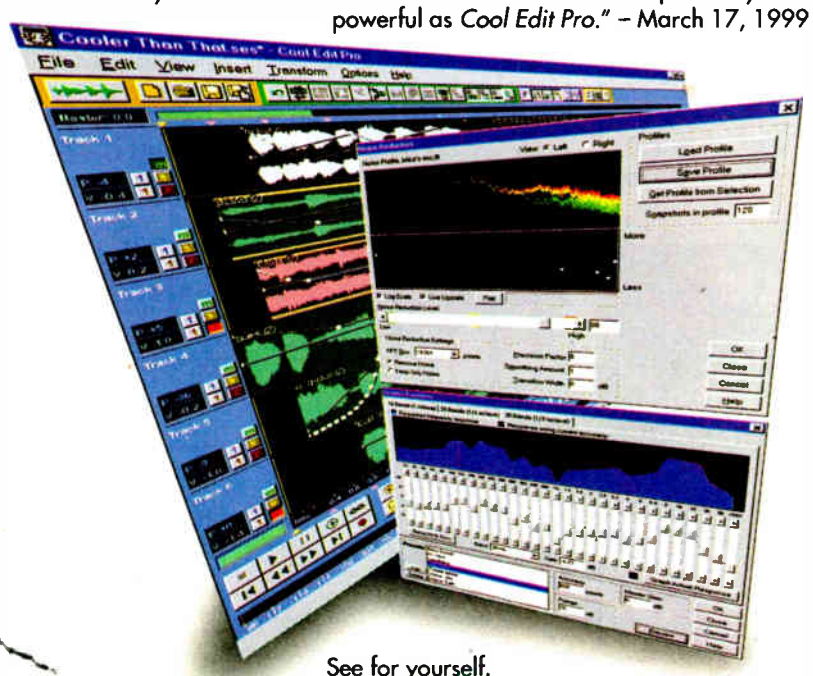
For more information contact the company in Utah at (801) 566-8800 or visit the Web site at www.digitech.com

Cool Edit PRO

Perhaps you've heard the buzz around *Cool Edit Pro*, the complete software multitrack recording studio. Why is it so popular?

It's so easy to use!

As one user said in Radio World, "When it comes to broadcast production, it is doubtful you will find an easier interface that is as inexpensive yet as powerful as *Cool Edit Pro*." – March 17, 1999



See for yourself.
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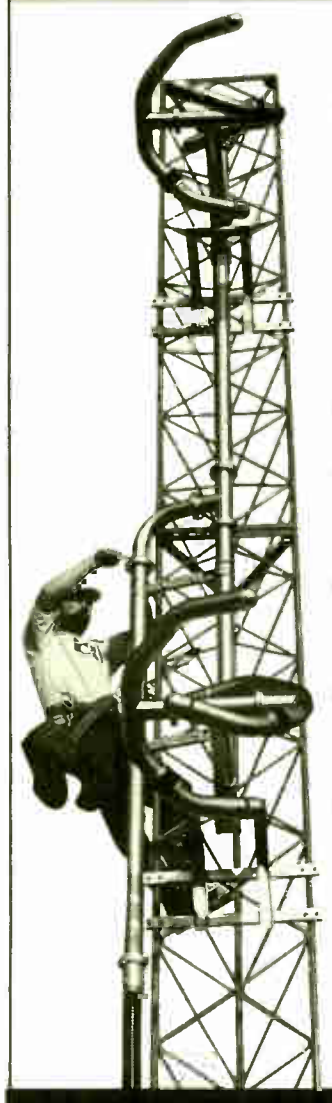

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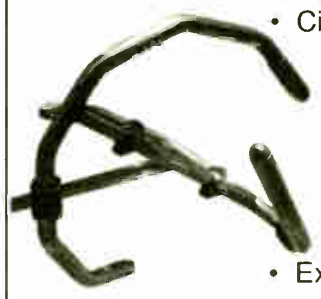

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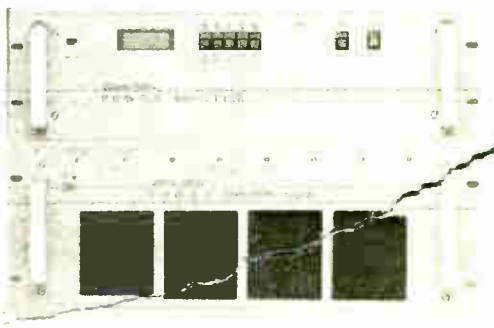

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World Radio History

PRODUCT GUIDE

Courier Price Drops; New Redboxes Available

Sonifex Courier portable hard-disk recorder has a new price of $2,675, almost 25 percent off the original list price. The ISDN version also has been reduced, to $3,750.

The new V2.5 software provides options for live audio as well as recording onto a PCMCIA card with cut-and-paste editing. Transfer of audio data can be done using a modem, a GSM mobile telephone or an ISDN modem.

The ISDN version uses MPEG Layer 2 compression to send mono 11 kHz bandwidth audio.

Tests have been done to ensure that the unit is compatible with Telos, CCS, Dialog 4 and Prodys codec equipment.

Compatibility with Enco DADPro32 and Apple AIFF systems was recently announced.

Also from Sonifex, two new Redboxes are available — the RB-MM1 automatic mix-minus generator for $400, and the RB-HD6 six-way headphone amplifier for $520.

The RB-MM1 removes the caller's voice from the output of the console to send it without the caller down the telephone line. It then removes the caller audio from the signal digitally.

A talkback input is included with a talkback select switch for ducking the talkback to the caller.

It has two XLR inputs for a feed from the mixer and a mono XLR output. The levels can be adjusted by preset potentiometer.

The RB-HD6 headphone distribution amplifier distributes stereo audio to up to six sets of headphones, each with a volume control. It has a master volume control and a stereo/mono input select switch that sums left and right together.

Recently released Redboxes include two six-way distribution amps, one for S/PDIF audio and one for AES/EBU, for $590 each.

The Redboxes work with sample rates ranging from 30 kHz to 100 kHz, and bit rates of 16, 20 and 24. They can distribute 16/44.1, as well as 24/96.

