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Radio on the Web

Alan Haber reports on the new generation of Streaming Media Players. **See GM Journal**



Radio World

The Newspaper for Radio Managers and Engineers

July 22, 1998

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Check out RW Online at www.rwcnline.com

Low-Power Debate Heats Up

by Leslie Stimson

WASHINGTON Apparently, nobody is wishy-washy about low-power radio. You're either for it or against it.

Strong emotions are apparent in comments filed with the FCC in response to three petitions calling for the creation of a new class of low-power service. The dead-

line was extended to July 24 at the request of the National Lawyers Guild, so that those not familiar with the commission process could participate in the discussion. The topic has generated heated debate, which is likely to continue well beyond this summer as FCC employees decide whether the petitions merit official action leading to a rule making or whether still

more questions must be answered.

The three proposals:

Nicholas Leggett calls for the creation of a service that would allow low-power AM and FM stations, with a maximum of one watt and antenna height 50 feet above the ground or supporting building structure, to serve an area of one to several square miles. Leggett asks the commission

See LPFM, page 6 ►



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NEWS MAKER

Justus: DAB Is Radio's Best Hope

As the radio broadcasting industry looks to a digital future, so too does the radio receiver industry. Car receiver manufacturers, who will be among the first who must implement digital radio technology in the United States, are watching and working with proponents of both in-band, on-channel and satellite delivery systems.



Ralph Justus

The Consumer Electronics Manufacturers Association represents about 500 companies that manufacture a variety of consumer electronic products including radios, TVs, accessories, home automation systems and

See CEMA, page 8 ►

NEWSWATCH

Philadelphia's Radio Mutiny Shut Down

PHILADELPHIA The FCC and U.S. Marshals have shut down unlicensed Philadelphia operator "Radio Mutiny." An equipment seizure followed several attempts by the commission to have the station operator voluntarily discontinue transmission on 91.3 MHz. FCC Compliance and Information Bureau Chief Richard Lee accompanied the June 22 raid.

This past spring, Lee spoke to mem-

bers of Radio Mutiny and others who claimed to be unlicensed operators at a convention in Philadelphia.

Also, a federal court ordered an unlicensed operator in North Dakota to stop broadcasting in late June.

Dunifer Appeals Injunction

BERKELEY, Calif. Attorneys for long-time radio pirate Stephen Dunifer are

appealing the government's recent injunction forcing him off the air. Attorney Louis Hiken told *RW* that Dunifer's team filed a motion for reconsideration to get their client's case "decided on the merits."

In a court case that began in 1994, Dunifer never denied he was operating an unlicensed station — "Free Radio Berkeley." Dunifer claimed he was taking a stand against FCC rules that make it tough for any but the rich to own stations.

The judge who granted the injunction said that Dunifer has never applied for a license, and rejected his arguments that his First Amendment rights were violated.

Actor Smits Asks For Minority Hires

WASHINGTON Actor Jimmy Smits, co-founder of the National Hispanic Foundation for the Arts, has invited FCC Chairman Bill Kennard to join him in sponsoring a CEO forum on how to promote opportunities for racial and ethnic minorities in entertainment industries.

Kennard accepted and said he hoped that the Sept. 22 forum in Washington, D.C., would address the issue of minority access to capital as well as help minorities, including Hispanics and women, secure entry-level and management jobs.

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AUDIOARTS ENGINEERING

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DRE Ready for an Early Test

KSAN(FM), San Mateo, Becomes Test Site for Digital Radio Express' FM IBOC System

by Leslie Stimson

SAN FRANCISCO Digital Radio Express, one of three proponents of an in-band, on-channel digital audio broadcasting system, has installed equipment in San Francisco area station KSAN(FM) in preparation for field testing its FM IBOC system.

DRE has an experimental license from the FCC to conduct the tests, which were expected to begin in July.

DRE Vice President, Engineering, Derek Kumar said when the tests begin, DRE would be "putting our digital signal on the air. The station will continue to broadcast in a standard (analog) format." DRE would combine its digital signal



with the host station's analog signal. Kumar said the tests would be sporadic at first, to make sure the DRE signal does not interfere with the signal of its host station or others.

Kumar said this first field test would be for DRE's own use, and the results would not be submitted to the DAB

Subcommittee of the National Radio Systems Committee. Kumar called the tests an equipment shakedown "in addition to getting some feeling for multipath characteristics and how our system responds to it."

DRE planned to use the same equipment it exhibited at NAB '98: a Ford receiver is the FM demodulator, which generates the FM analog signal. The DRE box taps into the Ford radio in order to extract and produce the digital signal, which is layered on each side of the host's analog signal.

DRE will also have a test van for use in field trials. DRE engineers would use the same antenna mast that comes with the van and bring the antenna feed into the Ford radio.

DRE engineers will drive the test van through "real-life multipath in one of the most difficult multipath environments in the United States," said Kumar.

The van is equipped with Global Positioning System navigation, a forward-looking camera, real-time spectrum analysis and simultaneous recording of both the analog FM and IBOC digital audio signals. "Together with the video from the forward-looking camera, the spectrum display and the audio recordings, we will be able to precisely determine where and why audio 'events' (like multipath) occur," said Kumar.

When asked to comment on Lucent's entrance into the IBOC development

fray, both Kumar and DRE President and Chief Executive Officer Norm Miller hoped that the addition of another proponent would not slow down the DAB subcommittee in selecting test criteria. "We'll know shortly ... if it's not accelerating the process," said Kumar.

Miller said DRE has not altered its business plans since Lucent's recent announcement. The company is focused on lab testing its FM system for the next

San Francisco has one of the most difficult multipath environments in the United States.

few weeks and hopes to have data to present to the DAB subcommittee and the FCC this fall, said Miller.

DRE does not intend to produce hardware, but rather license its IBOC technology to receiver and transmitter manufacturers as USADR also plans. Lucent does not intend to get into hardware manufacturing while launching IBOC, but has not ruled out the possibility.

Six to 14 people are working on DRE's IBOC systems at any one time at TriTech Microelectronics headquarters and lab facilities in Milpitas, Calif.

DRE receives funding from TriTech and private investors.

Public Radio Debates The Promise of Digital

by Fred Krock

SAN FRANCISCO Not everyone believes digital is the future of radio.

Tomlinson Miles Holman, president of TMH, which produces audio for video, downplayed the importance of the digital future to engineers attending the Public Radio Conference.

Holman said a new medium must produce a ten-times improvement in quality and convenience to the public for it to be effective. In-band on-channel DAB systems as currently planned are "insufficiently differentiated from analog FM broadcasting for it to succeed," said Holman.

Holman asked rhetorically, "Why muddy up analog in favor of a duplicated service?"

Holman invented and patented many of the technologies of LucasFilm THX. Holman figured prominently during the development of "5.1 channel audio" for the surround sound system used in the digital TV standards defined by the Advanced Television Systems Committee and later adopted by the FCC.

One engineer suggested that most listeners would not be able to tell the difference between analog FM and digital in a normal listening environment if the audio processing that is characteristic of today's super-aggressive loudness wars were turned off. Holman agreed.

In order to succeed, a DAB system must produce a very noticeable improvement in sound. Holman said that a digital multi-channel system could produce the required improvement.

As an example, Holman showed the perceived improvement in sound as the number of loudspeakers increased. Not too surprisingly, 5.1 channel audio produced the largest improvement rating over two-channel stereo.

The 5.1 channel audio uses six loudspeakers. Three are located in front, two surround speakers are in the rear,

and a bass augmentation speaker can be located almost anywhere in the vicinity.

Achieving a clear, robust sound in an automobile is a problem. Sound engineers complained that loudspeakers are placed where automobile designers decide rather than where the best sound would be produced. The "sweet spot" between two stereo loudspeakers is rather small. Usually no one sits in the "sweet spot" in a car. Holman said 5.1 channel audio solves the poor audio problem by producing greatly improved sound almost everywhere inside an automobile.

Why muddy up analog in favor of a duplicated service?

— Tom Holman

For studios, Holman said the real revolution is in non-linear continuous media storage and retrieval. The DAT recorder is not really satisfactory because of reliability problems, tape interchange problems, and the impossibility of random access of recorded material. Several engineers who attended the session cheered at this.

DAT recorders

As an example, Holman told the group about the loss of a whole day's audio recording during shooting of the motion picture "Independence Day." The sound engineer neglected to back up a DAT recording with an analog Nagra recorder.

Officials for one of the three proponents of an IBOC DAB system, Digital

See PRC, page 12 ▶

WHAT COMES AFTER DIGITAL?

In the beginning, there were stone axes. Then came fire, the wheel, and the steam engine. Then came analog audio and then digital audio. What comes next?

Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches on.

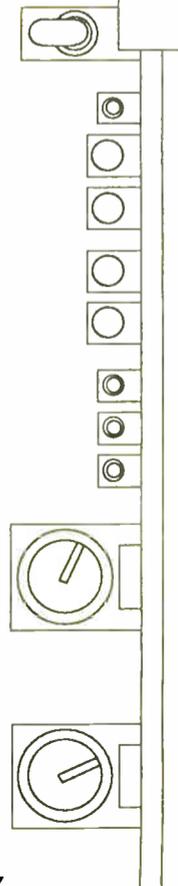
Digital audio is also not a terminal technology. It is simply where we are now.

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5



Senior Baseball: Worth Covering?

My comments about baseball and radio prompted a reply from Jerry Arnold, vice president of engineering for WTHC(FM) in Terre Haute, Ind.

The local Men's Senior Baseball League, he writes, has enjoyed live radio coverage for seven years. "While not professional, we do play a fairly good brand of baseball. We broadcast one game a month on WBOW(AM), and actually have people calling the station on which we broadcast to find out if there will be a game that particular week.

"Our radio coverage has helped our league grow, and it has reintroduced the sport to many local residents," he wrote. "Terre Haute had minor league professional baseball from 1888 to 1955. Many spectators and listeners to our games remark that they miss having 'real' baseball to see or listen to. Our league is affiliated with the National Men's Senior Baseball League, and we have even broadcast games back to Terre Haute from the International Men's Senior World Series held each fall in Phoenix!

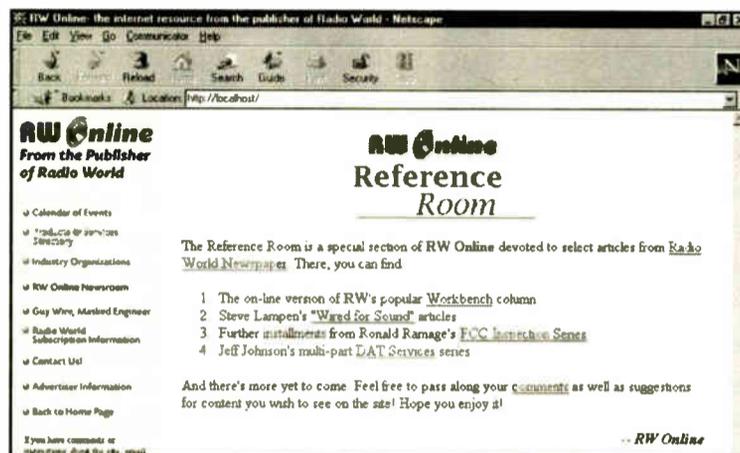
"Many radio stations, particularly AM stations, are desperately looking for revenue sources. Here is a chance for them. Many towns and small cities have a local chapter of the Men's Senior Baseball League. Many are well organized and even have former major and minor leaguers playing. I suggest that station owners or managers take a look at doing some of these games. It has been our experience that finding sponsors is quite easy, and that year after year we have a loyal and growing audience."

Thanks, Jerry. Nice pitch. Anyone willing to step up to the plate? The Men's Senior Baseball League has 300 local leagues, most of which have no broadcast arrangements. The national president is Steve Sigler. Call him in New York at (516) 753-6725.

★★★

Selections from some of the most popular series in RW now are available on our Web site at www.rwonline.com

Click there and you can read columns from John Bisset's popular *Workbench* series, Steve Lampen's *Wired for Sound* articles, our station inspection series by FCC Inspector Ron Ramage, and Jeff



Johnson's special primer on servicing DAT machines. More to come ...

★★★

Speaking of Steve Lampen, his articles about audio wire, cable and connectors led to an invitation to speak to a recent joint meeting of SBE Local 37 and the AES District of Columbia section. Technical Editor Al Peterson and I sat in at the meeting, held at the National Public Radio building.

I have enjoyed reading and editing Steve's work, but this was my first time hearing him in person. He is a dynamic speaker — more a teacher than a pitch man. Although he works as technology development manager for Belden Wire and Cable, he also pulls from experiences as a user and salesperson. His book on the topic is published by McGraw-Hill.

Let's face it, no one gets too worked up over audio cable. It's one of those commodity items that are easy to take for granted. But Steve had plenty of interesting things to say. He told how research by computer and data industries into the

characteristics of foam will spill over to help broadcast users. He discussed benefits of various kinds of material in the wire jacket and their effects on capacitance. He explored why impedance becomes a far more important spec when digital is involved. He reviewed various kinds of shielding, and gave, in all, a most interesting presentation. If you get a chance to hear Steve speak, do so.

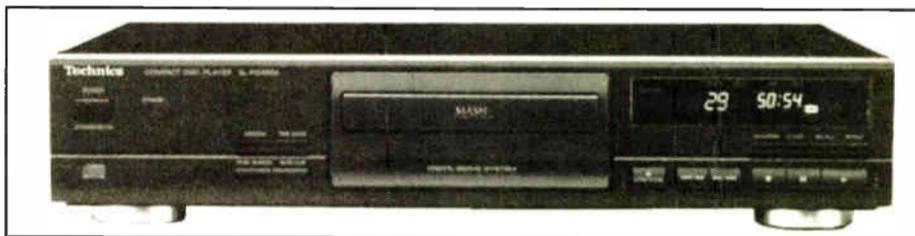
The meeting was arranged by John Reiser, FCC electronics engineer in the international bureau, who is secretary of the AES chapter and an SBE Fellow. Thanks also to Neil Shade of AES, Jan Andrews of NPR, and Ed Bukont, chairman of the SBE local and an RW contributor himself.

★★★

A round of calls to equipment dealers always turns up a good tip or two.

John Lackness at Crouse-Kimzey says Technics now offers a single-disc CD player called the SL-PG480A. It has RCA and optical digital outputs, and carries a list price of \$149.95.

"We expect to sell a lot of these. It is a CD unit that small- and medium-market



Technics SL-PG480A

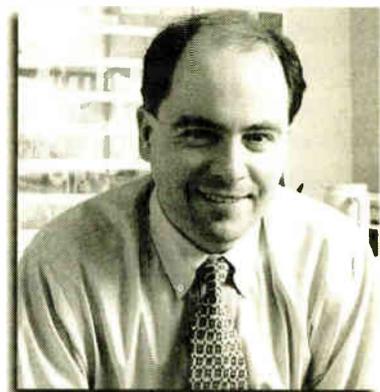
folks will buy and use," John said. "When they break, they become boat anchors. It has a feature called autocue, which in the old units was called cue to music. It cues to the first bit of audio, not the first part of the track selected."

John says his clients were "just livid" when Technics discontinued the similarly

thing like this. It has a 24-bit A/D converter, and the XLR plug is actually an AES/EBU output."

For info about these products, call Crouse-Kimzey at (800) 433-2105. Next time I'll pass along gear tips from another broadcast equipment dealer.

From the Editor



Paul J. McLane

affordable SL-PG350 and 450 a couple of years ago.

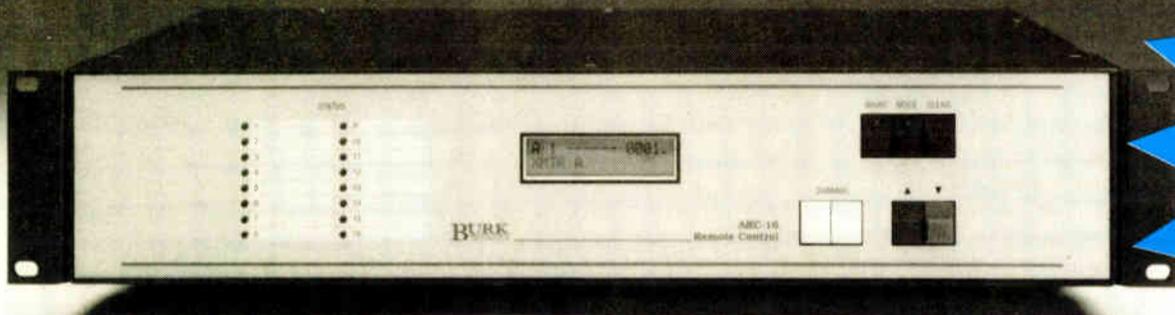
Other items John likes:

- Sony's MDS-JE520 MiniDisc consumer deck: "Stations have been buying these for different uses. It surprised me that some are using them for phoners!"

- The Denon DN-M1050R professional unit: "KSTP in Minneapolis is using this to delay Paul Harvey during their noon news block. It replaces an Otari reel. With the MiniDisc, it's a matter of hitting the Stop button, and Play to get it on the air. No more than about five seconds."

- Beyerdynamic's MCD 101 digital condenser microphone: "Always wondered if someone would come up with some-

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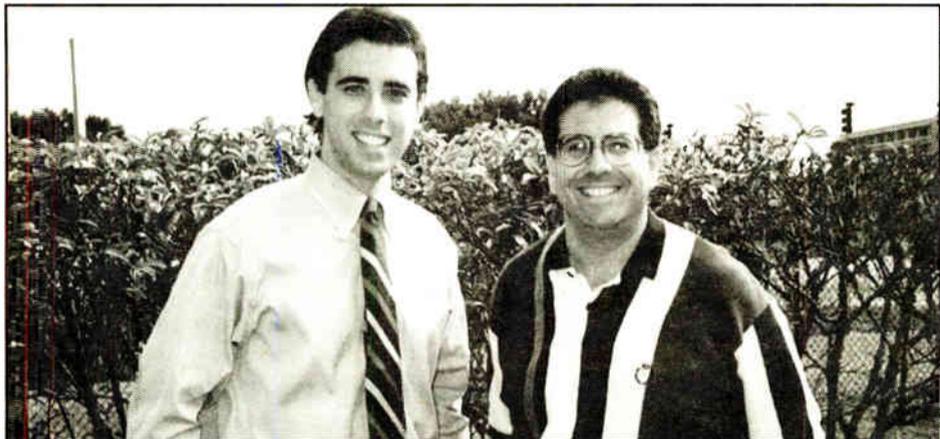
◆ READERS FORUM ◆

Letters received are the property of RW, and may be edited for space considerations.

Yadayadayada

Dear RW,
I loved Peter King's "Sein-off" story, "To Cover a Show About Nothing" (RW,

June 24). It was the best example of play-by-play I've experienced in a long time. By the way, I get to hear (Peter) every so often on WCBS(AM) ... and I understand perfectly the thrill at hearing your-



Seinfeld Look-alike Winner Steve NeSmith of Orlando and Peter King

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Next Issue of Radio World
August 5, 1998

self on the station of your earliest memories. When I'd be on the air at WNEW(FM), I'd always think "This is where Mom used to listen to Martin Block!"

Thanks for a great read.

Anita Bonita
New York

Overseas sentiments

Dear RW,

Living overseas I seldom get to radio events in the U.S.A., but "get there" anyway through the pages of RW forwarded to me every few weeks. With news from around the world, it really keeps me in touch.

Write to Us

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READERS FORUM

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Falls Church, VA 22041

radioworld@imaspub.com

Among several things I appreciate are the broad, evenhanded coverage you give to management and engineering issues, news, history, humor and religious broadcasting (both the good and the bad). I include the advertising — it's an information treasure trove.

I've checked www.rwonline.com too, and find it full of good stuff.

RW does well at filling us in on the proliferation of acronyms, though once in a while I can't figure one out. The May 13 issue's "Open Letter to the RAB" in *Readers Forum* left me wondering about CRMC, RAB and more, and overseas readers wouldn't understand EEO, but generally your articles do a nice job of sorting the alphabet soup. This is really important for those entering the field, newcomers and young recruits. Remember how hard it was to start reading computer magazines when you didn't know what RAM and ROM were?

Our mission owns Radio ELWA, a

Stay the Course

It is fashionable in some circles right now to question whether the U.S. radio industry has made a mistake by pursuing an in-band, on-channel solution to the digital radio question.

We strongly disagree.

Our industry is prone to this kind of second guessing. But the time to pick a direction and stick to it is here. Indeed, it may have passed. Let's not be slowed, once again, by hesitation and doubt.

You need only mention the words "AM stereo" in a room full of radio managers and engineers to hear the moans and chuckles start. That technology failed to reach its potential, not because it was poorly designed, but because the industry failed to embrace it and to make swift, sure decisions about its implementation.

We have no qualm with observers who debate the technical merits of any improvements to the U.S. radio system. But the ground rules have been established: Any successful digital radio system must provide notable improvement to the listener, meet the needs of the existing broadcast community and recognize the realities of available spectrum. IBOC meets the second and third conditions; we expect it will prove itself on the first point.

Industry leaders now recognize this. The NAB made some serious mistakes early in the DAB debate, but it now understands what IBOC signifies. The Radio Board has adopted a resolution that states, "Whereas the NAB Radio Board recognizes that IBOC DAB may lead to a significant enhancement of the AM and FM radio broadcasting services ... (that) no new radio spectrum will be needed, and (that) IBOC DAB will provide for a smooth transition from analog to all-digital services ... be it resolved that the NAB supports the rapid development of IBOC DAB technologies and furthermore supports the efforts of the National Radio Systems Committee to evaluate such technologies in an unbiased and fair manner."

This debate matters to anyone who holds a license or who wants to ensure that radio is part of the digital landscape in the next century. Radio managers should support the vigorous pursuit of an IBOC solution that protects their interests and that of our listeners.

Like an explorer crossing the ocean, radio must check its compass, chart its course and set sail. We do not need to reverse direction several times on our way to this new world. Columbus got there, and so can we.

— RW

major shortwave and local station in Liberia twice destroyed by the war. ELWA is now managed by those we trained over the years, is back on the air with FM and soon plans to restore regional shortwave. SIM also has a religious FM license pending in Abidjan, Cote d'Ivoire, a city of about 3 million.

Carry on, RW, we like you!

A. Jonathan Shea
Senior Member SBE, CSRE
Western Africa Area Director,
Society of International Ministries
Abidjan, Cote d'Ivoire

Share and share alike

Dear RW,

The June 10th story by James Careless ("Will Border Audience Cross Over?") was excellent. With the Canadian government increasing the Canadian content percentages to 35 percent the first of the year, border U.S. stations can only be the beneficiaries.

Our station, WBDR(FM) in Cape Vincent, N.Y., has its tower located just one mile from the Canadian border. It is just seven miles to Kingston, Ontario, a city of 123,000 people. Kingston has just two FM stations of its own. WBDR, known as "The Border," programs a CHR format aimed at the Canadian marketplace. In the Spring BBMs (Canada's equivalent to the ARBs) WBDR had an incredible 67 share with teens, and was number 1 with 18-34 year olds with a 22.2 share. We can offer listeners what they want to hear, not what the government thinks they should hear.

The Canadian marketplace has been good to us. One of our minority shareholders is a Canadian and serves as

general manager of our Kingston office.

We look forward to the increased Canadian content and expect it will increase listeners and revenue.

David Mance
President
WBDR(FM)
Cape Vincent, N.Y.

First format

Dear RW,

The May 13 article on KFWB(AM) was entertaining, but inaccurate in saying that "Channel 98" was the first top 40 format in the country. That distinction belongs to KOWH in Omaha, where Todd Storz and Bill Stewart lifted the term from the Billboard chart and applied it to their format.



As I also recall, an even younger Gary Owens was one of the DJs, prior to joining KFWB.

Gordon MacLendon's KLIF(AM) in Dallas also preceded KFWB as a top 40 station.

Don Hofmann
Monterey, Calif.

Correction

In our June 24 issue, the FCC Web site address to view the Mass Media Bureau Fact Sheet on Unattended Operation was incorrect. The correct Web address is www.fcc.gov/mmb/asd/bickel/no_oneshome.html

Low-Power Proposals Draw Heat

► LPFM, continued from page 1

to designate one AM and one FM channel for micro service and proposes the creation of geographic "cells" that each contain one station. Leggett proposes that microstations receive five-year licenses for a \$50 fee and that station operators be permitted to build and maintain their transmitters without commission approval.

J. Rodger Skinner supports the creation of a three-part FM service. The first type would be special-event, limited-time licenses; the second type of station would operate at 1 to 50 W with antennas up to 150 feet HAAT; the third would operate from 50 W to 3 kW with a maximum HAAT of 328 feet. These stations would closely parallel the operations of a full-power station. Skinner also recommends eliminating second and third adjacent channel spacing restrictions. He later changed his petition to propose amnesty for illegal operators and give them a chance to receive a new low-power license.

Gregory Deieso recommends an event broadcasting service similar to that within Skinner's proposal. Without endorsing any particular power level, Deieso proposes a range of one to 10 watts ERP as sufficient for most events.

In reply comments, opponents laid out a number of arguments against a new class of low-power stations:

Sacred Heart University, licensee of WSHU(FM) Fairfield, Conn. and WSUF(FM), Noyack, N.Y., said, "At minimum, any new LPFM, microstation, or event broadcasting service must provide adequate protection for FM translators such as Sacred Heart's and other secondary services. ... The petitions propose an inefficient use of the spectrum ... and the proposals would cause enormous interference and short-spacing problems."

FM translators

Sacred Heart said if the FCC goes forward with the LPFM proposals, all classes of low-power service should be secondary, unprotected facilities that are obligated to protect existing and proposed full-service and secondary facilities, such as FM translators.

Broadcaster ECI wrote, "Of the seven markets served by ECI, there has been recent pirate activity in four — Kansas City, Sacramento, Seattle and Tampa-St. Petersburg. In some cases, operations are shut down only to reappear a short time later on a different frequency and/or broadcasting from a different location. As there are certain to be many areas where demand for micro-station licenses would outstrip their availability (especially the congested urban areas), it is unlikely that regularizing some manner of microradio

operation would eliminate the urge of some miscreants to flout the FCC and broadcast at their whim."

Brian Hammett, operations manager for WPRS(AM) and WACF(FM) in Paris, Ill., offered a small-market viewpoint: "Our stations are serving the public to the best of our ability and ... granting licenses to low-power stations would be detrimental to those of us who are continually striving to serve our communities in an already overcrowded radio band."

Arthur Wilkerson, president of WLIL-AM-FM and WLIK(AM), Newport, Tenn., wrote, "I have been a broadcaster in small Tennessee towns since 1950 ... Docket 80-90 (allowing more stations on the FM band) was a total mistake ... Please don't let us make another mistake."

Roger Bouchard, president of WNRI(AM), Woonsocket, R.I. wrote, "The introduction of local FMs in the early '80s and the rise of cable TV selling advertising in local markets has driven advertisers to spend their dollar among many newer broadcast competitors. Today, only local advertisers make up our advertiser base. Introduce one-watt stations and they will go after an already 'over-picked' pool of local advertisers."

Advertising base

Minority-owned Radio One: "There is no data to demonstrate that there would be a sufficient advertising base to support such a service ... Most startling is the absence ... of any technical data prepared by a qualified engineer addressing the frequencies to be allotted, confirming there is sufficient spectrum available to create the service or estimating the numbers of stations that would be created."

Jim Robertson, vice president, general manager of Florida's WOGK(FM), WNDD(FM) and WNDDT(FM), argued, "Radio broadcasting should not be allowed to shrink to part-time people (pirates) who can turn theirs on any time they feel like playing."

Supporters were as passionate in their reply comments:

The Leggetts: "We understand that it is in the established industry's *perceived* short-term best interest to maintain the sta-

tus quo. We also understand that *they* see no need to upgrade either their technology or their position since they are doing quite well financially as they are. ... We question their hostile attitude towards a microstation service that could easily provide them with a valuable resource of both trained personnel and a proving ground for experimental programming."

Self-proclaimed pirates

The National Lawyers Guild submitted comments for approximately 40 petition supporters, both "concerned individuals and groups" and self-proclaimed pirates such as Radio Mutiny, Free Radio Berkeley and the Black Liberation Radio Network.

The group proposed a noncommercial FM service on "any unused frequency within the FM Broadcast band down to 87.5 MHz. A second adjacent channel would be the closest spacing allowed, with a maximum 50 W in urban areas and 100 W in rural areas. The proposal also calls for no public service requirements. (RW previously reported this proposal, which was discussed at NAB '98.)

