

NRSC to Guide In-Band DAB Testing

by John Gatski

WASHINGTON Although the Electronic Industries Association (EIA) and the NAB have reached an agreement on testing digital broadcasting transmission systems, the process still remains a challenge with testing now to be conducted

with an extra step.

The agreement allows the EIA to continue its schedule of evaluating potential digital broadcasting or digital audio radio (DAR) systems including the testing of in-band, on-channel systems (IBOC), the only type broadcasters want evaluated.

However, the NAB has convinced the

EIA to agree to let the joint EIA/NAB standard setting group, National Radio Systems Committee (NRSC), guide the in-band portion of the testing and evaluation.

The provisions of the pact are:

- The EIA will test all submitted DAR systems including in-band, out-of-band and satellite.

- The NRSC will plan and determine the scope and timing for in-band testing and recommend a single system, if appropriate.

- The NRSC will form a subcommittee to address the planning of IBOC tests, coordination with the EIA DAR Subcommittee and the analysis and possible recommendation and standardization of an in-band system.

- The in-band test procedures will be developed by EIA DAR Subcommittee Working Group B.

- The goal is to complete in-band testing by June 30, 1994.

The agreement is a compromise that allows the EIA to proceed with its DAR testing plans without continued dispute with the NAB. Prior to the agreement, the NAB had threatened not to cooperate with the EIA testing, which is supposed to begin in July and conclude by the end of the year.

Earlier in 1992, the NAB complained that preliminary voting procedures proposed in the EIA's DAR Subcommittee meetings were not favorable to broadcasters. Later in the year, the NAB said it was not interested in transmission schemes other than in-band and wanted nothing to do with testing satellite or out-of-band DAR systems. The NAB said the NRSC should test in-band systems.

The EIA, however, maintained that it was going ahead with its testing schedule even though the most publicized proponent,

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New Digital Formats:

How do MD and DCC fit into professional applications? For details, see pp. 11-12



**MD
or
DCC?**

EBS Tone Tests Slated

by Randy Sukow

WASHINGTON The 25-second, two-tone attention signal—that familiar Cold War relic that has long insinuated itself into the ears after the words, "This is a test of the Emergency Broadcast System"—may soon be as distant a memory as 'duck and cover.'

"Listeners and viewers have become desensitized to it and many times think that when they hear the two-tone signal, it is always a test even though an actual emergency may be in progress," said the National Association of Broadcasters in recent reply comments on a commission proceeding to completely overhaul EBS for faster reactions to hurricanes, twisters and such.

"Definitely a shorter and different burst of eight-to-10 seconds" will be tested this summer by an FCC working group formed to test new EBS technologies, said Helena Mitchell, director of the FCC's Field Operations Bureau (FOB) EBS project.

The working group met on March 1-2 and were to meet again March 29 to work out the details for field testing in the Denver area, tentatively scheduled for June 28-30. Assuming all goes well with the field tests, the FCC should be able to hold to its original intent to approve new EBS standards by late summer, Mitchell said.

A large radio involvement

The radio industry has been "extremely supportive" of the working group's

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NEWSWATCH

Made-in-U.S. Radios Pushed by Consumer Group

PITTSBURGH On March 11, President Bill Clinton was sent a "Made-in-the-USA" American Electrola DX-100 AM/FM/shortwave radio, a project undertaken by a non-profit consumer group to attract attention to the U.S.'s capacity to manufacture high-quality electronic products.

Consumer activist Chuck Harder, president of the White Springs, Fla.-based consumer group Peoples Network, Inc., which also operates a satellite talk-radio

network, said the radio was made at a formerly idle Pittsburgh electronics plant.

According to Harder, The People's Network became involved when a call-in listener complained about the lack of American-made radios. Harder said that call challenged the People's Network to try and find one, but with no success. That prompted the organization to build its own, he said.

"We had to ask our listeners to pay in advance, trust us and then we would order the parts and gear up to make the radios," Harder said. "We raised over \$250,000 in advance orders. That's how

American Electrola got started."

The Pittsburgh plant employs 12 workers, who make "well above minimum wage," according to the company. The DX-100s are said to be built with 75 percent of the dollar value in U.S. parts."

Because high-volume sales are key to the success of consumer electronics, The People's Network is looking for strong U.S. retailers, Harder said.

Loral Bows Out

WASHINGTON One of several applicants for satellite digital audio service,

Loral Corp., has withdrawn its application with the FCC.

Loral had proposed 32 subscription channels of digital audio to be delivered at 2355 MHz. Others applications are still pending including American Mobile Satellite Corporation, Digital Satellite Broadcast Corp., Primosphere and Satellite CD Radio.

NAB Radio Board Members Elected

WASHINGTON Newly elected NAB Radio Board members are: District 1, Richard Ferguson, president, WEZN-FM, New City Communications, Bridgeport, Conn.; District 3, Jerry Lee, president, WEAZ-AM-FM Philadelphia; District 5, William R. Evans, president/GM WQXE-FM Elizabethtown, Ky.; District 7, Matt Mills, vice president/GM, Paxson Broadcasting, Orlando, Fla., and District 9, Houston L. Pearce, president, Radio South Inc., Tuscaloosa, Ala.

District 11, C. Richard McBroom, president/GM, WONW/WNDH-FM

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DCR Gets Major Corporate Backing

by Frank Beacham

HATBORO, Pa. Digital Cable Radio (DCR), flush with an estimated \$20 million investment from new partners Sony and Time Warner, plans to expand into direct broadcast satellite distribution within a year, and later into satellite delivery direct to automobiles.

The premium audio service, now delivered to subscribers exclusively by cable television systems, will increase its programming line-up from 28 to 56 channels on May 1.

Plans also call for expansion to 80 channels by Dec. 31 and to 250 channels within the next two to three years. New channels will include additional CD music formats, news and information, sports, talk, foreign language and pay-per-listen programming.

In May, DCR will also move into the commercial background music business, offering several special channels of background music for restaurants, offices and other business establishments.

DCR currently is in negotiations to deliver the multichannel digital audio service by direct broadcast satellite in the United States and "absolutely" will be available on DBS within a year, company spokeswoman Karen Muldoon said. Asked if DCR would be delivered on the Hughes DirecTV DBS service, slated for launch early next year, she said "we are currently in negotiations and I cannot

comment on specifics."

Another goal of DCR is the automobile market. "Ultimately, we plan to put DCR into cars," Muldoon said. "We are evaluating alternative ways to deliver the service. Anything is a possibility."

Expanded pay-per-listen programming also is in DCR's plans, Muldoon said. The service, with its locally addressable technology, has previously broadcast pay-per-listen live digital audio feeds of a Dire Straits concert and the 25th anniversary gala from the Metropolitan Opera.

"We are looking for more pay-per-listen opportunities," Muldoon added.

DCR also revealed additional information on its new interactive remote control, scheduled to debut in May. With the capability to control multiple electronic devices, the remote will have a scrollable liquid crystal display that can accommodate long blocks of alphanumeric information.

Initially, the remote will provide song title, artist, album title, composer and record label for each song being played and the two previous songs, Muldoon said. "Later we will add the ability to send promos to the remote and to offer a

sports scoreboard and financial news on the display. Ultimately, the remote will have interactive capabilities with the TV set and subscribers will be able to call up lyrics on the screen as the song is played."

DCR's aggressive new plans are now on the fast track after the announcement that Time Warner Cable, the nation's

second largest cable television operator, and a joint venture of Sony Software Corp. and Warner Music Group, have joined the DCR partnership.

The new partners join General Instrument

Corporation's Jerrold Communications Division and a group of the nation's largest cable operators. They include Adelphia Cable Communications, Comcast Cable Communications, Continental Cablevision, Cox Cable Communications and Time Mirror Cable Television.

According to DCR, the partners have agreed to contribute additional capital to fund the company's expansion, enabling an increase in program offerings and worldwide distribution. DCR is now available on many cable systems in the U.S. and Mexico and is seeking regulato-

ry approval to operate in Canada. The company also plans to launch in Europe this summer and in the Far East and Latin America next year.

With the addition of Time Warner, DCR's partnership grows to include four of the nation's five largest cable operators. Time Warner is expected to permit DCR to increase its distribution significantly by making the service available to an additional three million homes, including New York City, by the end of 1994.

As part of the DCR deal, Sony Software and Warner Music Group will be paid a small royalty fee for use of their music on the service, and programmers will be limited in the number of consecutive cuts that can be played from a single CD. This provision is designed to prevent subscribers from easily taping entire album releases.

DCR's main competitor is Digital Music Express (DMX) of Los Angeles, a service also backed by a group of top cable industry players. Partners with parent company International Cablecasting Technologies are Tele-Communications, Inc. (TCI), the nation's largest cable operator, Scientific-Atlanta, Viacom, KBLCOM, Scripps-Howard, Colony Communications, Crown Media, Inc. and Shaw Cablesystems of Canada.

DMX, launched in 1991, now offers 30 channels of audio programming and has begun offering its service in several European countries. The DCR deal is expected to significantly tighten competition between the two fledgling competitors.

DCR currently is in negotiations to deliver the multichannel digital audio service by direct satellite.

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Radio Business Jump Starts in 1993

The radio business is sustaining the momentum of the economic upswing of late last year and early 1993. The Radio Advertising Bureau reported at press time that combined national spot and local advertising revenue for February 1993 paced 14 percent ahead of February 1992.

This is the first time since October 1990 that the business has posted a double-digit increase. The best news, however, is that national spot revenue (which had been taking it on the chin) was up 13 percent. The gains seem to be evenly spread across the country, with all regions posting gains over last year.

The year in network radio promises to be so much better and brighter than last year's financial fiasco that many radio network executives are going out on a limb and predicting a complete turnaround for their businesses (see story, *Running Radio*).



Networks witnessed a 13.5 percent drop in sales in 1992, a complete contrast from the first quarter of this year and the expected outcome for the year as a whole—a forecast calling for increased revenues of at least 4 percent, according to the networks.

The continued outlook for the industry as a whole looks so good, in fact, that more and more international companies are maneuvering for a foothold into the U.S. and Canada. The latest entry in the market comes from Spain.

Madrid-based AEQ, a manufacturer of consoles, telephones and studio equipment, has hired Gerardo Vargas, formerly with audio processing manufacturing

company Circuit Research Labs, to establish a sales, technical service and distribution office in Arizona. Vargas worked for five years in the international sales and marketing arena for CRL, developing a worldwide distribution network for the company.

AEQ's product offering consists of broadcast mixing consoles (BC-2000, BC-500), portable mixers (MP-10), line terminals equipment (SSR-10, LA-01, LE-01), a digital telephone hybrid (TH-20), power amplifiers (AEQ 151,302, 601, 901,1.201) and the multi-conferencing voice system, the Systel 3000, designed to communicate multi-point instantaneous voice transmission in full duplex mode.

Vargas' immediate task will be to establish a distribution network in the U.S. and several countries in South America. AEQ plans to warehouse equipment for immediate distribution through the company's network. The AEQ-America office will be staffed with an English/Spanish bilingual staff.

International companies are definitely on the move these days. Audio Processing Technology from Belfast, Northern Ireland, formed the apt-X User Group. The group will consist of equipment manufacturers worldwide who have incorporated apt-X technology into their professional audio equipment.

APT believes that agreement on compatible formats could, in the future, provide the industry with the ability to move apt-X100 compressed audio between various systems without generation losses.

The first meeting of the apt-X User Group will be held on April 19, at the NAB Spring Convention in Las Vegas. According to apt-X user Digital Broadcast Associates, "The primary purpose of the first meeting will be discussion of future product developments, encouraging agreement on compressed digital audio file formats and the transfer of audio data between STL, source, telecom and transmission equipment."

DBA has incorporated apt-X technology into its dB-Cart line of floptical-based digital cart decks. In a release, the company endorsed apt-X technology as the only

IC solution on the market and accepted it as the "de facto" standard for digital audio coding and decoding.

★ ★ ★

Our condolences to Bonnie Hnat and the family and friends of Steve Hnat of Hnat Hindes. Steve died last month of a heart attack at the age of 45.

Steve and Bonnie Hnat entered the business in 1972 with the formation of Hnat Electronics. He was the design engineer, a natural extension of his love of music and radio. The Hnats founded Hnat Hindes Inc. in 1983, a firm specializing in audio processing.

Hnat was generous with his time and equipment, often donating gear to colleges and universities. Bonnie Hnat is determined to keep things running smoothly at the company, and it is "business as usual" at Hnat Hindes.

★ ★ ★

The industry lost one of its pioneers last month when Edward H. Shively died March 18 after a long illness. Our condolences to his family and friends.

Ed Shively was a pioneer in FM radio development. He played a prominent role in the development of antennas and combining systems for FM radio and TV broadcasting for RCA during the 1950s. He continued developing this work in FM and TV electronics for more than three decades, most recently at Shively Labs in Bridgton, Maine.

Shively left RCA in 1957 to live and work in rural Maine. He joined Dielectric Communications as head of its engineering research and development team, designing products for everything from open-wire transmission to UHF TV.