Coming soon from Redbox: a sample rate converter and an A/D D/A converter. Both units are 24/96 compatible.

For further information on Sonifex products in the United States, contact Independent Audio in Maine at (207) 773-2424 or check out the Web site at www.independentaudio.com

PRODUCT GUIDE

My Spots Go Jingle, Jangle, Jingle

TM Century Inc. has a new subscription service for producing commercial jingles called JingleBank.com.

For an initial $185 and shipping plus $25 a month, subscribers gain access to a large library of commercial jingles and monthly updates.

The jingles can then be relicensed to the subscriber's clients and can be used in other markets.

Subscribers only pay for a jingle when they license a specific composition. Once a jingle is licensed, that cut then becomes exclusive to that market. Each jingle is then customized to meet the specific requirements of the subscriber's client.

Advertising jingles encompass all musical styles and tempos, with three new jingles produced every month.

For more information contact TM Century in Texas at (972) 406-6849 or visit the Web site at www.jinglebank.com

Aligning Your Soundcard

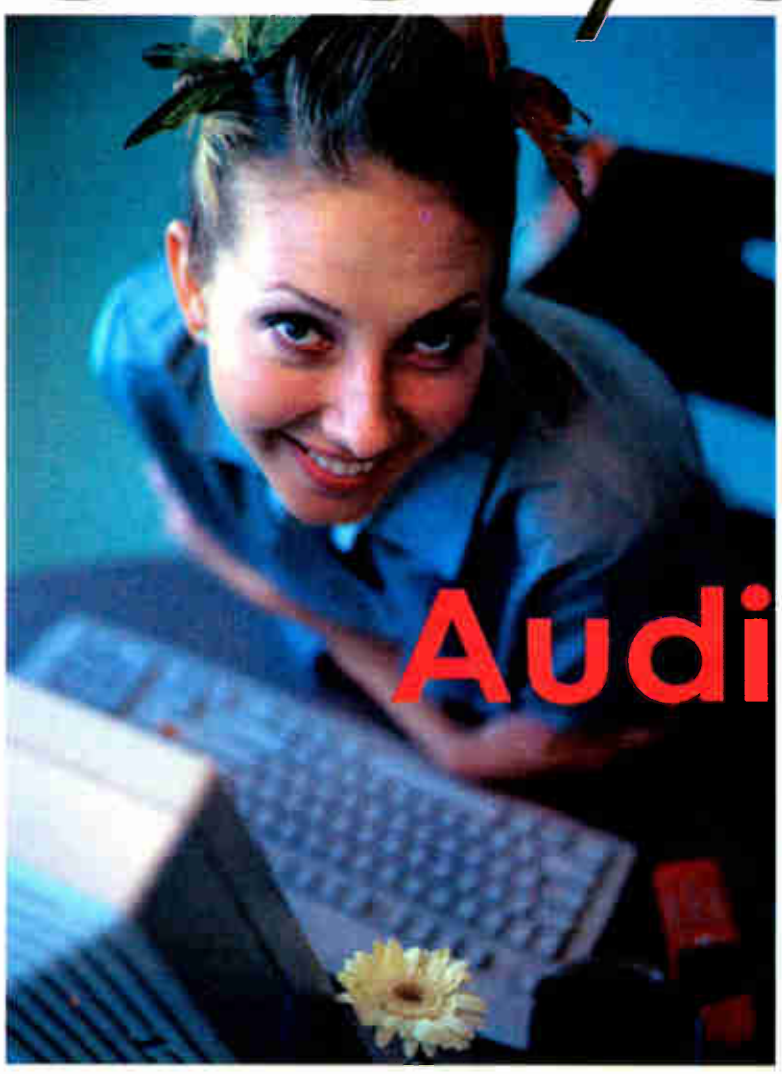
AudioControl Industrial released the MP-200, a portable two-channel measurement microphone preamp.

It is battery-powered and is especially designed to work with laptop computer soundcard-based measurement systems.

One of the mic preamps is switchable between mic level and an adjustable line level. It has a variable pink noise generator on its own jack, and a 94 dB-SPL reference light for calibrating computer programs and other level meters. A mini-jack line-level output is provided for soundcards.

Included are the ACI CM-10 calibrated microphone and a three-meter cable. It lists for $349 and a second mic is available for $145.

For more information contact the company in Washington State at (425) 775-8461 or check out the Web site at www.audiocontrolindustrial.com



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World Radio History

LINE OUT

Debating Spectral Manipulation

Bruce Bartlett

Should a radio station change the tonal balance of the recordings it plays? Is it okay to alter the bass, midrange and treble to create a sound or mood for the station?

I argued against spectral manipulation in an article I wrote in the Feb. 24, 1993, issue of **RW**.

Back then, I wrote, "Consider the

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people who make the CDs you're playing — the recording engineers, musicians and producers. They work very hard to create a certain spectral balance on their CDs. Why tamper with it? You're second-guessing their judgment.

"I realize that the idea is to give your station a distinctive sound. But if you change the balance between bass, midrange and treble, the CDs you play will sound different than intended."

Alex Zavistovich, **RW** editor at that time, countered by saying that spectral manipulation is used to set a mood. However, he noted that adding EQ at the station is a matter of personal preference, like colorizing a black and white movie.

Orban Optimod 6200

I liken station EQ to changing the colors of a work of art. Imagine the publisher of an art book saying, "Let's emphasize the blues in our photos of Van Gogh's art works — reds aren't 'in' this year."

Or, imagine a station manager saying, "Nowadays, everyone pumps up the bass so their car stereo will really boom. Let's add more bass to all our rap records." However, the listeners and record producers are probably doing this already.

Some radio engineers want a uniform tonal balance from record to record and multiband compressors help that. As an unknown DJ said, "If you don't use spectral manipulation, you're letting the personal preference of each individual recording engineer and producer tailor the sound of your radio station. If there are a thousand sounds on the playlist at the station, then a thousand different people EQ your audio. They can't all have it right."

As a DJ, I would give my station a sound that stands out when listeners scan the dial.

I appreciate this opinion, but would you rather hear the same tonal balance on every record? Or would you rather hear a pleasing variety of musical experiences?

Also, records are not made to give radio stations a sound. Records are an artistic expression of the musicians' ideas and feelings.