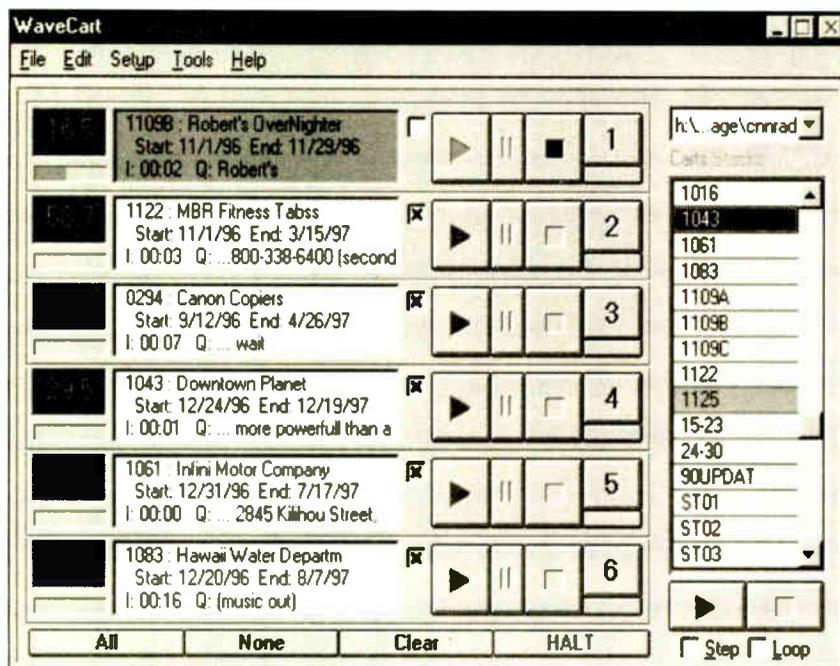
John Scavo: "The fact that the FCC laws are written to prevent anyone from applying for a low-power FM local station under 100 watts while allowing licensed broadcasters to apply for low-power translators under 100 watts is really a double standard."

James Reese, a 40-year broadcaster now in Sarasota, Fla., called implementation of docket 80-90 "almost totally inexcusable" and argues that LPFM is an efficient spectrum use.

"Efficiency of spectrum use is better defined by how many diverse communities can be served by a single frequency than by whether yet another Smashing Pumpkins recording can be heard from 100 miles away."

Thomas Desmond called claims by NAB and USA Digital Radio that LPFM may interfere with IBOC DAB "speculative." He wrote, "It would only occur as a result of the USADR system effectively being a spectrum grab, since the digital signal would be placed, in full, on two adjacent FM channels. Contrary to the claims in these comments, this is not IBOC but rather IBAOP (in-band, all over the place) digital. The FCC should mandate the IBOC DAB signal be kept closer to the main channel."

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DAB, Pirates Top NAB Radio Board Priorities

WASHINGTON Radio's transition to digital audio broadcasting and how the FCC treats unlicensed operators were tops in the minds of NAB Radio Board members at their semi-annual meeting here.

Board members heard progress reports from the three proponents of in-band, on-channel DAB systems. New Radio Board Chairman Bill McElveen said board members were encouraged by the progress made by the proponents: USA Digital Radio, Lucent Digital Radio and Digital Radio Express.

The board passed a reaffirmation of an earlier resolution supporting "the rapid development" of IBOC DAB in the United States and supporting the efforts of the National Radio Systems Committee "to evaluate such technologies in an unbiased and fair manner."

The board also passed a resolution praising FCC efforts in enforcing rules against unlicensed operators, or pirates.

Board members were updated on a variety of issues affecting radio. NAB Executive Vice President, Government Relations, Jim May said it was unlikely that Congress will adopt laws mandating free airtime for political candidates who agree to certain spending limits.

McElveen was elected Radio Board chairman after serving as vice chairman. He is president and general manager of Columbia, S.C., stations WTCB(FM), WOMG(FM) and WISW(AM).

Bill Poole, general manager of Fredericksburg, Va., stations WFLS-FM, and WYSK-AM-FM, was elected Radio Board vice chair.

— Leslie Stimson

A New Life For FM Subcarriers?

by Lynn Meadows

WASHINGTON It is just a dream now, but someday, your grandchildren will be able to step into a car, tell it where to go and then sit back and enjoy the ride. And radio will help navigate.

That is one of the far off and far out goals of the Intelligent Transportation System (ITS) touted by the Federal Highway Administration. A shorter-term goal is to transmit pertinent traffic infor-

A Marriage of STIC And IBOC DAB?

With three known companies developing in-band, on-channel digital audio broadcasting systems, how compatible would those systems be with STIC?

The original round of DAB testing done by the DAB subcommittee of the National Radio Systems Committee between 1994 and 1996 included tests on the interaction of IBOC signals with subcarriers. NAB Senior Engineer David Layer said the results indicated that subcarriers in the lower part of the FM band below 76 kHz were "not so badly affected by IBOC" while those in the upper portion seemed to be adversely affected by IBOC.

STIC is available in two versions: one uses 67 kHz and the other uses 92 kHz in the subcarrier part of the spectrum. Systems now in place typically use subcarriers in the 52- to 99-kHz portion of each FM channel.

Layer said that STIC has not been tested with IBOC. The original tests were done using analog subcarriers.

Rick Martinson, manager of DAB systems at USA Digital Radio, said such results are in USADR papers released at NAB '97.

He said subcarriers at 92 kHz have a minimal impact on the IBOC signal and an imperceptible impact at 67 kHz.

Lucent Digital Radio system will also be compatible with STIC. Media Relations Manager Christopher Pfaff said Lucent's system will be compatible with any signal in the main band.

Norman Miller, president of Digital Radio Express, stated that commenting on IBOC DAB compatibility with FM subcarrier systems at this time would be "speculative" because the HSSC subcommittee did not evaluate for compatibility with IBOC DAB.

Miller noted that DRE is implementing a high-speed subcarrier system of its own with data throughput speeds between 32 kilobits per second and 64 kbps depending on available subcarrier bandwidth. The FHWA wanted an FM subcarrier system that could provide a user data rate of 7.5 kbps for ITS.

Said David Kelley, former co-chairman of the HSSC subcommittee, "The issue is the delivery of the data. STIC is a technology like all technologies: it's ultimately an interim technology until there is something new."

He said when DAB offers the same ability to slice up a section of the overall bandwidth and send a different stream of bits through it, he thinks people will move to that.

"The job is to get data in the hip pocket and increase your rate card."

mation about upcoming highway speeds and crashes to drivers via FM subcarriers.

But questions stand in the way of even the short-term goal such as who will pay broadcasters to disseminate ITS information.

A new trade association is forming to help answer the tough questions about the use of FM subcarriers within the Intelligent Transportation System. FMnet will promote the use of a High Speed Subcarrier modulation method chosen by the FHWA for use in ITS.

According to Arlan Stehney, ITS Program Team Leader for the Society of Automotive Engineers, the vision for FMnet is for it to be a standalone agency

based near the SAE office outside of Pittsburgh. Organizers hope to finalize the structure and not-for-profit status of FMnet by summer's end.

The idea for FMnet sprang from members of the now-suspended High-speed FM Subcarrier Subcommittee of the National Radio Systems Committee. The NRSC, a committee co-sponsored by the Electronic Industries Association and the National Association of Broadcasters, formed the HSSC to select a single HSSC modulation standard.

The subcommittee could not agree on one industry standard and suspended its activities this spring (RW, April 29).

The subcommittee tested three HSSC

systems. The Federal Highway Administration took a strong interest in the proceedings because it wanted an HSSC industry standard that could be used within its Intelligent Transportation System.

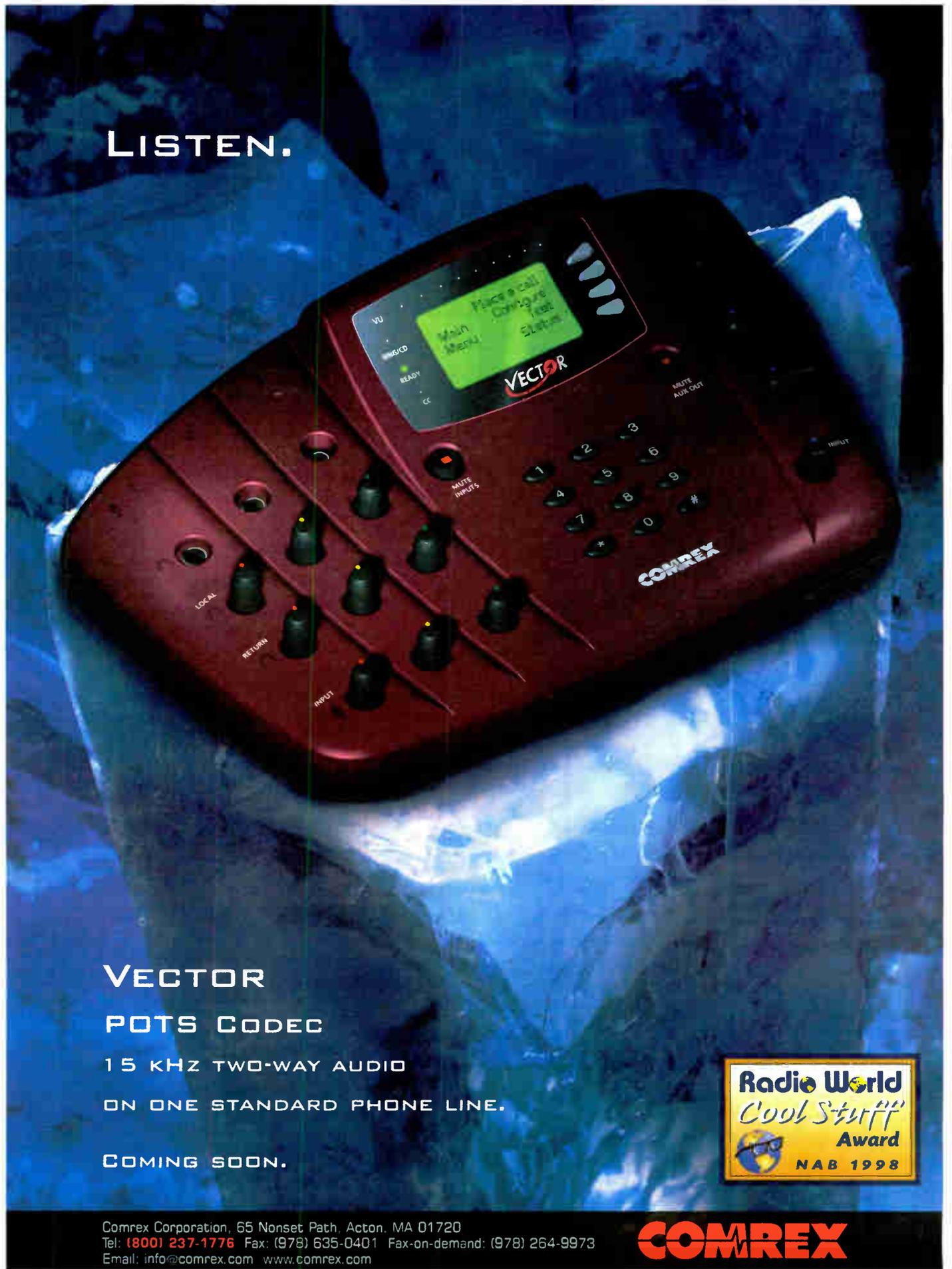
After reviewing the subcommittee test results, the FHWA chose the Subcarrier Traffic Information Channel (STIC) waveform developed by the MITRE Corp. as the United States standard for mobile traffic applications.

With a single standard, FMnet will give its members a forum to discuss the need for interoperable messages and other standards required for a successful ITS system.

Said Kelley, "The purpose of FMnet is to get ATIS (Advanced Traveler Information Services) information into the hands of our end customers so the

See FMNET, page 15 ▶

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Justus of CEMA

► CEMA, continued from page 1
computers. CEMA Director of Engineering Ralph Justus works on issues such as electromagnetic compatibility, radio and TV interference, digital radio systems, HDTV and consumer electronics/cable TV compatibility. His experience includes stints as a staff engineer in both the AM and FM branches of the FCC and director of engineering, regulatory and international affairs for the NAB. Justus also represents CEMA interests on the DAB Subcommittee of the National Radio Systems Subcommittee, whose members are setting test criteria for the proponents of in-band, on-channel digital audio broadcasting.

Justus talked with RW News Editor/Washington Bureau Chief Leslie Stimson.

RW: What do your studies show about how consumers use radio?

Justus: At home, it is becoming less. We did some studies last year of Direct Satellite System owners and we found that in a survey of over 1,000 users of DSS systems ... that 69 percent of those DSS owners are listening to their audio programs on the DSS systems.

They have 30-plus channels of CD-quality commercial-free audio and 69 percent of them are listening on an average of about 10-1/2 hours a week. Our previous results showed that radio listening for pleasure, at home, was about 11.8 hours per week. Which means that unless radio listening is dramatically increased over the study period, then the huge portion of listening hours spent at home is going to be DSS audio offerings.

RW: We have radios, CD players, DAT players ... What is the next entertainment medium that will compete with radio in our homes and in our cars?

Justus: I think the biggest thing is going to be Digital Versatile Disc audio, with CD or better quality sound, but more than

that, digital multichannel sound, in the home, in the car, anywhere that you have more than two speakers. It can deliver to a mono or stereo setup or a multichannel set up ... Maybe in a few years, CD quality won't be good enough, but digital multichannel will.

RW: What has been the most important technical development in radio over the past decade?

Justus: The promise of digital audio broadcasting, I would think, has the best



Ralph Justus

hope for the future of radio listening. We know the whole world of consumer electronics, including radio, is going digital. Your cell phones are digital. TV is going digital. The only one left out of that mix to date has been AM and FM broadcasting and whether or not they have an opportunity to join that digital revolution.

Will IBOC work?

RW: Is it possible for in-band, on-channel DAB to work? Will the consumer really be able to hear the difference in the sound?

Justus: The in-band, on-channel systems we have studied so far have a lower audio quality than CD and their digital robustness wasn't what we believe listeners would expect with mobile reception. Not when they have alternative audio program media available to them. If you're driving around a city listening to DAB, you have a half dozen or so dropouts because the system gets impaired either through interference or multipath or a blockage of the signal. We don't think listeners will tolerate that to the extent that they might tolerate dropout of a cell phone conversation.

RW: EIA released a DAB report that said out of several systems tested, the terrestrial Eureka-147 DAB system was the best. But that system would be on L-band. Most observers in the United States don't think L-Band will ever be available for commercial broadcast use. Are you convinced Eureka is the answer for DAB in this country?

Justus: If we could have been on the L-band, with spectrum being available, I would say definitely, yes. But it's not available, so it's a moot point. The final report of the DAR subcommittee was quite factual. It went through all the technical findings of the tests that were done, and concluded that the Eureka-147 was the best performing of all the systems examined ... The design of the Eureka system, with its OFDM (Orthogonal Frequency Division Multiplexing) modulation, was designed from the get-go to overcome multipath and other interference.

RW: Some people think DAB will never happen here. We tried to reach an AM stereo standard and it failed. Will there be an IBOC standard?

Justus: It's unknown. The past tests showed some very significant flaws in the IBOC designs at the time. Now we see new proposals by Digital Radio Express and USA Digital Radio and Lucent Digital Radio, and we don't know enough about those systems to be able to draw conclusions. Have they overcome their problems of audio quality and compatibility with the host station, interference to existing stations and digital coverage due to adverse propagation and multipath or interference from existing occupied usage of the band? That's unknown. But, we're hopeful.

RW: So audio coding is key...

Justus: That's one of the elements. It's the whole nature of design; it's the audio coding technology, modulation, frequency band of use and the total RF bandwidth available to insert digital signals, and there are tradeoffs between every one of those aspects.

For example, in the IBOC systems there's the host analog station, and the designs we have seen so far put digital energy in the first adjacent channel. Well, you get more robust coverage the stronger you make those digital signals, but the stronger you make those digital signals, the more adverse impact there is on the host analog station. And the more adverse impact there is a first adjacent analog station in another community. The lower you decrease those digital signals, the greater the compatibility is afforded to the host station, but you affect your coverage ... the robustness of the signal to the receiver.

RW: Does the NRSC have to pick a standard for IBOC DAB?

Justus: It would be nice if the committee could decide up front what it wants to do with that information after it receives these evaluations of the technologies. But to date, the committee members said let's get over the first hump first and see what they have to offer technically. Then, we'll decide where we go. Say you have three excellent performing systems. It's unclear how we would narrow that down to a single acceptable system in the eyes of the FCC, and in the eyes of receiver manufacturers and to the broadcasters for implementation

RW: How open are the different proponents to working with the NRSC?

Justus: Since we invested all the time and resources and had very little to show for it (before), as far as an IBOC implementation, the subcommittee elected to say let's do some common test procedures, common elements that we'd like to see tested in this way, give that to system proponents. Proponent, you then run your evaluations, and to the extent that you can incorporate these guidelines, we'd like to see information that addresses each one of these subject areas and come back to the subcommittee with your test results. At which time the subcommittee would evaluate them and determine whether they meet a threshold of acceptability.

RW: What do you think of the current NRSC process? Is it hard when new proponents keep popping up every few months? Does that set you back at all?

Justus: IBOC has a lot of problems to overcome, and to the extent one technology development center is addressing those, and another in a competitive environment, I think that's healthy for the technology. We would dearly like to see the IBOC system succeed because there are few other alternatives in the U.S. ... We have the satellite DARS licensees implementing their systems at S-band frequencies. They seem confident that they can provide an economically attractive service both to their license holders and to listeners, but it remains to be seen if the listener will accept the kind of outages that we expect at S-band.

Remember, (when) anything interrupts the line of sight to the satellite, whether it's trees or street signs or buildings or terrain, there's an outage. Even if they supplement their signals in every major urban area in the U.S. with a network of terrestrial repeaters or gap fillers, there's, practically, a limit on how many gap fillers can be employed in a community.

RW: In their IBOC DAB systems, Lucent and USADR are talking about having analog fill in at the edge of a signal coverage area where the digital drops off. Do you have any idea how that would sound?

Justus: Say I am listening to something near-CD quality and I get into an area where the digital signal is impaired and it blends to audio, you would think the listener would notice that, because you are going from 20 kHz frequency response down to something much less. Since I haven't heard it, and I don't know a lot of other people that have, it remains to be seen how effective that is an approach to implement a DAB service.

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Winds of 107 MPH Topple Tower

by Bob Rusk

MILWAUKEE Raging rivers in California, twisters in the Plains, torrential rains in Massachusetts. This year nearly every corner of the country has been hit by severe weather. Radio stations provide a vital community link when disaster strikes. But when stations become a victim of the weather and get knocked off the air, they are rendered unable to relay crucial news and information.

For example, Clear Channel-owned WOKY(AM), Milwaukee, was silenced in late spring when a storm packing 107 mph winds whipped through Wisconsin.



WOKY(AM) Tower

The gusts toppled one of the WOKY towers. Two other towers were "so badly damaged" that they had to be brought down, said Director of Engineering Phil Klingler. The station went back on the air after about 10 minutes, operating with just one of its remaining towers at a reduced power of 1 kW. As of late June, replacement towers had not been ordered because the insurance settlement was not finalized.

The tower that was toppled by the wind also held the STL dish for sister station WMIL(FM), which was off the air for several hours. WMIL resumed operations when a spare dish was placed on a

See TOWER, page 16 ▶

DRE on Its IBOC DAB Systems

▶ PRC, continued from page 3
Radio Express, updated attendees on the DRE system.

DRE President and Chief Executive Officer Norm Miller said DRE has completed lab testing its prototype FM system and was installing equipment in preparation for field testing at one station outside San Francisco (for more, see story, page 3). San Francisco was chosen for field testing because of its severe multipath environment.

In an interview with RW in June, Miller said DRE plans to begin lab testing its prototype AM IBOC system within the next six to eight weeks.

Like the other two IBOC DAB proponents, Lucent and USA Digital radio, DRE is developing "transition" IBOC AM and FM systems of both an analog and digital signals, and pure digital AM and FM systems.

No matter what IBOC system is ultimately used, getting stations to make the transition to digital will take time. Costs will be determined by the type and age of the station's current equipment and whether a station is AM or FM.

Also in June, DRE Vice President of Engineering Derek Kumar said for AM IBOC, an existing AM transmitter plant which is able to pass a C-QUAM stereo signal with a bandwidth of about +/-15 kHz will be sufficient for IBOC and will only require a new exciter. Since exciters are significantly less expensive than transmitters, this is an attractive situation.

Kumar said, "However, for IBOC FM, class C amplifiers will not pass an IBOC signal. We are working with transmitter manufacturers and coupler manufacturers to find the most efficient solution — whether it is a new amplifier which can pass both the IBOC signal and the FM signal, or simply a hybrid combiner with separate IBOC and analog FM signal amplifiers."

For the new single-amplifier approach, which is likely to be the most expensive option, there would be a new exciter which generates both an IBOC and analog FM signal; in other words, a composite IBOC signal, said Kumar.

However, Kumar said, for the "combined" approaches, which either use a hybrid coupler or separate antennas, the IBOC exciter is independent of the analog FM exciter. The station owner would be able to continue to use the existing analog FM exciters, provided that the exciter does not generate too much spurious spectrum.

— RW's Leslie Stimson contributed to this story.

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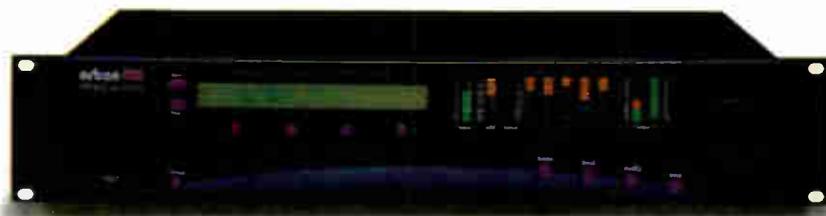
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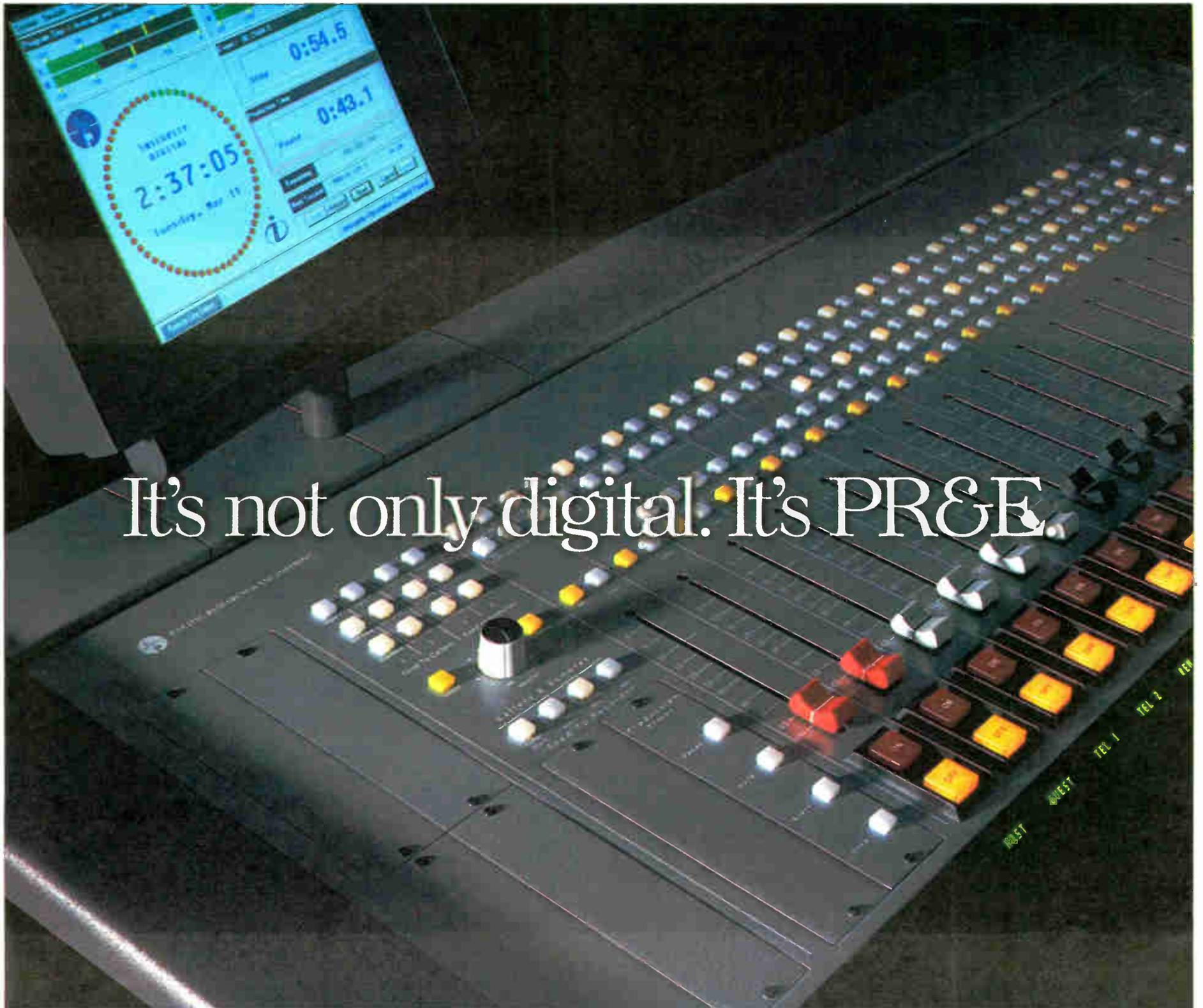
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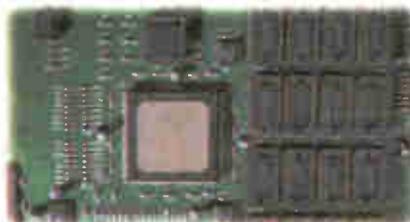
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PACIFIC RESEARCH & ENGINEERING

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FMnet Trade Group

► FMNET, continued from page 7
broadcaster profits, so they profit, so we can sell equipment that has those features. To that respect, FMnet is not even pro-STIC, it's pro-business, but STIC having been chosen is an open standard and allows all kinds of different companies to freely participate."

Kelley said he would like to see other applications developed for the Subcarrier Traffic Information Channel such as paging and song titling, but added that FMnet will probably concentrate on ITS work first.

There is much work to be done. Many pieces of ITS are unresolved. Take traffic messaging. Some ITS proponents want to use a text message like "Overturned truck: expect delay" so the user can read the problem.

STIC bandwidth

Others prefer a more automated method that provides travel time for every segment of road between every intersection of interest. Computer map-in-the-car type products would read that data and direct the driver to an alternate route when speeds on his or her current route dropped severely.

But not all the vision is centered on in-dash products. Some want hip-pocket products that might include news feeds, stock quotes and song titles in addition to traffic information.

Kelley said, "The goal here is to make this thing robust and versatile, but still common so that the population of subcarrier receivers becomes commonplace rather than very specialized as it is now. If that takes place, then the broadcasters have suddenly got an opportunity to deliver to those receivers."

While FMnet will focus on Advanced Traveler Information Services, Kelley noted that being able to slice up the STIC bandwidth and sell it in chunks would eventually mean more money in broadcasters' pockets.

Another debate is how traffic information will be disseminated. The FHWA wanted a system that required use of only one subcarrier per market from a station with good coverage.

And the reactions are divided according to Kelley. On one hand, there are broadcasters who would like to put it on every station as a way to attract people to the main channel. On the other are those who think the federal government is trying to foist ATIS on broadcasters and should have to pay for it.

Stehney said that radio plays a big part in getting information from the infrastructure to the roadside. The hook for broadcasters is how to make money and who is going to pay for it.

Said Stehney, "The model has not really been developed or tested yet."

Pay to play?

Who will pay? Kelley said the decision varies from state to state. Some states feel it is in their best interest to pay a broadcaster or network to disseminate the traffic information for free. At the other extreme are states that want to give it to for-profit entities that can rebroadcast it and charge a subscription fee, probably about \$50 per year.

Kelley said the lack of a uniform business model "is a great deal of the prob-

lem that is holding up deployment of subcarrier data" in the United States.

"That's one of the things that FMnet may be able to lend some help on. Not that it would pick who the suppliers along the various food-chain pieces are, but that it would provide a way for those different parties to interact in a generally alike fashion across the country."

At press time, according to Jim Chadwick, chief engineer for the Center for Advanced Aviation System Development at the MITRE Corporation, MITRE had signed royalty-free license agreements with six companies and was in discussions with

three others. One of those companies is interested in mass-producing an application Specific Integrated Chip — a STIC chip — to be put into radios. That could bring STIC chip prices down to the four-to-six dollar range.

- Not interfere with FM station entertainment channels
- Provide user data rate of at least 7.5 kilobits per second
- Be able to handle large blocks of information to reduce the latency of traffic data
- Be compatible with analog subcarriers at either 67 kHz or 92 kHz
- Be compatible with Radio Broadcast Data System (RBDS)
- Provide low-error-rate data to moving vehicles in variety of environments
- Be capable of providing coverage to typical cities in U.S. from a single FM station

Said Chadwick, "When you consider the comparison of that price to the price of the prototypes which was several hundred dollars because we were just using off-the-shelf stuff and general purpose components, it makes it practical."

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Retrofit Towers to Avoid Collapse

► TOWER, continued from page 12
100-foot auxiliary tower.