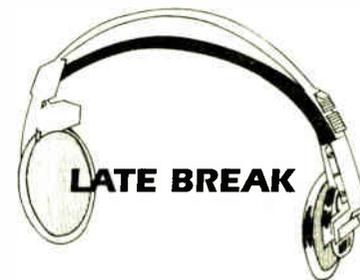
In 1963, Shively founded Shively Laboratories and patented numerous innovations in broadcasting equipment. He assisted in the development of radio telescope systems to map and investigate star systems.

Shively sold the business to Howell Laboratories of Bridgton in 1980, but continued to work as a consultant for eight years.

Shively was born in Middleton, Ohio, in 1925. He received his degree in electrical engineering from Purdue

University and his Master's degree from the University of Pennsylvania. He was a member of the Institute of Electrical and Electronic Engineers. He served as a staff sergeant in the 15th Air Force in Italy in World War II and flew numerous missions over Europe as a B-24 gunner.

Ed Shively is survived by his wife, Elizabeth, their children Margaret Ann, Bill and James, and a grandson.



Axxess USA Corp. finalized plans to attend the NAB Spring Convention and demonstrate its paging system. The Axxess RDS paging system uses the 57 kHz FM subcarrier to transmit data from existing FM stations. The Axxess 3000 handheld radio data receiver is capable of accommodating all applications of the RDS/RBDS technology, and features menu-driven graphic displays, multi-lingual messaging, and a bi-directional serial port for data transfer to terminals such as PCs or printers.

Stop by the Science and Technology Booth in the Las Vegas Convention Center Grand Lobby for a demonstration, or call Axxess at 504-889-9800.

Those of you shopping for new and established **Audioarts Engineering** production and on-air consoles can find them at a number of different booths in addition to Wheatstone's. The new MR-40 combination four-track production and on-air console will be displayed at booths: 5108, 1606, 4012, 4015, 1620, 5003, 4224, 4020 and 17976. For more information, contact Mark Kaltman at 315-455-7740.

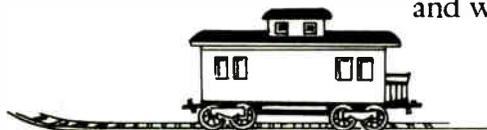


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Failsafe control

Dear RW,

I have read and learned from Harold Hallikainen's columns over the years. His Moseley TRC15 remote-control retrofits and stand-alone microcomputer R/C systems filled a real need for more accurate, stable and yet inexpensive remote controls for broadcast transmission systems.

The letter in the Jan. 20 RW from Harold asked the transmitter manufacturers to consider changing the I/O circuitry on their equipment, allowing pull-down logic, i.e., active low states to turn functions on and off. He argues that it would be much easier to interface to R/C boxes if the command inputs on transmitters used grounded lines for control. The practice of providing a control voltage and requiring momentary connections to this high state to operate the transmitter is almost universal (there are some exceptions) in modern transmitters for a reason: fail-safe control.

If normally floating-high inputs were used and somehow a wire frayed or got shorted to ground "anywhere" in the system wiring, the transmitter could turn on/off or accomplish some destructive action like raising the power to the maximum possible and overloading. Shorting a wire to ground is more possible than shorting it to a positive voltage in the bundle, especially if only one supply wire is common to the R/C. A ground short could be to shield to the adjacent chassis on the R/C rear apron or in the conduit or rack wiring harness. The design choice is based on probability and the grounded control scheme is more likely to have a fault. We're talking about what-if situations now.

By using a control voltage to switch functions, a separate external switch can be added to the common positive voltage source to completely disable remote control of the transmitter. Grounded systems lack the inherent safety in this approach as a ground could happen any-

where in the wiring downstream of the safety switch and possibly bypass it.

Another less-important reason for the logic choice on major transmitters is that ground may not be ground in the R/C rack a few feet away. If there is any resistance in the patch or a power ground loop, it may affect the logic threshold and noise immunity of the transmitter control inputs if a remote ground is chosen. To eliminate these effects good grounding practice must be observed; only the transmitter control ground can be used as common to the R/C outputs, with no other signal or current using this conductor (do not use shields on cable). The positive voltage-control scheme, on the other hand, is not likely to be used for anything else but the R/C control power.

It is a nuisance for people like Mr. Hallikainen, who build remote controls. It drives up the cost to have high-side switching, either relays or completely floating transistor outputs with their inherent design problems. Long-term reliability is always a problem with relays. Most modern transmitters use optoisolators on the inputs as well, so galvanic isolation is already provided.

I must agree, however, that optically isolated open collector status lamp outputs from the transmitters would be most desirable. One reason to provide high-output states when illuminated is to interface with older R/C systems where a metering channel might be used to monitor a status lamp. Open collector outputs could be easily accommodated with a pull-up resistor to a positive supply.

Maybe the time is right to finally change things, but I felt it important to explain some of the arguments which went into the decision of the original remote interface standards for one manufacturer. The ultimate solution is to buy a transmitter with the brains already in it, handling remote control with the appropriate serial data port. Otherwise, keep putting those dry contact relays in there.

John T.M. Lyles, RF Engineer
Los Alamos, N.M.

Let the record show...

Dear RW:

The headline "AM RBDS May Interfere with Wideband Receivers" and "AM RBDS Hurts Wideband Reception" is most unfortunate and misleading (RW, March 10). The title would lead you to believe that the addition of RBDS will be a deterrent to wideband reception.

Receivers which are flat to 10 kHz and beyond will experience 10 kHz whistles when the carrier of a first adjacent channel beat with the desired carrier and is detected by the receiver. This situation happens primarily at night and in many cases to strong stations.

This was the condition experienced with the AM RBDS test for audibility of the data tones. At night the data was not audible because of the 10 kHz whistle from the first adjacent channel. Tests during the daytime hours did not experience the first adjacent whistle and it was possible to hear continuous tones that were as

DAB Truce Is Welcome Progress

Compromise between the National Association of Broadcasters and the Electronic Industries Association is news happily received. Adequate digital audio radio (DAR) system development — in-band or otherwise — is impossible without the cooperation of the broadcast and consumer electronics industries.

By proceeding with two different test programs on two different timetables, all past concerns that the EIA's tests are too hastily organized or weighed against in-band systems should be set aside. In-band should be assured a fair hearing in the National Radio Systems Committee (NRSC) tests, where NAB has ample opportunity to see broadcasters' concerns figured into the test procedures.

A re-emergence of the NRSC is a fortunate byproduct of the compromise. The group's voluntary standards to clean up AM interference in the 1980s, later approved by the FCC, achieved uniform satisfaction if not an answer to all AM problems. It will be up to the task of testing digital systems and recommending a practicable complement or replacement to the current AM and FM service.

Two testing programs should give the radio industry and the FCC all the relevant data on all proposed digital audio systems. Full participation by all known DAR developers is encouraged; any other developers yet unknown are encouraged to reveal themselves.

But full participation is not yet assured. USA Digital, the consortium behind the well-publicized Project Acorn in-band, on-channel system, had not yet committed to participation in the NRSC tests as this issue went to press. If USA Digital does not step forward, have all NAB/EIA efforts to cooperate been for naught?

Other questions loom. What if the FCC ultimately decides to approve two digital systems? "The best interest of the country is not necessarily one system or the other," EIA's Gary Shapiro says.

Will there be in-band/new-band radios, like today's AM-FM sets? What will that do to consumer electronics costs? Will two different forms of DAR be able to develop into successful businesses?

The only answer for now is that digital audio will prosper. By pre-recorded media, cable (coax and fiber), satellite and microwave it will continue to flood into homes and cars. In April 1993, word of NAB-EIA compromise seems to increase the likelihood that radio broadcast will be added to that list.

—RW

much as 30 dB down from 100 percent modulation.

Truly, you cannot get something for nothing. High frequency tones in the 10 kHz region for AM RBDS data were chosen by understanding that the whistle filter would attenuate the audibility of the data tones. Tests conducted during daytime hours found that the same whistle filter used to remove the annoying 10 kHz whistle found in the nighttime test also removed the data tones from audibility. This confirmed that the concept of inserting data tones into the audio in the 10 kHz region was indeed realistic.

The AM receiver marketed today is of narrow bandwidth (3 to 5 kHz) and does not exhibit the problem with either first adjacent whistles or data tones. However, as we progress with extended bandwidth receivers, I am concerned that we will get tangled in a numbers game, as the insertion of a whistle filter will reduce the audibility of frequencies in the 10 kHz region. It is important to understand that the 10 kHz whistle experienced in the nighttime tests was far more audible than

the continuous tone placed 30 dB down into the program.

The audible spectrum is divided into octaves. An octave is a 2 to 1 spread in frequencies. An example is that the spectrum from 8 to 16 kHz is one octave. Similarly 50 to 100 Hz is also an octave. Therefore in actuality, a receiver design which would provide flat response to 8 instead of 10 kHz would have a reduction of 1/5th of an octave yielding a total of 6 and 1/4 octaves of audible spectrum instead of 6 and 1/2. By contrast, the audible spectrum of FM broadcast is approximately 7 and 1/4 octaves.

Therefore, it was concluded that a receiver design which was flat to 8 kHz in the "Wideband Position" and one which incorporates a 20 dB 10 kHz notch filter meets all the criteria required for an AMAX receiver (-3 dB @ 7.5 kHz) will also remove the audibility of AMRBDS data tones.

I would welcome any comments.

Richard W. Burden
Burden Associates
Canoga Park, Calif.

Clarifications, Corrections

In the March 10 RW, the parts list on page 36 ("Do It Yourself Amplifiers and Clocks") contained an incorrectly listed value. The correct value for R7-R34 is 330 ohms.

In the March 24 RW, a typographical error in the "Radio Has Amazing Specs" article on page 3 referred to FM frequency response instead of AM, which was correct. Also in the March 24 issue, the page 9 article "Radios Altered For SCAs" contained an incomplete phone number. Compol Inc.'s number is 1-800-722-0755.

In the March 24 RW, the story on page 49 ("Radio's Automated Future Is Here") failed to mention **International Tapetronics Corp. (ITC)**. ITC will introduce the DigiCenter, its digital audio management system, and feature a full live demonstration and multiple workstation demonstrations.

ITC also will display its redesigned DPR-612 digital program repeater.

ITC plans to exhibit its full line of analog tape cartridge machines, the Series 2, Series 1, 99B and Delta Series, as well as introduce an entire series of service programs designed for broadcasters for analog-only applications and analog-to-digital programs. ITC will exhibit in the North Hall, at booth 4602.

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93
NAB

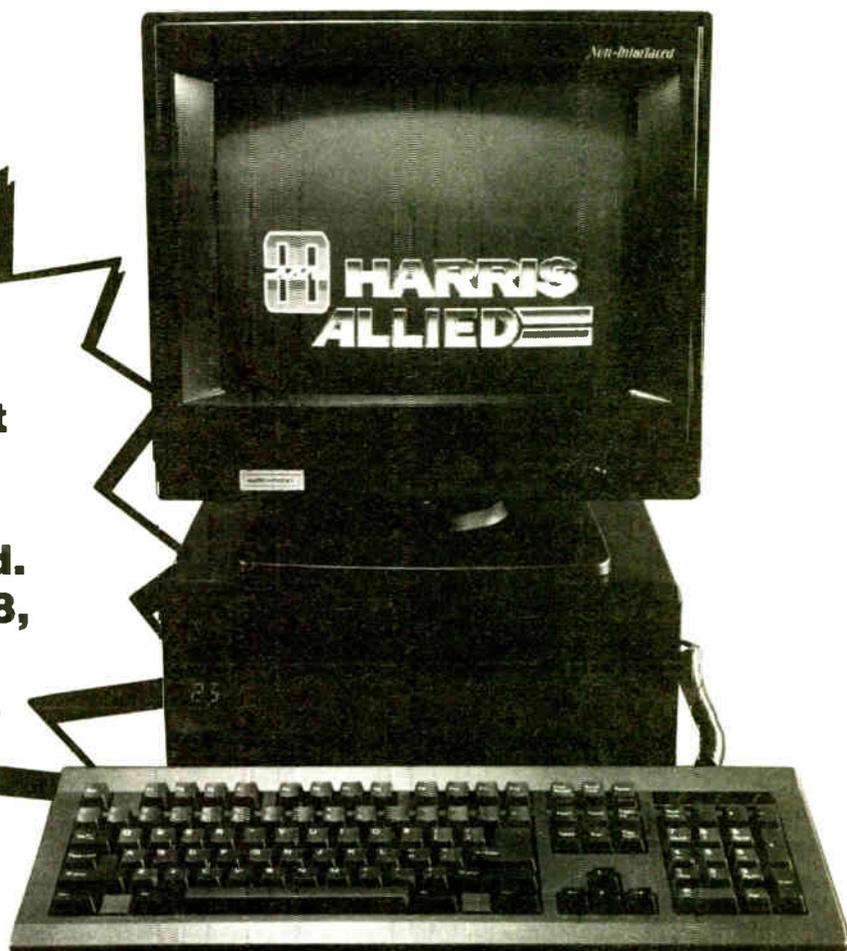
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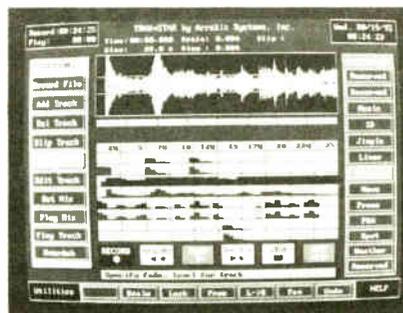
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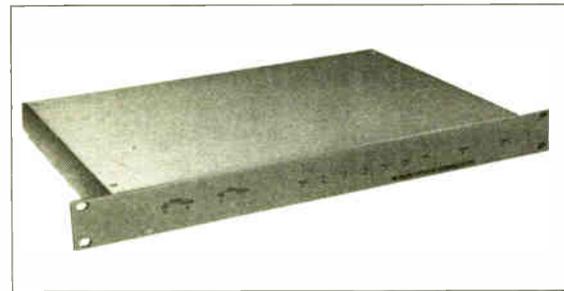