Musicians determine the tonal balance that the listener hears. The musician decides whether the bass should be louder than the cymbals or whether the sibilants in the vocals should sound sizzly or smooth.

When stations change the tonal balance, they change the loudness relationship among instruments, which changes the aesthetics of the music. I have a prejudice in favor of honoring the integrity of the artist's product.

I believe the job of a radio station is to be a simple messenger of the music. Originally, radio was meant to be a transparent, high-fidelity medium faithful to the original. In this spirit, most classical music stations avoid EQ because the listeners love natural timbres — they know how acoustical music should sound.

Devil's advocate

On the other hand, as a DJ, I would give my station a sound that stands out when listeners scan the dial. I have flipped through the dial trying to find the loudest, clearest station. I have noticed that some stations have a bright, punchy sound that gets my attention. At that moment when scanning the dial, the sound of the station matters more than the musical balance.

I understand how spectral manipulation should be no big deal. After all, a record sounds different between a home and a car stereo. What harm comes from a little extra EQ at the station?

If a station changes the tonal balance of a record, it will sound different between the radio and CD. Suppose a record has been beefed up to sound bright and aggressive on the radio. If listeners like that sound, they may be disappointed when they hear the same record on their CD players.

However, listeners do not expect CDs to sound like radio. Many folks consider radio to be a sonically inferior medium and like the improved sound of CDs.

Viewpoints

As a musician, former radio engineer, recording engineer and producer, I can see all three viewpoints.

Quantum by dbx

Musicians want to reach the home listener with an artistic statement. Recording engineers and producers want to hear their sonic creations accurately replayed on the radio. Radio engineers want to excite listeners sonically so they will tune in — and that is what sells ad time.

Listeners do not expect CDs to sound like radio.

I suspect that musicians do not mind if their sound has been manipulated on the radio, as long as listeners want to tune in and hear their music. Once the listeners buy the record, they can hear it as the musicians intended.

The bottom line is that producers and musicians want to sell records. Station managers want to sell advertisements. If spectral processing is what it takes, so be it.

■ ■ ■

Bruce Bartlett is the author of Practical Recording Techniques 2nd Ed. published by Focal Press.

World Radio History

Products & Services Showcase

Incredibly Flexible DTMF Control

The DS-8 Programmable DTMF decoder

Bridge the DS-8 across your audio source and get eight individually programmable relay outputs. Each closure is activated by its own code of one to four digits long. Each relay can be set up as momemtary, latching or interlocked with other relays! Use the DS-8 for remote audio switching, automated program recording, secured remote EAS control, you name it! Optional rack mount (pictured) is available. A two unit R.M. is also available.

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World Radio History

What's Up With DVD-Audio

▶ DVD, continued from page 111

be up and running with 5.1-channel playback.

Derived from the extended DVD-Video format, DVD-Audio is capable of holding up to 4.7 GB of audio data and graphics, seven times that of a conventional compact disc, on a single-sided/single-layer disc. Initially, this will be the only option.

Available formats

The available formats include DVD-5 single-sided/single-layer with 4.7 GB capacity; DVD-9 single-sided/dual-layer with 8.54 GB; DVD 10 double-sided/single-layer with 9.4 GB; and DVD-18 double-sided/dual-layer with 17.1 GB. Eventually, DVD-A will support some of these other versions.

An international steering committee with representatives from the IFPI, RIAA, RIAJ and major international music companies developed the disc. Version 1.0 of the DVD-Audio specification was published in April 1999. DVD-A discs and consumer players were scheduled to be on the market early this year.

The disc has the capability of delivering still-frame video, like a slide show of lyric sheets or notes on the production. It has a capacity of at least two hours of surround-sound audio with up to 176.4 or 192 kHz sampling rates.

Meridian Lossless Packing data compression is specified as an option to increase the playing time of a DVD-A disc to at least 74 minutes per layer for 24/96 media to ensure the longest classical piece would fit in the format.

Long-term durability of the DVD media is said to be greater than conventional CDs. It also is possible to store both two-channel and six-channel surround-sound versions on a single disc, using each layer or side.

Complex scheme

A complex protection scheme using watermark and encryption technologies prevents unauthorized playback of a protected DVD-Audio disc on unlicensed players. Still pictures in MPEG-2 format can be recorded with associated audio material with transitions including cut, fade, dissolve and wipe.

A slide-show mode allows pictures to be displayed, as they are loaded from disc with audio playback. A browser mode allows stills to be preloaded before audio begins and then selectively displayed.

An interesting side note is the maximum data rate 9.6 Megabits per second, which is a limitation of drive and data-transfer technologies. The sampling frequency for multichannel audio will be limited to 96 kHz or less.

The more important left, center and right channels might be encoded at 96/24, while the surround channels use 48/16.

To utilize the available bandwidth, surround-sound DVD-A releases could be encoded as sets of two-channel groups, each with different data-encoding parameters.

The maximum data rate, 9.6 Megabits per second, is a limitation of drive and data-transfer technologies.

For example, the more important left, center and right channels might be encoded at 96/24, while the surround channels use 48/16. The channel groups can be used in various ways with different channels.

Each DVD-A will contain a stereo "down-mix" of the multichannel surround-sound audio. A series of coefficients, referred to as "SMART Content" for System-Managed Audio Resource Technique, allows the DVD-Audio player to produce a left/right output for users that lack a full surround-sound playback configuration.

Super Audio CDs are an alternate format developed by Philips and Sony. The specification of SACDs utilizes Direct Stream Digital (DSD) audio coding. It is a proprietary process that deserves its own article.

Options

SACD players offers multichannel audio with compatibility with conventional CDs. Record labels use a proprietary process, Super Bit Mapping Direct, to convert DVD-Audio masters to SACD format.

A hybrid CD/SACD format allows discs to be played on existing CD players as well as SACD decks. CD-Audio pits are put on one layer of the DVD substrate that is otherwise blank. Using the semireflective DVD layer for the "super" high-definition bits, the other CD-Audio layer can be read by conventional CD players. SACDs can store only 4.7 GB total.