According to professional engineer Madison Batt, no amount of maintenance can guarantee that a tower will stay up during every conceivable natural disaster — however, the chances of a tower toppling can be greatly reduced.

One of the most important steps radio engineers or technicians can take is to reinforce a tower, making it able to withstand stronger wind gusts. For example, a tower that was originally designed to survive an 80 mph gust can

be retrofitted to withstand winds in excess of 100 mph.

“When we do an analysis to find out where the critical elements are, we generally find that the legs are overstressed,” said Batt, president of Seattle-based Tower Engineering Consultants. “Certain areas of the leg structure may need to be upgraded, but the complete leg system of the tower won’t necessarily have to be changed.” (Batt was commenting on his general experiences, not on the Milwaukee incident in particular.)

On X-braced towers, larger support pieces can be added, “but this is a potentially major problem because of the high stress levels,” said Batt. “There have been a number of tower failures

due to improper replacement technique.”

Old guy wires can also contribute to tower failure, Batt said. Improperly-sized wires pose a serious problem, as well.



WOKY(AM) tower number five on the ground.

“I Won the Marconi with Scott”



“I do like to give credit where credit is due and acknowledge Scott Studios as a major player in my daily broadcasting battle. The time I now have to devote to preparation, and the ease of operation of the Scott System, has helped me increase show professionalism.”

Bill O'Brian - KRKT, Albany, Oregon
Marconi Small Market Personality of the Year - 1997

“The spring stiffness relationship from guy level to guy level should be about equal,” he said. “When you see a deflected shape of the tower in an analysis and it is moving too much, it means a guy wire is probably not the right size. This is something that can be noted in an evaluation of the structure and changes can be recommended.”

Wind speed data has been supplied by tower manufacturers industry-wide since 1987, when the standard, “TIA/EIA Revision D, Structural Standards for Steel Antenna Towers and Antenna Support Structures” was published by the Telecommunications

“We Won the Marconi with Scott”

The 1996 winner of the Marconi Major Market Air Personality of the Year Award *also* uses Scott Studios’ touchscreen digital audio system! Still another Scott Studios user won the Country Music Association “Station of the Year” award in 1997! The Scott System can help *your* stations sound better!

Mac Hudson & Irv Harrigan - KILT FM, Houston, Texas
Marconi Major Market Personality of the Year - 1996



Old guy wires ... and improperly sized wires can contribute to tower failure.

“Scott has Improved our Product”



“We were very eager to ‘go digital’ last Fall, and compared different systems. Our decision to go with the Scott System was one we *all* felt good about. I’m confident knowing the comfort level of our different departments who use the system is high. Our Scott System has improved our efficiency and the quality of our product.”

Michelle Mercer, PD - KPWR FM, Los Angeles

Tom Koza, Chief Engineer, top rated afternoon personalities “The Baka Boys” surround Program Director Michelle Mercer

Industry Association, an arm of the Electronic Industries Alliance.

Prior to that, said Batt, the reference was the wind loading (in pounds per square foot) that a tower was designed to handle. For older towers, wind speed data may be available directly from the manufacturer.

Even more damaging to towers than the wind is ice load. “Ice is the biggest killer of towers,” said Batt. “It can buckle a leg or put a huge stress on bolts that are not designed to handle that kind of tension. You might prevent this with better maintenance. Over the years, ice has found the weaker structures.”

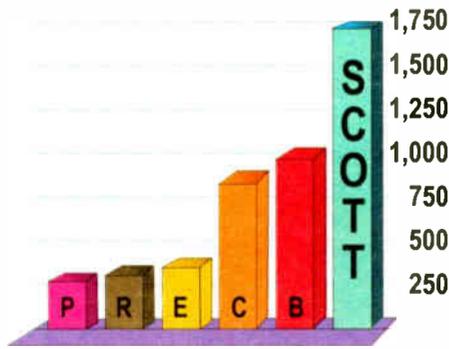
Towers are designed to withstand an accumulation of one or two inches of ice, said Batt. “But the problem is freak storms have occurred in the last few years” and a six-inch accumulation of ice has not been uncommon, he said. “It wouldn’t be cost-effective to design every structure to take six inches of ice loading. The towers would require bigger face widths, larger members, and bigger guy wires.”

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Overloading

Also, some towers are becoming overloaded with antennas, which could lead to a collapse. “Some people are adding antennas as a way to generate revenue,” said Batt. “Towers should be evaluated to determine if they need to be upgraded to handle the load,” said Batt.

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So now they're bringing me back —

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Traffic and Billing in 2000, Beyond

Randy Stine

What are the biggest trends in radio traffic and billing as the new millennium approaches? "Here a WAN, there a WAN, everywhere a WAN, WAN," said Debbie Hamby, vice president and sales manager for Datacount. "Wide area networks and Internet reporting are where things are going," she said.

Traffic and billing in this era of radio consolidation has changed dramatically.



The business practices of five years ago are obsolete for most ownership groups. The days of a single traffic director per station are long gone. Now, you are more likely to see several traffic managers, a couple of general ledger accountants, and maybe two continuity directors working from one office for a half-dozen stations.

Today, according to Datacount, the new reality is low-bandwidth connectors and users with dial-up connections. Hamby said the communication aspect of the industry has grown even more important. "With so many vice presidents to report to, stations need very highly detailed revenue and inventory reporting, accounts receivable, and general ledgers available on the fly for people who may be across the country," she said.

Radio World continues its Special Focus series this issue with our Focus on Traffic and Billing Management. Frequent RW author Randy Stine covers the present traffic and billing landscape of the radio industry and takes a look ahead at the expected direction of the systems and processes.

An in-depth look at the trends in traffic and billing will serve as a useful guide when considering your options. Stine also reports on what to look for when purchasing your traffic and billing system.

Take a look at what those in the business are saying, with remarks, opinions and recommendations from several radio professionals included in the pages of this special section.

As always, we welcome your comments and suggestions. Send your thoughts to radioworld@imas pub.com

WANs allow for one centralized location to handle traffic and billing for any number of radio stations scattered across the country. Steve Kenagy, vice president of marketing for Custom Business Systems Inc., said, "The move is definitely toward multiples of stations using a central traffic and accounts receivable system," he said. CBSI serves over 2,600 stations worldwide.

Kenagy said the traffic directors' job, with more than one radio station to schedule for, has changed greatly. "Speed, accuracy, and ease of use is vital. With maybe 30 commercial logs coming out of one location, you need something that is standardized across the board." CBSI offers three traffic systems, with the Premier system the top of the line. Operating with the new DeltaFlex traffic engine, a third-generation Windows system, it offers capacity for 64 simultaneous users and what the company promises is "potentially an unlimited number of radio stations interfaced from a central facility."



The move toward more automation and live-assist situations has led traffic system suppliers to solve the problem of merging the commercial log. The Datacount Account Receivable and Traffic System (DARTS) is a PC-based system and, according to the company, was one of the first to offer automatic log reconciliation to automation vendors for them to package with their systems.

"Stations are to be able to download the log from traffic to the automation, and then back to DARTS for reconciliation," said Hamby. Datacount, based in Opelika, Ala., has introduced its new 32-bit traffic and billing system called D32* with a Windows 95/NT platform.

Ron Burley, president of Broadcast Software International, said if a radio station is searching for traffic software to run automation and live assist, he recommends buying the systems from the same company. "For traffic and music together, you don't want to worry about how the two will work together. Buying your systems to

interface with each other, whether it's Windows or DOS, is the most important." BSI offers software interface and turn-key systems for use with NaturalMusic automation systems to small- and medium-market radio stations.

The move away from DOS to Windows 95/NT is just about complete in traffic and billing circles. "DOS applications were all we offered," said Art White, sales manager for Register Data Systems. RDS makes Traffic Master 2 and Traffic Master 6, both

DOS based, designed to interface with the company's Phantom automation system. "We will introduce our new Windows-based System 32 in late summer," White said.

While there will be some new features to the System 32, the key selling point, according to White, is how easy it is to use. "Windows 95 and NT are where you have to be anymore to compete," he said.

At Columbine JDS Systems, the Paradigm Windows 95 32-bit application is new. David Netz is senior marketing manager for the company. "The Paradigm is for major radio groups who

See TRENDS, page 20 ►

In the Field: Traffic and Billing Management

Randy Stine

What do radio traffic and billing professionals say about the latest trends and software? Here is a random sampling.

Linda Chandler is corporate manager of traffic for WAMO-AM-FM and the American Urban Radio Network in

through it, both accounts receivable and payable," she said.

Like many Americans, Chandler is doing more work from home. "With a modem at home, I can work on the log or my reports Sunday night and have the printed copies waiting for me on Monday morning," she said. It's that

Account Exec	Feb 97	Mar 97	Apr 97	May 97	Jun 97	Jul 97	W/T Total
BRIAN DEWITT	29,987	11,823	12,792	15,201	12,835	10,014	120,854
CANDY HELGELSON	26,801	29,890	28,004	33,962	23,201	36,407	307,421
DAN LEVITT	123,004	69,537	19,252	20,425	2,398		238,563
DAVID JONES	196,866	105,225	109,463	114,828	72,614	91,085	878,455
DIANE SABO							6,375
DON DURAND							666,511
BOBSE							100
JERRY HANSEN							677,982
JIM GRIMM	23,336	21,232	47,616	41,884	11,633	13,087	226,843
JIM OENLER	196,398	40,290	78,460	82,540			397,688
JULIE BYRD	49,210	51,435	36,747	34,778	42,871	15,862	319,548
KATY FLANNAGAN	49,840	33,120					82,960
LISA POLLETTI	548,281	274,968	8,076				831,325
LOUIE CALLAHAN	25,641	7,404	1,700				34,745
HARCY ETCHEBAR	159,743	31,969	41,045	33,525	26,820	33,525	467,432
MIEL HAMILTON	20,922	11,490	4,560	6,950	4,250	6,400	57,550
SHANNON McVILLANE		3,000	12,000	15,000	12,000	15,000	72,000
STEVE SZADONIEWSKI	294,609	172,710	77,590	62,128	21,376	2,106	643,667
Total Lead	1,984,187	1,126,479	717,914	832,364	324,174	297,189	6,036,817

Sales Analysis Plus From Columbine JDS Systems

Pittsburgh, Pa. Chandler has worked in traffic and billing for 20 years. She sees her job as being the very heart of the business side of radio. In her current position she uses Radio Computing Service's RCS Traffic on a UNIX operating system. "It does a great job handling all traffic and management reports. We run all of our billing

kind of versatility that makes Chandler a fan of RCS Traffic. She wishes for only one thing: "A way to pull up sales reports by demographics," she said.

Kristen Larson serves as traffic director for KIIF(FM)/KXTA(AM) in Burbank, Calif.

See FIELD, page 20 ►

Let's Go Shopping for Systems

Randy Stine

What was once the laborious task of order entry and scheduling commercials has become a task that has, thanks to better computer software programs, become much less time consuming.

Speed, accuracy, dependability, and good technical support are all qualities you should look for when shopping for a new traffic and billing system. There is no shortage of options for both single-station and group applications.

Where to start? Most software vendors in the field advise station owners and general managers to discuss long-range needs and desires with traffic and billing personnel. Buy program software that you will be able to upgrade as new technology comes along and look for integrated systems that have traffic, billing, music, and general business functions built-in.

Interfacing

As the radio industry continues to consolidate, spreading now even into small markets, the need for the ability to interface with a main computer network will someday become a necessity for many stations. Centralized traffic and billing is the way business will be conducted for many radio groups. This is the time to explore wide

Register Data Systems said if you're buying DOS, you're really missing the boat. "Most software companies have rewritten their programs for Windows. The versatility of Windows 95/NT along with the user friendliness quality is what most traffic directors are looking for," he said.

White said everyone wants one-step



system with software written in a way that an experienced software person should be able to handle it without costly training," he said. He said out that it is the goal of his and other companies to, "teach the system, not the job. System simplicity is important when it comes time to hire a replacement when your traffic or billing people leave," Burley said.

Tech help

Even if a system is easy to use, that doesn't mean you won't need some technical support now and then.

Jan Schad, owner of SMARTS Broadcast Systems, thinks that good support is a must. "Look for a vendor with a long track record of good customer service. Get references if you can," she said. Remember, you're buying more than just software and hard-

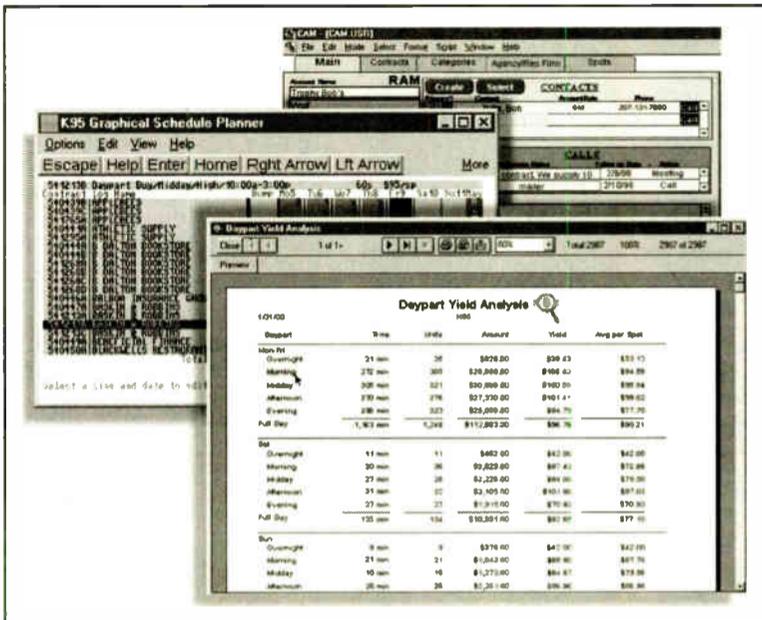
ware. "You're buying the years of experience and knowledge of a company," Schad said.

SMARTS constantly asks for feedback from its customers. Schad said that most of the feedback is in regards to order entry. "It boils down to the nuts and bolts of the system. You want the



system operator to be able to sit down and be as efficient as possible," she said. "The everyday mundane functioning of your traffic and billing departments is just as important as all of the bells and whistles like WAN and fancy reporting features."

Once you have decided on a new system or software, make sure take your time with the start up. "Whether you purchase a turn-key system or new software, give yourself more than just a weekend to get it up and running," said BSI's Burly. Most system makers provide on-site training of some sort. Then interface away. "If you're looking for one-stop traffic and billing, it's definitely available," he said.



CBSI's Traffic and Billing Solution

interfacing between all departments. "How can I do everything I want without getting out of my chair? That's what traffic directors should ask themselves."

Wish list

When preparing a wish list of functions you want, make sure to prepare a

well-thought-out list of questions. And asking a question like "Will your system do X" is not enough, according to Debbie Hamby, general manager and vice president of sales for Datacount.

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The versatility ... along with the user friendliness quality is what most traffic directors are looking for.

— Art White

Register Data Systems

area networks (WAN) and Internet capabilities. Both will play a major role in the coming years.



Eileen Tuuri is communications director for CBSI. "First, make sure you deal with good software on a good platform, and not vapor-ware. That's software that's mocked up to look like Windows, but really isn't," she said. Tuuri said that while vapor-ware is cheap, it turns out to be expensive in the long haul. "And make sure you get a demo from the vendor. Give it a good shake down and make sure the enhancement package is what you're looking for," she said.

The shift in traffic and billing systems has been away from DOS and toward a Windows multitasking environment. Art White, sales manager for

well-thought-out list of questions. And asking a question like "Will your system do X" is not enough, according to Debbie Hamby, general manager and vice president of sales for Datacount. "They will of course answer 'yes it can,'" she said. "Many shoppers have been bitten by 'will it' questions instead of asking 'how it' questions. Ask how it works and you'll learn more."

And plan ahead. "If your goal is have all of your sales reps entering orders from the field on laptops, shop for a



system with the greatest growth possibility," said Hamby. Having some foresight is very important. "Ask yourself what it is you want the system to do today, tomorrow, and three years from now," she said.

Keep in mind that all software is not created equal. Ron Burley is president of BSI. "You should be able to find a

Systems and Solutions Are Good for Business

► **FIELD**, continued from page 18

Larson uses the Columbine JDS 1000 with the U.S./3.1 upgrade package on an IBM AS/400 computer. "I know this is an over simplification, but it's a very logical system," she said. "Reconciliation cuts to the nitty gritty very quickly with only a few keystrokes.

Larson works with two traffic directors, several accountants, and two continuity directors on the Columbine system. Management can also access the system. "One of the better things it can do includes all of the report functions. If we want to see what an advertiser spent with us on every odd numbered Thursday during every even month, between 4 p.m. and 5 p.m. in the afternoon over the past two years, we can pull it up and print it in a snap," Larson said.

Having previously worked with Marketron and CBSI, Larson said the Columbine JDS 1000 stacks up well.

DARTS™

Diana Cirino works as the accounts receivables coordinator at WZAK(FM)/WZJM(FM)/WJMO(AM) in Cleveland, Ohio.

Cirino has worked with CBSI's INTERACCT accounting system at the stations over four years. "CBSI has many built-in safeguards to catch any errors that come up before they become major hassles," she said.

Co-op and agency billing is simple, thanks to the flexibility of INTERACCT. "We pre-store all of our formula percentages and we let the system take care of the rest. It gives us very detailed invoices that are easy to read and which

look good," Cirino said. She also said that CBSI technical support is first rate.

Linda Karl is traffic coordinator at WFMK(FM)/WMMQ(FM)/WJIM-AM-FM/WITL-FM/WVFN(AM) in Lansing, Mich.

For traffic and billing practices the stations employ CSBI's Elite system with Delta-Flex. "This system is so complete," Karl said. "Everything from catching duplicate cart numbers to the ability to copy over logs from one station to another are important when dealing with so many stations," she said.

Karl has found that you need to find "major step savers" whenever you can. "The improvements in programs I've seen over the eight years I've been in traffic have been fantastic," she said. Nothing is foolproof when it comes to preventing mistakes, though. "Like anything, human error enters into the equation. But, with the CBSI safeguards backing us up, we do get close to being mistake-free," Karl said.

Jackie Cowden is traffic director at WYSF(FM)/WZRR(FM)/WAPI(AM) in Birmingham, Ala.

Cowden works with Datacount's DARTS system of traffic and billing. "DARTS ranks right up there with the best in my book," she said. "When we do our flights, we use the same numbers for all three stations. And you only have to put the order in once, where with some systems you can't transfer them over."

The people with the best ideas on how to improve traffic and billing practices are the ones who use the systems everyday. "Datacount knows that we are the best research staff you can have. They've always been very receptive to our input," Cowden said.

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Management in the New Millennium

► **TRENDS**, continued from page 18

want to be able to pull everything together and integrate ... all of their radio stations' traffic scheduling, billing and sales departments reports," he said.

Columbine offers several interface systems for use on IBM AS/400 mid-range computers.

For billing and general financial reporting, CBSI offers its interactive accounting software, called InterAcct. Kenagy said the system will handle general ledger and accounts receivable tasks. "It can handle up to 100 different subsidiaries on a single system, along with reporting features for GMs, GSMs, and salespeople."

SMARTS Broadcast Systems owner Jan Schad said her company will introduce a Windows 95/NT-based traffic and billing system for the first time this fall. "It's called SMARTS/The Second Generation. It's a big change for us, we are moving away from DOS and embracing Windows," she said. She said that traffic and billing are very closely related on their system. "As you enter a traffic order you put in the unit rate and the bill is completed as you do the scheduling. We also allow for you to level bill if necessary."

Centralized billing is fast becoming reality as it is for traffic. "Radio groups

now want to bill for 10, 20, or even 30 stations from corporate center," Schad said. Radio stations on the old SMARTS DOS program will receive tech support from SMARTS. "After that we would hope to have all of the stations working with Windows," she said.

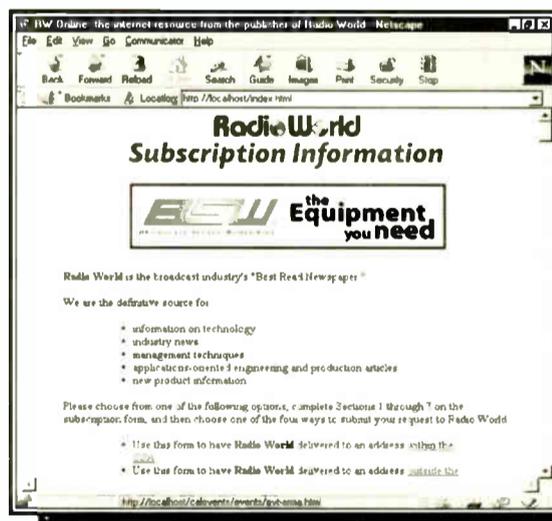
The year 2000 problem is fast approaching, and like many types of businesses that rely on computers, many radio stations are tackling the problem. "This is a very serious situation," said Kenagy. "We are working with stations to ensure a smooth transition through the period. It's still not too late to do something." The problem stems from what most computers will read in their date clock: It will read 00, thinking it's 1900 instead of the year 2000. "Can you imagine what the discrep sheets could look like if, say, a major group with multiple stations across the country goes down," said Kenagy. "GMs everywhere are already getting nervous."

As radio continues its process of consolidation, now trickling down through even the ranks of small markets, traffic and billing will also continue to evolve. Next, we will probably see radio sales managers being able to enter traffic orders right from the field on their laptops. Oh, wait — that's already being done.

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PRODUCT REVIEW

Rane's Rugged Distribution Amp

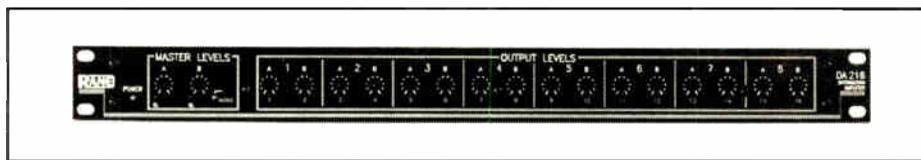
Jeff Johnson and Jay Crawford

A distribution amplifier (DA) is an almost invisible component of a broadcast plant, but plays a crucial role in the sound quality and reliability of the entire operation.

The DA performs a simple but central function in a broadcast or audio plant. It accepts a single- or dual-channel input and produces multiple, isolated outputs. If, for example, the air studio program signal must be sent to numerous destinations, it is bad practice to merely parallel the connections. Hum or noise originating at one of the destinations will end up everywhere. A short circuit in an obscure corner of the station will take you off the air. This is where a DA is necessary, such as the Rane DA 216.

loose, "barrel-style" low-voltage power connector. Powering professional equipment with the barrel style is inadequate.

All front panel controls are recessed to minimize fiddling. The shafts have no marking, nor does the surrounding front



Rane DA 216

The RJ-11 plug is not marked as a power plug. Care should be taken to avoid inserting it into a telco or data jack. We believe all manufacturers should include a terminal strip for screw connection of the power input, or supply much better quality connectors.

panel legend have reference numbers. The shafts have a "D" notch, but close inspection is necessary. It will be difficult to mark or note correct settings.

The DA 216 is accompanied by a well-written and illustrated manual. A block diagram and schematics are included.

Too many manufacturers skimp in the area of "the book." Rane should be particularly commended for including a "Sound System Installation Tutorial," which goes well beyond the explanations necessary for this piece of equipment only. System grounding is covered thoroughly and explains a pertinent feature of the Rane DA 216.

The rear panel grounding screws mount on the chassis frame rather than being integrated into the terminal strips, thus eliminating the possibility of a "one-point star" grounding scheme within the unit. Signal ground is chassis ground.

The "Sound System Installation Tutorial" included with the instruction manual explains the desirability of this for balanced systems. Should a partially unbalanced system be necessary, the Rane tutorial explains alternative solutions. The manual is a valuable reference and should be included on your "tech

See RANE, page 24 ▶

Take a look

Reliability being paramount, let us begin with a physical inspection of the unit. It consists of a full-width, 1 RU enclosed steel case. The input and output connections are on terminal barrier strip. Ground screws are located adjacent to each channel.

The ground screws attach to the chassis with press-inserts, a feature that assures reliable grounding. All chassis assembly screws have lock washer heads for conductive integrity of the chassis. The barrier terminals solder directly to the circuit board and float through a cutout in the chassis. We have experienced solder joint failures with other devices using this method. However, with this unit, each strip has 18 connections, so mechanical stresses should be distributed adequately to minimize any problem.

The DA is powered by a wall-wart with an AC line cord that allows it to be located away from the power receptacle. An improved feature of this Rane unit is the low-voltage, six-conductor RJ-11 plug connection to the chassis unit. This type of telephone-style connector is more reliable than the ubiquitous, commonly

WIRED FOR SOUND

Choosing Microphone Cable: Part 2

Steve Lampen

The first part of this series can be accessed at www.rwonline.com

Continuing our discussion on microphone cables, constructions and performance, we start with balanced lines.

Balanced lines

To understand balanced lines, you must understand what those words mean. What they mean, in simplest terms, is that the two wires in the pair are the same. They are the same material (cop-

per), the same size and the same length.

Very few understand how important these "samenesses" are, but they are critical to reducing noise pickup. Both the source and destination of this balanced pair must be balanced too. This used to be (and often still is) done by using transformers on the source and destination. More commonly, it is accomplished by using a differential active circuit, often part of an IC.

The secret behind balanced lines is that the signal on the twisted pair is always equal but opposite polarity on the two wires, as shown in Figure 1.

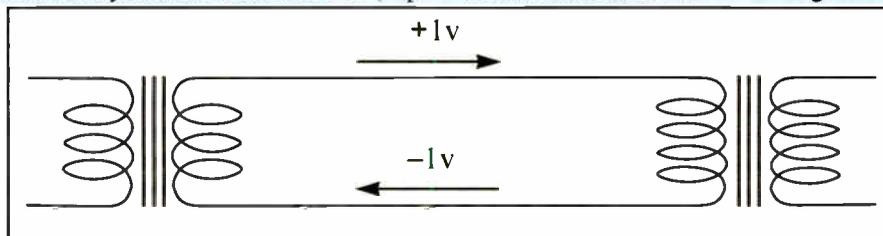


Figure 1: Equal but opposite voltages on a balanced line.

When electromagnetic noise hits the two wires, it induces a voltage flowing in the same direction on both wires. When that noise gets to either end of

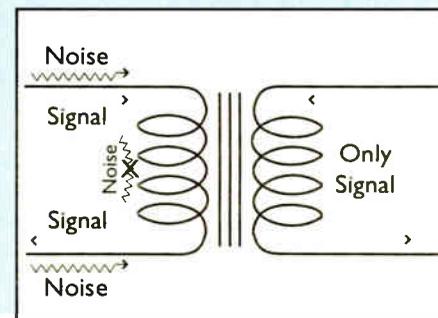


Figure 2: Noise Cancels Out

the circuit at the same time, it will cancel itself out. Thus, the noise is cancelled, but the signal passes through. See Figure 2.

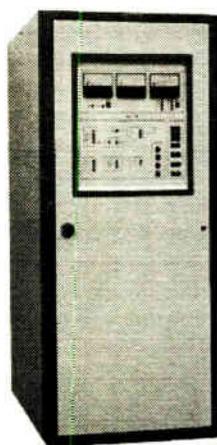
This effect was not lost on the phone company which has used twisted pairs

See MICS, page 34 ▶

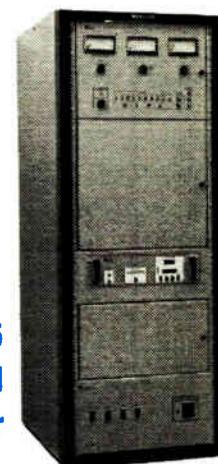


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FEED LINE

More Measurements for the FCC

W.C. Alexander

This continues a multipart series of articles about constructing an AM expanded-band station. The previous part appeared in RW July 8.

In the last part of this series, we discussed some of the post-construction steps necessary to obtain program test authority and get the new station on the air. This time we will continue looking at some of the other measurements the FCC may require and the data that must be submitted.

Resistance measurements

If your new station is in close proximity to, or is dplexed with another AM station, there will probably be a requirement on your construction permit to submit a "direct-measurement application" for the other station showing the base or common point resistance and reactance following construction.

Building a tower close by an operating AM station has the potential to alter the self-impedance of the other station's tower(s) and thus change the resistance and reactance at the base or common point. If the resistance changes, the amount of current necessary to produce the proper amount of power also will change, thus the requirement to measure and submit the data.

If the other station is co-owned with the new one, you will have access and can make the antenna or common point impedance measurements yourself. If the station belongs to someone else, you will have to enlist the cooperation of that station's owner and engineer to get the measurements made.

For the most part, station engineers are cooperative and will want to help. After all, it is in their best interest to get the impedance measured and filed, and to ensure that their station is operating at

the proper power level. If the other station refuses to cooperate or drags its heels, however, you have the recourse of asking the FCC to intervene. Again, this should be the last resort.