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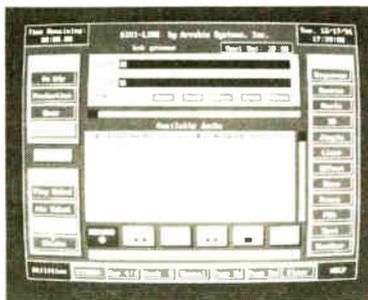
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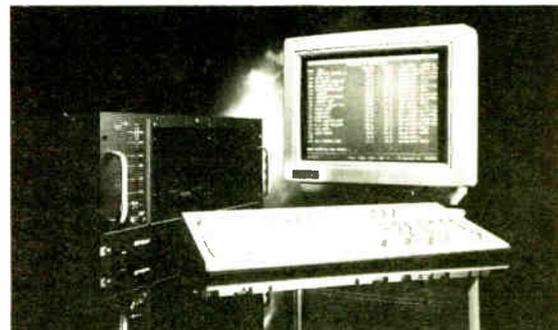


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Administration, Senate Clash on Auctions

by Randy Sukow

WASHINGTON A conflict has arisen between the Clinton administration and the Senate over implementation of spectrum auctions.

If the White House gets its way, almost all non-governmental spectrum users—including radio and TV broadcasters—will be required to bid for new license assignments.

But in the Senate, where the widely supported spectrum-auction bill (S. 335) exempts broadcasters from competitive bidding, Communications Subcommittee member John McCain (R-Ariz.) predicted: "It will be much more difficult to see this legislation become reality if that exemption were removed."

"I think that's a pretty good assumption," said Jim May, executive vice president of

the National Association of Broadcasters' government relations department.

At the same time, Subcommittee Chairman Daniel Inouye (D-Hawaii) was making bold guarantees: "This will be passed by the Senate, I assure you."

If McCain and Inouye are both correct, Senate leaders will be forced to prevail over a currently popular administration.

To the highest bidder

Licenses for all future spectrum-based communications technologies, including digital audio broadcasting (if in-band, on-channel does not succeed), would be awarded to the highest bidder under the Clinton administration's economic plan. Current licensees would be exempt at renewal time, but those seeking new broadcast assignments would have to bid.

Broadcasters also would be forced to bid for STL licenses, spectrum for ENG and all other auxiliary spectrum.

During a recent Senate Communications Subcommittee hearing, NAB President/CEO Eddie Fritts, repeated the association's view that broadcasters should be exempt from auctions because "broadcasters agree to serve the public interest and be judged on how they have accomplished that obligation when their licenses come up for renewal."

The Clinton Administration's response, as summed up by Commerce Secretary Ronald Brown in a letter to Inouye: "At a time when all citizens are being asked to make greater contributions in order to address the deficit problem and get our economy on a sound footing again, it would be appropriate for tax payers to realize some benefit from the commercial use of this national resource."

A lot of money, they say

The Administration estimates revenue of \$4.4 billion over four years from auctioning of spectrum opened up by S. 335. (The bill also provides for the transfer of 200 MHz from government control to the private sector.)

Such revenue estimates are problematic, according to FCC Chief Engineer Tom Stanley, who told the subcommittee that revenues will depend on the amount of spectrum to be auctioned, the types of services

that will be allowed to operate on those frequencies and when the auctions are held.

The amount of spectrum to be auctioned is another matter of controversy. The administration is pushing for auctioning of S. 335's entire 200 MHz and for any new allocations proceedings to follow. S. 335, as currently written, calls for a "trial" auction of 30 MHz with congressional consideration of further auctions after the trial.

Several subcommittee senators are believed to support increasing the trial size beyond 30 MHz, but few are expected to support the administration's call for auctioning of all new assignments.

Meanwhile, in the House, the 200 MHz has already been passed by the full body, but without spectrum-auction provisions. Hearings on H.R. 857, separate auction legislation proposed by Telecommunications Subcommittee member Michael Oxley (R-Ohio), and a proposal from House Telecommunications Subcommittee Chairman Edward Markey (D-Mass.) are expected later this spring.

Markey is one among many House members who fear the "deep-pockets" scenario of spectrum-auction implementation. All frequencies offered for bids could be "gobbled up" by large companies, he fears, while small companies and entrepreneurs are unable to compete.

His proposal is expected to either reform the lottery process or auction proposals to reflect his concern.

DAB Discussed at NRB

by Pamela Watkins

LOS ANGELES Many broadcasters who attended the recent National Religious Broadcasters (NRB) convention have more than a passing interest in digital transmission technology.

"DAB is coming," predicted Jim Sanders, vice president of technical services for Ambassador Advertising Agency, during the Radio Digital Production Workshop at the convention.

Citing media coverage of the rapidly advancing digital transmission technologies, Sanders said, "you just need to look at a recent issue of Radio World to see how rapidly DAB is going to be coming into place."

Although Europe and Canada are ahead of the U.S. as far as accepting a DAB delivery system (both are working on the Eureka-147 system), Sanders said much is to be gained by religious broadcasters once DAB is implemented in the U.S.

"Flatter frequency response, less distortion from modulation and demodulation of the audio, immunity from

FM multi-path interference like lightning, power poles, etc., and it will be possible to imbed a digital signal within the analog signal and have those two formats mutually exclusive," Sander said.

Along with DAB, the application of Radio Data Broadcast Services (RDBS) seems like a natural for the religious broadcasters, he added.

"DAB makes the application of RDBS feasible since both are in the digital domain...and potentially highly profitable," Sanders said.

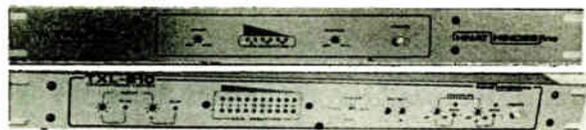
Technically, RDBS allows anything that can be converted to data, such as hooking up a FAX machine to your radio, providing a radio with a small screen on its face so sports scores, station logos, and traffic bulletins can be displayed.

Sanders challenged Christian radio broadcasters to become progressive visionaries rather than reactionary when it comes to DAB.

"Changes are coming down the line with DAB, and they will affect all of us in the home, studio, broadcast chain and program production," he said.

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Session Outlines Workstation Tips

by Pamela Watkins

LOS ANGELES A significant step toward an all-digital radio station is the purchase of a digital audio workstation.

During the National Religious Broadcasters convention, Christian Financial Ministries' Rich Rosell provided information on how to select a digital audio workstation as the first step toward the all-digital audio broadcast system.

The process of finding a digital audio workstation that would meet the needs of Christian Financial Ministries took approximately two years, Rosell said, so perhaps the question you should ask before any other is: "Do we really need a digital workstation?"

Once that decision is made, Rosell emphasized that before the process of selecting commences, everyone who will be in contact with the new system should refresh themselves on the basics of good audio radio production: Familiarize yourself again with areas such as blade editing, proper mixing and recording to the early stages of good script writing, and good announcing, Rosell said.

Know what you need

- Analyze the type(s) of production you do right now. You might do a lot of spot production depending on whether or not the station is commercial or non-commercial. Perhaps your station does voice editing, commercial spot production as

well as multi-track production.

- Be aware of the length of your spots. Are the majority 30-60 seconds or are they longer?

- Be aware of how your staff handles on-going projects. For instance, is a weekend program completed in one day with production time encompassing an hour of the studio, or is the program done in 15 minutes increments throughout the week?

- Take note of how many people will share the studio so that adequate storage capabilities are included in the system. Some systems are designed for spot production only and can't store anything over four minutes on the system. Whereas, others have a larger storage capacity.

- Be realistic about the budget and budget restrictions.

Ask other stations or users about their workstations, if they are using them. Ask questions like, What do think about your system? Does it save you time and therefore money? And so forth.

If saving time is one of your criteria, make sure the workstation encompasses the entire digital environment, such as, digital editing, digital mixing and digital recording, especially if the system will be used for feature programs.

To network or not to network?

Is the system networkable? Ask this question if the operation is large, and the plan is to purchase several workstations. Make sure the system will not become a dinosaur

because it has no expandable contingency.

What is the station's computer preference, IBM or Macintosh? Also, realize that using a computer to double for production and word processing will probably slow the system down, and it will be more susceptible to crashes.

Make sure you contact the manufacturers directly to obtain literature and most importantly, to set up a demonstration of the product. Try to get a demonstrator

who's not only a salesman, but also a user.

Don't be afraid to ask manufacturers for their client list.

Once you've set appointments for the demonstrations, Rosell added, bring your own audio material to be used. You know the sound quality of that audio better than anyone and will be able to ascertain if there is any significant difference.

During the demonstration, according to Rosell, here are other questions to be answered: Type of editing, PlayList or EDL? Time compression feature and how it sounds? Does it restore old programs? Does it do background loading and unloading?

Exhibitors' Reactions Varied at LA NRB Show

by Pamela Watkins

LOS ANGELES Although disappointed that the 1993 National Religious Broadcasters (NRB) Convention was considerably short of the 7,000 projected attendance, many radio hardware manufacturers were surprised and pleased with the caliber of potential clients and the exhibit hall.

The National Religious Broadcasters' convention (Feb. 13-16) was held in Los Angeles at the Convention Center, and was only the second time it has been held outside of the familiar Washington D.C. setting of many years. On opening day, February 13, the attendance was more than

3,000. But by the third day, Monday, February 15, the NRB had an attendance of 5,200.

In gauging companies that exhibited at NRB, most emphasized quality over quantity. Hardware manufacturers surveyed took a very positive view regarding the NRB as a valuable market segment, which was worth the trip and the minor inconvenience of distance. Some indicated the interest of the Christian broadcasters would be translated into sales in a matter of weeks.

"I honestly believe it has exceeded our expectations," Cablewave's Bill Meola said. "I really came out here with the pre-

continued on page 10 ►

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EBS Tone Tests Slated

► continued from page 1
 efforts, Mitchell said. Out of approximately 40 working-group members, 60 percent are from the radio industry.

The radio industry has led the push for new standards, or "at least in this state they definitely have," said Colorado EBS Chairman Paul Montoya, president and general manager of Broadcast Services, Lakewood, Colorado.

Signal blockage from the Rocky Mountain region's rugged terrain tends to expose the weaknesses in the current "daisy-chain" method for EBS alerting, he said.

Montoya is coordinating the field tests, which will include the participation of seven or eight Denver-area TV and radio stations, most notably Jacor Broadcasting's KOA(AM)-KRFX(FM).

The main concern of radio-industry participants, Mitchell said: "Will the system hold up under true emergency situations? How specific can the information be?"

Replacement of the daisy chain with a more efficient "web" system will be high on the list of approaches to test. "The web concept can be implemented by simple scanning receivers or by individual receiver circuits in the form of plug-in circuit boards that will allow stations to customize their web monitoring system for their individual operational areas," NAB said in its comments.

Web systems to be tested will likely use satellite, microwave and a combination of the technologies. "We're going to try it all...The beauty of field tests is that you can push the system to its limit," Mitchell said.

However, the Federal Emergency Management Agency (FEMA), which manages the Broadcast Station Protection

Program (BSPP), is unenthusiastic about costs associated with webs and shorter tones. "New equipment will be required to replace the existing two-tone alerting equipment...It is not likely that FEMA will fund the new alerting equipment through the BSPP," the agency said in its reply comments.

Expensive?, Yes

Satellite monitor systems are similarly "very expensive" and are "beyond the current scope of the BSPP," FEMA said.

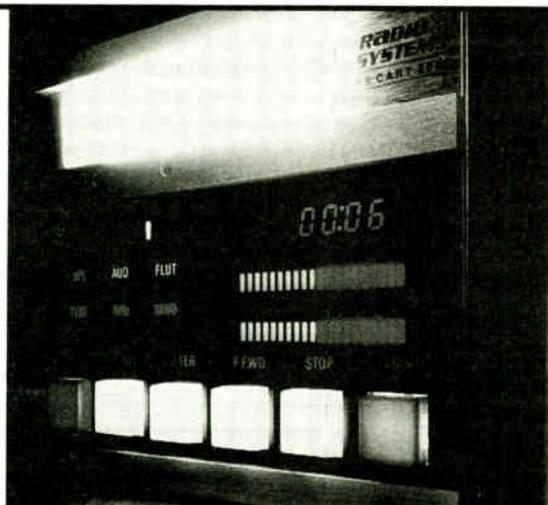
In answer to the two-tone concern, CBS's comments suggested allowing broadcasters to modify their receive equipment for shorter tones. "No harm would result from allowing broadcasters to immediately reap the benefits of this improvement," CBS said.