DVD-Audio discs will be fabricated in the same way as other DVD media. All DVD formats — including DVD-5, DVD-10 and DVD-9 — can and will be used for DVD-Audio. Hybrid SACD media are manufactured differently.

For stations looking to prepare material in the new format, Sonic Solutions announced DVD-Audio authoring software that will be compliant with the DVD-A V1.0 specifications and Super Audio CD. The Macintosh-based DVD Creator AV is a DVD-A version of DVD-Video production system that will be made available soon.

■ ■ ■

Mel Lambert founded Media& Marketing more than 12 years ago to provide communications and consulting services for pro audio firms and facilities.

Reach him via e-mail at www.mel-lambert.com

Radio's Most Wanted

PROFILE: Terry Baun, CPBE

Vice-President and Director of Engineering
Cumulus Broadcasting, Inc.
Radio World reader for more than 20 years

Favorite piece of equipment: Anything that continues to provide service well beyond its warranty period with a minimum of broken switches, knobs and software upgrades.

Least favorite piece of equipment: Anything that ships with a "Preliminary" manual or requires more than one factory "mod kit."

Favorite place to listen to the radio: In the automobile, because I now understand that it contains the only receiver by which program directors and consultants can judge the performance of any radio station. To heck with $25,000 worth of test equipment!

Favorite format: I enjoy oldies - both from the 18th century and the 20th.

Hobbies: Computers, high-end audio & collecting (Conelrad-era transistor radios, tuning fork Accutron watches).

Pets: Two cats, Buster and RF (Radio Frequency). RF was found abandoned at a transmitter site, natch.

Proudest moment professionally: Fighting local bureaucracy and citizen opposition to re-erecting a fallen transmission tower in time to meet a deadline for a station transfer. What a lesson in both civics and politics!

Proudest moment personally: Working with the SBE as a board member and officer to initiate a meaningful strategic planning initiative to help move the organization forward and improve member services. As Chairman of the SBE Certification Committee, I am very proud of the efforts SBE has made and continues to make in setting achievable standards by which our industry can judge engineering competencies.

Favorite Radio World columns: I enjoy Paul McLane's "Earwaves" column because it often gives insight into technology issues bubbling just below the surface. And, because I'm dealing with more than 45 market managers throughout Cumulus Broadcasting, the "GM Journal" is a must-read.

Reads RW because: It is the most genuinely useful of the industry technical publications I receive. There is always something that speaks to issues that our Cumulus engineering team is working on.

Terry Baun, standing in front of [illegible] designed diplexer which allows [illegible] to successfully diplex with another 5kW station [illegible]

Here at Radio World, we strive to deliver the information that helps you, our readers, deliver the goods that make you the most wanted people in the industry. We salute you all, and thank you for reading Radio World.

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PRODUCT GUIDE

Two-Drive Analyzer for CD, CD-R Testing

The CDA2000 multidrive analyzer from **CD Associates Inc.** is designed to perform a byte-to-byte comparison between two CD, CD-R or CD-RW discs, while simultaneously analyzing both discs in real time.

The CDA2000 is designed to address the problems of failure and distortion of CDs recorded at speeds higher than real time.

In less than four minutes, the analyzer can test a disc for playability at up to 24-times real time. If the CD fails at that speed, the CDA2000 automatically drops the speed and retests to report at which speed it will play correctly.

It also can be used to test the batch quality of blank CD-R media, allowing high-volume users to save money by using less-expensive, tested media.

The system consists of a high-speed computer, large-capacity hard drive, color monitor, printer port and Windows NT-based software.

For information contact the company in California at (949) 588-3800 or check out the Web site at www.cdassociates.com

COMING SOON

Coming in

Studio Sessions

Producer Profile: KVIL's Chris Robbins

Tom Vernon Restores A Spring Reverb

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World Radio History

The DAW of the Future ... Literally

Nichol Endyme-Storr

The latest digital workstation to hit the radio production studio may be ahead of its time in a very real way.

The newest innovation from FloraPolis Labs in Singalongwith, Mich., is said to have the ability to read into the future, then predict and execute mixing decisions before the production director even thinks of them.

Utilizing a new type of adaptive predictive coding, this new digital audio tool does not only look ahead to the next byte — in some cases, it looks ahead to next year and beyond.

In keeping with the popular trend of naming products after legendary characters (Merlin, Darwin, *et al*), the company has christened its new product with a fitting name: the Nostradamus 2000.

"This is nothing short of a revolutionary new technology," said Project Manager Sal P. Fiorol. "We discovered a way to use constellation analysis of data matrix coding and apply it in quadrature foldover multiplexing. Then we drop the whole enchilada into a seventh-magnitude frequency division plug-in which processes the raw WAV data and compresses it into an MP6 file by dividing it all by zero."

Even a sixth grader knows that it is impossible to divide any number by zero — one could go on until the end of time in an effort to reach an answer. Yet, Fiorol contends the Nostradamus 2000 works by bending the fabric of time until it reaches a mathematical resolution, then returns to the present. This entire process takes place so rapidly that the radio producer is unaware any changes have taken place.

"Once that time-annoyance thing is out of the way," snorted Fiorol, "the unit can proceed with the important job of producing radio spots!"

Indeed, it seems as if the modern-day production director finally has what he or she always wanted — all the time in the world to complete a complicated project.

Construction of the first successful Nostradamus 2000 was completed three weeks before it begun and was sent to a beta test station in Arryu, Ill.

What's going on

As seen in Fig. 1, the screen is relatively simple. There is no area for inserting multitrack segments. Remember, the Nostradamus 2000 knows what you are going to do before you do it, so the unit does not need tracks to hold data. It performs a stereo mixdown and controls levels by looking ahead at what you were going to do anyway, and then returns to the present and does it.