For many years, the FCC required a sweep of the base or common point, and



required a plot and tabulation of the measurements to be filed. No more. Now, all that is required are the on-carrier resistance and reactance values. That makes it simple for us by making it possible to measure the impedance with an operating impedance bridge or common-point bridge. It still is worthwhile, however, to

It is in the best interest of station engineers to get the impedance measured and filed.

know what the load looks like at the side-band frequencies, so I would encourage you to take the extra time if you have it to take a peek on the other frequencies.

Who signs?

If the other station is yours, you can fill out and submit the FCC license application for that station with the new resistance and reactance measurements shown. If the other station is not co-owned with yours, you can fill out the

form for them but the licensee will have to sign it. There is no filing fee for a direct-measurement application, so that should not be a factor. The name of the game is cooperation, and you should do everything you can to enlist the cooperation of the other station's licensee and engineer in order to get the impedance measurements made and the direct measure application filed.

Suppose the other station licensee will not cooperate. What can you do then? Will the other licensee's lack of cooperation hold up your own paperwork at the FCC? If the other licensee refuses to cooperate, your communications counsel can help by filing — along with your license application and request for program test authority — a statement describing the situation, listing the steps you have taken in an attempt to secure the other licensee's cooperation, and requesting that the Commission grant your application notwithstanding the other licensee's stonewalling. In all likelihood, the FCC will proceed with the processing of your application without a significant delay.

Spurious and harmonic measurements

In the event that your new station is either dplexed with another station or located in proximity to one or more existing stations, the FCC may require you to make spurious and harmonic measurements to demonstrate that there is no interaction between stations. To properly make these measurements, you must first locate an accessible point at a relatively close distance to the site(s) for the measurement. There is no cut-and-dried formula for selecting a measurement point, but here are some of the criteria:

- Close enough that the ratio of the measured stations' carriers to other station's signals is relatively large
- The bearing to local stations on second- and third-order frequencies is perpendicular to the bearing to the measured stations
- Clear of overhead wires
- Free of local noise sources
- In the main lobe, if one of the stations is directional.

If you can find a point within a thousand feet or so of the site(s) that meets all these criteria, you have done well.

The next thing you must do is make a list of frequencies to be measured. These frequencies will include all the possible second-, third- and fifth-order intermod frequencies, plus the second and third harmonic frequencies of your new station. Here's an example: Let's assume your station operates on 1650 kHz (frequency "A") and is dplexed with an existing station on 1000 kHz (frequency "B"). The second-, third- and fifth-order frequencies are as follows:

- 650 kHz (A-B)
- 2650 kHz (A+B)
- 2300 kHz (2A-B)
- 350 kHz (2B-A)
- 2950 kHz (3A-2B)
- 3300 kHz (2A)
- 4950 kHz (3A)

For your measurements, the easiest thing to do is use a field intensity meter,

such as the Potomac Instruments FIM-41. A spectrum analyzer can be used, but this is usually much more difficult. Traps typically must be used to notch out the fundamental frequencies because of susceptibility to overload and dynamic range limitations. The characteristics of the traps on each of the measurement frequencies must then be figured into the measurement. There are also the problems of power and antenna. The FIM is battery-operated and has a built-in shielded loop antenna.

With the FIM in hand, go to your preselected measurement point and first measure and note the field strength of both stations. Be sure to note the orientation of the antenna — is it pointed toward the station or at some angle away? If the antenna is not pointed toward the station, you should look for a new point.

Next, measure and note the field strength at each of the preselected second- and third-order frequencies as well



Delta Electronics OIB-1

as your second and third harmonic frequencies. On or adjacent to some of the frequencies you measure, there may well be other authorized AM stations operating in the local area. These frequencies are particularly important to measure, as they are where the greatest potential for real interference lies.

Be sure to measure these and all frequencies with the antenna oriented toward the stations. If the measurement location you selected was chosen properly, the bearing to any other stations on the same or adjacent frequencies as you are measuring will be perpendicular to the bearing to the stations you are measuring and the null of the loop antenna will reject the other station's signal.

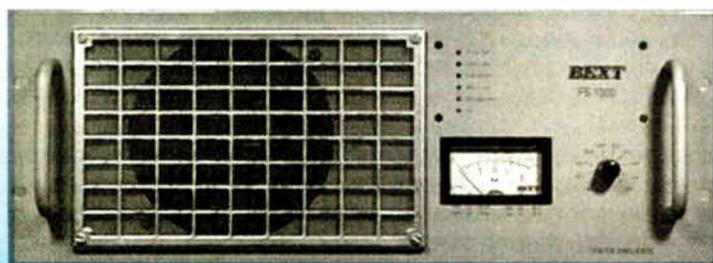
As you make each measurement, calculate the ratio in dB to the carriers of both stations you are measuring. The ratio should be better than 80 dB. If it is less than 80 dB, make a note of the circumstances (i.e., antenna orientation, other local stations operating on that or an adjacent frequency, what was present in the demodulated audio on that frequency) and go on with the rest of your measurements. Later, if you have one or two measured frequencies where the ratio was less than 80 dB, you may need to select another location and repeat the measurements.

In the next installment, we will conclude our look at the proper method of making spurious and harmonic measurements, and wrap up with the FCC-required paperwork.

■ ■ ■
Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. Contact him at (972) 445-1713 or via e-mail at cbceng@compuserve.com

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KEYBOARD CONNECTION

Windows 98: The Hope, the Hype

Barry Mishkind

If you haven't heard about the release of Microsoft Windows 98, it can only be because you don't have a computer, don't listen to the news and have been on assignment for the past six months in the jungles of the Amazon.

Rarely has any release of software been the object of more publicity, both within its industry and from the U.S. Government, as has Windows 98. Based largely upon the integration of an Internet browser into the Win98 operating system, the U.S. Department of Justice and some states have brought monopoly charges against the Microsoft Corporation.

The "hype" abounds. Is there a Microsoft plot against Netscape, the other major browser competition? Is Bill Gates on his way to owning the world? Some say yes.

Is Internet Explorer the better browser? There are pluses and minuses.

Microsoft has made more than a few enemies while growing to be one of the major software companies in the world. On the other hand, a recent New York Times/CBS poll shows a majority of people hold positive opinions of Microsoft.

It would have cost Microsoft hundreds of millions of dollars to buy this much publicity for their product.

Let's leave the legal-beagle stuff behind, and figure out if an upgrade to Windows 98 is worth your time and money.

Major or minor

One of the major complaints against Windows 98 is that it is not an upgrade so much as a few fixes and additions to Windows 95. And, while there are fewer differences on the surface with Win95, compared with the "step up" from Windows 3.1, there are some important reasons to consider purchasing Win98.

In fact, 15 of the top PC makers, with over 60 percent of the market, have decided there are enough new features in the product that they will ship their new PCs with Win98.

Among the improvements: a much improved version of Plug and Play, which integrates the new USB (Universal Serial Bus) device standards, and support for more peripherals than Win95. The setup program contains approximately 1,200 new drivers, making setup for most people a breeze.

Microsoft tells us it has worked overtime to prevent most installation hassles, including the embarrassing moment in April when Windows 98 crashed at the spring COMDEX show in Chicago, right in front of Bill Gates himself.

Windows 98 also comes with troubleshooting "Wizards" that ask you questions so you can diagnose and repair problems quickly. And, with an Internet connection, Win98 will update itself whenever you want it to, incorporating any enhancements and bug fixes since

the release of the program.

Other important updates include enhanced utilities and an improved file system.

The enhanced ScanDisk and Defragmenter, along with a new CleanUp feature, make it possible to easily "tune up" your computer on a regular basis, solving problems. This will make your computer faster and more efficient.

Meanwhile, Win98 uses a newer file system: FAT32. This permits a reduction of the allocation unit to 4 kB, and releases a lot of space, potentially 25 percent. Microsoft claims many users will save enough disk space, not having to pur-

chase a larger hard drive, that it will pay for Win98 all by itself.

Browser hoopla

Now let's talk about that browser, MS Internet Explorer (IE), subject of much legal hoopla.

As both Win95 and the Internet matured, MS realized the benefits of using the browser both for the Web and the local computer. This permitted more flexibility for the user, who now would use one browser in place of two.

Additionally, MS added the ability to make the browser act as a desktop, and automatically to pull in preselected sites.

This also has aroused the attention of regulators, since the initial list of sites all have a relationship with Microsoft.

Is Internet Explorer the better browser? There are pluses and minuses. Some features are better than Netscape, for example, where others are not. IE4 will use the new "scroll wheels" on some mice, so that you can read through a page more easily. On the other hand, IE has a tendency to "scramble" the video from time to time, requiring you to shut it down and reload.

Another difference is in the way bookmarks are handled. Netscape uses a file with all the bookmarks in it. IE4 stores each bookmark in a separate "link" file, which uses lots more disk space (even with FAT32, it is a minimum of 4 kB for each bookmark) and

See WINDOWS, page 25 ►

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Rane DA 216 Distribution Amp

► RANE, continued from page 21
"bible" shelf.

There are two balanced inputs, left and right stereo channels, and eight balanced outputs per channel. One input can feed all 16 outputs in mono mode. The Rane DA 216 is capable of amplifying mic level to line level. Thus it could be used close to mic locations in a broadcast or sound reinforcement system to eliminate long low-level cabling.

important if you plan to use the DA on the receiving end of a broadcast phone line; you may encounter telephone company battery voltage if a lineman crosses up your wiring. Lightning protection also will be afforded by this arrangement.

Inputs have clipping LEDs that appear to light about 5 dB before actual clipping is observed on an oscilloscope.

Each output also has level controls. As with any DA having both input and out-

approximately 15 Hz to 100 KHz. We found the unit to measure better than the published specs by a small margin.

One thing this DA will not do is drive a broadcast circuit directly. The output impedance is 200 ohms, designed low to avoid high-frequency loss due to cable capacitance on long local wiring. If you need to drive a broadcast line, use two 200-ohm resistors, one in series with each output lead to build out to a true 600-ohm value. Since the DA's clipping point is +24 dBu, it has enough drive to enable the use of these resistors.

Thanks to Bradley Broadcast Sales for arranging this trial unit.

■ ■ ■
Jay Crawford is chief engineer and Jeff Johnson is network engineer at WVXU(FM) in Cincinnati. Send e-mail to Jeff.Johnson@goodnews.net

Rane should be particularly commended for including a 'Sound System Installation Tutorial' with the unit.

Inputs have two types of gain adjustments to allow input levels of -70 dB to be brought up to 0 dBm output level (with no pad, input and output gains at maximum). There is a 40 dB input pad plus a 20 dB input amp gain adjustment. One warning: labels of these adjustments are somewhat confusing. The label says "Input, Pad - DB - Gain," or -40 and 60 or 40. This does not mean a level of -40 dB but rather 40 dB of padding from maximum gain.

Mono mode

Input stages can be switched to mono. This drops overall in/out gain about 5.5 dB. If you plan to run in mono (assuming you have one mono channel coming into the DA), do your entire setup in this mode.

From the schematic, the DA appears to have overvoltage protection on its inputs (Zener diodes back to back from the + and - inputs to ground). This ought to be

put controls, use care in setup. Turning the outputs low and overdriving the inputs to get enough level will run the risk of distortion in the input stage. This is not a design problem but a setup problem. If you want to use a microphone requiring power, the DA has the capability of supplying 15 VDC phantom power to its inputs. This is not available with the 40 dB pad in the circuit. (Because the DA would not have the gain to bring a mic level signal up to a usable level with 40 dB of pad, the box assumes you do not want phantom power at that setting.)

Noise floor

The noise floor of the DA is -85 dB in line input mode and -128 dB in mic mode, according to the specifications. These published noise figures appear to be quite accurate. Note that the mic mode noise floor is below line level reference.

Frequency response from the unit's specifications appears flat from

Product Capsule:

**Rane DA-216
Distribution Amplifier**



Thumbs Up

- ✓ Microphone amplification available
- ✓ Rugged, all-metal construction
- ✓ Versatile input and output gain adjustment controls
- ✓ Good noise and frequency response specifications
- ✓ Excellent manual and tutorial



Thumbs Down

- ✓ Front panel not marked well
- ✓ Back panel settings are confusing
- ✓ Power connector into device could be better.

For more information contact Rane Corp. in Washington state at (425) 355-6000; fax (425) 347-7757 or circle **Reader Service 125**.



You Must Remember This

Depression-era radios resembled this model, the 165 from Atwater Kent, manufactured in 1933.

Things were tough all over; this radio came complete with the National Recovery Act sticker. Both AM and shortwave broadcasts could be picked up on this 5-tube unit.

How much did radios cost in the early '30s? The Atwood Kent 165 was priced at \$29.90. Atwood Kent also offered a 7-tube model for \$45. Jumping up to an 8-tube radio from the same company would have set you back \$59.90.

This is one in a series of photographs in RW featuring classic and less well-known radios. The pictures and descriptions are by collector Bill Overbeck, president of the Delaware



Valley Historic Radio Club, who has made every effort to ensure accuracy.

Contact him via e-mail at billoradio@aol.com or through RW.

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CHRONICLE

Not many people realize it, but radio was *instrumental* in the naming, if not the actual design, of one of the most effective anti-tank weapons of World War II.

The story begins with comedian Bob Burns, a.k.a. "The Arkansas Traveler," a spinner of country tales who got his break in radio in 1935 thanks to Rudy Vallee, one of the original crooners. Burns spent many years on "The Kraft Music Hall" with Bing Crosby before getting his own show in 1941.

Part of Burns' act consisted of murdering a familiar tune on a musical device of his own invention



which he had slapped together while rehearsing with a band inside a plumbing shop in Arkansas. This "instrument" consisted of two gas pipes and a whiskey funnel.

Familiar tunes were butchered with the 'bazooka.'

He called it a "bazooka," after the sound it grudgingly gave out when he played it. When the army came up with an infantry-sized anti-tank weapon during the war, it bore such a striking likeness to Burns' instrument that the troops quickly christened it "bazooka," the name it carries to this day.

Burns holds up the original version (at right), while an unidentified army officer holds up its far more potent cousin.

This image is provided by the Library of American Broadcasting, which welcomes your questions, comments, and donations. You can contact them at (301) 405-9160 or via e-mail at bp50@umail.umd.edu

Should You Upgrade to Windows 98?

► WINDOWS, continued from page 23 is a bit harder to manipulate.

A more important reason many prefer Netscape is its ability to read Usenet newsgroups (a series of message boards). IE does not do newsgroups, leaving that for Microsoft Exchange/Outlook, neither of which have become favorites on my computer. (For those who are interested, I use Netscape for newsgroups. I prefer Eudora for mail.)

■■■

Barry Mishkind is probably loading Win98 even as you read this. Unless his system crashed, you can reach him at barry@broadcast.net His home page is at <http://www.broadcast.net/~barry/>

FAT32 Explained

In order to keep track of the data stored, hard drives contain a directory and a FAT (file allocation table).

In order to keep these files at a manageable level, a minimum size for each file is set. However, with hard drives literally exploding in size over the past few years, it is common for many users to have multi-gigabyte capacities. Unfortunately, the penalty is that the minimum file size gets pushed to 32 kB.

This means that the smallest file, even a 25-byte note in a text file,

would take 32,000 bytes of disk space.

Calculations indicate the average user of a multi-gigabyte hard drive currently wastes about 25 percent of its capacity. FAT32 is Microsoft's way to recover that capacity. Your mileage may vary.

One of the features of Win98 is that it takes the old FAT16 system from Win95 and converts it over to FAT32, so you do not have to delete everything and restart in order to benefit from FAT32.

— Barry Mishkind



Capstar CEO, Mr. Steve Hicks

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SBE NEWS

Certification Proves a Radio Boon

David Carr

The Society of Broadcast Engineers' Certification Program began in 1975. The program was intended to help the broadcast engineers qualify themselves not only in the eyes of their peers, but also in the eyes of management. Without the program, management would have a difficult time assessing the extent of an engineer's knowledge.

Monitoring change

Technology has changed at such a rapid pace that even an engineer can have

difficulty evaluating his peers. Fortunately, as technology has evolved, so has the certification program.

The certification committee constantly monitors the various technical areas that today's broadcast engineers must deal with.

As soon as changes occur in these fields, the committee discusses the possible impact on the broadcast engineer and develops a plan to help the engineer. The "Radio and Television Operators Handbook" and the "DTV RF" book are examples of the SBE's commitment to help those in our profession.

The certification program has added radio and television operator certification, certification for the broadcast technologist and certification for audio and video engineers.

This growth in our program is a direct result of the changing needs of our engineers. The "Radio and Television Operator Handbook" often is used as a training manual by many broadcast facilities. It serves as an excellent checklist when training new operators.

The broadcast technologist certification provides an entry level for those who desire to become broadcast engi-

neers. The certification of audio and video engineers was formed to include those engineers who work in a production facility. Such engineers work in our profession but do not deal with the transmission side. Therefore, a certification test that excludes the transmission questions but includes additional questions in the specific audio and video fields was developed.

Student story

Kent State University Instructor William Weisenger recently relayed a story to me of a student who credits his being hired to SBE certification. According to the student, "when all the applicants have a college degree, SBE certification makes the difference." Weisenger said, "With certification, you can get an interview much easier. This shows (the employer) that you at least know the FCC rules and that you know how to behave."

Doug Garlinger, director of engineering for LeSea Broadcasting, said LeSea definitely believes in SBE certification. LeSea encourages all of its master control operators to obtain the television operator certification. All of the chief engineers that have been recently hired

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are certified. All new hires are required to be certified within one year. Their group relies heavily on the certification program to help them screen their applicants. Garlinger said that certification provides extra insurance that the candidates are quality people.

Spartan Communication has found certification so valuable that it has decided to require all master control operators within its group to be certified by the SBE. The company will pay for their certification handbook and one exam.

Operators hired after October 1, 1996 are required to be certified within the first 90 days of employment. WSPA-TV/WASV-TV Director of Engineering Bob Richardson said, "The SBE television operator certification program now fills the void left by the elimination of the FCC's licensing program by presenting a structured certification program for operators."

Benchmark

William Kozel, engineer at WEWS-TV, sees certification as a benchmark. He said, "It is a standard that you have accomplished something. It shows others that you are interested in your profession."

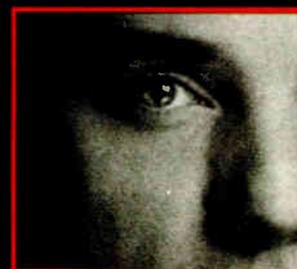
Kozel, who holds certification at several levels, added that his knowledge is reinforced every time he prepares for a certification test.

Certification is not limited to the United States. Due to the increased awareness of the certification program, individuals from other nations are requesting certification.

Sergey Bogush recently certified as a

See SBE, page 28 ►

HE **DARED** TO GO THERE.



Workbench

Radio World, July 22, 1998

Watch Out for Troublesome RF 'Hot Spots'

John Bisset

Rich Archut, the Chief Engineer of WKDN(FM) in Camden, N.J. writes, "From time to time the issue of controlling filament voltages to extend transmitter tube life surfaces. Although this is a noteworthy goal, it is not always as easy as it sounds."

You see, Jim maintains a vintage AEL 25KG transmitter that has the ability to control the filament voltage on the PA tube (a 3CX15000A) through an SCR power controller. Such is not the case for the IPA in this transmitter, which uses a 5CX1500B. Hoping to gain a few more

showed the pictures to their general manager or program director and got the maintenance time they needed. We accomplished our goal; I'm glad the pictures worked. If you have a photo to share, send it in. Meantime, you can add Figure 1 to your collection.

Inspection of the transmitter should include any power supply cabinets, typically found in the higher-power AM and some FM transmitters.

In Figure 1, the bleeder resistor no longer bleeds, which poses a potential shock risk to servicing personnel. It is not uncommon for these wirewound resistors to open, given the stresses they operate

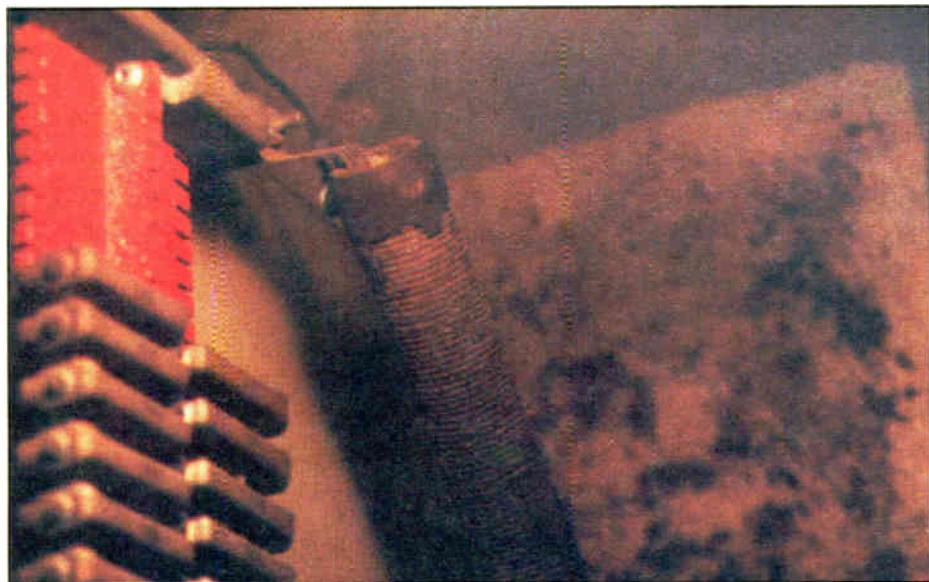


Figure 1. Inspect bleeder resistors for failures.

hours from the IPA, Rich connected wires from one side of the primary of the filament transformer to a 5-ohm 25 W potentiometer he mounted on the front of the transmitter.

After applying filament voltage to the IPA tube, Rich found that the pot gave the necessary voltage range recommended by the tube manufacturer.

However, powering up the transmitter with this modification produced erratic tuning, and anything over several hundred watts caused arcing in the PA. Rich traced the problem to the path he chose to run the new filament control wires. He found that in some older transmitters, like his, there are RF "hot spots" which, if not taken into consideration, can create spurious signals such as those introduced into the filament circuit of the IPA.

Today, Rich's modified AEL works great. Rich can be reached at (609) 854-5300.

★★★

Thanks for all the calls regarding our "seeing is believing" pictures of burned RF components due to lack of routine tightening and preventive maintenance (RW, June 10). Many readers said they

under. The dead bugs and dirt do not help the operation either.

A routine visual inspection of your transmitter will help spot these problems early.

★★★

This column is regularly a forum for getting proper power output from new transmitter tubes. William Hess, K8SGX, in Chardon, Ohio, writes that, although most of his experience involves the lower-power 4CX250B used in ham and commercial transmitters, this tube is typically used as a driver in broadcast rigs. There are similarities to higher-power tubes, too. Mr. Hess' suggestions are very valid, because too often we concentrate on the tube socket connections and forget about the anode clip and the tube pins.

When an external anode tube is changed, adequate care is required to make sure all the contact surfaces of the tube are absolutely free of dirt and oxidation. This includes the plate cap or anode contact assembly. The tube itself also should be clean.

One method of cleaning tubes with small pins, like the 4CX250B, is to scrub them under a faucet with regular kitchen cleanser and a toothbrush. Although you

should use care not to knock or jar the tube, the water will not harm it.

Furthermore, this method of cleaning permits getting to all sides of the pins. It is particularly important to clean the screen bypass ring. This treatment makes the contact surface very clean, but does not destroy the silver plating.

Make sure the tube is rinsed thoroughly and completely dried before installing. After cleaning, keep your fingers off the contact surfaces for best results. Since you cannot easily get to the contact fingers in the 4CX250B tube socket, inserting and removing the cleaned tube a couple of times will help to burnish these contacts.

Larger contact surfaces may be cleaned with a regular pencil eraser or ink eraser if they really are oxidized. Of course, if you use the eraser on parts inside the transmitter, make sure a vacuum is used to clean up the eraser "fuzz."

★★★

I recently met with a manager whose AM signal was buried in noise. He bought a new processor and got off his

old phone lines, but still sounded anemic on the dial. As we walked to the tower, the answer was obvious: He had no ground system.

As mentioned earlier with the enclosed power supply cabinet, out of sight, out of mind is too often the case. Just because the wires and strap are buried underground does not mean they will last forever.

In this station's case, the copper strap leading from the transmitter building to the tower had been ripped up in several places. It appears that the bushhog used to mow the field sliced into the ground and gave a nasty tug. At the base of the tower, there was no ground screen. There appeared to be no ground to the ATU, and little strap connecting the radials at the base of the tower.

■■■

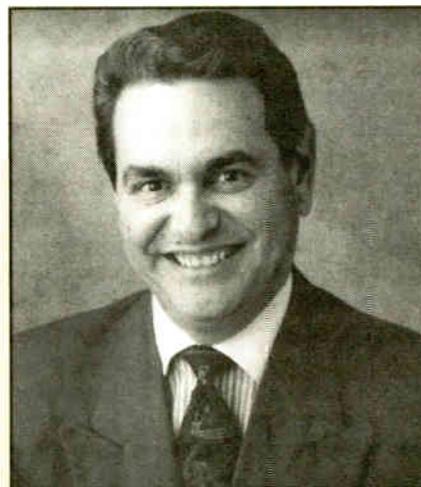
John Bisset has worked as both a chief engineer and contract engineer for nearly 30 years. He is a district sales manager for Harris Corporation.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or e-mail to jbisset@harris.com

Certification Program Attracts Internationals

► SBE, continued from page 26

broadcast engineer in radio. He tested at the State University of Telecommunications of Bonnch-Breuvich and became the first engineer to be certified in Russia.



David Carr

Thomas Wojciechowski is a certified senior broadcast engineer in radio and promotes the SBE certification program in Sri Lanka.

My belief in the certification pro-

gram is strengthened whenever I hear stories like the ones that I have just shared with you. These comments indicate that not only are individuals helped by certification, but teaching institutions and broadcasting corporations are assisted as well.

I am also pleased that certification is attracting the youth into our profession. Recently, SBE recognized the need for "young blood." After all, we need to entice and educate the future engineer. To accomplish this, SBE formed a youth membership grade. The SBE further encourages local chapters to provide a meeting devoted to the youth.

Each of us has a unique story about how we entered this field. We also can recall that special mentor who helped us along. It is now our turn to take someone under our wing. One of my mentors once told me, "If you wish to keep something, you give it away."

I have learned much in the 30-something years I have been in broadcasting. I do not ever wish to lose it, so I share it with anyone who will listen. Are you ready to share?

■■■

David Carr is the SBE Certification Committee Chairman.

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It's Time to Test Your New Audio Facility

Mario Hieb

In our article in the June 24 issue, we dealt with things to consider prior to studio construction. This part deals with what happens after your construction is complete. The performance of your facility depends a lot on what happens next, so dive in.