Radio Broadcast Data Service (RBDS) technology integrated into EBS, an approach endorsed by the Electronics Industries Association, is also likely to be tested this summer. Sage Alerting Systems Inc., Stamford, Conn., actively lobbied for its own RBDS system for the task in its reply comments.

"A new EBS system is in the best interest of the public and it needs to be implemented in a timely manner," Sage said. "Perhaps those few broadcasters who desire to maintain the status quo do not understand the cost benefits of effective new technologies and other benefits such as the reduction in over-the-air testing or possible manpower reduction."

Capital Cities/ABC said immediate Sage-system approval "would be a mistake." RBDS is not equally applicable to AM and FM, and should Sage or a system like it be standardized, "it would become necessary to totally restructure the EBS system state-by-state to eliminate all primary AM stations," the network said.

...a shorter and different burst of eight-to-10 seconds will be tested this summer.



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Exhibitor Reaction Varied at NRB

► continued from page 8

conceived notion that because it was on the West Coast, it wouldn't be as active as it really is, but we found it to be just as active as the Washington area."

Gordon Allison of TTC also noted a serious buying mood from the somewhat smaller crowd: "Last year we went to the

Jon Clark of Shively Labs was exuberant about the floor traffic's buying mood. "Sunday, February 14, was probably the best single day that I've had at an NRB in eight years in doing NRB's myself," he said. "I found myself talking for long stretches at a time to people that really had an interest in radio hardware, and that kind

said the company exhibited at NRB for the first time. "It appears to me that the people who are here are very serious about doing their work, and they are looking for ways to increase their productivity (with a digital production workstation)."

A serious attitude

Some hardware was introduced for the first time at the NRB, and some reps were emphasizing products which they believed fit the religious market niche. Others displayed their products as a window into the 21st Century.

Bob Boehme of BEXT said his company had a mix of old and new products. "Most importantly, we have a new FM unit, which is a translator. We can take and receive an FM station and re-transmit it out on another frequency," he said.

Radio Systems also had new products including the "SuperClock" system, an integrated clock timer system. Braverman also noted that the company's entrenched line of broadcast consoles are medium and small market-oriented, appropriate for many of the religious stations.

Cablewave introduced new directional and high powered FM antennas at NRB. "The high powered antenna now goes from 30 kilowatts to 50 kilowatts. So we're up in the Class C area of FM where we weren't before," Cablewave's Meola said.

Shively's Jon Clark said that his sales staff emphasized the translator antenna market and the very low power antenna market because there's a lot of need.

"I'm not discounting high power," he said, "because I spent over an hour with a gentleman speaking about the pros and cons of doing two Class C 100 kilowatt stations on a tower combined or with separate antennas."

Gordon Allison of TTC said the primary new product at the show was the Model X Exciter, that enables a 100 watt amplifier to become a 100 watt transmitter.



Radio Systems' President Dan Braverman at the 1993 NRB Show.

NRB in Washington, D.C., and we had apparently more traffic than what we had this year, but most of the people were tire kickers and vacuum cleaner types.

Energy-Onix's Ernie Belanger said NRB met its expectations, but it was the first time the company had exhibited. "The NRB is a new show for us. This is the first time that we've come. And coming here is pretty much what I expected. Individuals look to replace their AM transmitters, looking for high powered short wave transmitters as well, and there is some interest in solid state FM."

of surprised me because this is not really a hardware crowd."

Radio Systems Dan Braverman was not happy with the floor traffic, but emphasized that his company has been faithful to the NRB conventions.

"I think that our expectations about lower attendance are realized," Braverman said. "I'm happy I'm here, and I would have made the decision to come even in retrospect, but I'm afraid that exactly what I expected happened, which is fairly dramatically lower attendance...."

Harold Drews of Spectral Synthesis

RF Guidelines Implementation Pushed by FCC

by Randy Sukow

WASHINGTON Broadcasters should not be adversely affected—in cost or over-regulation—by proposed new FCC rules to monitor radio frequency emissions, according to broadcast engineers and industry advocates.

The proposed guidelines are based on a standard developed over the past ten years by the Institute of Electrical and Electronic Engineers (IEEE) and adopted last year by the American National Standards Institute (ANSI). The "two-tiered" standard sets field-level maximum radiation at 1,000 mW/cm² for controlled (workplace) exposure and 200 mW/cm² for uncontrolled (public) exposure.

ANSI's current standard sets 1,000 mW/cm² in all cases.

None of this is expected to generate much change in a typical radio station's layout. In fact, "there are some departures (in the FCC proceeding) from the strict word of the new ANSI standard which I think are going to be appropriate for broadcasters," said consultant Jules Cohen of Jules Cohen & Associates, who participated in the IEEE standards process.

The FCC also proposes new restrictions on body currents absorbed from emissions below 100 MHz.

The Commission expects to release the text of its full proposal by this month (April) and will probably allow for a long comment period—approximately four months. But after comments, the Commission is likely to move rapidly to complete the proceeding.

A significant standard

"When the entire scientific community, after a decade of debate, proposes a significantly more conservative standard in terms of human beings operating around RF, I think that's a fairly significant step," FCC Chief Scientist Tom Stanley said. "So it's very important I think that the Commission does process this to reflect the scientific state of the art."

Cost is really not an issue, according to Barry Umansky, deputy general counsel, National Association of Broadcasters. "I don't think we necessarily have to be looking at a very expensive set of new regulations," he said. "I think if the FCC does the right thing—and we have all expectations that they will—we will have a better standard."

"It would appear that it would be a rare case that any broadcaster would have to do anything more than he's already doing," Cohen said.

But Dane Ericksen, senior engineer for the consulting firm Hammett and Edison, warned that the FCC still might not do it right. The body-current regulations are still vague and "if

continued on next page ►

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Professional Audio Targeted For DCC

by Koos Middeljans

EINDHOVEN, the Netherlands

In 1992, Philips launched the DCC (Digital Compact Cassette) system for consumer applications in the U.S. and other countries.

The introduction of the DCC players, pre-recorded DCCs and blank cassettes was executed in close cooperation with other manufacturers of consumer electronics, the music industry and tape manufacturers.

Apart from making the DCC product

available for the consumer audio business, Philips also strongly supported the professional infrastructure of the music duplication industry by taking responsibility for developing, manufacturing, installing and servicing complete production lines.

Philips has done this set-up in close relation with a number of already dominant players in this field such as Gauss, Lyrec, Tapematic and Otari.

The present operational DCC high-speed duplication is supporting the pre-recorded music cassette business. Other cassette

applications such as spoken books, music specials and others in the area of small volume business will be supported by using other duplication equipment.

The manufacturing capacity for pre-recorded DCC now is being accomplished all over the world, so that the expected success can be backed by a large amount of titles and volume production.

During 1993, Philips will extend the availability of the DCC pre-recorded products into other regions such as Korea, Taiwan, Hong Kong, Singapore, Brazil and Australia.

The DCC bit rate is fixed at 384 kBit/sec, but with a variable word length of samples between 16 and 24 bits, it allows for an increased performance level over present CD quality. Such a high performance standard generates a very good platform for professional equipment manufacturers and users. (Editor's note: As with the MiniDisc, however, the compression-based DCC can result in audible degradation during multigenerational editing, a problem not inherent in digital formats such as DAT.)

Based on MUSICAM

The basis of the standard is the ISO/MPEG, which has been the guideline for the technology (and the Philips MUSICAM standard), and will be available for other applications during the coming years. Philips already has established a number of contacts in related areas and will extend this into operational platforms.

In addition, DCC technology is embedded in the MUSICAM standard and therefore a number of advantages become immediately clear for the next application areas to be studied. MUSICAM is, apart from other applications, the chosen and ideal system for digital audio broadcasting (DAB) in Europe.

As this technology continues to develop, the industry will need carriers within the MUSICAM domain for recording and broadcasting these new audio signals.

□ □ □

Koos Middeljans is business unit manager for Philips DCC Mastering and Duplication, in the Netherlands.

In-cassette duplication

With high-quality duplication practices accomplished, Philips wants to ensure that the high standards and guaranteed DCC quality level hold true for DCC in-cassette duplication, likely to be utilized in professional and broadcast applications.

DCC coding and decoding principles are based upon newly developed algorithms, thus offering an open system. The better these are, the better the audio performance will be.

As a result, DCC technology is regarded as a counterpart to the compact disc. An 18- to 20-bit recording will maintain this impressive quality level once the DCC mastering and duplication equipment has transferred the recording onto the DCC pre-recorded music cassette.

In ways, the DCC is actually able to exceed the high-quality standards of CD.

FCC Opens RF Proceeding

▶ continued from previous page

there aren't some clarifications by the FCC, then I can see this standard as having a tremendous burden on broadcasters to demonstrate compliance," he said.

Ericksen and others raised an objection during the IEEE/ANSI standardization process over the proposed 100-MHz (the middle of the FM band) cutoff level for body-current regulation. "It may be necessary, in order that the whole FM band be treated uniformly, to extend that requirement all the way up to 108 MHz. That's going to have to be explored," Cohen said. An exemption for FM broadcasters is another possibility.

Further detail on the Commission's FM body-current proposal will be included in the rulemaking document to be released this month, said Robert Cleveland of the FCC's Office of Science and Technology.

Local ordinances

"The real wild card is whether local governments that have adopted the new standard—King County in Washington state comes to mind—whether those governmental entities will acknowledge or defer to any policy interpretations the FCC comes up with," Ericksen said. "I

see it as unlikely that the FCC would preempt, although I think it would be wonderful if they would."

Public pressure was placed on local and federal governments by recent national reports on RF radiation health hazards from cellular telephones. (Health experts at a February House Telecommunications Subcommittee hearing agreed that cellular phones probably do not cause cancer, but said some users could be at risk.

Commissioner Ervin Duggan, at last month's regular FCC meeting, was sensitive to any suggestions that the RF radiation proceeding was a reaction to the cellular-phone stories. "I simply want to make sure no one forms the misimpression that this Commission is reacting to media hype and hysteria," he said. "This is part of a careful process of policy development and scientific investigation."

The FCC's RF radiation proceeding is expected to be the center of attention during next month's (May 3-5) annual Electromagnetic Energy Policy Alliance (EEPA) symposium in Alexandria, Va. The FCC's Stanley and Cleveland have been invited to participate, said NAB's Umansky, an EEPA board member.



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Sony Introduces Pro MD

by David Bush

BASINGSTOKE, HAMPSHIRE, U.K.

The launch of a new consumer format always arouses more than a passing interest from the professional fraternity.

Both CD and DAT are examples of digital formats that owe their lifeblood to the consumer world, but also have found favor in professional environments.

It is wise, however, to consider carefully the potential of a format's performance and whether it really is suitable for the development of professional hardware.

The Sony MiniDisc does indeed appeal to the professional as an economic media. It can be expected that hardware and media

cost will compare very favorably with anything in the existing radio station. It is digital, compact, very well protected in a caddy, re-recordable (more than one million times, but who's counting?) and has a playing time to match CD at a maximum 74 minutes.

And, of course, it's a disc, with the associated advantages of near-instant access time and durability.

With this in mind, Sony will commence with introduction of MiniDisc for broadcast-simple transmission applications. In 1993, Sony will introduce a low-cost MiniDisc recorder and player designed essentially to fulfill the tasks that are today the domain of the ubiquitous NAB cart

machine and also to provide for the playback of pre-recorded MiniDiscs.

The machines will look and feel like today's cart machines and yet provide up to 74 minutes of material, along with high-quality digital audio accessibility at a touch and a clear display to inform the operator of the title at a glance. The storage of dozens, even hundreds of spots on one disc also can be envisaged.

Does this mean that the days of DAT as a production media are already numbered? Well, not quite. MiniDisc, in order to achieve 74 minutes of playing time on a 64

mm disc, uses ATRAC (Adaptive Transform Acoustic Coding) data compression to reduce the data necessary by a factor of approximately five. Using this system, which is based on well-known psycho-acoustic effects, produces an impressive result. In listening tests, performed under critical conditions, many of the industries' finest have disagreed over whether they have been listening to the 16-bit original or the ATRAC-encoded version.

The difficulty arises, however, when we want to digital process such signals.

continued on next page ►

In-Band Guided by NRSC

► continued from page 1

USA Digital's Project Acorn, an in-band system, had renounced its intention to submit to testing.

USA Digital officials said the consortium would not participate until broadcaster concerns were addressed. (At press time, USA Digital had not said whether it would resubmit its system, but there are five other proponents that have submitted proposals).