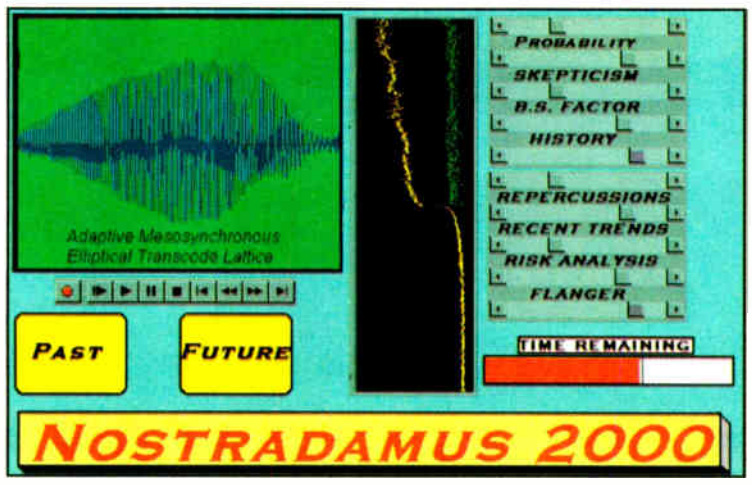


Figure 1

On really clear days, it will rip CDs before you get the jewel case open. In fact, 5.1, 7.1 and 9.1 versions have already been released in the time it took you to read this far.

Instead of Undo and Redo keys, the Nostradamus 2000 features a pair of on-screen icons showing Past and Future.

"The Past key opens a drop-down menu showing your recent edit history," said Fiorol. "The Future button shows what you will be doing next and beyond."

Fiorol stresses not to place too much perfection on one's work. "It's natural for someone to think 'what-if' and take the time to try other mixes and other possibilities, but you cannot do that with the Nostradamus 2000."

According to Fiorol, the moment someone stops to think "what if," the Nostradamus will instantly mix down and try all possible combinations that the producer naturally will have led him/herself into. All available RAM will fill with the mix decisions of the next 10 years and crash the DAW. So the first mix generally is the best.

Paraphrasing Joe Meek, Fiorol said, "If you *think* it's a good mix, it is good."

A set of faders recreates what the original Nostradamus had up against him back in the good old days. By setting each fader for a specific balance of skepticism, possible repercussions from the leaders of the day and a little fudge factor, the Nostradamus 2000 can be fine-tuned for its forays into the future without annoying delays or "system busy" warnings. In fact, the unit looks ahead to see when the system won't be busy, then does its best work.

The window on the left side of the screen shows the degree of future lookahead performed by the Nostradamus 2000, along with typical confidence limits, heteromorphic packet disassembling, statistical multiplexing and how cold the jock's coffee is getting.

Test drive

"I'm really quite amazed by what this little box can do," said Lola Porfis, a local radio buyer based in Goaskyer, Pa. "I have seen the Nostradamus do things most of today's workstations couldn't possibly pull off."

Porfis watched as production specialist Dawn Zerly-Light produced a spot series for a local car dealership. Four CD-ROMs, a DAT backup and a cassette dub for the client were all produced, boxed and labeled ... even before Dawn sat down to write the copy.

Porfis wanted to give the DAW a real workout, so she prepared to surprise Dawn with a piece of "mystery" copy that only she knew about. On the day of the test, Dawn called Porfis to tell her that her tapes were ready — even before Porfis knew what she was going to test her with!

"I'm hearing this a lot from them," said product manager Fiorol. "If those faders are set too high, the whole thing gets a little sensitive. Then strange things begin to happen."

Fiorol noted that the faders on the test unit were set hot and were beginning to generate demos and dubs for businesses that had not yet opened, "going out of business" ads for well-to-do companies and car ads for models years not yet on the drawing board. The clincher was the spot announcing the anticipated merger between gasoline giants Mobil and Chevron: "Moron."

"Fortunately, the production director noticed the settings were too high," said Fiorol. "But before she changed them, it reset itself."

The Nostradamus 2000 will not be available anytime soon. Once it looked ahead to its own future, it decided the world was not ready for it, and summarily discontinued itself before the date of its first manufacture. FloraPolis Labs summarily went out of business shortly before the owner announced the founding of it.

In effect, this never happened. So happy April Fool's Day.

■■■

Gotcha again, friends. As in previous years, all cities and states are funnier when read aloud, and most names are anagrams for "April Fools" with the usual exception of the author.

PRODUCT GUIDE

Small Headphone Amps

ATI's latest edition to the NanoAmp Series is the HDA100 Headphone Amplifier. It can drive 32 to 600 ohm headphones at levels near 120 dB SPL. It features selectable -10 or +4 inputs, a stereo/mono switch and volume attenuator.

It retails for $219 and uses a 24 V DC power supply. One power supply can be linked to drive several units. Optional rack-mounting kits are available to mount one to three units in one rack space.

For $262 retail, the HDA100-BAT version runs on two 9 V batteries. Alkaline batteries provide about 16 hours of operation.

For more information contact the company in Pennsylvania at (800) 959-0307 or visit the Web site at www.atiguys.com

World Radio History

LINE OUT

Reverb: Spring Is in the Air

Tom Vernon

I've got a confession to make — I am an incurable packrat. One of my passions is older consumer-grade stereo gear. Most of my prizes are cleaned up and put back in like-new condition.

This hobby is inexpensive and it feeds the occasional need to go retro. After working on complex digital systems, I like to revisit simpler times.

Most of my acquisitions are free or cost next to nothing. I collect many units during spring cleanup when non-recyclable trash is put on the curb for pickup. Yard sales are a good place to find old equipment, as are thrift stores such as Goodwill and the Salvation Army.

I consider the mid-1960s to late '70s to be the end of quality materials and craftsmanship used in the manufacture of consumer electronics equipment. We can trace the gradual decline during this period easily. Metal knobs with plastic inserts and eventually all-plastic knobs replaced solid-metal knobs. Wood cabinets gradually gave way to particleboard enclosures covered with wood-grained vinyl. Brass flywheels and pulleys morphed into plastic. Chrome-plated dress hardware disappeared. Neatly dressed wire bundles became rat's nests.

Now, all that are left are inexpensive plastic devices that are not worth fixing when they fail.

One hi-fi treasure came from a thrift store: a Pioneer SR-202 spring reverb for $3. This unit's parts are made of metal, although the knobs have plastic inserts.

The Pioneer SR-202

The front-panel controls include a power switch, reverb control and reverb mode switch. Another knob selects the source from two tape decks for reverb or to insert the reverb into either deck for recording.