Test equipment

You should have the following test instruments:

- Precision audio generator, frequency-agile, with calibrated attenuator and low-impedance output
- Precision audio analyzer, includes true-RMS voltmeter, distortion analyzer, phase meter and high-impedance input
- Oscilloscope-dual-trace with X-Y display or audio Phasescope
- One pair of high-quality audio transformers

By now you have chosen your facility reference level. I personally like 0 VU = +4 dBu. Let's assume you choose it. Now

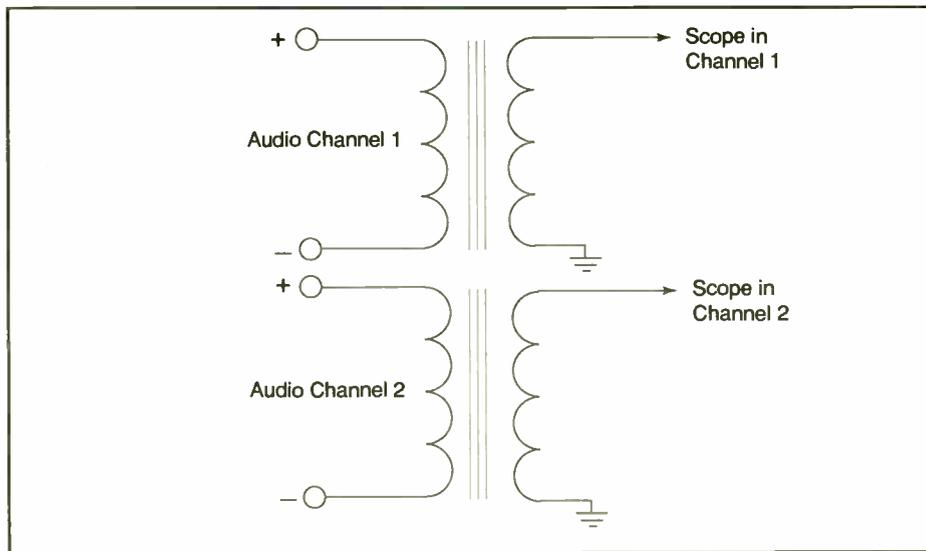
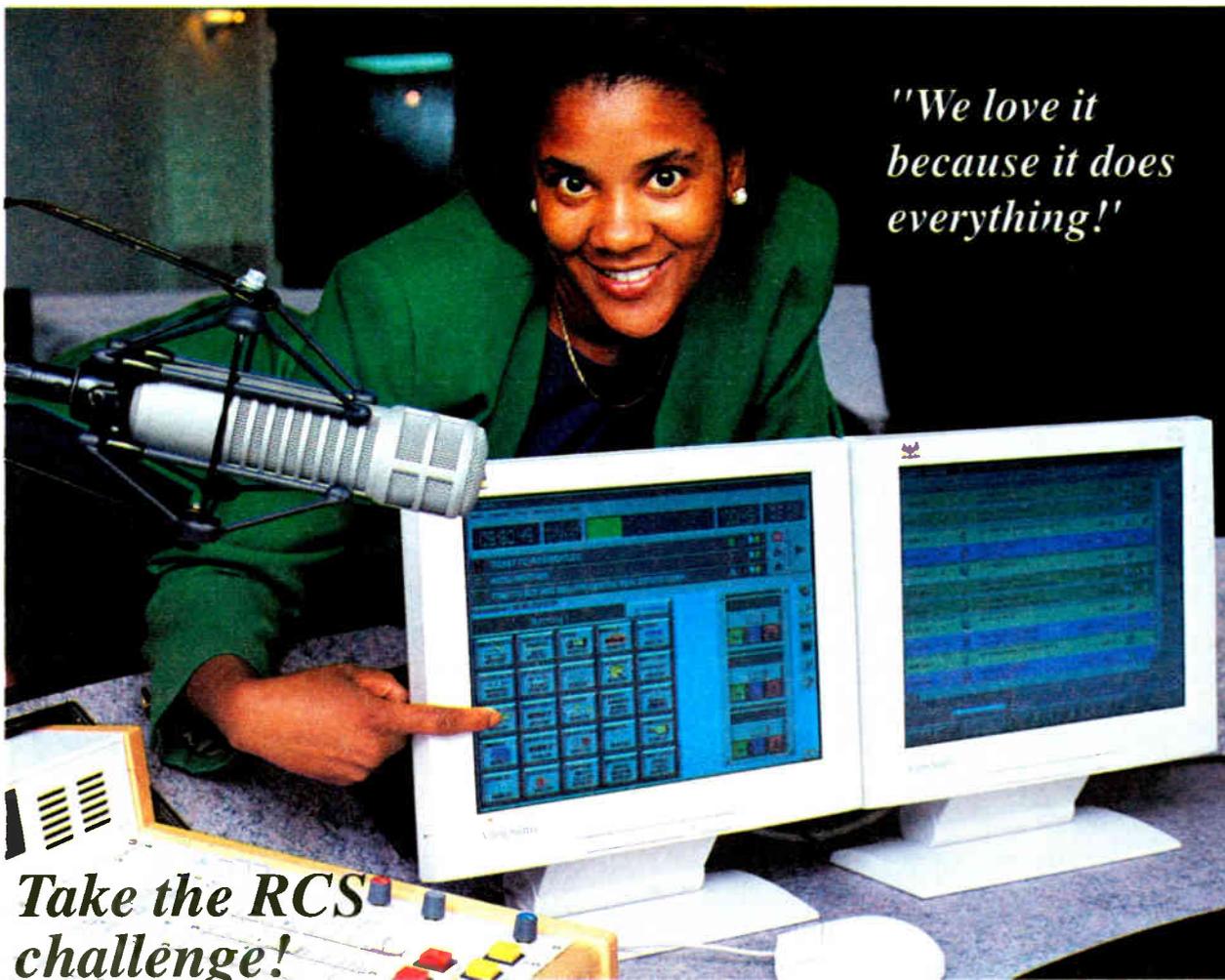


Figure 1: Transformer Interface for Oscilloscope

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you need to go through every piece of equipment and calibrate each unit so that +4 dBu in is 0 VU on the input meter, and 0 VU on the output meter shows up as +4 dBu on the output.

Calibrate distribution amplifiers and routers for unity gain. Calibrate all unbalanced-to-balanced conversion interfaces so that a -10 dBV signal in yields a +4 dBu signal out. Calibrate all balanced-to-unbalanced conversion interfaces so that a +4 dBu in yields a -10 dBV signal out.

Remember that dBV and dBu are not the same unit; -10 dBV equals -7.7 dBu. Also remember to calibrate mic preamps and turntable preamps.

Testing is easier if you include patch panels in your facility.

CD players can be a bit tricky. If you set up the player with a reference disc, the output probably will be too hot when regular CDs are played. Unless your console has a line input attenuator, your fader will not have much range of operation. Usually I end up setting the CD output level so that the average level corresponds to 0 VU when the fader is set to 0 db of attenuation. Calibrate the house tone generator to +4 dBu.

Test procedure

Testing is easier if you include patch panels in your facility. I like to use half-normalled patch bays. Plugging into the top row taps the input signal without affecting the output, while plugging into the bottom row breaks the path. Plugging into the top row lets me bridge the input path with the audio analyzer or scope and still feed audio to its destination.

When using an oscilloscope as a phascope, use a pair of high-quality transformers to create a balanced input (Figure 1). The scope will be used in the X-Y mode to observe relative phase.

For each audio pair in your facility you will:

- Measure RMS signal level
- Measure phase relative to the house tone generator
- Test for "lifted legs," "grounded legs," "phase flips" and other wiring errors

See AUDIO, page 31 ▶

► AUDIO, continued from page 30

For example, when testing a distribution amplifier, feed the house tone into the input. Measure the input to verify that it is +4 dBu. Next, measure each output of the DA to verify that each is set to +4 dBu. Connect the X input of the scope to the house tone generator via the bridging jack on the patch panel. Connect the Y input of the scope to each output of the DA via the bridging jack on the patch panel.

The normal waveform is a 45-degree line indicating that both inputs are in phase. Wiring errors can be seen as waveforms illustrated in Figure 2. If you use a phascope with a differential input, the "lifted leg" and "grounded leg" waveforms may look different than Figure 2.

Using your Test flow diagram and a highlighter pen, color in the lines corresponding to each cable as it is tested. Also make note of wiring errors on the flow. Go through the entire facility, testing every cable. After the errors are corrected, retest the cable.

End-to-end test

The final test is the end-to-end test, a more thorough test for critical signal paths. You may wish to perform more than one end-to-end test in your facili-

ty; it depends on your configuration. One example is the air chain end-to-end test, in which several tests are performed beginning from the input to the on-air console, through DAs and into audio processing. Here are several tests you may want to perform:

- Level
- Noise floor
- Distortion
- Amplitude vs. Frequency
- Phase vs. Frequency
- Crosstalk
- Headroom

Keep a record of each measurement you make.

Conclusion

Good audio facilities are designed

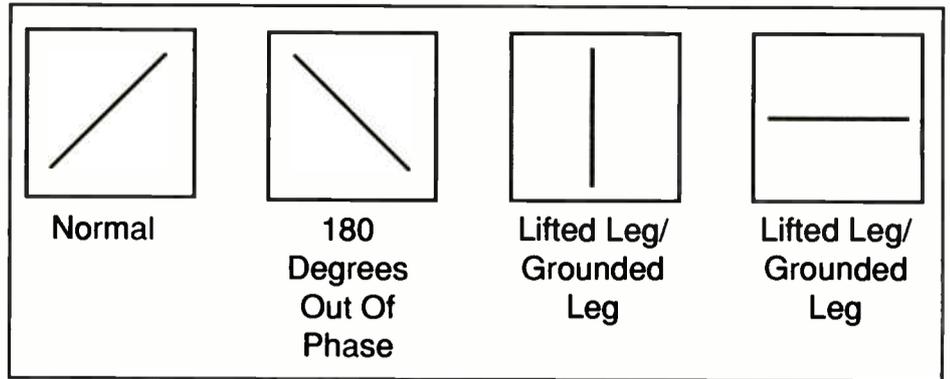


Figure 2: X-Y Display of Audio Channels

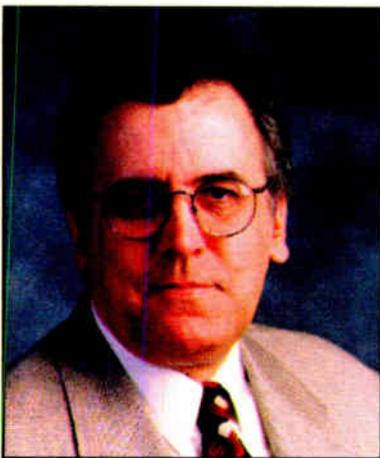
with the plan put down on paper. Once constructed, the design should be thoroughly tested, with the test results also documented. A little bit of precision goes a long way in developing a high-performance audio facility.

■ ■ ■
Mario Hieb, CPBE, is the chief engineer for KXRK(FM) in Salt Lake City and consults for various clients. He holds a Bachelor of Science degree in electrical engineering.



Lambert Joins Otari

Radio industry veteran Mel Lambert has been appointed to the staff at Otari Corporation of America. Lambert will serve in the newly created position of international marketing director.



Mel Lambert

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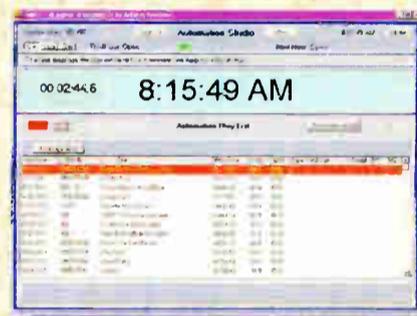
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Added Advantages to Wire Twists

► MICS, continued from page 21

long before the turn of the century (and unshielded, you might note).

Since the noise must be identical at either end to cancel out, anything that makes it less identical will reduce the noise-canceling effect. This is why the wires should be identical size and length (Figure 3). If they are not identical, then one of the noise signals will arrive before or after.

This time difference means only a percentage of the noise will be cancelled out and the rest of the noise will travel on with the signal. If the wires are different sizes, one noise signal will be greater intensity and, again, they will not exactly cancel out.

Not only must the wires be the same length, they must be in the same place. If they are separated, then the noise will hit them at slightly different times. This difference will show up as less noise cancellation. However, it is very easy to have wires in almost exactly the same spot, by twisting them together. (See Figure 4)

Not only will twisting wires put the two conductors in almost exactly the same spot, but it almost guarantees that the wires will be the same length, at least for audio frequencies.

deal on the shield of the cable to make up for imperfections in the sending and receiving devices.

Quad or star-quad cable

There are a number of cable designs featuring four-conductor spiral designs called "quad" or "star-quad." While their effect has been known and used in laboratory cables as far back in the 1950s, it was Canare from Japan that first put it in a commercially available mic cable. Now there are many manufacturers with simi-

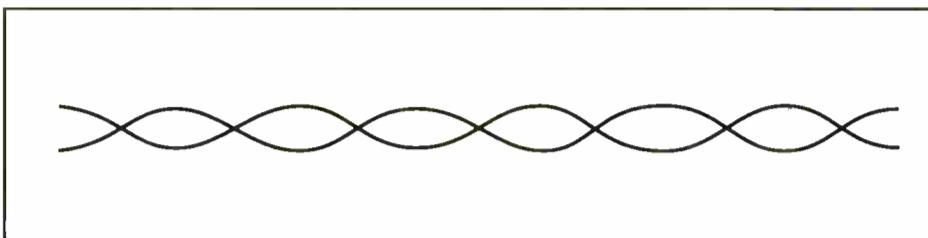


Figure 3: Wires must be identical size and length in a twisted pair.

Twisting has one more added advantage. Since the signal traveling down each wire (in opposite directions) creates a magnetic field around each wire, the only way noise can effectively enter a wire at a given point is to align with the signal's magnetic field at that point. With the wire rotating, there is only one place per twist (one phase angle) that will align

lar designs.

It should be recognized that only a spiral of four wires will work in this format. Using two twisted pairs, or four bundled wires, has little or no effect. To understand how quad works, one must understand something called "loop area."

If you imagine a twisted pair at any instant in time, you will see that each

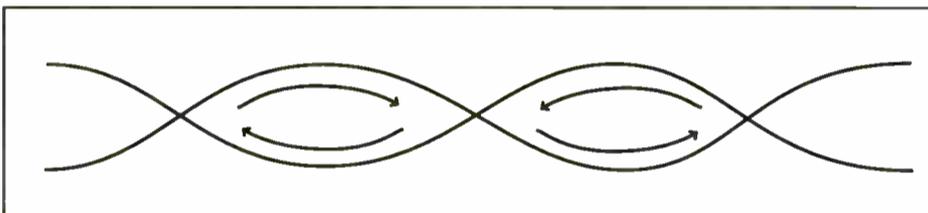


Figure 4: Twisted wires "in the same place" assure signals arrive on time. See text.

with any particular noise. This will further reduce the pairs' ability to pick up noise.

Much work has been done on twisted pairs in the data world. Many of those are UTP, unshielded twisted pairs. We have learned what was once suspected. The majority of noise reduction comes from

twist consists of one wire with a current going one way, and the other wire with a current going the other way. In this way, each of these twists looks like a loop.

The smaller the loop, the more identical those two signals are (identical but reversed, of course). The more identical they are, the more noise they

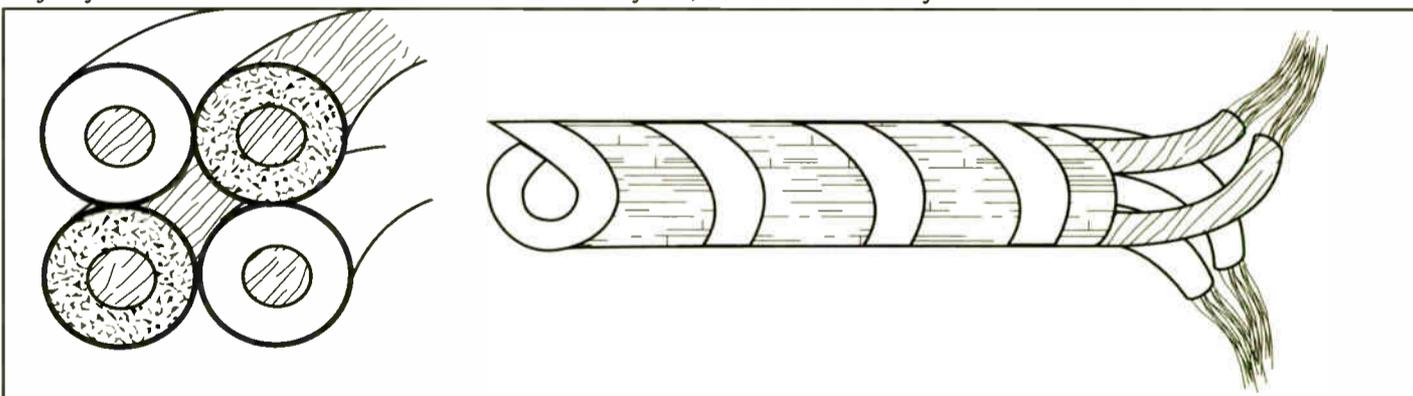


Figure 5: Using four conductors to create a Quad Cable, with exceptional noise reduction figures.

the fact that the pair is twisted.

Shielding was primarily to make up for the fact that the twisted pairs were less than perfect. So, at least for data cables, we have "fixed" the pairs. We will discuss UTP, and its impact on audio cables, in a future column.

It should be noted that many analog audio devices, especially those of the previous generations, are very poorly balanced. This means that cables attached to them are imperfect in their ability to resist noise and also, in their ability to resist emitting their own signals as noise. They depend a great

pick up, and the more that noise will cancel out at the ends of the cable. So the secret is to get the loop area as small as possible.

There are two ways to get a small loop area. One way is to twist the pair very tightly. However, this uses much more copper and reduces the flexibility of the cable. Plus, there is a diminishing return on twists, as mentioned in the previous installment.

One other way of reducing loop area is to spread the copper out so that a conductor covers more circular area. It would be hard to make a conductor

that is flat and curved, but we can accomplish the same effect by using four conductors, as shown in Figure 5, and combining them into two conductors.

To get the noise canceling effect, you must combine the conductors across from each other. Often these cables have color-coded conductors (such as two white conductors and two blue conductors), so you know what is supposed to combine with what.

Some manufacturers also put a stripe on one of each of the colors, so it can be used as a four-conductor cable for applications that require four conductors (such as separate phantom power, MIDI, etc.). However, the user should be aware that by not combining the pairs in the quad configuration, all of the noise reduction afforded by the quad design would be lost. And that

Not only must the wires be the same length, they must be in the same place.

noise reduction can be dramatic.

I remember going to a seminar where the speaker showed the low-frequency (60 Hz) noise immunity of various cable constructions. The speaker took a handheld tape demagnetizer, which, as you can imagine, is a wonderful source of 60 Hz noise.

He turned the demagnetizer on and held a piece of cable next to it. Each piece of cable was terminated at one end with a 150-ohm resistor and, at the other end, plugged into a high-gain amp and speaker.

To say that the 60 Hz noise was apparent is a huge understatement. When the speaker got to a quad cable, he held the cable up to the demagnetizer and there was no noise. He started wrapping the cable around the demagnetizer until he had run out of cable. No noise!

That was what convinced me of the superior noise reduction of low loop-area cables.

In the next installment, we will discuss the last two microphone cable parameters: self-noise and electronic cable performance.

■■■

Steve Lampen is technology development manager for Belden Wire & Cable Co. in Richmond, Ind. His book, "Wire, Cable, and Fiber Optics for Video and Audio Engineers" is published by McGraw-Hill. He can be reached at steve.lampen@belden.com

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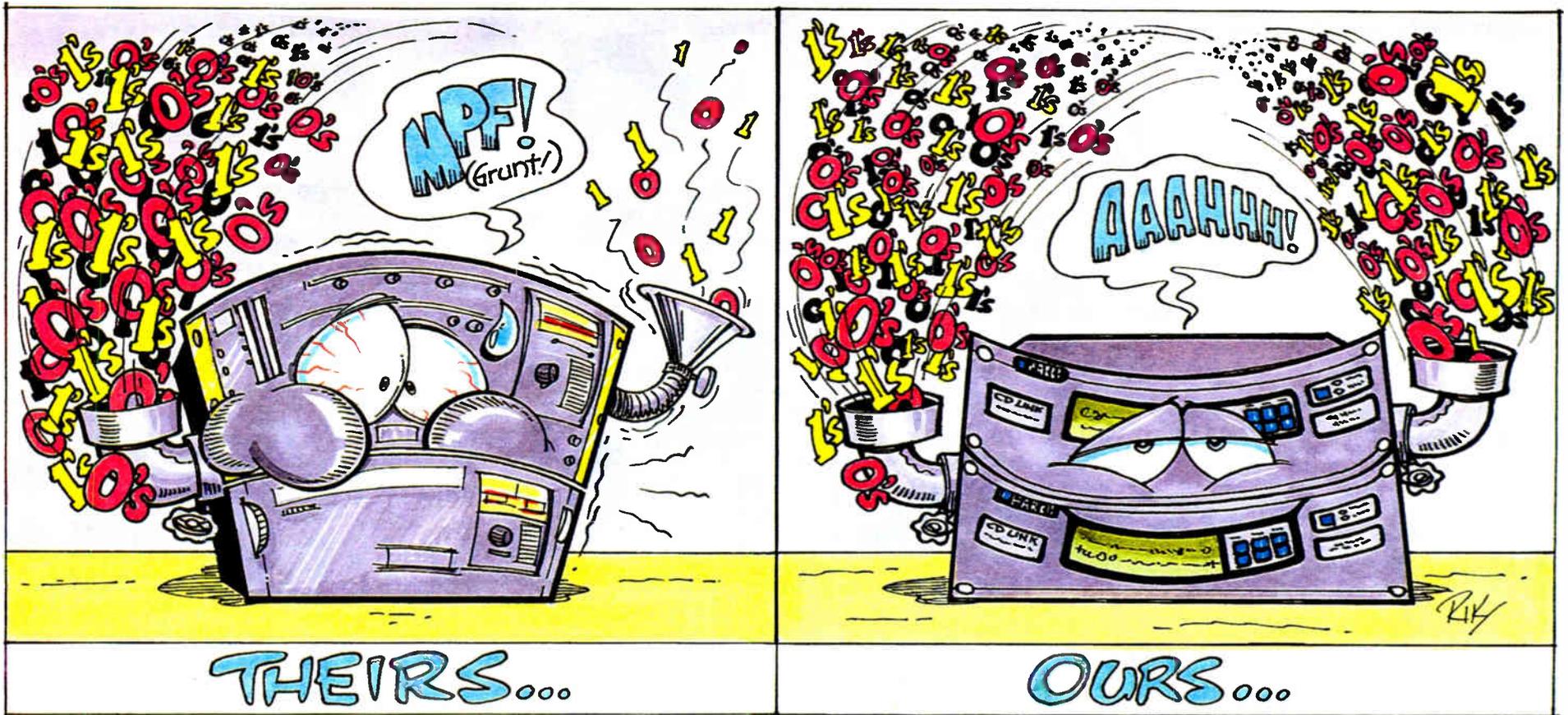
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Big Groups Spun Off Stations in Q2

Lynn Meadows

The wave of consolidation continued to encounter an ebb tide in the second quarter of 1998.

Near the mid-year mark, according to BIA Consulting, about 736 station sales had been announced for a total transaction value of \$2.3 billion. By contrast, in the first six months of 1997, 1,220 station sales had been announced for a total dollar value of \$10.5 billion.



Joel I. Klein

"There are a lot of relatively smaller deals getting done, pulling together pieces and filling out complements and that kind of thing," said Richard Blackburn, president of brokerage firm Blackburn & Company.

Try to comply

In San Diego, for instance, Heftel Broadcasting Corp. (Nasdaq: HBCCA) announced it would purchase two FM stations from Jacor Communications (Nasdaq: JCOR) for \$65.15 million in cash. The move fulfilled a goal of the Hispanic-language group to have a presence in the top 10 largest U.S. Hispanic markets.

Two other large groups arranged trades with Jacor in the second quarter in

order to comply with ownership limits. Capstar Broadcasting Corp. (NYSE: CRB) announced it will swap WTAE(AM), Pittsburgh for Jacor-owned station WKNR(AM), Cleveland. Likewise, CBS will swap stations in Baltimore, St. Louis and San Jose, Calif. for Jacor stations in Minneapolis and Columbus, Ohio.

Several of the deals that wowed everyone around the time of the fall Radio Show closed during the second quarter of 1998. CBS (NYSE: CBS) finished its acquisition of American Radio Systems (NYSE: AFM) for approximately \$2.6 billion. The buy added more than 90 radio stations to the CBS radio group. Capstar completed its purchase of SFX Broadcasting for approximately \$2.2 billion, adding 68 stations in 19 different markets to its portfolio.

The second quarter was a historic quarter for Capstar. Two days before closing the SFX deal, the company went public with an initial public offering of 31 million stock shares at \$19 per share. After an initial dip to \$17 per share, the stock price climbed steadily skyward. Two other groups, Citadel Communications and Cumulus Media, were expected to go public before the end of the quarter.

Monopoly blocker

The Department of Justice continued its vigilant watch over radio in the second quarter. In order to close their respective acquisitions, Capstar must sell off 11 stations and CBS must part with seven.

In June, Capstar Acquisition Company, a sub company of Capstar Broadcasting, agreed to terminate a contract to buy KXXM(FM) Cedar Rapids, Iowa after noting DOJ opposition. With KXXM(FM), Capstar would have owned five of the 12 radio stations in the market. According to the DOJ, those five stations accounted for more than 49 percent of the radio advertising revenues in the market last year.

In May, the DOJ approved the acquisition of five New Orleans Radio stations by Baltimore-based Sinclair Broadcast Group after Sinclair agreed to sell off three radio stations in that market. According to the DOJ, without the spin-

off, Sinclair would have owned nine stations in the market accounting for about 55 percent of market revenues.

"Sinclair offered to fix the competitive problems and made a serious proposal right off the bat. That's the kind of cooperation we welcome," stated Joel I. Klein, assistant attorney general in charge of the DOJ Antitrust Division.

See QUARTER, page 42 ▶

Directional AM Stations Require Close Inspection

Ronald Ramage

FCC Inspector Ronald Ramage offers tips about what he looks for during inspections. This is the third of three articles. Previous installments can be viewed at <http://www.rwonline.com>

I discussed why a station is selected for inspection and discussed "administrative items." In part 2, I discussed the outside facilities and monitoring and control. In this third part I am going to look at AM directional inspections.

As a group, directional AM stations



A Field Intensity Meter

The following is the third in a series of articles providing insight into some of the items I look for during a broadcast inspection. In part 1 of this series,

tend to have more violations than any other type of commercial station I inspect. This is because a directional

See INSPECT, page 43 ▶

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Not Your Father's Radio Newscast

John Montone

On June 1, World Radio, the public broadcasting network located in Georgetown, Ky., began offering public radio stations across the country a five-minute hourly newscast provided by Feature Story Productions of Washington, D.C.

Simon Marks, the co-founder and editor-in-chief of Feature Story, has positioned the new product as "an alternative to NPR" that aims to reach a younger demographic. "We're all young people, and we want to produce a newscast we want to listen to," Marks said.

Marks' refusal to label his service as a "competitor" to NPR may be driven in part by the fact that Feature Story still contributes reports to National Public Broadcasting as well as the BBC and many other international radio and television news organizations.

Marks is going after what he calls "the second and third public radio stations in the top 100 markets:" stations that play classical music or jazz 24 hours a day and don't carry "All Things Considered" and "Morning Edition."

Filling the void

"World Radio News," the new program, is designed to fill the gap left when Christian Science Monitor Radio went dark. Marks recalls that development being met with "expressions of sorrow" by public broadcasters.

Marks is promising his affiliates "a lively production style" reminiscent of Monitor Radio, with stories that are "short but provide comprehensive coverage." In a quick jab at the status quo he added, "We are seeking to engage listeners in a way public radio news has failed to do in the past."

For example, Marks said, "When Pakistan exploded its nuclear bomb, our correspondent in Islamabad, Jennifer Griffin, did a piece. She signed off and our Washington correspondent Paul Miller picked up saying, 'The Clinton administration is now weighing a response.' He signed off and our correspondent in New Delhi came on."

But Marks does not want to deter any public stations from carrying "World Radio News," even if stations don't have a place for other World Radio programming. "We are thrilled if our affiliates want to carry World Radio programming, but there's no requirement they do that," Marks said.

In one important respect World Radio News will echo NPR and other public radio news organizations by staying true to "the traditional public radio news agenda," which Marks said gives top priority to major international events.

"I don't frankly care that the Louise Woodward case was resolved today," said Marks of the typical choice of lead-story news material. "I'm much more interested in President Milosevic's visit to Moscow."

Differences

Marks quickly added that when covering international events his company's news reports will come customized for a North American market, striving to explain the significance of news in far-off places to listeners in the United States.



One thing "World Radio News" will avoid at all costs is boredom.

Without naming names, Marks said,

"Some people in public broadcasting think it is courageous to be boring. I cannot see the point in being boring because

it forces people to switch off and reach for Imus."

Of his five-minute newscast Marks said, "We want the thing to move, to give it life because we think that carves it out as something different within the public broadcasting community."

Not too different, though. Marks is careful to say he is not throwing the baby out with the bath water. He repeatedly pointed out that World Radio News is sticking to the public broadcasting agenda. "The challenge to all of us in the post-Cold War world is to frame these international stories in a way that matters to Americans."

World Radio News anchors, reporters and executives have a solid public broadcasting pedigree. Morning anchor Jessie Brandon came to Feature

See WORLD, page 45 ▶

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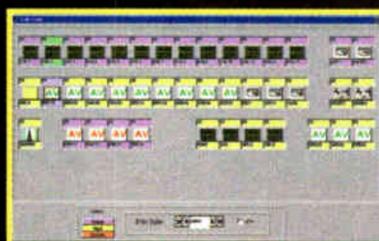
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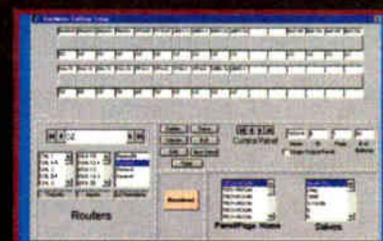
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Solutions for Tomorrow's Radio

New Streaming Media Players Debut

Alan Haber

A new generation of streaming media players from Microsoft and RealNetworks has been thrust on the world at large, allowing more seamless experiences of multimedia presentations on the Internet than ever before.



The Microsoft Media Player plays back a wide variety of file types.

This brave new world is being shaped in large part by the goods the Internet has to offer. Multimedia is where it's at, and radio stations need to realize this lest they yield cyber-presence and audience to television stations, movie companies and other competitive entities.

Spinning the players

Having spent some time with the new players from RealNetworks and Microsoft, I am convinced there's an enhanced game afoot, one that Sherlock

Holmes and Watson would likely have relished to the hilt.