Despite the latest compromise, the dispute may only have been pushed into the future. Several questions still remain to be answered including what happens if the NAB sticks with in-band—even if the EIA DAR Subcommittee recommends another system to the FCC.

Gary Shapiro, vice president of EIA's Consumer Electronic Group, declined to predict a scenario if the EIA recommends a non-IBOC system.

He said the EIA subcommittee or the NRSC, with its in-band agenda, may not select the best DAR system on its technical merits, which was the criteria used to formulate a TV stereo standard in the early 1980s.

"What happened with TV stereo was that there was an interest by all industries to come up with the best system," Shapiro said. "And it was just a matter of testing in recommending that."

"Here, we don't have an interest in all industries coming up with the best system," he added. "I think the FCC will act

in the best interests of the country. The best interests of the country is not necessarily one system or the other."

Shapiro restated his position that the other related issues including voting procedures are secondary to the testing at this point.

"Our objective is to gather data," Shapiro said.

Michael Rau, senior vice president of the NAB's Science and Technology division, said the NAB believes it can work with the EIA on the DAR issue, even though the broadcasters are not interested in non-IBOC systems.

"I don't feel like we are in conflict just because they are testing different systems than in-band, on-channel," Rau said. "I think the agreement is really great news. But I can't say it is going to be smooth sailing. I am sure there are going to be some rough spots along the way."

Potential difficulties would include agreement by EIA and NAB members within the NRSC on test procedures for the in-band testing, Rau added.

Rau said the voting procedures are no longer an issue since the IBOC testing administration will be handled through the NRSC, which already has prescribed voting procedures.

The EIA plans to begin testing in July and complete testing by early 1994. Rau said the NRSC will complete evaluation of in-band testing data before the June 30, 1994 deadline.

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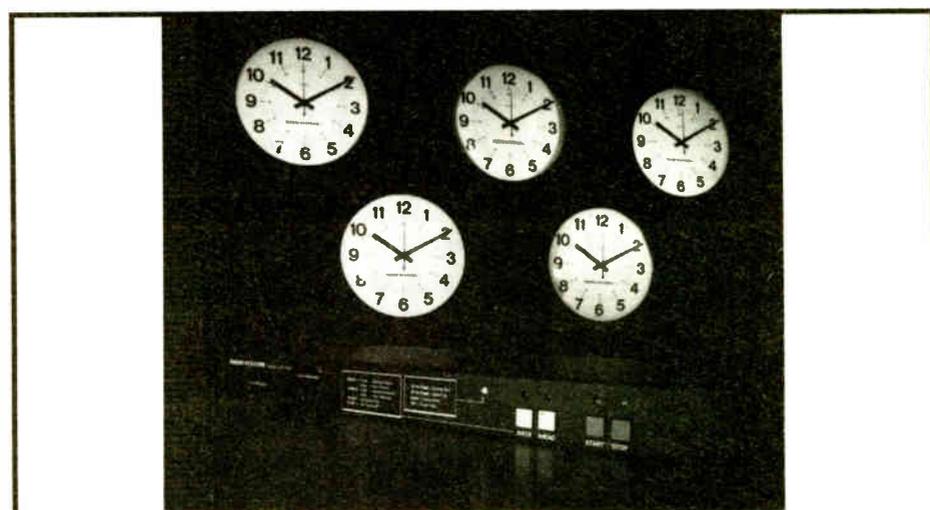
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Shamrock, Malrite Sign Station Deal

by Nancy Reist

SAN FRANCISCO Shamrock Broadcasting, Inc. is moving to take advantage of the FCC's liberalized radio ownership regulations by merging their radio properties with those of Malrite Communications Group Inc.

The transaction, which is contingent upon FCC approval, would bring Shamrock 21 radio stations, including two AM/FM combinations in the San Francisco market. Shamrock estimated that the deal would be worth more than \$300 million and would rank it among the biggest radio-only companies. Shamrock Broadcasting is a subsidiary of Shamrock Holdings, the investment company owned by the Roy E. Disney family.

Clifford Miller, a business associate of Disney's, explained that this is a very appealing deal for Shamrock Broadcasting.

"It was an opportunity to buy nine stations in a bulk transaction and get us into some markets where we are not now represented, especially New York and Los Angeles. More importantly, we already have two existing stations in San Francisco, and Malrite has two stations, so that would give us four stations in a very major market, and an opportunity to test the opportunities available to broadcasters today under the new FCC rules."

Shamrock Broadcasting already owns KABL-AM-FM in San Francisco. This deal would bring them Malrite Communications' San Francisco stations: KSAN-FM and KNEW(AM). Additional Malrite stations included in the deal would be WHTZ-

FM New York; KLAC(AM)-KZLA-FM Los Angeles; KFAN(AM)-KEEY-FM Minneapolis; and WHK(AM)-WMMS-FM Cleveland. WEGX-FM, Philadelphia is owned by Malrite Guaranteed Partners, L.P. and is not part of the transaction.

Shamrock currently owns 14 stations including the San Francisco stations; WWWW-AM-FM Detroit; KZFX-FM Houston; WFOX-FM Atlanta; KXRX-FM Seattle; WWSW-AM-FM Pittsburgh; KXKL-AM-FM Denver; KMLE-FM, Phoenix; and WHB(AM)-KUDL-FM Kansas City, but the Kansas City stations are scheduled to be sold to Apollo Radio.

Stanley P. Gold, president and chief executive of Shamrock Holdings, stated that Shamrock may pursue additional major market radio station acquisitions, including some in markets in which the companies now operate.

Miller said it is too early to discuss any changes that will take place in the individual stations as a result of the merger. "Our people are just now visiting the Malrite stations and getting acquainted with the people and the format." He added that Milton Maltz, who was the owner of the Malrite stations, will become a board of directors member of Shamrock Broadcasting and will be a minor stockholder. Maltz also will serve as consultant to the company.

Maltz could not be reached by *RW* for comment, but in a press release he stated: "With new FCC rules in place, the strongest strategy is to own equity in a larger radio universe distributed over a wide range of

major markets. The Shamrock/Malrite alliance fulfills this objective."

Miller said Trefoil Capitol Investors, L.P. will play an important role in financing the deal. "Trefoil is an investment company which includes as major investors Roy Disney and Stan Gold. It was created by executives of Shamrock Holdings as an independent investment vehicle. It has other major investors as partners as well. Trefoil plans to supply a significant part of the capitol to make the

transaction viable. They, in turn, will become major owners and stockholders of Shamrock Broadcasting once this transaction is complete. The major stockholders then would be the Roy Disney family, Trefoil, and Mr. Maltz...with a minor position."

Miller said the transaction does not include the companies' non-radio operations. "The television properties that Malrite owns will continue to be owned and operated by Mr. Maltz. Our television stations will continue to be operated by us, but Shamrock Broadcasting will end up to be just a radio company, not a radio and television company."

MD Slated For Pro Use

► continued from page 12

Conventionally, any type of digital processing requires binary multiplication. Digital level changing, for example, involves the multiplication of a 16-bit audio sample with a 16-bit multiplying coefficient, yielding a 32-bit result that can later be reduced to a 16-bit output.

In the case of a bit-rate reduced signal, it is therefore necessary to first convert to a 16-bit code before signal processing can take place. Successive conversions to and from 16 bits may well result in audible degradation.

The conclusion must therefore be that for critical signals such as music recording, BRR (Bit-Rate-Reduced) should be kept out of the domain of production where many successive conversions to and from linear code are inevitable.

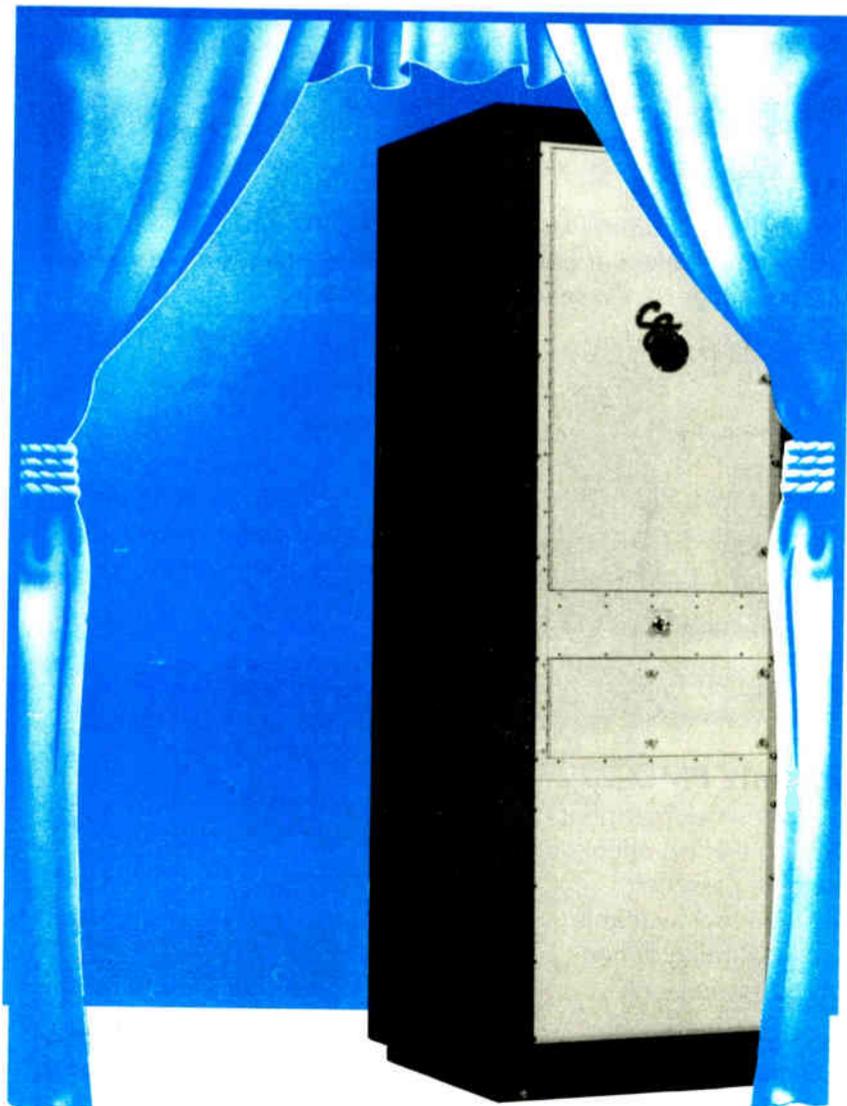
Whether BRR technologies need penetrate further into the broadcast chain remains to be seen. Cost of storage of digital audio and the need to transfer at speeds much higher than real time in digital networks are motivating arguments toward that end. On the other hand, signal degradation ought to be resisted and today there is no method for transparent complex digital processing of BRR signals without some audible compromise.

□ □ □

David Bush is product manager of Sony Broadcast and Communications Ltd. in Basingstoke, Hampshire, U.K..

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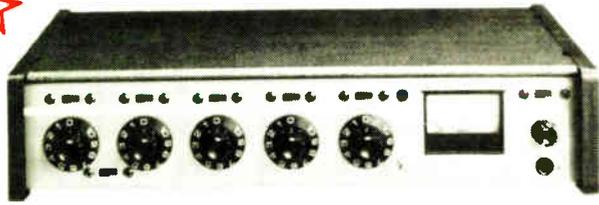
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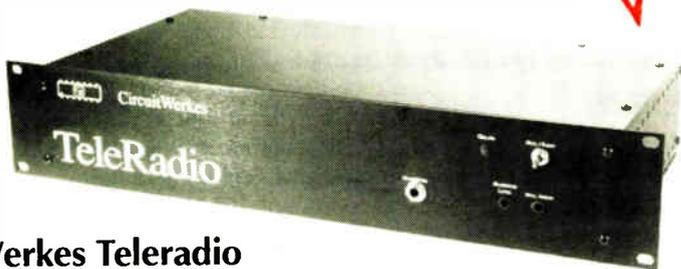
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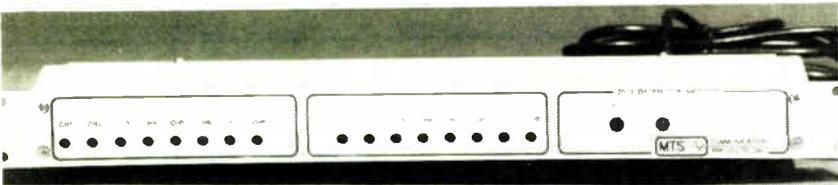
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NEWSWATCH

► continued from page 2

Napoleon, Ohio; District 13, Ross Beiderman, president, Midwestern Broadcasting Co., Traverse City, Mich.; District 15, Bayard H. Walters, president, The Cromwell Group, Nashville.; District 17, Wayne Vriesman, VP of Group Radio, WGN(AM) Chicago; District 19, J. Douglas Williams, president, KWOX-FM, Omni Communications, Woodward, Okla.; District 21, Paul Hedberg, president/CEO, KMRS/KKOK, Hedberg Broadcasting, Morris, Minn., and District 25, Harold Greenberg, president/GM, KMAS(AM), Shelton, Wash.