An illuminated blue-diamond level indicator turns on when activated, which expands across the display as the amount of echo is increased. While this display is just a gimmick, it adds to the vintage "coolness" factor of the SR-202, which was quite a novelty when introduced in the early '60s to the consumer hi-fi market.

The intent of consumer reverbs was to reproduce the experience of listening to a live concert at home. People quickly began experimenting with the reverb level.

With the reverb control set within the lower third of its range, the effect was like sitting in front-row seats at Symphony Hall for a Boston Pops performance. When the control was set about midway, the effect was like being in the nosebleed section of a hockey rink during an Aerosmith concert. Set beyond this level, the reverb just sounded weird.

Mechanical reverbs also played an important part in broadcast audio processing during the 1960s. Many top-40 stations added echo to create a unique on-air presence, and to make the "boss jocks" sound larger than life. When done properly, the effect was impressive.

The first step with the SR-202 was to see if it still worked. I jacked it into my stereo system, and to my delight it worked fine. I heard a slight buzz in the audio and the sound quality was not great, but this is expected after about 35 years.

Next, I cleaned up the outside. This unit looked like it had been used heavily for several years and then was stored in an attic or basement.

I disassembled and removed the front panel, and carefully cleaned all the metal parts with Spray Nine. Knobs were soaked overnight in warm water and Spray Nine.

The next day I removed the remaining grunge from the grooves in the knobs with an old toothbrush. I cleaned the masking tape and label residue from the top of the chassis with pure mineral spirits. When reassembled, my SR-202 appeared in mint condition.

A good step in restoring vintage circuitry is to replace all the old electrolytic caps. These deteriorate with age, and replacing them all at once usually eliminates problems with motor-boating, oscillations and poor low-end response.

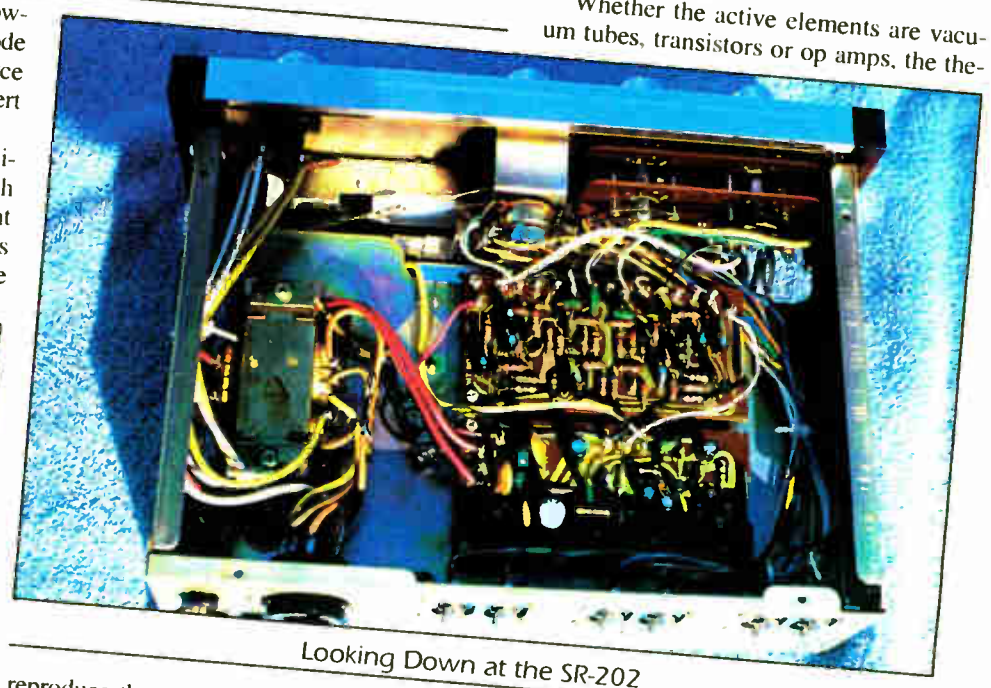
I went over the whole chassis and wrote down all the cap values. Then I did a bulk order for replacements from one of the larger electronics parts distributors such as Digi-Key or Jameco. The old capacitors were removed carefully from circuit boards using solder wick, making note of values and polarity.

I also looked at the circuit boards for signs of overheated components, but in this case, I saw none.

Finally, all connectors, switch contacts and volume pots were sprayed with DeOxit. Once reassembled and returned to my system, the SR-202 sounded surprisingly good.

Whether the active elements are vacuum tubes, transistors or op amps, the theory of operation for a mechanical reverb remains the same. An input amplifier takes the signal from the source and drives an inductor, which surrounds part of the spring unit at one end.

This inductor causes the spring to vibrate with the input signal. At the other end of the spring, a pickup coil is connected to the output amp. A feedback control is connected from the output amp back to the input amp to control the reverb level.



Looking Down at the SR-202

Hard times

This was a simple project. The job of reviving old tuners, amps and tape decks can be far more challenging. Expect difficulties in locating service manuals and schematics for equipment from long-gone companies. You may need to apply serious detective work to find specialty components such as pinch rollers, belts and idler wheels. Troubleshooting some of the circuits can be complex.

Despite the use of digital signal processing to create reverb, an interest in older mechanical devices survives. Vacuum tube units are popular with guitar amp fans due to the soft overload characteristics.

For more information, application notes on designing spring reverb amps, or to purchase spring units, check out *www.members.tripod.com/roymal/reverb.htm*

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WANT TO BUY

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AUDIO PRODUCTION

WANT TO SELL

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Rack mount kit for Shure M-67 mixer, $20. E Ribner, 314-771-2155.

52 point 1/4" patchbay, 1 space rack mount, multipin connectors on rear, manufactured by Special Products Co, gd clean cond, $100 ea or trade for old bdct gear. markhugh@aol.com, M Hughes, 301-962-6823.

API 550A EQ, needs repair, BO. A Polhemus, 212-302-9010.

Audiometrics voice over booth on wheels w/XLR/Phono inputs, 60x42,30, $1275 +shpg. J Baltar, 207-623-1941.