Sporting plain clothes, nimble fingers and the viewpoint of a home user, I took RealNetworks' G2 players (the basic player and the souped-up PlayerPlus, both in alpha) and Microsoft's Media Player (version 5.2 in beta) for a spin. Even in their embryonic states, they are, in my opinion, top-drawer. RealNetworks' G2 players up the ante for listening to streaming media. Specifically, the sound quality of the few G2 live radio streams now available is phenomenal, even though stereo is not supported in the alpha releases of the players (it is slated to be incorporated into the beta 1 versions).

I listened to the live streaming audio noted in this review using two systems: a Pentium 100 with 16 MB of memory connected to the Internet by a 56 kbps modem, and a Pentium 200 with 64 MB of memory connected to the Internet by one ISDN B channel (or 64 kbps).

Listening to alternative KDGE(FM) and AAA KKZN(FM) — Dallas stations already Webcasting in G2 — put a wide smile on my face. Connected to the Internet by way of my 56 kbps modem, KDGE's 40.7 kbps mono stream was strong, exhibiting great depth and resonance, particularly on cymbal crashes. I was particularly impressed by the clean sound field exhibited during the quieter music passages.

KKZN came in at 48.7 kbps and sounded absolutely wonderful in the same ways that KDGE did.

Switching to my Pentium 200 and a

single ISDN B channel Internet connection, I ran through the same trials. The results were similarly satisfying.



RealNetworks' PlayerPlus

One of the cool features of the G2 system is the ability for stations to send a logo and other visual elements that manifest themselves on the right side of the players. A simple mouse click on the logos for KKZN and KDGE brought me to the station's pages at <http://www.broadcast.com> (formerly AudioNet), from which I was able to link to the stations' Web sites.

Saving favorite audio streams on the G2 players is a snap. Users of Internet Explorer 4.0 will recognize and be right at home with the players' file-like tree system. RealNetworks has dropped the preset buttons scheme found on the old RealPlayer Plus. Now you can save an infinite number of presets in an infinite number of user-defined categories. A maximum of 40 streams, not defined by category, could be saved on the old RealPlayer Plus.

Prior to the G2 alpha release, you could

not save presets on the basic RealAudio player. Now you can save them on both. So the advantage of using the Player Plus G2 over the basic RealPlayer G2 may come down to whether a person wants the use of such new features as a very cool on-board equalizer, the handy ability to tweak the contrast, brightness and color level of video streams, and an on-screen audio analyzer for use in either graph or wave mode.

Media Player

The Microsoft Media Player is available in only one version and sports no such extras. However, that doesn't mean it is any less of a piece of software. It is, in fact, a robust (software and sound-wise) creation that necessitates its residing on every radio listener's desktop.

Even in their embryonic states, these players are top-drawer.

The Media Player looks nothing like the G2 players; it is much less flashy and sports a cleaner face. It is pretty much a get-right-down-to-business, no nonsense player. A couple of pull-down menus hover over the main part of the screen.

Like the G2 players, the Media Player plays back a wide variety of file types, including, of course, NetShow 3.0, RealAudio and RealVideo 4.0 and below, AVI, MPEG, WAV and MIDI.

See STREAM, page 40 ►

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Today's Women' and Conan on the Radio'

United Stations brings two new programs to the radio this summer with "Conan on the Radio" and "Today's Women."



Joan Osborne

Women are enjoying immense popularity in the music industry, and "Today's Women" features many of these talented women performers in acoustic performances and personal interviews. Many of these featured artists are headliners for this year's Lilith Fair tour.

The summer program, which began on the July 4th weekend, is a series of 10 weekly two-hour installments that run through Labor Day. The series is on CD and available to stations on a market exclusive, barter basis.

Sarah McLachlan, Melissa Etheridge, Paula Cole and Joan

Osborne are among the featured artists.

"Conan on the Radio," due later this summer, will feature highlights from the opening monologue taped before a live audience in New York City for the popular NBC late night show, "Late Night with Conan O'Brien."

The feature will be fed via satellite to the United Stations affiliates for broadcast the next morning.

Nicholas Verbitsky, president and CEO for United Stations Radio Networks said, "This production will be crisp, clever and right on target for contemporary and rock stations that are looking to differentiate themselves in the marketplace."



Sarah McLachlan

For more information from United Stations Radio Networks contact Julie Harris in New York at (212) 869-1111; or circle Reader Service 206.

Inspirational Radio

Radio stations that are interested in acquiring free public service programming will find just what they are looking for in "CONTACT."

This award-winning weekly program is available to radio stations on compact disc in 5-, 15- or 30-minute increments.

Currently airing on over 400 stations in the United States and Canada, "CONTACT" takes a unique approach in dealing with real life issues. Gary

Kolarcik, executive director of Jesuit Productions, said, "We let ordinary people who usually don't have a voice in

"CONTACT" Radio Program

the media tell their own stories of overcoming adversity and obstacles in their life."

Domestic violence, alcoholism and drug addiction, living with

Alzheimer's disease, and consumer credit counseling are some of the issues that have been covered on recent shows.

For more information from Jesuit Radio Productions contact Gary Kolarcik at (314) 533-0320; or circle Radio Service 89.

Entertainment, Education And Insight

That's what Danielle Lin's show, "A Word on Health" is all about.

The nationally syndicated show puts a healthy spin on typical call-in radio programs, as listeners are provided with insightful tips on how to maintain a more healthful lifestyle.



A few of the many thought-provoking issues that Danielle tackles in her show include, aging, sex and relationships, mind/body medicine and nutrition and fitness.

The two-hour program is broadcast via satellite.

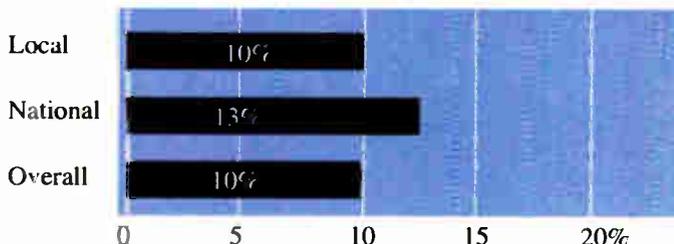
Danielle's friendly style has kept her on the airwaves for 15 years.



Danielle Lin

For more information on The Danielle Lin Show contact Tseth Thomas or Dean Himmelman in Utah at (801)278-9669; or circle Reader Service 50.

RADIO REVENUE : YEAR TO DATE



Revenue Growth Remains Healthy

Again, national revenue again set the pace in the latest year-to-date figures from the RAB, registering a 13 percent increase through May of 1998.

That figure is identical to the uptick in national revenue for the month of May alone. Regionally, the East and Southeast both saw the strongest surge, with the West slightly behind.

May growth in local revenue was strongest in the East, at 13 percent, followed by the Southwest at 12 percent.

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Inside the Microsoft Media Player, 5.2 Beta

The Microsoft Media Player, in version 5.2 beta at this writing, will play a wide variety of file types, including, of course, NetShow 3.0 and RealSystem 4.0 and below.

The Media Player comes at a time when there is an increasing push toward offering "multimedia" content, rather than just audio or just video, to Web surfers. "All we're trying to do is to communicate to people that when you're running Windows, you play multimedia content with something that's called the Media Player," said Gary Schare, lead product manager, Windows NT Server.

"From a consumer point of view," he said, "the message we would want to get (across) is that NetShow content is cool. NetShow content can be radio signals. It can be video, it can be lots of things. It gets played back by a combination of two tools, one being the browser and the other being the Media Player."

How is Microsoft positioning the Media Player? Schare said he thinks the direction is "integrating the player and browser into the entire client experience with Windows, because just like we say that the browser is an extension of Windows, the player is an extension of the browser."

"The reason we're doing this," he said, "is because the increases in bandwidth, the improvements in compression technology and the increasing processing power in people's computers have made audio and video a reality."

Schare said he thinks that "what the content providers seem to want to do is provide more than just the stream.

"The stream is interesting but in and of itself it's not that interesting. What's more interesting is the stream plus the HTML all around it."

There have been "drastic improvements," said Schare, in the quality of audio and video streams between the release of NetShow 2.0 and 3.0. For example, NetShow 2.0 could not stream stereo content at 28.8; NetShow 3.0 can. Now, he said, "Audio can go from basically 2.4 kbps voice grade mono quality up to like 96 kbps CD-quality audio."

But what does this all mean, as far as radio is concerned? Radio stations, said Schare, "haven't come that far in finding a business model" to do Webcasting properly. "I'm not saying there (aren't) business models out there. There just aren't that many (radio stations) that have really done the legwork to build that business model, but there's a ton of opportunities."

"So that's kind of what's held things back a little bit, is that it's expensive. (Radio stations) haven't necessarily been able to broaden their reach. Maybe they've got better convenience for the corporate user who likes the radio station and can't get it at work, but that's not going to bring in more advertisers or more advertising revenue unless they can prove a whole lot of expanded audience and more reach out of that. It's going to have to be new and unique services that they couldn't do with just an audio broadcast over the radio waves."

— Alan Haber

New Net Audio Players

► *STREAM*, continued from page 38

Unlike the G2 players, the Media Player does not come stocked with pre-set radio stations; you have to collect these yourself (there are, however, seven video-oriented destinations to travel to, including CNN Videoselect and Fox News.) Favorite live radio streams are

I experienced very little rebuffering using both varieties of players.

saved just as they are in the G2 players, only here they are called "favorites" instead of "presets."

Stations played through the Media Player sound great, but not quite as great as stations played through the G2

players. But it's early in the game. I experienced very little rebuffering using both varieties of players.

For example, the 24 kbps New York country Y-107 stream I listened to through the Media Player sounded as wonderfully robust using the 56 kbps modem as it did using the ISDN modem. Dallas rocker KTXQ(FM)'s 20 kbps stream also sounded great using both modems.

In the end, it's not a question of which player is better but rather whether each one, in its formative state, will lead to a final release that will make it easier than ever to listen to live streaming radio stations. I think we are in for even better days ahead.

Download the G2 players from RealNetworks at <http://www.real.com/g2/index.html>

Download the Microsoft Media Player at <http://www.microsoft.com/ntserver/netshow/download.htm>

■ ■ ■

GM Journal Internet writer Alan Haber is a frequent contributor to RW.

RealNetworks' G2 Players

The new RealPlayer G2 and RealPlayer Plus G2 streaming media players (in alpha at this writing) are components of RealSystem G2, a new generation streaming media delivery system from Seattle-based RealNetworks. Since RealAudio was first released in 1995, the company has grown to incorporate video and multimedia into its products, necessitating a corporate name change last year.

According to Matt Hulett, group product manager of Consumer Products, development of G2 technology began "right around the time of (RealAudio) 4.0." G2 is *big*. How big? "It's a million-and-a-half lines of code," said Hulett, adding, jokingly, that developers consumed "about 5,400 gallons of Diet Coke."

Taking streaming media to the next step, he said, "We really needed to focus on making streaming media really a standards-based solution. What enabled browsers to get to the next level was the ease of authoring with things like HTML, and that's why we focused on SMIL as an easy way to lay out streaming media."

SMIL, a W3C proposed standard that is short for Synchronized Multimedia Integration Language, is "like HTML for a browser," Hulett said. "It's basically an XML-based layout language that allows you to lay out multiple data types like audio, video and text images so that you get more of a choreographed presentation."

In their current alpha state, the G2 players do not support stereo; Hulett said they would "in the beta 1 timeframe," which was expected at press time to occur within the second quarter of this year.

G2 delivers increased frequency response. The new G2 codec delivers 9.9 kHz at 28.8 kbps, up from 5.5 kHz delivered at the same baud rate

via the codec used in the previous release. At 56 kbps, the previous frequency response of 8 kHz now has been doubled in G2.

Not only has the frequency response been increased, but RealNetworks' SmartStream technology "dynamically reduces stream bandwidth to eliminate rebuffering," according to the company. Also, according to RealNetworks, "All RealAudio files can now scale dynamically from 14.4 to 56 kbps modem rates."

We will stream anything, and we will let the market decide on what's popular.

— Matt Hulett

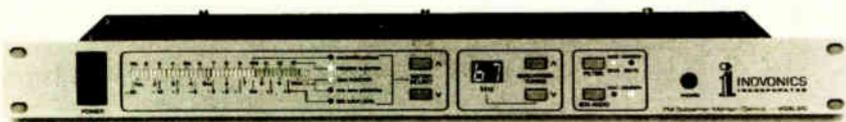
The RealPlayer G2 and RealPlayer Plus G2 play a variety of media types, from AVI and WAV to ASF, MPEG and AU, but not, at least at present, Microsoft NetShow. Is RealNetworks working on allowing the G2 players to play back NetShow streams? "That's an interesting question," Hulett said. The company's philosophy, he said, "is that we will stream anything, and we will let the market decide on what's popular."

The G2 players include an auto update feature that allows users to download updated player components as needed, without having to reinstall a completely new player version.

So, will the G2 players be self-filling for the foreseeable future? "It's kind of like the last player you'll ever have to install," Hulett said. "It's going to have a life of its own."

— Alan Haber

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First Audicy 'Network' Goes On-line

Jacor has recently employed the new version 2.0 software for the Orban Audicy workstation at its three San Diego stations: KGB-FM, KKLQ-FM and KIOZ(FM).

The network features in version 2.0 software allow a broadcaster to link a single Audicy to an external PC as well as multiple Audicy workstations to a single or multiple file servers. Audicy networking gives broadcasters access to a full range of remote PC resources, including file servers, alternate backup storage, removable disk drives, CD recorders and .WAV file import and



Steve Asaro, production talent, KGB, checks out the 3-workstation Audicy network.

export.

Jacor has linked the three separate Audicy units to a central file server. "I'm very impressed with Audicy networking," said Jacor Engineering Manager Kevin Douglass. "Recently, we completed a nationwide corporate network, and version 2.0 software creates the potential for linking all our production studios throughout the country."

Features of the Audicy workstation include speedy RAM-based editing, a comprehensive hardware controller and integrated 24-bit digital effects.

For more information from Orban, contact Amy Huson at (510) 351-3500; fax (510) 351-0500; or circle Reader Service 49.

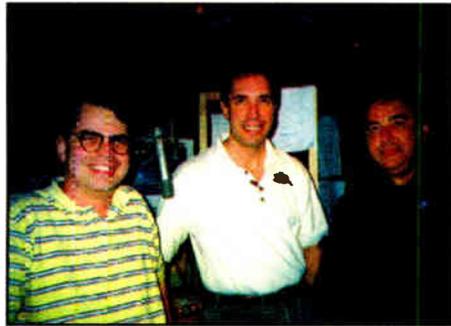
Bay Area Station Enlists Microtech Gefell Mics

Smooth Jazz station 103.7 KKSFM in San Francisco has chosen Microtech Gefell UM92.1S microphones for its new studios at the Chancellor Media Broadcast Center.

The entire staff of KKSFM was involved in the decision to switch over completely to Gefell mics. "After auditioning many microphones over a period of two to three months, the UM92 was the clear consensus winner among our staff," said chief engineer Doug Irwin. "The balance of high-frequency clarity with the overall warmth and extremely low self-noise is impressive and contributes nicely to

the signature on-air sound which our listeners expect from us."

The station purchased eight Gefell UM92.1S vacuum tube microphones from Leo's Professional Audio, a Bay area dealer. According to Leo's Vice



KKSFM Staffers Doug Irwin (left), Hoyt Smith and Mark Haynes

President Mark Haynes, the station will use the mics for all of its on-air and production needs.

Microtech Gefell manufactures a full range of condenser microphones for professional use. The mics are distributed in the United States by G Prime Limited.

For more information from G Prime Limited, call (212) 765-3415; fax (212) 581-3415; or circle Reader Service 88.

University of Puerto Rico Taps IAC to Install Studios

Industrial Acoustics Company (IAC) recently installed three new studios at WRTU(FM) at the University of Puerto Rico in San Juan.

Problems arose when a subway route was planned to go directly through the University's Monserrate building, which was the home of WRTU. The route was unavoidable, due to time constraints mandated by the federal government. With a new building in the works but nowhere near to being finished, the obvious dilemma was keeping the station on the air while being forced out of the present facilities.

Acoustical consultant Russ Berger had designed a studio complex for the new building specifying IAC Accu-Tone Modular Studios. These studios can be readily assembled, dismantled and relocated with no loss of acoustical performance. Seemingly a perfect solution, three of the nine specified modules were selected and installed in a temporary location, courtesy of the university.

After contacting IAC, vice president John Handley flew to San Juan to meet with everyone involved. Managed by the architectural department at the university and John Handley, the three studios were installed on time, allowing WRTU to maintain continuous broadcasting.

For more information from Industrial Acoustics Company, contact John

Handley at (718) 931-8000; fax (718) 863-1138; or circle Reader Service 166.

Alaskan Radio Station Adds Two DL4 Systems

Arrakis Systems announced the purchase of two DL4 automation systems by KBRW-AM-FM in Barrow, Alaska, the northernmost station in the United States.

The recently added DL4 systems will handle the multiple NPR satellite feeds that must be time-shifted for Barrow, which is close to the International Date Line.

The DL4s serve as additions to two existing DigiLink DL3 systems. One of the DL3s has been upgraded from an earlier model DL2 without the need to trade in and buy new. Additionally, the

two production rooms are equipped with Arrakis Trak*Star systems to produce the heavy local programming carried on KBRW.

For more information from Arrakis, contact Bob Groome at (970) 224-2248; fax (970) 493-1076; or circle Reader Service 205.

"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.

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Buyers Still Scouting Properties

► QUARTER, continued from page 36

The showdown between Chancellor Media Corporation (Nasdaq: AMFM) and DOJ wrapped up at the end of the first quarter and may have encouraged others to cooperate with DOJ more quickly. In the first contested court challenge to a merger in the radio industry since the Telecommunications Act passed in 1996, the DOJ sued to block Chancellor's acquisition of four radio stations in Long Island, New York. That deal would have created a group with more than 65 percent of the radio revenue market. Chancellor settled.

Said Klein, "As the Long Island case shows, we continue to be ready to fight in court, radio mergers that harm competition and result in higher radio advertising prices for businesses relying on radio to sell their products and services."

Multiple market

Despite the pitfalls, buyers were still looking for good properties in the second quarter and multiples were still high.

Said Blackburn of multiples, "Now the number is 12 or 14 or 15. It just depends on

the market size. Any higher than those kinds of numbers, unless it's the biggest of markets, generally means that there is something else going on, and it's not just a multiple deal."

He added that there is still a bit of the "get it while you can" philosophy among buyers.

"It used to be we had clients who would buy one station and they'd fix it up and spiff it up. Then they'd buy

another one. Obviously nowadays, people are buying all they can buy. They'll spiff them all up later."

In early June Dow Jones reported that radio stock prices had fallen 20 percent in the previous two weeks. By quarter's end, the largest groups were thriving on Wall Street.

Growing optimism

Blackburn was optimistic when comparing the groups today to those that were highly leveraged in the early 1990s.

"The real difference is they are not standing there in 15 markets exposed in

Below are the stock prices for the top 10 owners (at time of publication), showing the price at the beginning of the second quarter and ending on June 29.

The group rankings are provided by BIA; stock prices are from other resources.

Group	April 1	June 29
CBS	33 15/16	32
Chancellor	45 7/8	50 1/16
Jacor	59	61 7/32
Clear Channel	98	107 13/16
ABC (Disney)	106 3/4	113 3/16
Cox	42	43 1/2
Southern Star	N/A	22 3/4
Emmis	52 3/4	48 3/4
Heftel	44 3/4	43
Atlantic Star	N/A	22 3/4

every single market with high leverage and lots of entrepreneurs picking away at them 15 different ways," Blackburn said. Today, he said, groups control four or five of the best facilities in their markets, costs are lower and revenues have grown substantially higher.

The numbers from the Radio Advertising Bureau are good news for any general manager. May was the 69th consecutive month of revenue growth.

Local and national ad sales were up 11 percent over May 1997. In April, local and national revenues combined were up 13 percent over April 1997.

"Because of this acceptance of radio's marketing capabilities by advertisers at all levels, 1998 is quickly shaping up as another banner year for our industry," said RAB President and CEO Gary Fries.

Fries observed a trend where

national dollars are filtering into small and medium markets. National ad totals were up 17 percent in April and 13 percent in May.

Groups are looking closely at innovative ways to increase the revenue numbers. Chancellor Media Corporation (Nasdaq: AMFM) announced the formation of the Chancellor Marketing Group in the second quarter. The group's goal is to increase revenue from sales promotions.

■ ■ ■

Lynn Meadows is a free-lance writer based in Chesapeake, Va.

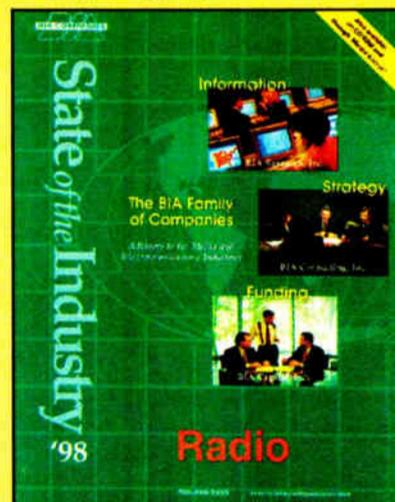
NEWS ANALYSIS

BIA's 1998 'State of Radio' Assessment

M.G. Stevens

Bullish.

In a word, that is the forecast for radio in the near future according to Chantilly, Va.-based BIA Research. The forecast, and much more, is contained in BIA's "State of the Industry" report for 1998, presenting analysis, opinion and forecasts based on data culled from the company's ongoing research.



The bulk of the report focuses on the impact of ownership consolidation and draws some interesting conclusions from the available data. Individual station disclosure is discretionary, leaving BIA to extrapolate from in-house research, as well as publicly available information.

Fewer owners

While the generally robust state of the U.S. economy is certainly a factor, the report points to growth rates for radio which outpace the general economy and show consolidated operations taking more than their share of the pie. At the same time, the research shows that almost 750 fewer owners exist in the industry.

BIA's Peter Bowman, a co-author of the report, said, "There's no doubt that whatever the benefits (of consolidation), there's less of the experience and entrepreneurial flavor that many of the mom-and-pop operations had." Despite the exodus of the mom-and-pop owners, the core elements of radio, listenership and share of overall ad dollars continue to be strong. Duopoly-plus stations have experienced the greatest growth, with some 75 percent of listenership going to the top 50 markets that

are in duopoly-plus situations.

The "State of the Industry" report also profiled the top 25 radio group owners, examining acquisition activity and comparing 1996 and 1997 ownership rankings. The financial outlook for radio is both strong and improving, according to the BIA figures. Profit margins have soared to more than 35 percent in some cases, with the report predicting continued revenue growth in the 7-percent range. That growth would outpace the growth in expenses by 1 to 3 percent.

Record deal volume

Additionally, radio's transaction marketplace continues to spawn record deal volume, with 1997's \$18 billion figure more than three times that of 1995 transactions. The report also reveals the contributing factors driving station values up to broadcast cash flow multiples of 12 times or more.

"While listening is down a bit from the all-time highs of a few years ago, it is still very strong and is being converted to revenue at a greater rate by today's owners," Bowman said.

Asked to comment on the relative newness of the ownership changes and the scales of economy they create, Bowman said, "Considered in that light, there should be even greater gains in the years to come as these groups gain more experience in running their operations in the future."

Listener trends include some surprises. The report shows AM listenership holding at an 18-percent share overall, with a majority of the top five billing stations in the country being AM stations. Format earning trends also are profiled, as are comparisons between properties in both large and smaller markets.

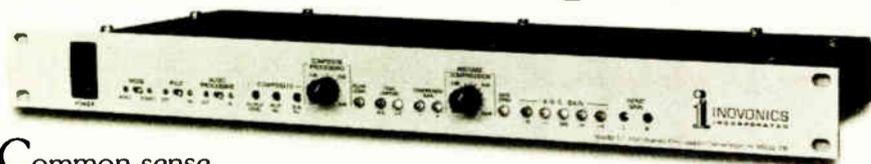
A tremendous amount of information is boiled down into a digestible report. Contact BIA at (800) 331-5086 or visit the BIA Web site at <http://www.biacompanies.com>

Bowman described the report as "a snapshot of where the industry is performing from a financial standpoint" and claimed its target audience is "anybody who will read it!" The document retails for \$300.

■ ■ ■

Mark Stevens is a media producer and former broadcaster. He can be reached at (604) 541-8330; or via e-mail at mgsmedie@cmag.net

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Directional Inspection

► **INSPECT**, continued from page 36 station has more items to be inspected than any other type of station. Each tower added to the array requires additional metering and a more complex directional pattern to maintain.

The number of engineers with knowledge of AM directional stations is dropping drastically, and the fees charged by those that remain are higher. In addition, many of the stations are operating with relatively old ground systems, sampling systems, towers and tower fences.

More maintenance is required and is costly, but the revenue generated by the station often is no more than that of a standalone AM or FM. This problem is worse in rural areas and smaller markets where there are even fewer experienced engineers.

My intent here is not to frighten licensees, who are already entirely too familiar with each of these concerns. My point is that AM directional licensees must work harder to maintain a level of compliance with FCC regulations than most of their standalone competitors.

Field intensity

The single most important technical parameter an AM directional station must maintain is the field intensity at each of the designated monitoring points.

The field intensity shown on the station authorization for each point is the absolute maximum authorized for that particular directional pattern. If the phase or base current ratio of a tower is out of tolerance, the station can continue to operate — pending corrective action — as long as all of the field intensities are maintained at or below the licensed maximums. I am not aware of any exceptions that would allow a station to operate with excessive field intensities for more than brief test periods.

In accordance with §73.1350(d)(2), the licensee is required to terminate operation or lower power within 3 minutes of the development of an out-of-tolerance directional parameter, excessive monitoring point field intensity or incorrect directional pattern. This section is confusing to those who think it takes longer than 3 minutes to travel to a monitoring point to check on the field intensity to determine if it is out of tolerance.

I have also fielded questions from broadcast engineers claiming that this section is contrary to §73.62(b)(5), which allows the licensee 24 hours to measure and log the field intensity at every monitoring point at least once for each mode of directional operation. In addition, many engineers bristle at the thought of some operator "messing" with the transmitter in an effort

to get the station back on line within the 3-minute period.

Keep in mind the primary point that these rules are addressing: possible interference to another station. If an out-of-tolerance condition arises, then the licensee is to take immediate action to correct the problem. You would expect no less from another station if you were the one being interfered with.

Use some common sense when looking at this. If the engineer is at the station and is able to start checking out the problem

back into compliance with the station authorization.

After the initial 24-hour period, the station can operate for temporary periods of time for test purposes only, but normal full-power operation cannot be resumed until the monitoring point field intensities can be maintained at or below the maximum authorized values for that time of day.

If a problem develops that causes the authorized phase or current ratio parameters of the station to be out-of-tolerance for a period of more than 30 days, the

I highly recommend that the management of each AM directional station locate the authorized monitoring point locations of their station without aid of the engineer.

immediately, then by all means do so. However, if the engineer is not immediately available (i.e. not at the station), then the licensee must either reduce power or terminate operation until the engineer or someone who can address the problem is available.

I have had several engineers point out that unknowing operators should not be changing phasor controls in an attempt to bring the antenna monitor readings back into tolerance.

Many an AM directional station has erroneously made this adjustment, only to cause a problem to mushroom into a headache or expense. Instead, the station should contact the engineer, note the monitor readings and weather conditions in the station log, then take monitoring point readings to see if they have exceeded the station authorization.

If the monitoring point readings are within tolerance, the fault may lie in the monitor, antenna sampling systems or somewhere else in the system. However, if no person is available to take the monitoring point readings, then licensees may be wise to terminate operation until they can be checked.

The 24-hour period stated in §73.62(b)(5) is to allow the station to be put back on the air, for temporary periods of time, to evaluate the cause of the out-of-tolerance condition. These temporary periods, and the results of all measurements taken during this period, are to be entered in the station log so there is a clear documentation as to what has occurred.

Once all measurements are taken, the licensee is required to adhere to the maximum field intensities for each and every monitoring point. If any monitoring point has an excessive field intensity, then power must be reduced or operation terminated to bring all of these points

licensee must apply for and obtain a Special Temporary Authority (STA) from the FCC Mass Media Bureau in Washington, D.C., prior to the end of that initial 30-day period. Once issued, the STA allows the station to operate with "parameters at variance" for a specified period, as long as all monitoring point field intensities are maintained at or below the maximum values specified on the station authorization.

Where are the monitoring point locations? I highly recommend that the management of each AM directional station try to locate the authorized monitoring point locations of their station without aid of the engineer. The descriptions to each monitoring point are specified in the station authorization.

In too many cases, these descriptions are outdated and inadequate to provide the exact location of the monitoring point. This is due to changes in physical reference points such as rerouting of roads, new buildings, removal of fences or removal of buildings. If you cannot locate the monitoring points by following the descriptions on the station authorization, then chances are that I will not be able to either.

Marker

When possible, try to place a permanent mark on the exact spot where the point is located. Changing the descriptions on the station authorization is a relatively simple matter. See §73.158.

Prior to taking field intensity measurements, I make certain the output power of the station is as close to 100 percent as possible. I then travel to each of the monitoring point locations to look for the maximum field intensity at each designated point, regardless of where the field intensity meter antenna is pointed.