Sports Collector Show Gains News Affiliates

NEW YORK The Sports Collector's Radio Show recently added radio markets Honolulu, Oklahoma City, Rochester, N.Y., Santa Barbara, Calif., Ft. Pierce, Fla., Torrington, Conn., and Youngstown, Ohio, to its syndicated national network.

The live call-in show is the only radio show dedicated to sports collecting of baseball cards, autographs, and sports memorabilia. The show is hosted by John L. Raybin, publisher of the Baseball Autograph News. The show airs every Sunday, 9 p.m.-10 p.m. EST.

John Behnke To Receive Belva B. Brisett Award

LAS VEGAS The NAB will present Fisher Broadcasting Board Chairman John Behnke with the Belva B. Brisett Award at the 1993 NAB Convention in Las Vegas.

Behnke will receive the award on April 21 during the Policymakers Breakfast, which is part of the Law and Regulation

Conference. Behnke is being honored for his advocacy in the cable/telco debate.

Dolby S Cassettes Planned for Release

SAN FRANCISCO Analog cassettes are not dead yet. WEA Manufacturing recently announced that new Warner Brothers, Atlantic Recording Group and Elektra Entertainment labels will release pre-recorded cassettes with Dolby S noise reduction.

Dolby S, the consumer version of the professional Dolby SR, offers improved signal-to-noise over Dolby B and C, and is said to make analog recordings indistinguishable from digital recordings.

Quello Hands Off OIC Directorship to Ball

WASHINGTON Acting FCC Chairman James Quello has designated James L. Ball as acting director of the FCC's Office of International Communications (OIC).

Ball, who had served as acting director of the OIC, has been with the FCC for 18 years and has held positions in the Common Carrier Bureau and International Facilities Branch.

RF Guidelines Available

WASHINGTON Copies of the FCC's proposed RF radiation guidelines (IEEE C.95.1-1991 or ANSI/IEEE C.95.1-1992) can be ordered by calling the Institute of Electrical and Electronic Engineers (IEEE) at 1-800-678-IEEE.

The new guidelines were developed to replace the old ANSI C95.1-1982 regulations, and will include two tiers: one for workplace exposure and the other for public exposure.

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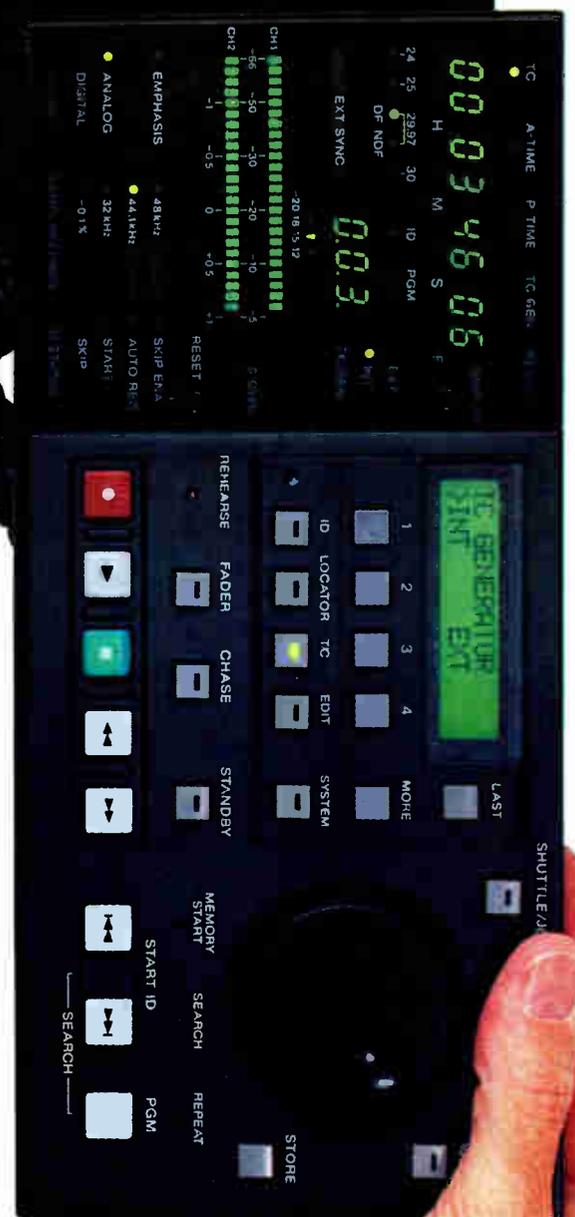
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Running Radio

Improve operations through automation, page 25.

Your Resource for Business, Programming & Sales

Network Revenue Climate on an Upswing

by Mary Ann Dorsie

WASHINGTON The year in network radio promises to be better and brighter than last year's financial fiasco, many radio network executives predict.

Networks witnessed a 13.5 percent drop in sales last year, a complete contrast from the first quarter of this year and the expected outcome for the year as a whole.

This year's forecast calls for increased revenues of at least 4 percent, according to the networks.

The turnaround

"This year has started off significantly different from the way last year ended," said Robert P. Kipperman, VP/GM of CBS Radio Networks. "Last year, radio networks were down 13.5 percent. This year, so far, the radio network industry is just about double digits above last year."

Last year's decline in revenues partly can be attributed to the full course of Summer and Winter Olympic games, Kipperman said.

"Both of those events, I believe, siphoned off major network radio dollars," he said. "Sponsors that wanted to

participate in the Olympics but didn't have the advertising dollars to do so—they took it from the radio budgets."

Unistar Communications Group President Bill Hogan agreed with Kipperman regarding the positive outlook for networks.

"This year we're looking for a complete turnaround. I think we're already seeing it," Hogan said.

The first quarter was pretty strong, Hogan said. January was up about 6 percent, and he expects the February figures to be even higher, he said.

Hogan predicts the year will be up anywhere from 4 to 7 percent. He also attributes last year's downfall in part to the Olympic games, but sees a definite change this year.

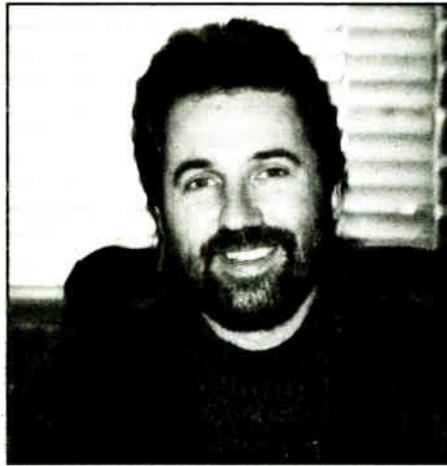
"I think there's a little more excitement to the industry," Hogan said.

"It's coming back."

Dave Kantor, Executive VP of ABC Radio Networks, said networks are starting to return to revenue levels of previous years.

"We see it rebounding," Kantor said. "We're not sure if it will rebound to 1991 levels, but it's definitely coming back."

Premiere Radio Networks, however, said it "bucked the trend" in 1992 by staying ahead of the game, said Steven Lehman,



Thomas A. Ferro, Executive VP & General Manager, Westwood One

Premiere's president and CEO.

"Premiere's net revenues were up 25 percent for 1991-1992," Lehman said.

The network was able to do this by keeping a close eye on programming, Lehman said.

"We were able to successfully balance the amount of programming we had with the commercial inventory we sold," Lehman said.

He said Premiere sold out first quarter, and he has similar expectations for the second quarter.

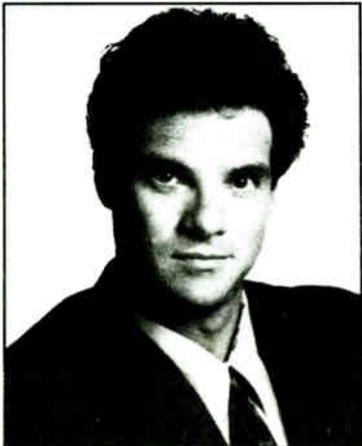
"I think it's going to be a very strong year for network radio," Lehman said.

New business

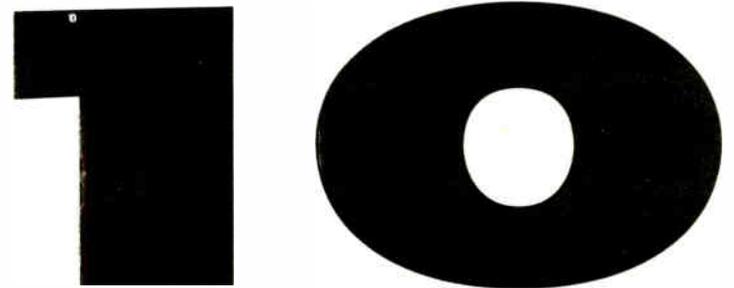
Advertisers who pulled away from network radio are now turning back with budgets 30 to 70 percent above what they were last year, Kipperman said.

"The new business the networks have been focusing on over the last couple

continued on page 21 ▶



Steve Lehman, President/CEO, Premiere Radio Networks



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Hamburg's OK Radio Aims for Mass Appeal

by Michael Lawton

HAMBURG, Germany On August 27, 1990 at 5:59 a.m., OK Radio was still a rock radio station for enthusiasts.

Trouble was, there weren't too many rock music enthusiasts in the city of Hamburg, and the station's audience was hovering around 2 percent. On August 27 at 6:00 a.m., the rock fans were shocked out of their morning doze when OK Radio played "Pump up the Jam."

OK Radio has not looked back since.

Attacking the market

In its new incarnation as a Contemporary Hit Radio (CHR) station, it hoisted listener figures within a year to 12 percent of the Hamburg audience. Last year, they were up to 15 percent.

Owner/manager Frank Otto recognized there was no future for the station without major changes. And he was in a position, unique in Germany, to push those changes through.

Before Otto got into radio, he was an artist and music producer. He was a wealthy man—part of a mail order dynasty—and had a share in the station from its inception in 1988 before he took it over completely in 1989 after an internal management crisis.

What makes him unique is that he is the only radio station owner/manager in the

country. All the other stations are owned by consortia, usually including major press interests. That gave OK Radio a flexibility that few other radio stations could boast.

A different approach

Had OK Radio been owned by the usual consortium, there would have been endless arguments about the station's future.

As it was, Otto could push the idea to change music formats through on his own—inspired by U.S. commercial radio practice.

The change was kept secret—another advantage of one-man ownership—until the fateful 6 a.m. changeover. The idea was that the outcry from the faithful rock fans would echo around the local press and guarantee the station plenty of unpaid

publicity in the first days of its new format.

It worked.

Most of Otto's other ideas have worked as well.

Against the German convention of interchangeable music presenters, the station's DJs are sold as personalities. Advertising is played in short bursts around speech highlights to not interrupt the music, giving the listener the false impression that there's less advertising than on other stations.

A database of the station listeners, what Otto calls the listener club or the "OK Network," is used to target advertising campaigns at closely defined consumer groups. The station also puts a lot more effort into self-generated music research than is usual in Germany.

Studio design

It is no surprise that OK Radio's willingness to flout convention is evident in the technical field as well.

When the station decided that the time had come to renovate the old low-budget studio facilities, Technical Director Jörn Landmark chose to look around discotheques and restaurants for his models. He thought that "a DJ who feels good will sound different. The audience can immediately tell subconsciously if a presenter is putting on his good humor



Germany's discotheques inspired the design of OK Radio's on-air studio.

continued on page 31 ▶

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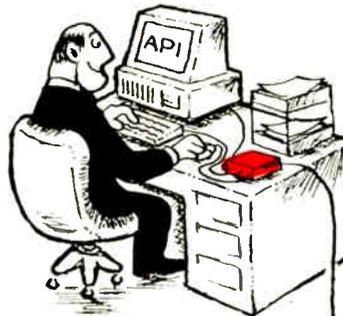
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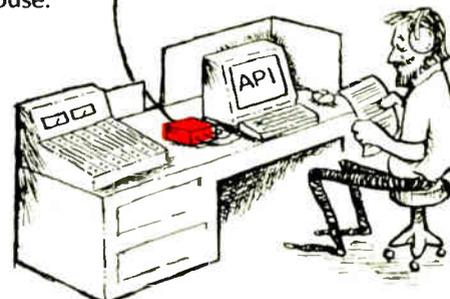
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PROMO POWER

Simple Contests Can Draw In Listeners

by Mark Lapidus

WASHINGTON For this paragraph to work, you have to read it in your best DJ voice: "You're caller number 105! If you can name all of Paul McCartney's kids, tell me where Jimi Hendrix is buried and sing the Star Spangled Banner, you'll rip me off for a brand-new Q105 t-shirt."

Regardless of how stupid this sounds, you can still hear something like it on many stations around the world. Why? Because even dumb contests create excitement and entertainment. However, the better the elements of the contest are,

the more effective the outcome.

State your goal. Are you trying to: get people to listen longer or more often (TSL)?; obtain new listeners (CUME)?; or are you contesting for sales promotion purposes?