AXS control room, 2 PB, 1 RP, spt-X card, far & PBR, 4 source stereo audio switcher w/8 I/O & extended software, CDI interface for 16 Pioneer PD-M502 or TM/3 CD players, 486-66 workstation, Pro Digital cut recording system, super log traffic system, music log Ver 5, AXS interface for super log & music, $5283. F Rainbolt, 580-237-1390.

Crown RTA-2 analyzer-scope; M520 20x8 mixer; Eventide bdct delay BD980; dbx 140 type 2 NR, 142 NR; Autogram 10 ch stereo board; Telos ECHO digital voice storage/retrieval unit; CRL Dynaflex stereo NR system; Ramsa WR-133 portable mixer; Telos 10 digital telephone system; Orban DSE 7000 stand; SMC Carousel; Denon CD cart player, needs work. J Phillips, 419-782-8591.

dbx 3BX, 3 band stereo expander, gd cond, $300. markhugh@aol.com, M Hughes, 301-962-6823.

Urei 529, 1/3 octave EQ (2), lf & hf cut controls, 2 space rack mount, gd cond, BO/trade for tube bdct gear. markhugh@aol.com, M Hughes, 301-962-6823.

Valley People Maxi Q, new never used, $350; UREI 537 graphic EQ, $500. A Polhemus, 212-302-9010.

Urei 565 Little Dipper EQ, $700; ADC Propatch 1/4" punchblock patchbays, new, $600 (many); 1.4" TRS patch cords like new, $15; ADC TT 144 point patch bays, recond, $149-229. W Gunn, 760-320-0728.

AUTOMATION EQUIPMENT

WANT TO SELL

UDS II automation system & (5) Sony CDK006 juke boxes in fine working cond, $6000/BO. P Fraley, 606-233-1515.

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Ampex AM10, 6x2, excel cond, $295; Altec 1599A 6x2, $295. J Price, 214-321-6576.

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Sparta A-15-B mono 5 ch audio console w/pwr supply, works, $100; Sparta A-20-B mono 8 ch audio console w/pwr supply, works, $100; McMartin 1080 8 ch mono console. pwr supply incl, works, $200; Micro-Trak 6618 6 ch stereo console, works, $300; Harris MSP-90 compressor/limiter, manual incl, $200. S Eberhart. 972-392-0274.

Ampex AM-10 (6) input mono mixer w/master, gd cond, $250 ea. Bernie, 626-835-1972.

Broadcast Audio Series IV 12 chnl, 36 inputs w/prog, aud, util & cue, full metering, oak trim, $650. G Hamilton, 301-255-4340.

RCA BC-7A in gd cond, just removed from service, must pick up, BO. J Natoli, 740-922-2700.

Autogram 20 mixer stereo console. Continental Communications. 800-664-4497.

Soundcraft 600, 24x8, $3900; JL Cooper 16 trk automation, $1200. W Gunn, 760-320-0728.

LIMITERS

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Orban Optimod 8100A in excel cond w/Texar card installed, manual; Texar Prisms (2) sequential serial numbers, excel cond, manual, $600/pr. Will sell all items for $3000. J Taddeo, 847-518-0340 or 920-693-3103.

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EV RE-50 mic w/windscreen & stand clip, $75. E Ribner, 314-771-2155.

Shure M68 4 mic mixer, gd cond, $95 +shpg. A Berger, 781-239-5245.

Neumann TLM 193 (5), new in boxes, $750 ea. A McClatchey, 915-779-0016.

Neumann U-87 w/jewelers case, shockmount & new windscreen, $1495/BO +shpg; Sennheiser 416 short shotgun promo mic, phantom powered, w/case, $725/BO +shpg. J Standefer, 409-295-9171.

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Distributor Directory	$120	115	110	105
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Blind Box Ad	$15 additional			
Station/Studio Services	$175			

World Radio History

ACTION-GRAM

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World Radio History

◆READER'S FORUM◆

Remembering Jesse

Dear **RW**,

I read with sadness Paul McLane's column about Jesse Maxenchs in the March 1 issue. I had known for some time that Jesse was ill, but I did not know that the end was near.

Jesse has been such a piece of the landscape for as far back as I can remember that I feel oddly naked knowing that he is gone.

I've known Jesse since he was working for Arno (Meyer). And, as part of the crowd who did a dozen or more shows a year, I often saw him more times in a year than I did my brother or father. In fact, the traveling road show became your family.

I remember emerging from a jetway in Halifax for a Canadian show at the same moment that Jesse emerged from the adjacent jetway, probably 1986 or 1987.

Moments later, we saw Dave Harry. That made the third time and the third city where we had all been together in 10 days, having just left the Kansas City SBE and before that Madison, I believe.

We joked that we should all just charter one DC-9 to fly us all around in comfort. It might be cheaper.

As in any industry, there are straight shooters in radio and there are snake-oil salesmen. You soon learned who you could trust and who you couldn't. Jesse was one of the few whose word I would trust without limit.

There was an occasion when I flew to negotiate the purchase of a design from another manufacturer where Jesse was sales manager. The deal was finalized with Jesse's boss on the phone before I got on the plane. By the time I got there, Jesse's boss wanted to go back to square one and renegotiate the whole deal on terms that were much better for him. Jesse stood up and said that such a double-cross was not the way business would be done while he was with the company, putting his job on the line.

Jesse drove a hard bargain for his many employers. But he was fair and he was honest.

He was the best of the best. He knew the science of radio. He knew the people. And he knew his craft of salesmanship.

Few people appreciate how long Jesse has been a fixture in the industry. Names that were giants in the industry when I met Jesse, like RKO, Storer, San Juan Racing, McClendon and General Cinema have been gone so long that most people on the show floor today don't even recognize them.

I thought of going to see Jesse several times in the last year, but was under the mistaken impression that he was still on the West Coast. I tried several times over the years to lure him back to the East Coast but he told me that he could never leave California.

With the frenzy of consolidation swirling around our office for the last two years and the resulting seven-day-a-week work schedule, I never made it to the West Coast. Had I known he was in Georgia, I might have found the time.

Many reporters write obits on assignment, methodically parading out the dry facts of the life of a stranger. Paul McLane's memorial article was anything but that. It is clear he knew and understood who Jesse was. It took a very unusual article to do justice to all that Jesse was and had accomplished throughout his lifetime and the time he spent with us. Thank you for a memorial article that was befitting to the life of my friend.