As long as the highest indication is at or below the maximum authorized, that point will be in

compliance. Problems arise only when the field intensity exceeds that authorized at any of the designated points.

The highest field intensity should occur with the meter antenna pointed toward the center of the directional array. If it is higher while pointed in some other direction, there may be a re-radiation source in the area.

On several occasions when I have found excessive field intensity with the meter antenna pointed in some direction other than the center of the directional array, the engineer has claimed that there is a re-radiation source in the area. However, in too many of those situations the engineer had not bothered to check the rest of the radial to be sure this was the case.

In such instances the rest of the radial needs to be checked, and all measurements documented to determine if the problem is with that one point or if the entire radial is out-of-tolerance. Any number of things can cause the re-radiation, but the problem needs to be addressed and changes made to the station authorization if necessary. Be sure to document; don't assume.

Another problem I find with measurements at monitoring points is the frequency in which they are taken. The rules state that they need to be taken as often as necessary to maintain compliance.

Stations without approved sampling systems are to make measurements at intervals not to exceed 120 days. In too many instances I am finding stations that have not taken any readings in several months, yet they have had out-of-tolerance phases or loop current ratios that would clearly indicate the need to take such measurements.

As I have stated in previous

articles, I am not a strict letter-of-the-law inspector. I look for effort. If, for instance, I find excessive field intensity at a point, all other directional parameters are good, and the engineer shows me the results of measurements taken recently that indicate compliance, then I know the station is making a good effort.

Often the licensee is making the effort to maintain compliance, but the documentation proving this is lacking. The rules may not require the amount and extent of logging that was required several years ago, but many stations are finding the need for such logging is still there for their own purposes.

Please note that §73.1225(d)(2) requires licensees to maintain the results of the most recent field strength (intensity) measurements and make them available upon request.

AM directional stations are required to maintain an ammeter at the base of each antenna [§73.58(d)]. Make certain that responsible station personnel know how to conduct base current readings.

I routinely find stations utilizing plug-in metering for their base current readings, where the meter is kept in a location known only to the engineer who is not available at the time of inspection. When the plug-in meter is available, the station personnel often do not know how or where it is to be plugged in to take a reading. Also, because the meter is being plugged into a circuit with high RF potential, these workers need to know how to plug in or engage the metering without causing harm to themselves.

If there are any questions pertaining to this article, e-mail me at rramage@fcc.gov

The views expressed in this article are those of this author and do not necessarily reflect those of the Commission.



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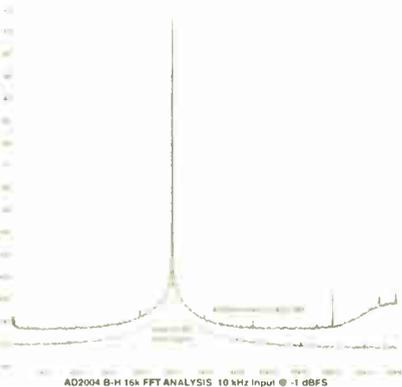
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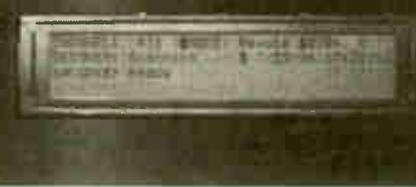
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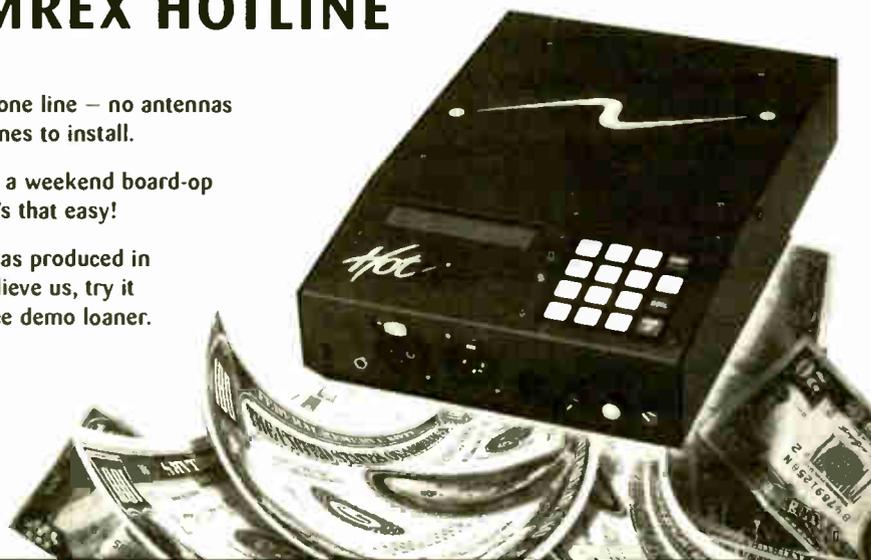
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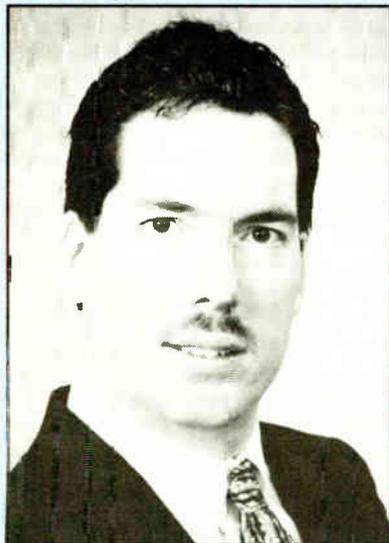
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Denon Upps McGuinness, Zeppieri

Denon Electronics has appointed James K. McGuinness to the position of field engineer and broadcast prod-



James K. McGuinness

ucts specialist, professional products division. McGuinness is now responsible for the direction of the company's broadcast-related activities. He has been with Denon for 16 years.

Silvio Zeppieri has been promoted to technical support specialist, profes-



Silvio Zeppieri

sional products division. Zeppieri is now primarily responsible for technical inquiries within his division, as well as service in customer and sales support and sales engineer capacities for the entire pro product line. He has been a member of the Denon team since 1992.

New Public Radio News Provider

► WORLD, continued from page 37

Story from Metro Networks in Washington. A decade ago she reached a European audience on pirate station Laser 558, which broadcast from a ship in the international waters of the North Sea.

Afternoon man James White worked at WAMU(FM), a public radio outlet based at American University in Washington, D.C. White can still be heard on NPR's "Morning Edition."

World Affairs Correspondent Paul Miller is a former reporter for NPR and NBC news. The co-founder and managing editor of Feature Story is Emma Gray. Previously she was the Moscow Bureau Chief for Christian Science

Monitor TV. The senior editor is Bill Wax, a public broadcasting legend who was the executive producer at Pacifica for eight years.

Marks' early problem was money. Namely, the prohibitive cost of satellite time. That's why he calls his partnership with World Radio a "perfect match."

World Radio, which offers music, commentaries and information features to its affiliates, was looking for a news supplier. Marks had the news product and World News had the transponder on Galaxy VI.

Feature Story's Washington newsroom is equipped with a Newsready-32 computer system manufactured by

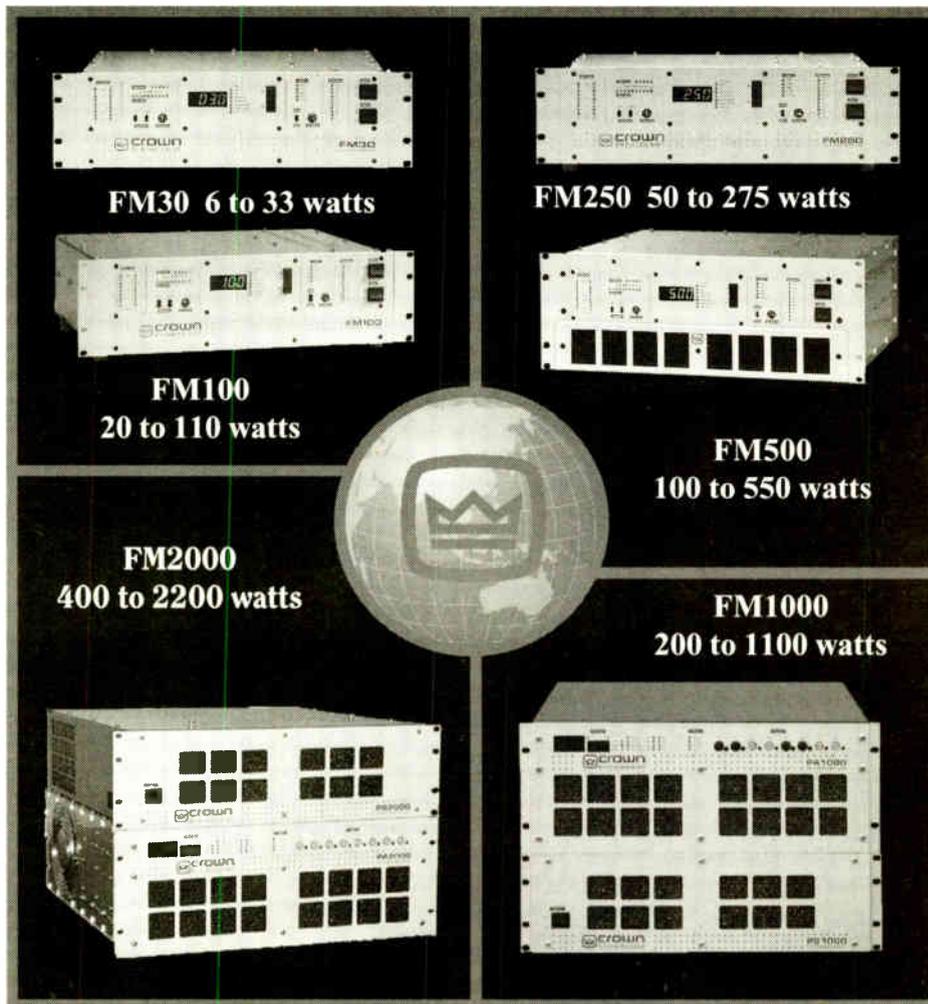
Wireready NSI. The room also is equipped with a digital editor called Cool Edit. Newscasts are fed from Washington via ISDN using a Prima-120 at 128K to World Radio in Kentucky and then bounced up to Galaxy VI. News bureaus in London, Moscow and Jerusalem also have ISDNs.

Public radio stations can sample World Radio News broadcasts by calling toll free (877) 230-NEWS or get more information on the Internet at www.featurestory.com

■ ■ ■

John Montone is a radio reporter for 1010 WINS(AM), New York. Send him e-mail at jfmontone@worldnet.att.net

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PRODUCT EVALUATION

A Pair of Processors From Korg

Brian Cooney

Ah, yes ... the seemingly never-ending search for the ultimate effects unit. We seek out *the sound* anywhere we can — whether in rackmount units, workstations or digital mixers. And just look at the myriad of DSP “Plug-ins” being introduced for computer-based audio editors.

The popularity and ease of plug-ins notwithstanding, I think most production crazies would love as many effects as

tifunction knob (labeled, fittingly enough, “Function”), a 12-digit alphanumeric LCD display with input level meter and mode indicators, a push/pull Value knob and a similar knob labeled “WARP!”

The front panel concludes with four small buttons labeled Tap, Hold, Trigger and Bypass.

On the back panel, you will find an AC power jack, MIDI Thru/Out/In DIN connectors and jacks for a switch pedal or expression pedal, Trigger, Hold and

lator) used to create modulating delays. There is also an internal mixer to allow you to specify the levels and panning of each tap delay and the direct output of the unit.

The Utility mode delves deeper into the operation of the unit. Utility mode is where MIDI, external real-time control devices and utilities for display and memory are controlled.

The AM 8000 R Ambience Multi Effect Processor offers far more bang for the buck in comparison to the DL 8000 R. The front panel is laid out exactly as the DL 8000 R — the only exceptions being the four buttons: FX1, FX2, Dly/Rev and Bypass.

The same goes for the back panel — identical, but with three Control jacks in place of the Control, Trigger and Hold jacks on the delay unit. Editing in Program Edit mode and Utility mode are also the same. Most similarities end here.

The AM 8000 R is quite simply a fun box. Essentially, you can run three effects simultaneously. There is an FX1 parameter, an FX2 parameter, and a delay/reverb parameter. The manual refers to the effects available under these parameters as “sub-parameters.” Check the sidebar to see the selection of available effects.

The possibilities with the AM 8000 R are as deep as your imagination. You could reshape outdated effect libraries or spruce up commonly used radio station identifiers. The effects in this unit are so plentiful and varied, you could

See KORG, page 53 ▶



The Korg DL 8000 R Digital Multi-Tap Delay Processor

they can get their hands on. If this is the case with you (or someone you know), Korg has introduced two single rack-space digital signal processors worth investigating: the AM 8000 R Ambience Multi Effect Processor and the DL 8000 R Digital Multi-Tap Delay.

Taps

The DL 8000 R is what it says it is: an echo unit. It is, however, comprehensive enough to keep you busy for days.

The front panel consists of a L/R Input knob, a L/R Output knob, a push/pull mul-

Bypass.

Rounding out the back panel are the unbalanced quarter-inch L and R Output and L/Mono and R Input jacks.

The DL 8000 R offers a maximum delay time of nearly five seconds (4,800 milliseconds) and a maximum pre-delay time of 400 milliseconds.

As you roll through the parameters in the Program Edit mode, you will find many ways to shape sounds. In addition to the multi-tap delays, there are parameters for pre-EQ, high and low damping filters and an LFO (low frequency oscil-

Bullwinkle Is Back on Three Compact Discs

Hey Rocky, Watch Sound Ideas Pull a Collection of Classic Cartoon Sound Effects Out of the TV!

Sallie Schneider Sauber

Sound Ideas has done it again. The company that brought you the classic Hanna-Barbera sound effects collection and the legendary Warner Brothers cartoon library has reached

Bullwinkle Show just before venturing off to school each morning. There was a certain thrill that came with sneaking in an episode of my favorite cartoon on a weekday morning — a day reserved for learning, not leisure.

I was way too young to grasp the message most of the time, as the dialogue was written to humor an older audience. Still, I could not help but love the show anyway, with its flashy theme song and unique characters.

As good as it gets

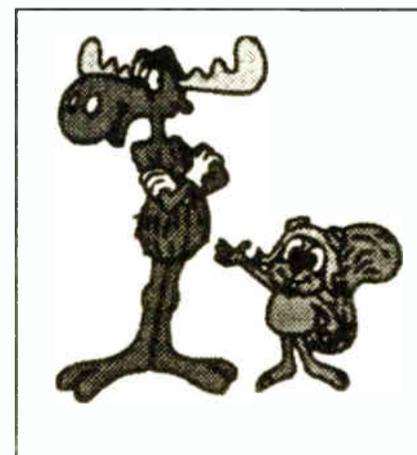
Unlike most cartoons, The Bullwinkle Show did not possess much, if any, ambience. The dialogue and sound effects were very much “out there,” partly because of the wicked word play and because, frankly, that is all there was. One certainly could not sing high praises about the animation methods.

The technique of “limited animation” created by Jay Ward went against the more fluid animation styles established by the other major studios of the day. Everything in a Jay Ward scene was completely static, except for the character who was talking or walking or going through some other action.

Without any visual distractions, the viewer had no choice but to pay a lot of attention to the audio, whether it be dialogue or sound effects. Clever dialogue aside, it is the sounds which make this particular cartoon so nostalgic.

Creator Ward has since passed away, but his creative genius lives on in the form of this three-disc library. Each disc contains over 200

See ROCKY, page 49 ▶



Bullwinkle and Friends, Now on CD

back into your childhood memories and pulled out “The Sound Effects of Rocky and Bullwinkle and Friends.”

The three-CD anthology is packed with digitally remastered sounds from the original television series which ran from 1959 to 1964.

One of the highlights of my younger days was watching The

PRODUCT EVALUATION

Sony R700 Recorder: Now DAT's Confidence

Ty Ford

Confidence recording, the ability to hear what you have just recorded a split-second after it hits the tape, is a wonderful feature.

How many times have you mixed to DAT only to find that it did not stick to the tape? How many minutes and hours have you spent listening to DAT playback to make sure there were no glitches? How much is that time worth to you?

If you figure this kind of confidence is worth an extra grand over the life of the next DAT machine you buy, then take a step closer and consider the Sony PCM-R700 DAT machine (\$2,695), or the PCM-R500 (\$1,695).

Features

According to Courtney Spencer of Sony, other than confidence recording and a front panel Key Protect switch,

both the PCM-R700 and R500 are the same.

“Both units offer SBM (Sony Bit Mapping) and four direct-drive motors,” said Spencer. “The R500 is the only DAT in the ‘popular price’ category with four direct-drive motors. It’s a more expensive implementation. You can’t tell the difference from the outside, but if you watch how direct control of the spindles affects how the tape is handled, you will see that it’s better than using spindles, belts and wheels.”

SBM is a single-ended process that has been around for a while. During analog recording, it shifts the noise of the signal up the audible frequency spectrum to an area less likely to be heard by most humans.

A good test of SBM is to jack up the monitors and compare how a signal sinks into the noise floor as it fades,

See DAT, page 57 ▶

Products & Services Showcase

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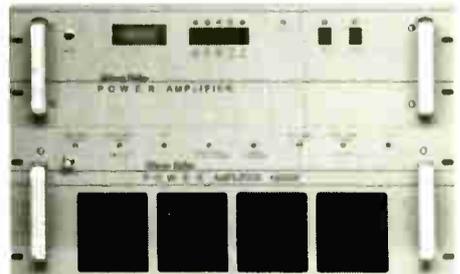
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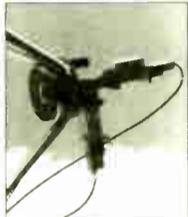


Photo of 7892's mounted between antenna feed and LNA's (both Vertical and Horizontal Polarization).

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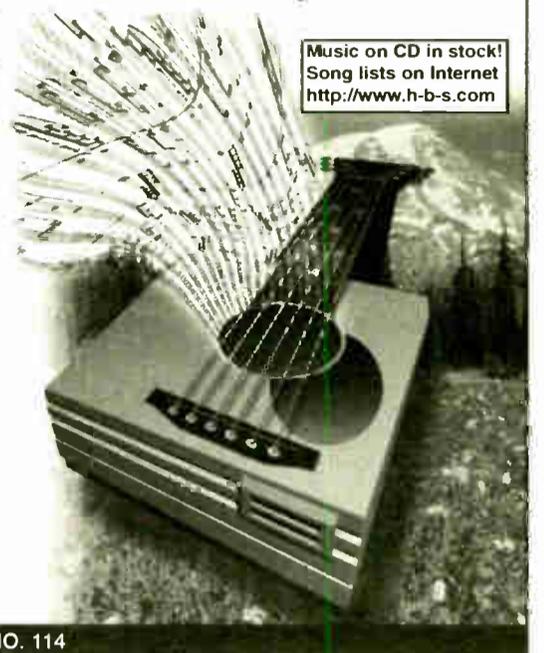
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Inventing A Summer Radio Special

How a Botched CD Delivery Forced My Station to Come Up With a Last-Minute Holiday Program

Alan R. Peterson

Summer in the city, or anywhere else for that matter, means there will be at least three syndicated weekend music specials aired on one or more stations in your market. Maybe even your own station is booked to run one.

This past Memorial Day weekend featured a four-hour "Are you ready for the summer" show. The recent Independence Day patriotic retrospective was obliged to conclude with *that* Lee Greenwood

tune. And the upcoming Labor Day weekend means a summer-is-over weep-fest, complete with "See You In September" and "Sealed With a Kiss."

I'm not ragging on these specials. They give your regular staff a break, they provide no-brain programming for the music director and PD and offer a starry-eyed kid the chance to "be on the radio," if only to deliver weather breaks and liners every 12 minutes or so between CD tracks.

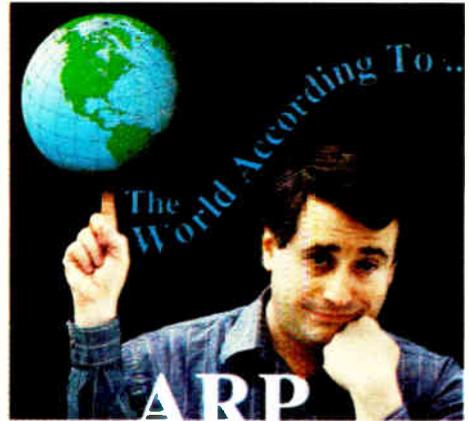
Audiences eat them up, too. A sound-

track of summers past when everything was fun (before real life set in) is a genuine feel-good show and a memory maker. I would not care to board-op these shows anymore, but I love to listen to them.

Then, there was that one hideous weekend when the show never arrived.

It's in the mail

Memorial Day weekend, 1990: My station was to air a long-form program on CD that I believe was called "Summer Beach Weekend," or something like that. This was to have been several hours in length, heavily researched and produced, and would pretty much eat up all of the



Monday holiday.

The contract was signed and faxed back to the syndicator weeks before air. We began talking up the show with promo cards and tagged each oldie in our regular rotation with a mention that, "you can hear more just like this on our Summer Beach Weekend special."

The Friday of the big weekend came and there was no show.

We waited for the Fed Ex delivery person, the UPS driver and the merry mailman. No CDs. By noon we were panicking and on the phone with the syndicator. A younger man answered the phone at the program provider's office (everybody else left for the weekend) and essentially told us, "Huh-huh-huh, don't know what to tell you, dude."

In the great tradition of 'the show must go on,' we decided to roll our own holiday special.

We arranged for an emergency overnight delivery of new discs, but it was a holiday weekend. If we were lucky, the show would be in our hands by late Saturday afternoon or mid-Monday at best. Remember, this was 1990 — a lifetime ago in the express shipping business.

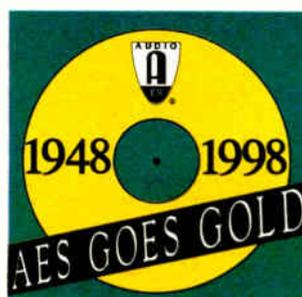
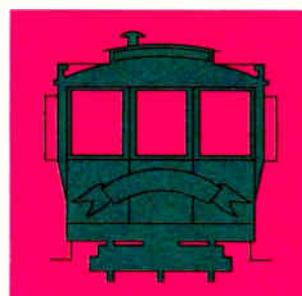
All week long, we had been promising listeners that we would air the "Summer Beach Weekend" beginning early Monday morning. However, we never said *what* "Summer Beach Weekend" we would air. So, in the great tradition of "the show must go on," we decided to play it safe and roll our own production, quite literally in the 11th hour.

Hit the books

We needed enough music and content to carry us for 10 hours on a light log, so we tore through everything we could find for information and inspiration. Some of us phoned old jocks we once worked with and asked, "Hey, what's a good summer song?", while others raided "The Green Book" for appropriate music.

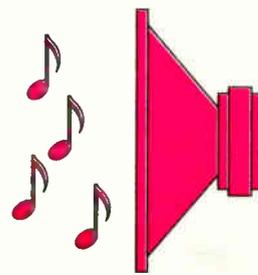
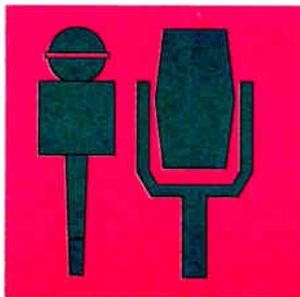
If you have never heard of "The Green Book", it is one of the best resources you can own for cross-referencing song titles and lyrics. If you need to find a song about "dad" or "flying" or "candy," this is the text to own. We pulled its pages apart, looking for *beach, sun, girls, surfing, romance, school* and anything else we could loosely link to the topic at hand.

The station was not running music
See HOLIDAY, page 56 ►



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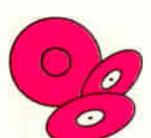
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Rocky and His Friends Are Back

► ROCKY, continued from page 46

well-known sounds from The Bullwinkle Show, Boris and Natasha, Mr. Peabody and Sherman, Dudley Do-Right, Fractured Fairy Tales and George of the Jungle.

New audience

According to Brian Nimens, president of Sound Ideas and producer of this project, the reason for creating this new and improved effects library was the recent return of The Bullwinkle Show to television via the Cartoon Network cable channel.

Because every bit of audio, including the original sound effects, had to be cleaned up and refurbished anyway, Jay Ward Productions decided to go ahead and release the sounds to the public. Now anybody can use the "Rocky Squirrel Whizzes By" jet effect, courtesy of Sound Ideas.

Keep in mind these sounds were created a good 40 years ago, which means Rocky whizzes by in mono with a little tape hiss. But that characteristic, combined with the tinny, compressed raw quality of the cuts, makes these effects instantly recognizable.

Even though I could not mentally place many of the sounds to particular episodes, these are uniquely distinct as Jay Ward creations. Nimens said, "Putting this library together meant a lot more than simply dragging tapes out of the archives and spinning off sounds." In fact it took Sound Ideas eight months to complete the project.

Load it and cut it

Not only did Sound Ideas technicians clean up every sound, they created new ones by combining existing effects for more variety.

Digital noise reduction processes were used to get rid of most of the tape hiss. Sound Ideas technicians analyzed the frequency spectrum of the hiss that occurred just before the effect, then digitally removed it from the effect itself.

All sounds were originally stored on 35-millimeter three-track magnetic tape, the preferred sound-sync method used in film production of the day. Frequently used effects were looped onto their own "mags", and hundreds were always cued up and ready to use.

There is a looped engine sound in the

library created from mechanical chugging sounds and even human chugging sounds. The rhythms created in the loops are almost comically melodic. My favorite sound effect of all is the "Comedic Radar Room," filled with buzzers, bells, alarms, whistles and yes, even flatulent noises.

Big fight

For a cartoon sound effects library, "Rocky and Bullwinkle and Friends" has an abundance of fighting noises. These are actually better than much of the so-called "military" stuff I have in my station studio now. From artillery cannons and flame throwers to depth charges and various oth-

er explosives, Ward and company certainly took their fighting seriously.

The Slap Fight is classic, with an occasional "ow" thrown in every so often. The punches and smacks come complete with strained grunts. Even the "Whistling Wind" effect is as bold as the person who must have braved it to capture the original recording.

All of the human sound effects are very true to life. From "Natives Chanting" and "Indian War Whoops" to "Angry Crowd," "Happy Crowd" and even a "Crying Baby," it is all very real and certainly useable for many a creative commercial.

But don't get me wrong. The discs

are full of all the sounds done in the true style of classic Jay Ward productions: the ratchets, bonks, boings, crashes, clinks, spins, rattles, conks, clanks, clunks, honks, whacks, thuds, giggles, slurps, sighs, roars, moos, clucks, whinnies, croaks, snorts, barks, quivers, twangs, ticks, splats, glissandos, squeaks and sprongs ... they are all there. Enjoy.

For information, contact Sound Ideas in Ontario, Canada, at (905) 886-5000 or circle Reader Service 164.

Sallie Schneider Sauber is the production director of WATH(AM) and WXTQ(FM), Athens, Ohio. Fittingly enough, she interviewed "Rocky the Squirrel" voice actress June Foray last year in Studio Sessions. Sallie can be reached c/o RW.

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DIGITAL DOMAIN

Time to Talk Some Digital Turkey

Mel Lambert

If attendance figures are anything to go by, NAB '98 in Las Vegas this past April was an overwhelming success. According to NAB figures, some 104,000 attendees gathered for the four-day bash in the split-venue technology showcases ... and wrote a lot of business.

By the way, you did get to check out the size and scope of the multimedia demonstrations at the Sands, didn't you? Impressive, in more ways than one.

Meanwhile back in Radio Land, one theme kept coming to my mind: Are the manufacturers of production and on-air consoles in regular communication with the vendors of playback systems?

As long as I'm here ...

I posed this very question to several leading purveyors of digital mixing hardware in Las Vegas. Aside from relatively basic serial and parallel control interfaces for issuing switch closures and related logic commands to CD players, DAT machines, MO players and hard disk systems, very few vendors felt it appropriate to investigate — let alone offer — the applicability of forming a fully integrated system with a variety of such replay systems. A shame indeed.

All right, there was a notable exception: the Harris Broadcast DRC1000, which featured a programmable input matrix, parametric EQ, dynamics and AGC functions, and which can be supplied with an optional serial interface for direct control of the Orban Air Time.

Why would such capabilities be useful? Quite simply because the on-air console — and to a certain extent mixers

designed for production chores — needs to be considered as the focus of activities in the control room. Unlike their analog precursors, the current generation of all-digital designs are capable of offering a great deal of creative options that place a lot of power into the hands of the engineer or on-air talent.

At the very least, such integration could be offered as a series of plug-ins or extensions to the console's basic operating system. After all, any digital console is actually a high-speed computer lurking beneath a familiar user interface.

In this way, we could interrogate the remote replay system from the work surface, maybe via a conventional high-speed Ethernet-based LAN topology, and determine the types and titles of available material. If the playlist has been made available in a form that can be uploaded onto the console's built-in or companion video display unit, we can now begin to implement control of selected files and replay sequences.