■ **For Time Spent Listening:** This type of contest is structured so that your audience must keep listening to win. A standard cast TSL contest that is resurfacing in many large markets gives away a thousand dollars an hour from 8 a.m. to 5 p.m. Each hour, listeners stay tuned for a designated song or sound effect. When the song or effect airs, the right caller wins the cash. If you're unable to toss out that kind of money, you can do this same TSL contest with any other valuable prize like a CD, a boxed set, or a VCR.

■ **For Cume:** You're attempting to get more people to sample your station at a given time. Many stations do this by giving away cash at a specific time. For example, "tomorrow morning at 7:20, WCXR is going to give away a trip to Paris to visit Jim Morrison." If visiting Jim is not your station's idea of fun, perhaps you could give away a bowling alley for a day or enough movie or theater passes so your winner's entire office can see a show.

■ **For sales promotion:** This is the wildcard. Some of these are terrific, others are real stinkers. I've had to give away everything from cars to fifteen percent off ice cream certificates. The neat stuff you make a big deal out of, the cheapies you bury coming out of stop-sets in the middle of the night. There are times when you just have to say no. You should always find out what goal your client has in mind when you are asked to do a contest. This opens up an avenue for discussion of the prize and the method of giveaway.

For example, if they're trying to drive

traffic to their store, they might be better off giving away the prizes at the store than on-air: "The first fifty customers dropping by Townsend's Guitar Shop today win free Who songbooks."

This makes a contest easy to explain on the air. A simple explanation means more people will understand and therefore more people might play. This is true regardless of the size of the prize. The method of giving a prize away is frequently referred to as a *trigger* (as in the trigger of a gun).

Trigger techniques

Easy triggers can be mass appeal songs, like "be the tenth caller when you hear The Doors play *Light My Fire* and win a Black and Decker fire extinguisher" or you may use sound effects as in "be the tenth caller when you hear the sound of the jet plane and you're off to Cancun." The easiest trigger is "call me now and win."

Unfortunately, radio stations too often make listeners hop through too many hoops to win. I recently heard a station giving on-air clues for a scavenger hunt where listeners had first to figure out what stores had the entry blanks for the contest. Most people do have real lives, whereas your station is, at most, light entertainment.

Whenever possible, tie in your contests with your market position. Make the contest fit your format. Here's a great sales promotion that can make money for a "classic rock," "light rock" or just "rock" station. Find a dealership with several locations willing to give away a car. In each location fill the car with the same number of foam rocks. Have people go by the dealership and fill out a registration form guessing the number of ("classic") ("light") rocks. The person who comes the closest wins the car. Of course this does nothing for TSL or CUME, but it may assist in solidifying

your image as a "rock" station and it will generate dollars.

Learn to use outside media. For major CUME or TSL contests you should consider using some form of media other than your station to get the word out. Sure, hit the big contests as hard as you can on your own property, but nothing beats television's ability to reach out beyond your weekly audience for fresh blood.

Specify the rules

No contest should hit your airwaves without written rules. This goes from the cheapest t-shirt/tenth-caller contest to that house you're going to give away. Rules are the *Genesis* in your contest bible. They answer DJ and listener questions, settle disputes and may be your only protection in a lawsuit. The two basic concerns to address are "The Prize...a back massage from Lovely Rita's," and "How to Win...be the 10th caller whenever we play the Beatles."

Complete limitations should be spelled out under the "How to Win" column. Opinions differ as to how or even if you're required to air contest rules. If it's a major contest, consult your broadcast attorney. It's generally recommended that rules be aired for prizes valued at over six hundred dollars.

Many attorneys say that airing rules once a day in a different daypart is sufficient. Make sure all of your on-air people have seen the complete rules and that they're available at your front desk for listener inspection. When possible, print rules on the back of entry blanks.

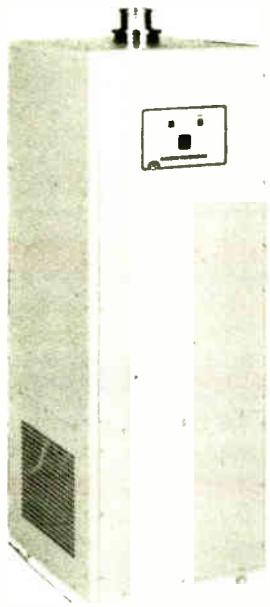
When considering types of prizes don't forget that there's one thing we all need: money! Sure, there are many prizes with more perceived value on-air, but nobody will ever be disappointed to be handed a crisp one thousand dollar bill. They won't complaining about the size or the color. As Pink Floyd said, "Money... it's a hit."

□ □ □

Mark Lapidus is promotion director for Group W's WCPT(AM)-WCXR(FM) Washington. He can be reached at 510 King Street, Alexandria, VA 22314.

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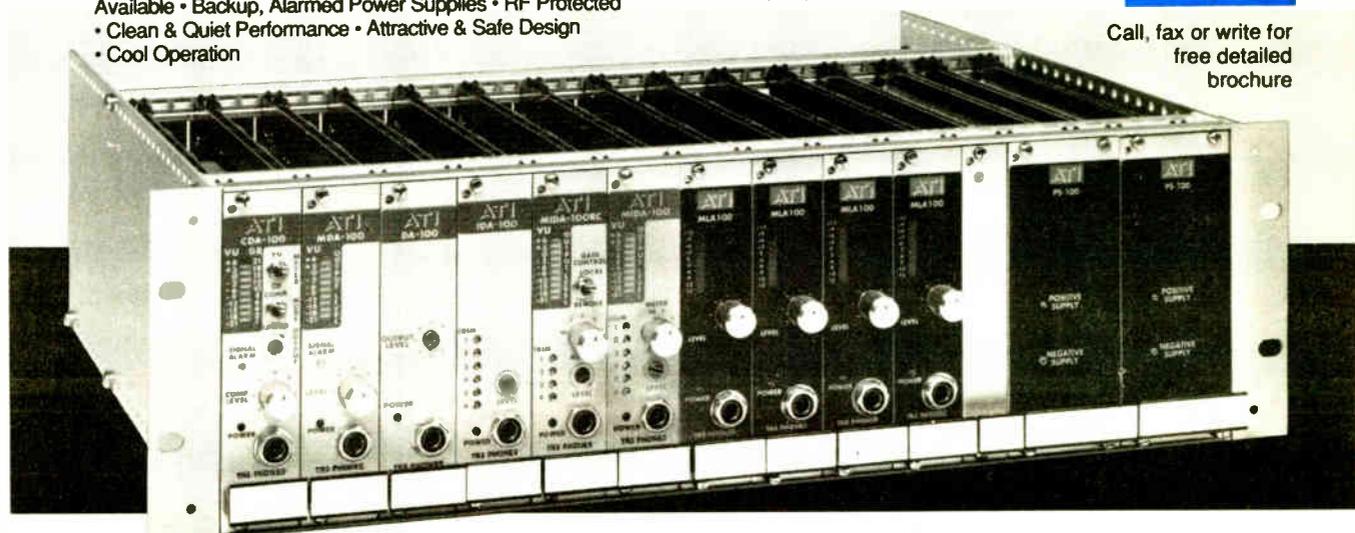
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Early 1993 Network Numbers Encouraging

► continued from page 17
years is also starting to pay off," Kipperman said. "We have a number of new advertisers that have put more into network radio for '93—more so than in '92."

Thomas Ferro, executive VP/GM of Westwood One, predicts that things will start to pick up sometime during the summer. The general pickup in revenue sales can be attributed to a number of things, including the new government administration, Ferro said.

"Last year was the worst year in the history of network radio," Ferro said. "The first quarter was softer than we would have hoped, but I'm starting to

see light at the end of the tunnel."

Greg Batusic, Westwood's president, projects business will be up 6 to 8 percent over last year.

"That roughly makes up 60 percent of the deficit we experienced last year, which is a positive sign," Batusic said.

King's rule

Many of the network executives said the preferred programming format this year is talk radio.

Batusic said Westwood's recent move of Larry King from night radio to day radio has been a success, both with advertisers and listeners.

"King just broke 400 radio stations,

which is actually more radio stations than he had running the 11 p.m. to 1 a.m. shift," Batusic said. "The advertisers have clamored to King."

He attributes this to the fact that King is noncontroversial.

"He's not a Rush Limbaugh or Howard Stern," Batusic said. "He lets the guests be controversial."

Batusic said talk radio in general is becoming quite a popular medium (see chart).

"Now, 12 percent of radio stations have full-time talk, and probably another 20 percent have part-time talk programming," he said.

Ferro also said the network plans to jump into comedy sometime in the near future. Right now, daily features or morning show prep packages are being targeted, Ferro said.

The network is also planning to concentrate on its summer concert series aimed at country radio stations, Ferro said. Country is becoming "an extremely hot format," he said.

Recent launches

CBS Radio Networks launched a talk show last August with Gil Gross. Kipperman said. He said the show has surpassed anything he has seen in the last 10 years.

"So much is happening out in the world, so much is happening in the economy, that there's a tremendous need to know," Kipperman said.

Based on the success of Howard Stern and other syndicated shows, Premiere is planning to nationally syndicate Gerry House's morning show from Nashville, Lehman said.



David Kantor, ABC Radio Networks Executive VP

"The old adage that you need to have a local person to win was shattered when [Howard] Stern became number one in New York and Los Angeles," Lehman said. "I think it woke up the industry."

Unistar's recent agreement with Infinity, which involves Infinity's management of the business of Unistar, is a smart move, Hogan said.

"Now we have access to some excellent, top-name talent we're going to try to maximize," Hogan said.

In addition, the combination of the two networks provides Unistar an avenue to the world

of sports programming, Hogan said.

ABC also will branch out to new things this year, and will continue with its



Greg Batusic, President, Westwood One

already-successful program line, Kantor said.

"Our 24-hour formats have been doing tremendously, our ESPN Radio Network is doing great and American County Countdown and the other syndication products are going well," Kantor said.

RADAR 46 (Fall 1992). Persons 12+

Common Daypart: All full service networks
Monday-Sunday, 6 a.m. to 7 p.m.
Persons 12+

| | RADAR 45 (000) | Rank | RADAR 46 (000) | Rank | Pct. Chg. (%) |
|------------------|----------------------|------|----------------------|------|---------------------|
| Prime (ABC) | 5,407 | 1 | 5,344 | 1 | -1.2 |
| Mutual (WW1) | 3,196 | 2 | 3,033 | 2 | -5.1 |
| Platinum (ABC) | 2,949 | 3 | 2,979 | 3 | 1.0 |
| Genesis (ABC) | 2,373 | 5 | 2,545 | 4 | 7.2 |
| Spectrum (CBS) | 2,420 | 4 | 2,415 | 5 | -0.2 |
| Ultimate (US) | 2,088 | 7 | 2,322 | 6 | 11.2 |
| Super (US) | 2,265 | 6 | 2,229 | 7 | -1.6 |
| CBS (CBS) | 1,811 | 8 | 1,786 | 8 | -1.4 |
| Source (WW1) | 1,458 | 11 | 1,556 | 9 | 6.7 |
| NBC (WW1) | 1,559 | 9 | 1,408 | 10 | -9.7 |
| WONE (WW1) | 1,556 | 10 | 1,344 | 11 | -13.6 |
| Power (US) | 1,424 | 12 | 1,305 | 12 | -8.4 |
| Excel (ABC) | 1,209 | 13 | 1,188 | 13 | -1.7 |
| Galaxy (ABC) | 1,073 | 15 | 1,083 | 14 | 0.9 |
| Amer Urban (AUR) | 1,132 | 14 | 1,062 | 15 | -6.2 |
| | 31,920 | | 31,599 | | -1.0 |

Source: RADAR 46, Fall 1992; RADAR 45, Spring 1992; Volume 2, Network Audiences to All Commercials, Daypart Averages, Monday-Sunday 6:00am-7:00pm. ABC Radio Network Research Analysis.



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MARKETING & MANAGEMENT

Lining Up Targets for Sales Staff

by John Cummata

ALGONQUIN, III. We're continuing with our Marketing Class, training your salespeople to be "Marketing Consultants" to their clients. This month we'll discuss how your consultants can help their clients effectively target the optimum prospects in their marketing universe. It's important.

"... targeted marketing is the art and science of identifying, describing, locating, and contacting one or more groups of prime prospects for whatever you are selling.

"In today's marketplace, if you don't know who, what, and where your true

prospects are, or if you fail to go after them as individuals, you will lose ground to competitors who do," write Stan Rapp and Tom Collins in "MaxiMarketing."

Rule number one

You cannot get *everyone* as a customer. Kmart, Sears, Walmart and other supposed mass-marketers only get certain slices of their retail trade areas, and they know that. It's reflected in their marketing plans and their advertising strategies. They are taking more and more of their ad budgets out of mass media and putting them into targeted marketing designed to reach specific types of people with specific messages.

No one is a potential customer for everything. Even common products such as soap and toilet paper are not really purchased by every consumer. Children don't buy their own toilet paper, and neither do people living in dorms or barracks. And some people buy designer paper that matches their bathrooms, while others look only for the cheapest price.