With great sadness ...

Glen Clark
Consulting Engineer
Former President, Texar Inc.
Pittsburgh

NAB: Worth the Airfare

It's popular in some circles to complain that radio owners today don't send their managers and engineers to the NAB shows in sufficient numbers.

Why send hundreds to a convention, when a dozen will do?

We agree, it's a shame. In some cases, consolidation has translated into less opportunity, fewer airline tickets to Vegas or the fall Radio show.

But our advice is this:

If your employer won't pay your way, do it yourself. Invest in your own future, if your employer won't.

New technologies are exploding around you.

The biggest radio facilities in the country are being built by satellite radio providers.

DAB proponent USA Digital Radio is snapping up talented engineers, preparing hopefully for an IBOC rollout.

Web sites are streaming new, edgy programming right to our listeners' PCs every day.

Consumer electronics companies are fighting to position themselves for wireless Web access, for audio on demand, for bigger and better video pipelines.

It's all there on the floor at NAB2000. This isn't a broadcast show anymore, it's a multimedia bonanza. And apart from all the shouting and hype, it's an exceptional demonstration of the huge employment market that awaits a radio veteran who has a technical bent.

The cost of registration, an airline ticket and a hotel room may seem prohibitive. But you'll learn more walking around the floor at NAB for three or four days than can be taught in an entire college class.

As we have written before, and as SBE President Andy Butler points out in one of our show preview stories, the job opportunities for **RW** readers are tremendous right now.

Consider it an investment in your own future.

— **RW**

CES coverage comments

Dear **RW**,

I see in the Feb. 16 **RW** on page 14, that Electro-K Inc. introduced a product at CES called X-ion that will neutralize electromagnetic fields from radios ... not to mention from washing machines, dryers, refrigerators and cars.

Well, by golly, just when someone disproves the "electricity can kill you" theory, and we find the study was faked, a miniature-negative-ion producer shows up on the market with the intent to protect us by forming an invisible barrier to EMF damage.

Here's how I see it: Forget all the calculations to set up a complicated directional system. Just set a few of these RF-suppressors in the right places and you've found a cheap way to protect that co-channel station a few hundred miles away.

Tom Carten
Wilkes-Barre, Pa.

DAT bashing

Dear **RW**,

Just some commentary on Ken R.'s Dec. 8, 1999, DAT-bashing article ("Why I Hate My DAT Machines").

I am primarily in the recording business, but have done my share of work in radio. I got my first DAT machine in 1990 because it was the first digital recorder that was self-contained, not video-based and affordable. I was tired of dragging a 60-pound two-track Ampex to record local events, so I gave it a try.

What a godsend! It weighed less than 15 pounds, had no tape hiss and allowed for two hours record time on one tape. It beat the pants off the old Ampex, which needed the tape changed every half hour at 15 ips, had outboard noise reduction and needed lots of maintenance. And the price of analog tape ... $25 a reel for a half-hour.

Sorry, I will buy the *best*-quality DAT blanks and not spend more than $10-11 for a full two hours of full dynamic, hiss-less sound.

Ed Lacinski
President
Natural Sound Studios
Patchogue, N.Y.

Write to Us

RADIO WORLD
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P.O. Box 1214
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radioworld@imaspub.com

—EDITORIAL STAFF—

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Telephone: (703) 998-7600 • Business Fax: (703) 998-2966 • Editorial Fax: (703) 820-3245
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—ADVERTISING SALES REPRESENTATIVES—

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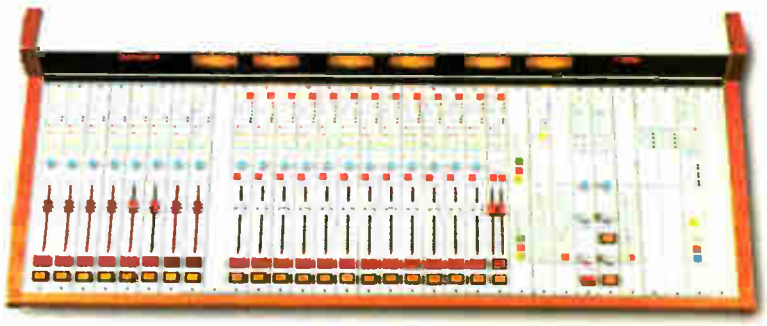
Our New WHEATSTONE A-5000 gives you the **best** of both worlds. Order it from the factory now as a topnotch ANALOG on-air console. Then later, when you're ready, switch it out to DIGITAL! That's right, this new design accepts modules from our top-of-the-line D-500 and D-600 consoles, allowing it to be converted from analog to digital in the field!

Think of it: no new studio furniture, *no rewiring*—all your existing studio connections simply replug. And while we're at it, no re-training your staff either. A painless switchover on your own timetable, right in your own facility! If you need a new radio console *now* but aren't quite ready for the Big Switch, then check out our new A-5000—you'll like what's under the hood!



Wheatstone Corporation

600 Industrial Drive, New Bern, North Carolina 28562 (tel 252-638-7000/fax 252-637-1285/email: sales@wheatstone.com)

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The Leading EDGE

WHEATSTONE'S D-600 is *the* DIGITAL CONSOLE with the features you NEED!

It can control our digital AES routing switcher and display source information right above each fader. It can receive serial commands from your station's automation system, displaying track and cut IDs; it can even store and recall channel setups directly from its control surface—all without the use of an external PC.

Each individual channel can have multiple parametric equalization, limiting, ducking and digital gain settings—complete with preset recall—a great feature for your production suite or demanding on-air talent.

Its LED metering system provides dual readouts showing full scale digital peak *and* calibrated VU or PPM ballistics, so you can derive maximum benefit from its 24-bit architecture. You can even have in-line channel VU and gain reduction metering!

The D-600 allows you to smoothly transition into digital technology without upsetting your entire organization and retraining your whole staff. THIS IS A TRULY EXCITING CONSOLE!

ADVANCED TECHNOLOGY, SYSTEM INTEGRATION and HIGH RELIABILITY—
WHEATSTONE has the LEADING EDGE!

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