What's in the window?

The majority of all-digital mixers have some type of LCD or similar window, primarily for system setup, but often for real-time display of input routing, EQ and related parameters. This display could also be used to provide a scrolling listing of music cuts, PSAs, IDs, commercials and other titles, which could then be accessed and initiated using conventional on/off commands.

Sometimes such a scenario would not be relevant nor appropriate for a particular design. If so, it should be possible to provide a serial port enabling various system setups and source assignment

functions plus replay sequences to be initiated from a companion PC, necessary on an occasional basis.

On a related point, I can also report on a measure of success in initial discussions taking place between the Audio Engineering Society and the European Broadcasting Union — in addition to a number of supporting organizations — regarding the formulation of standardized file formats for digital audio workstations and related playback systems finding their way into radio stations around the world. And for a broadcaster, direct plug-and-play interchange of material edited and processed on any DAW with any automation package would be a wonderful reality to behold.

It sounds good on paper

On paper, OMF (Open Media Framework — with development spearheaded by Avid Technology) offers potential in solving both media and file-interchange snafus. In reality, implementation of a viable solution is taking its own sweet time.

While OMF V2.0 offers a more complete solution than its predecessors, active support from DAW manufacturers in response to customer demands has been slow. In the meantime, the proposed AES-31 Recommended Practice (AES31 RP) for file formats is being closely scrutinized by a growing number of firms, as are developments in the EBU's Broadcast Wave Format.

BWF is designed to serve as "a file format which contains the minimum information ... considered necessary for all broadcast applications." Using an object-oriented approach, a higher-level

descriptor can be used to reference other files containing more complex sets of information that can be assembled for the different specialized kinds of application.

BWF is a conventional IBM/MS audio file with information in the main header chunk that defines the audio data's format and sampling rate. An extra header chunk contains necessary additional information. This file format enables applications to skip chunks of data which the accessing program does not understand, allowing new chunks to be added without invalidating pre-existing software; a rather neat touch.

Information within the broadcast audio extension chunk includes a description of the sound sequence, name of the originator, reference of the originator, origination date and time, plus a time reference. Find out more by checking out EBU Specification: "Tech 3285: The Broadcast Wave Format" for more information.

By the way, the brief of the European Broadcasting Union's "PMC Project P/AFT: Audio File Technology," working in conjunction with the AES and utilizing BWF structures, is threefold: to develop a specification for a digital audio file format for use in new and existing audio archives; to develop a specification for a digital audio file format for use for production operations, including the editing of sound-program material; and to develop a specification for a file format to use for sound recording for film.

This side of the pond

The AES Working Group on Audio-File Transfer and Exchange is considering audio interchange in production and post-production, with or without picture; distribution and archiving formats are to be considered separately.

According to the group's task document, "Applications range from the simple interchange of a single sound file to complex projects involving fine editing of many source sounds. The interchange method needs to be flexible enough to support all these needs at a level of complexity appropriate for the task."

The AES31 RP has been divided into four independent stages to form a series of scaleable modules with interchange options, including Data Transport, Audio File Format (probably the EBU BWF format), Simple Project Structure, and Object Oriented Project Structure which will integrate OMF.

It is proposed that audio coding will be linear pulse-code modulation (PCM) at a sampling rate of 48 kHz or better, with 16-bit or better sampling precision.

There are several broadcast manufacturers already embracing the Broadcast Wave Format. But with such well-reasoned progress being made into practical solutions of standardized file formats and data exchanges, it still remains a mystery why elements of the all-digital broadcast facility still cannot communicate directly with one another.

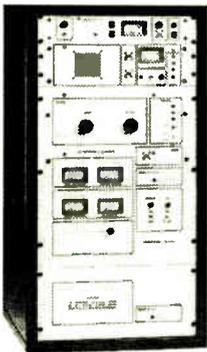
Time will tell if more innovative manufacturers will take up the challenge; the pieces of the puzzle are already in place.

■■■
Mel Lambert recently joined Otari Corporation as international marketing director, following a decade as principal of Media&Marketing, a Los Angeles-based consulting service for pro-audio firms and facilities. He can be reached at mediapr@earthlink.net

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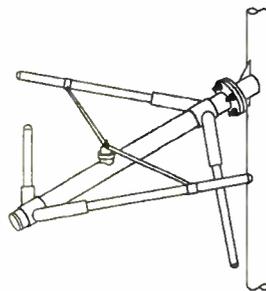
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Korg Uncorks Two Processors

► KORG, continued from page 46
find yourself in an endless creative cycle.

Both units, however, lack ease of use. And that is where most of my niggles with these units started.

Need it now

In radio production, time is of the essence. Both the DL 8000 R and AM 8000 R are not time-friendly. Changing presets was easy enough: simply turn the Value knob. However, if you are on Program No.19 and need quick access to Program No.120, be prepared to twist the Value knob a lot.

It becomes even more difficult when there is no number within the display, but a name only. This task is easier to tackle through MIDI foot-switching or sequencing, but this is radio, not a live performance.

Navigating through the many parameters and sub-parameters was no simple task either. Turning the Function knob enters Program Edit Mode. Turning the Function knob clockwise rolls through the parameters and pushing in the Function knob allows access to the sub-parameters.

Twist, click, twist, click

For example, the sub-parameter "Stereo Chorus/Flanger" (accessible under FX1/FX2) has thirteen *more* parameters you may need to adjust to create the desired sound. Add in another effect from FX2 and a reverb from Dly/Rev, and it all adds up to a lot of knob-tweaking and pushing.

The space Korg used for the 12-digit

LCD display might have best been used to cover more ground than it does. Each turn or push of the knob displays one parameter at a time. I could achieve similar results much faster with an Eventide H3000B or Yamaha SPX90.

There is, however, one saving grace for these units. It is the "WARP!" knob. The basis of the WARP! function is real-time control of parameters. To save time, you could build upon an existing factory preset and customize the sound of the preset to your liking. Once you have saved the changes, you could enter the Utility Mode and assign a parameter to the WARP! knob.



Companion to the DL 8000 R, the Korg AM 8000 R Ambiance Processor.

Assign a delay time, a reverb time, feedback level or the rate of a chorus/flange — you name it. You then program the WARP! knob to change the value of these parameters with each turn of the WARP! knob. This would allow you to tweak small aspects of your sound without even entering the unit's Program Edit mode.

You could save one program as your favorite vocal reverb and if you need a longer pre-delay or decay time you could simply turn the WARP! knob until the desired time is reached.

This, of course, would depend upon taking some extra time to customize existing factory presets or creating programs from scratch. If you can spare the time during the day or on the weekend to dig deep into the machine, the time could be well spent.

Overall, the DL 8000 R and AM 8000 R are pretty cool-sounding units. While I think it is obvious that these units were not designed for radio production or home/project recording, they still possess tremendous sonic possibilities, but only if you have the time to spare.

For the purposes of radio production only, I would recommend the AM 8000

Product Capsule:
Korg AM 8000R and DL 8000R Multi Effect Processors

Thumbs Up

- ✓ Quality 18-bit effects
- ✓ Good bang for the buck
- ✓ WARP! real-time control

Thumbs Down

- ✓ Complicated basic operation
- ✓ Display could be more comprehensive

For information, contact Korg in New York at (516) 333-9100 or circle Reader Service 203.

Bottom Line. These units cost considerably less than you would expect for such processing power. Both units list for \$600, a figure any radio general manager would consider pretty low.

These units are worth at least a test drive. See if you can borrow one from your local equipment supplier. If you have the time to spare, Korg just may have an effects unit for you.

■■■

Brian Cooney is a production and audio engineer based in Miami and an occasional contributor to RW.

Options under the FX1 and FX2 parameters:

Stereo Chorus/Flanger, Dual Chorus/Flanger, Modulation Delay, Stereo Modulation Delay, Dual Modulation Delay, Tape Delay, Phaser, Stereo Phaser, Dual Phaser, Pitch Shifter, Ensemble, Doppler, Horn Simulator, Rotor Simulator, Stereo Tremolo, Stereo Ring Modulator, Dual Ring Modulator, Stereo Resonance Filter, Dual Resonance Filter, Stereo Wah, Talking Modulator, Stereo Compressor/Limiter, Dual Compressor/

Limiter, Stereo Gate, Dual Gate, Early Reflection, Saturator, Stereo Three-Band EQ, Stereo Ducker.

The options under the Delay/Reverb parameters are:

Long Delay, Tempo Delay, Stereo Delay, Dual Delay, Cross Delay, Left/Center/Right Delay, Multi-Tap Delay, Dual Multi-Tap Delay, Room, Hall, and Plate Reverbs.

Remember, you can have FX1, FX2, and DLY/REV on simultaneously.

SHORT TAKE

New Studer ADAT Deck

Studer Professional Audio has joined other companies in making an ADAT-compatible S-VHS cassette digital recorder.

The Studer V-Eight is an eight-channel, 20-bit recorder with integrated timecode capability, chase synchronizer, a jog/shuttle function and an analog Auxiliary track. A built-in monitor mixer allows hearing the rough mix on the tape without routing the V-Eight back into the console. The deck is compatible with other decks using the ADAT type II format.

Studer intends to make the V-Eight the machine of choice for 5.1 mastering and for broadcast facilities requiring a



Studer V-Eight Recorder

machine with a long life span.

For information, contact Studer in Tennessee at (615) 360-0444 or circle Reader Service 128.

— Alan R. Peterson

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Hafler Amp Has New Power and Price

Hafler Professional announced a new power rating and price for the P4000 Trans•Nova audio power amplifier for studio and broadcast applications.

The P4000 Trans•Nova Diamond

amplifier. The device combines Hafler Trans•Nova circuitry with a transconductance driver stage that combines Class A linearity with Class B headroom.

The P4000 features a full LED display, gain controls, balanced inputs and MOSFET output devices. List price on the Hafler P4000 amplifier is \$1,199.



(Dynamic Invariant Amplification Optimized Nodal Drive) is a 200 W per channel, 8-ohm convection-cooled

For information, contact Hafler Professional in Arizona at (602) 967-3565 or circle Reader Service 9.

SADiE 24 96 Workstation

Studio Audio & Video, makers of the Octavia workstation, launched the SADiE 24 96 DAW, capable of 192 kHz editing and mixing, full surround sound panning and the capacity to handle 32 inputs and outputs.

The SADiE 24 96 is based on Windows 95/98. The 24 96 soundcards are PCI-based, equipped with eight inputs and eight outputs, and can replay 24 tracks of edited 16-bit audio. Support for 24-bit, 96 or 192 kHz is standard, making the SADiE 24 96 system DVD-ready.

The SADiE 24 96 represents a new pricing standard as well; the system is shipping in the U.S. for \$9,995, with host computer.

For information, contact SADiE in Tennessee at (615) 327-1140 or circle Reader Service 10.

CreamWare CUTmaster for Broadcast

CreamWare has created C-LAN, a full network system for editing and

routing broadcast audio, based around the company's CUTmaster components.

The CUTmaster is available in several versions. The basic CUTmaster allows voice and music editing, cross-fading and parametric filters to clean up audio. CUTmaster Pro adds limiting, compression, de-essing and room simulation. The Pro version also contains a time-shifting tool.

CUTmaster ToGo places a full CUTmaster editing system onto a laptop Pentium computer. The ToGo version supports linear and MPEG audio formats and has optional ISDN transfer capabilities. CUTmaster ToGo is priced at \$995 list.

Other components of the C-LAN system include the CUTbase database manager and archiver and the MasterCART on-air playback controller, with up to three stereo channels "pulled" in real time from the C-LAN server.

For information, contact CreamWare in Washington state at (604) 527-9924 or circle Reader Service 48.

New Frontier Surge Protector

From New Hope, Pa., comes the New Frontier Surge-X SX-202-R, a rackmount surge protector designed for audio, video and broadcast applications.

Mode technology provides protection from multiple surges of up to 6,000 V and unlimited surge current, without causing any ground contamination.

The SX-202-R is rated for a 40 A load and is mounted in a magnetically



The 2U chassis offers 12 standard grounded AC receptacles set into two switched banks of six outlets each. The company's Series

shielded steel enclosure.

For information, contact New Frontier Electronics in Pennsylvania at (215) 862-9344 or circle Reader Service 204.

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MP-4	4	800W	3.3	\$1,280
MP-2-4	4	2,000W	3.3	\$1,820
MP-3-5	5	3,000W	4.1	\$2,270
MP-3-6	6	3,000W	5.2	\$2,740

LOW POWER CIRCULAR SERIES

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GP-2	2	4,000W	0	\$1,350
GP-3	3	6,000W	1.5	\$1,900
GP-4	4	6,000W	3.4	\$2,600
GP-5	5	6,000W	4.3	\$3,150
GP-6	6	6,000W	5.5	\$3,700

MEDIUM POWER CIRCULAR SERIES

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SGP-3	3	10,000W	1.4	\$3,595
SGP-4	4	10,000W	3.3	\$4,500
SGP-5	5	10,000W	4.1	\$5,300
SGP-6	6	10,000W	5.2	\$6,100

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New Folio Mixer

Spirit By Soundcraft introduced the Folio FX8 mixer, an eight-channel mul-

tipurpose mixer with a built-in Lexicon effects processor section. The mixer is built on the success of the original 16-channel version, the Folio FX16.

The FX8 is a four-bus mixer with a 16-program Lexicon effects section. Effects include chorus, reverb and delay. There are eight line/mic inputs and a pair of stereo inputs. UltraMic preamps on all mic/line inputs provide 60 dB of gain range and +22 dBu headroom. Three-band EQ on each channel features sweepable midrange controls.

Suggested price of the FX8 is \$699.95.

For information, contact Spirit By Soundcraft in California at (916) 630-3960 or circle Reader Service 87.



AMEK Soho Console

Considered the first-generation descendant of the AMEK DMS console, the new Soho console is designed for DVD and surround



post-production.

The one-size mixer is available in three variations: eight faders with eight analog and 32 digital inputs, eight faders with 24 analog and 32 inputs, and 16 faders with 24 analog and 32 digital inputs.

The Soho is capable of 48-channel mixing, has four-band parametric EQ and compression/limiting, and includes the Virtual FX rack; featuring reverb, chorusing and flanging. Up to 24 simultaneous channels of reverb or any combination can be accessed directly within the system.

For information, contact AMEK in Tennessee at (615) 360-0488 or circle Reader Service 165.

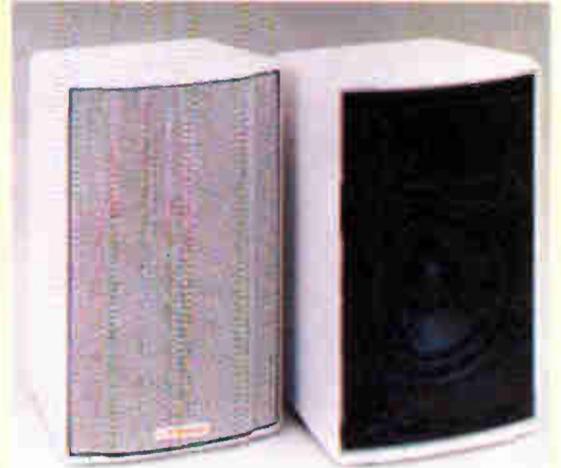
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capacity is 75 W at 8 ohms.

For information, contact Klipsch in Indianapolis at (317) 574-3866 or circle Reader Service 126.



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READER SERVICE NO. 150

Panic Drives Holiday Program

► HOLIDAY, continued from page 52
software at the time, so our entire library was documented on a flip-through card-catalog arrangement. That Friday afternoon, three-by-fives flew through the air to the floor as if ejected by some berserk IBM punchcard machine, in our panic-driven quest to find any song that would work.

No track escaped our home-grown special. Sure, Mungo Jerry's "In the Summertime" made the cut, but we also managed to shoehorn in Eric Carmen's "Make Me Lose Control," just because of the lyric, "turn the radio up for that sweet sound" (After all, who didn't have the radio on all summer?). We also man-

aged to slide in Van Morrison's "Have I Told You Lately," only because the violins in the background segued nicely into Percy Faith's "Theme From 'A Summer Place.'"

Very few songs escaped our rather broad criteria for inclusion. We were not going to restrict ourselves to oldies; Bananarama's "Cruel Summer" was as much fair game as Nat King Cole's "Lazy Hazy Crazy Days of Summer." We even stuck in some Christmas tunes just for laughs ("Finally, it's warm enough to use that bike Grandma bought you ... *last Christmas!*").

We tried to make the show sound as

close to a syndicated production as we could. One of our female weekenders stayed late on Saturday to cut some bumpers and liners for us, complete with seagulls and surf effects. Her lines were delivered in a buttery romantic tone, dabbled with long-tail reverb. You could almost visualize the crimson summer sunset dropping into the ocean behind her when she spoke.

What few spots we had that holiday weekend were structured to sound as if programmed by a syndicator. We would bumper into stopsets with our sexy-sounding cuts. National spots would be placed in the front, separated from the local spots and promos by a shotgun logo

jingle. Our sultry re-entry cut would get us back into the music.

All of the cuts we "researched" were written by hand onto a low-tech music rotation log. There was space down the margin for jocks to initial and timestamp each cut played, preventing "Beach Baby" from coming up three times in two hours. It wasn't pretty, but it was going to have to work. We were up against the clock, working with a weekend holiday staff.

'Come on, just be yourself'

Jocks were actually encouraged to be creative, drawing on their own summer experiences and where they were when some songs were hits. Some folks brought almanacs, yearbooks and an old newspaper or two in with them. The newspapers were an exceptional resource, as they contained old TV listings, movie ads and stories of old drivens and teen hangouts long torn down. You want memories? An old newspaper or microfiche archive is the place to find them.

To any contemporary jock raised only on liner cards, a show such as this would have been exhilarating and perhaps a little terrifying to pull off. But once done, it would be awfully hard to go back to being a card-reading button-pusher.

Three-by-five cards flew through the air as if ejected by some berserk IBM punchcard machine.

Our homemade "Summer Beach Weekend" show was conceived late Friday afternoon. Most of Saturday was spent assembling details and firming up the music. It hit the air 9 a.m. Monday morning and made it all the way to 7 p.m., when it was time to join the evening's Sun Network talk programming and go home. We made it, but to borrow a thought from comedian Steven Wright, the day felt as if we were balanced on the back two legs of a chair, trying hard not to tip over one way or the other.

Oh, by the way, our "overnight" CDs arrived Tuesday morning.

Never again

After being bitten like that, the new policy was put forth *not* to promo any special show until it was in-house and checked for skips and defective discs. If we were to have done it again, I think the show should have included some recorded reminiscences from listeners and perhaps a couple of old-time radio commercials from those glory days.

If your station plans to bake its own Labor Day special from scratch this year, I would be very happy to know what you did and how you pulled it off. Drop me a few electrons at apeterson@imaspub.com. Hopefully, you are not obligated to invent a show because the syndicator stiffed you, too.

And to Irv, Tom, Bart, Big George, Jay, Pete, Anselmo, Margaret and the gang who strung "Summer Beach Weekend" together, that was one heckuva weekend, wasn't it?



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A Close Look at the Sony R700

► **DAT**, continued from page 46 with and without SBM. From my CD player to the unbalanced analog input of the R700, the difference was negligible, and the sound quality and separation were quite good.

Out back

The R700 supports balanced analog inputs and outputs with individual level tweaks, unbalanced analog inputs and outputs, a digital I/O switchable between AES/EBU and coaxial S/PDIF (IEC).

In addition to the wireless remote that comes with the R700, the optional RM-D750 allows programmable playback by ID number. An eight-conductor, parallel-port DIN jack with pinout assignments in the manual can be wired for simple stop, start, rewind, fast forward, pause, start ID

A built-in clock lets the R700 record the day of the session into the subcode. When toggling through the Mode button during playback, the date of recording is displayed. The Margin Reset buttons allow you to reset the peak display, which shows how close to 0 dB and "over" the signal has come.

The Shuttle/Jog and Data wheels are concentric and easy to navigate. Want to get to a particular ID number? Dial it up from 1 to 99 on the data wheel and hit Play.

The final switches determine balanced or unbalanced analog or digital input, standard or long-play (12-bit, 32 kHz, half-speed) mode, 44.1 or 48 kHz recording (standard 32 kHz is supported through the digital inputs only), SBM and a pair of center-detented analog record level controls.

Detented positions on the Sony inputs matched well with the detented fader and

you will need to get the optional RM-D750 remote control.

The manual states no provision for post-striping Absolute Time on a DAT tape that already has audio on it. This may not be an issue unless you are working with DAT tapes recorded on an older DAT machine that does not record Absolute Time.

When transferring digital audio using AES/EBU protocol, the R700 Auto ID feature writes Start IDs at user-set audio threshold points down to -60 dB. With straight digital transfers, the R700 needs a Sony PCM-2600, PCM-2800, PCM-R500 or PCM-R700 to transfer Start or Skip IDs.

If the S/PDIF port is used, Start/Skip

IDs can only be digitally transferred to and from PCM-2300, PCM-2700 or PCM-2700A machines. The R700 will also detect Q codes from CD players during S/PDIF transfers.

In conclusion

With or without the SBM, the R700 sounds good. The confidence recording heads and four direct-drive motors make a compelling case for the R700. I also like the idea of being able to record the date of a session on the tape itself. The price is high, but falls in line when you put it in context with the features offered.

■ ■ ■

For information, contact Sony in New Jersey at (800) 686-SONY or circle Reader Service 11.

Ty Ford may be reached at www.jagunet.com/~tford



Photo by Alan R. Peterson

Sony R700 DAT recorder: Comes With Its Own Confidence Head

write, fader start and condition lights. An industry-standard IEC power socket finishes off the back.

The front panel is cleanly designed and extends past the sides of the chassis to form rack-mount ears with holes. Beneath the front panel power switch is a three-way switch for wired, wireless or no remote operation.

The Key Protect switch renders all but the Auto ID, Repeat, Skip Play, Open/Close and Stop buttons disabled. It is not really tamper-proof, because the switch is rather evident on the front panel and the Stop and Open/Close buttons will definitely stop playback.

You do not need the switch to lock out the record feature, as you could do that by simply opening the record-safety slot on the DAT tape itself. To me, it makes more sense to hide the switch and have it disable all of the transport controls.

What? What?

The headphones and level control are next. There is more than enough clean power to drive a set of AKG K240 headphones, unless you are in a very loud environment. The headphone amp has more guts than my Panasonic SV-3900 DAT machine, which distorts my K240s at high gain levels.

The four Start ID buttons: Auto, Rehearsal, Write and Erase, three Skip ID buttons, Counter Reset and Renumber button are self-explanatory, as are the main transport controls. When the machine is stopped, the Menu button allows access to copy protection, record mute, Auto ID threshold, blank time, incoming start/skip IDs on the S/PDIF port, incoming Q codes from the S/PDIF port, incoming start/skip ID on the AES/EBU port, Date/Time display enable, Track time display enable, hours of operation and about half-dozen other parameters.

master positions on my Mackie 1604, leaving a snug but comfortable 2 dB before "over." Adding comp/limiting to the Mackie main bus inserts pushed the DAT into "over" until I dropped the gain structure a bit. The meters are easy on the eyes and show average and peak hold. Emphasis will be recorded if it is present.

Keep the insides in

Nine screws hold the cover in place. The interior layout is uncluttered and you can easily get to the headstack with or without a tape in the transport. A small arm with something that looks like a thin but firm plastic squeegee makes contact with the spinning head at various times to keep the head clean.

This undocumented feature decided to show off when I had removed the cover. After turning the unit on, I was serenaded by an unsettling rasp for a few seconds, as the squeegee contacted the DAT head. A few seconds later the arm moved the squeegee away from the head and silence was restored.

The other obvious noise the R700 makes is the "ka-click" it makes when put into play or record.

The R700 manual suggests not using tapes over 120 minutes in length due to problems with improper tape threading, incorrect writing and erasing of start IDs and sound distortion. I am still carrying around enough analog voodoo to keep me from using anything over 90 minutes.

The manual also notes that Start IDs must have a minimum of 18 seconds of tape between them, 36 seconds in long-play mode. This is twice the amount of time that I have been used to. This quirk may or may not appeal to you.

Like most DAT machines, the R700 allows you to write and erase Start and Skip IDs and automatically renumber cuts on a tape. If End IDs are important,



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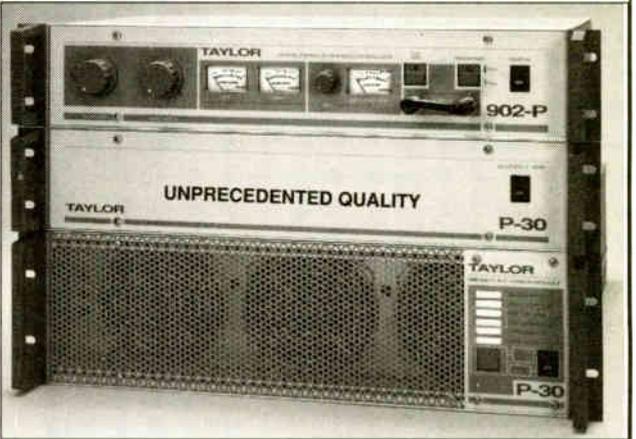
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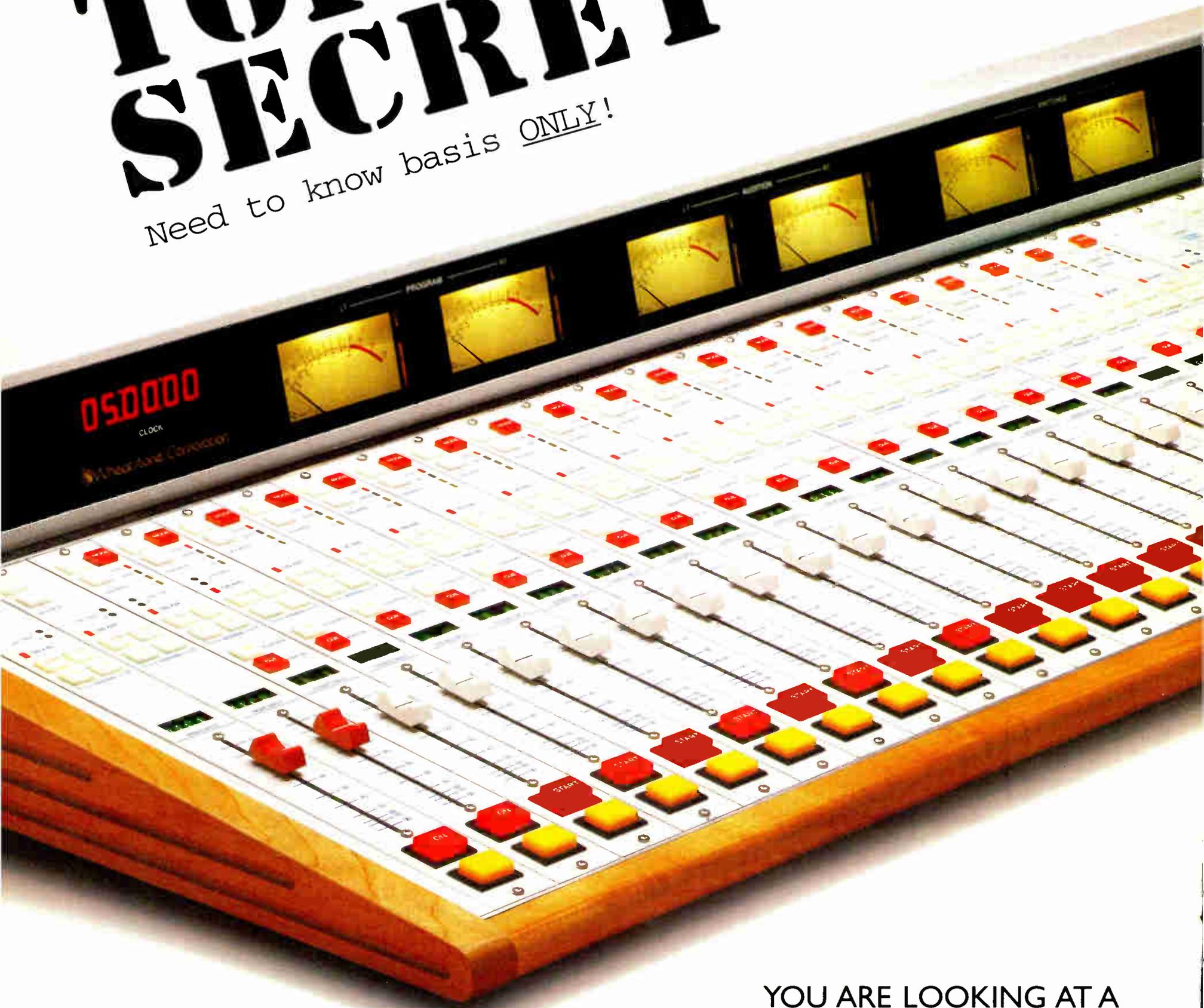
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