In order to not waste advertising dollars, you must focus your promotional budget on only those specific people whom you are relatively certain will buy your product or service. As much as possible do not spend money to reach people who don't fit that description.

For example, you're much more likely to sell airplanes through Flying magazine than you are through People magazine. While People may put you in touch with a few pilots who possess the means to purchase a plane, you'll be reaching a far larger crowd who will have no interest whatsoever in your product. You are wasting a ton of money putting your ad in front of them.

As a Marketing Consultant, your salesperson should be honest enough to tell a prospect or client that reach or CPM are not the key criteria for making a media buy. It's not how many people a message reaches, it is how many people it reaches who are both likely to buy and capable of buying the particular product or service being sold.

Valuable target market

Sending your message through a medium that reaches prospects who are "likely" to buy what you're selling is one form of tar-

geting, and it's important, but there's an even better group of prospects for your business. A group of consumers that are the *most* likely to buy from you in the future. They are the people who have bought something from you in the past. Your customers.

Great! Now all you have to do is send your sales message to your customers, right? Not quite. Are all your customers identical in their buying habits or abilities?

Most businesses find that about 80 percent of their business comes from the best 20 percent of their customers.

Are they all as likely to buy what you're selling in a given promotion? Probably not.

Then how can you differentiate between the good customers and the not-as-good ones? Is that even the best question? Isn't it more accurate to say that certain customers are probably good prospects for some of your products or services, while other past customers are better prospects for different product or service lines?

In other words, certain customers buy certain things from you, and knowing their buying habits, their lifestyles and their needs puts you in a much better position to precisely target them for future promotions of the same or similar products.

Knowing *who* buys from you, *what* they buy and *why* they buy it is tremendously valuable data. It is also data that most small to medium businesses don't bother to collect. They do not build a customer database.

Customer database

Business owners who have developed information-rich customer databases would probably let all their other business assets burn in a fire, while attempting to save their database medium. A customer database is, without question, the most valuable marketing asset a given business has; and, in many cases, it is the single most valuable asset of any kind.

Insurance can replace buildings, computers, furniture and even products; but if you

lose connectivity with your customers, you've lost something that insurance money will never restore. You have lost a significant piece of your present and future business.

A customer database is, quite simply, an organized storage of specific and actionable information about your customers, which can be retrieved and manipulated in ways that identify optimum prospects for specific advertising and sales efforts.

In plain English, if you know a lot about your customers—in terms of where they live, how much they usually spend, on what, how they pay, how they take delivery, how often they buy from you, and so

on—you can choose only the people most likely to respond favorably to each specific product or service you're selling.

Instead of wasting hundreds, maybe thousands of dollars on advertising that will reach *all* your customers, you can spend less money and get a much higher return on your investment by going after only those most likely to respond.

Most businesses find that about 80 percent of their business comes from the best 20 percent of their customers. If you can identify and promote to only those 20 percent, you will spend 80 percent less promotional dollars, yet you will still get 80 percent of the dollars you would have realized had you spent the additional 80 percent in promotional money.

Another way to say this is that you would have to spend the additional 80 percent (four times as much as the 20 percent you did spend) to get that additional 20 percent of business. Targeting your marketing gives you that four-to-one improvement in your marketing dollar return on investment.

Next month we'll discuss finding the best 20 percent. It's called database segmentation.

□ □ □

John Cummata is an independent Marketing and Management consultant, and the author of the Sales Machine database marketing course and Sales Machine PC database marketing software. He can be reached at 708-658-9107.



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DALLAS FirstCom, a radio program-service company, is offering Nashville—The Promo Library +, a new promotion and production library for country stations. The package spotlights current country-music trends with music recorded by several leading Nashville session players, such as Brent Rowan and Brent Mason.

The library is available in two categories, Promos Plus and the format-exclusive Promo Effects. The package is delivered on six compact discs, which are updated quarterly.

For information, contact Andrea Bergeron at 1-800-858-8880; or circle **Reader Service 133**.

Major Markets Affiliate with Weather Channel

NEW YORK The Weather Channel Radio Network has signed WABC(AM) New York, WGST(AM) Atlanta, WWWE(AM) Cleveland, KVI(AM) Seattle, WSM-FM Nashville and KCMO(AM) Kansas City to its growing list of affiliates. The service, which debuted in 1992, can be tailored to individual station needs.

Among the features network provides are: business travel forecasts, national and international weather outlooks, "Today in Weather History," weather facts, weekend outlook and ski/leisure. Actual forecast and feature schedule varies according to station format requirements.

For information contact John Brady at 212-688-2424; or circle **Reader Service 42**.

ABC Readies Memorial Day Special

DALLAS ABC Radio Networks has scheduled a three-hour special edition of American Country Countdown with Bob Kingsley for the Memorial Day weekend. The special, "The Greatest Hits of the '90s: Country's Gold and Platinum Decade," will

focus on the hottest country artists of the past three years. The special is designed for broadcast between 6 a.m. and midnight from Fri., May 28 to Mon., May 31.

Another three-hour American Country Countdown special, "The Hottest Country in the Country," is planned for the Labor Day weekend. The show is regularly heard on over 700 U.S. stations and the Armed Forces Radio Network.

For more information, contact Barbara Silber at 212-456-5646; or circle **Reader Service 24**.

Goodman Offers Ad Campaign Software

FRESNO, Calif. Goodman Advertising and Marketing has introduced a turn-key program for any DOS-based computer to aid radios stations and small-to-medium-sized ad agencies planning per-inquiry and per-order campaigns. The company created a new division, MicroEaZe Software Development, to market the new product, which sells for \$1,995, plus shipping and handling.

A manual on topics such as media negotiations, finding new clients and other related topics is included with the software. But Goodman stressed the manual and the software are user-friendly for both one-man and multi-terminal operations.

For more information, contact Stephen K. Goodman at 209-226-8559; or circle **Reader Service 79**.

Sunspot Resumes Broadcast Software Sales

CHARLOTTE, N.C. Sunspot Inc. recently began sales of its Sunspot Broadcast System, a software package for broadcast managers to aid billing, traffic and accounting. The company originally offered the software in 1982-88, but later sold the copyright to Jefferson-Pilot Data Services.

Sunspot bought the program back last year and upgraded it to operate with DOS 5.0 and Windows 3.1. By September 1993 Sunspot plans to resume support services for stations using the old version. Further upgrade to the new version are also

planned for later introduction.

For more information, contact Joshua Wesley at 704-543-4677; or circle **Reader Service 144**.

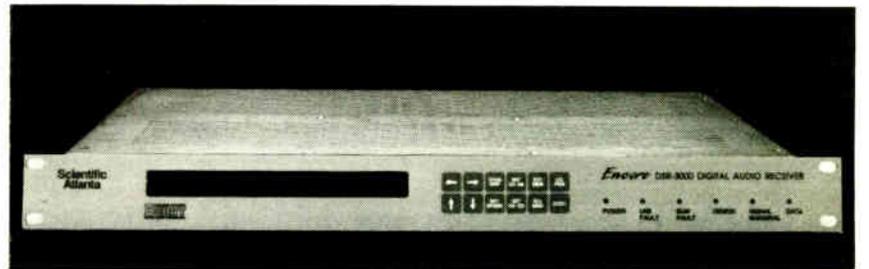
David Essel Show Premieres on Westwood This Month

ARLINGTON, Va. David Essel—Alive!, a three-hour talk show hosted by motivational speaker David Essel was scheduled to begin April 10 on approxi-

mately 250 affiliates of Westwood One's Talknet. The weekend show (Saturdays and Sundays, 10 p.m.- 1 a.m., ET) will cover topics such as stress management, self esteem, nutrition and exercise.

Essel moves into the time slot formerly occupied by The Harvey Ruben Show, which has expanded to five nights (Mon.-Fri.) on Talknet after over 10 years of weekend broadcasts.

For more information, contact Laurie Peters at 310-840-4383; or circle **Reader Service 14**.



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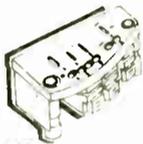
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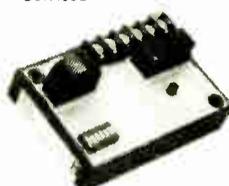
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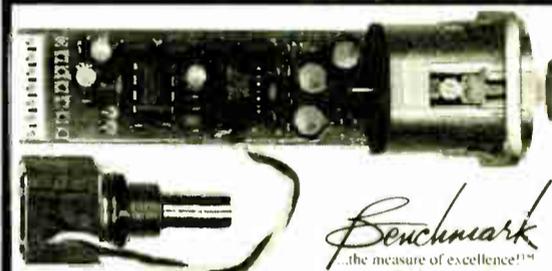
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TECH TALK

LMAs Can Save with Digital Hard Disks

by Judith Gross

EAST ROCKAWAY, N.Y. New technology can be exciting for tech groupies, but it takes more than just the latest generation of DSPs to sell managers who are concerned about the bottom line.

Take digital hard disk systems. First touted as cart replacements, they always seemed like a good idea. But you didn't see hordes of station managers kicking each other out of line to be the first to try out the latest models.

Now a new digital hard disk system vendor springs up every other week and anyone who can write software seems determined to take a crack at the new market. There are a few key questions to keep in mind when shopping that market.

Greater efficiency

Most stations that have benefitted from installing digital hard disk systems have done so to save money. They do this in several ways. Some stations consolidate station operations with LMAs and automate one or more stations with a satellite format. Others use time-shifting to double the efficiency of their staffs.

Let's get the hard-to-swallow part out of the way up front. Any way you look at it, stations most likely cut back their personnel to realize the savings. But the one thing they don't want to sacrifice is quality, which translates into ratings which translates into ad revenues. That's where digital audio comes in.

First we have the time-shifting phenomenon. Without digital quality audio, you have to operate in real time. The live DJ plays music, gives the weather, introduces songs and tells you when it's the top of the hour.

But with most music formats these days that traditional approach amounts to a manager paying a person to sit in a booth and push buttons, devoting a lot of time and attention to what is happening right then.

Enter digital hard disk systems. Now you can pre-record voice breaks, even time checks, and no one can tell it's a recording.

"Even today, there are times when even I cannot tell that we are not fully live," observed Edward Hinsted, general manager of WWCC(AM)-WDNH-FM Honesdale, Pa., after he installed a Broadcast Programming Sentry Systems hard disk and began shifting dayparts.

This means that air shifts can be moved around and talent can double in sales, news or other tasks, saving time and money.

"I've been in radio for 35 years and this is the first change in the way we produced the product that I've seen," said R.L. Caron of KRSO(AM)-KXFX(FM) San Bernardino, Calif. "It doesn't have to be live if it doesn't serve your needs."

Basic systems

Most of the digital audio hard disk systems finding their way into stations today adhere to a basic structure and are distinguished by software features and the bells and whistles that get added as manufacturers get feedback from users. There are way too many companies marketing systems to include in this month's column, so we'll focus on a handful of

systems that are mentioned by users over and over again.

Basically, you are dealing with a PC-based system. Extra hard drives to increase storage time are options. To save on storage, the system includes some sort of audio data compression, usually apt-X, Dolby and even MUSI-CAM are offered.

They produce 15 kHz fidelity audio or FM-quality (7.5 kHz for AM), although bandwidth can be adjusted during the record stage. They are best used to store spots, jingles, promos, commercials and other types of announcements. They interface to a music source, usually mul-

multiple CD players. They can include a satellite interface to respond to satellite music format cues.

Pricing, of course, varies depending on the storage time, the company and the breakdown of options. You should expect to pay \$8,000 to \$12,000 for a hard disk system which can go up to \$15,000 if you add satellite capability. Some scaled-down systems (for mono AM) can start even lower.

That's in the affordable range for stations that realize either a cost savings from staff cutbacks or increased revenue from adding a station in an LMA arrangement. If a station reduces its staff

by just one full-time person by adding computer-based automation, the system has paid for itself.

Sampling some systems

Audisk, now Gentner Audisk (801-975-7200), was one of the first systems to go on the market with a hard disk system aimed at satellite automation. Gentner bought Audisk from MacroMedia, the systems' inventor. All the standard features are included for walk-away satellite automation. Gardiner Broadcast has set up a regional network of stations via satellite,

continued on page 27 ▶

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More Tips for Cash-Free Motivation

by Sue Jones

BURKE, Va. Last time out we looked at some ways to motivate staff without using pay increases or bonuses as incentives. Motivating staff is one of the best managerial talents to possess but can also be one of the hardest talents to develop. There are several ways to motivate staff that do not require money. Since we only looked at three last time, let's consider some more.

Lead by Example

In successful business endeavors the leader(s) clearly identify the operational rules and guidelines but follow them as they expect the staff members to follow them. If you expect your staff members to put in a full eight hour day with exact arrival times, then you must do the same.

If you typically arrive at the station at 10:00 a.m. and depart 6 hours later, you send a clear signal to your staff that you do not consider the rules important enough to adhere to them. If you cannot/will not follow them, why should they? Do you require your staff members to advise you if he/she is going to arrive late? If you are arriving late, do you advise your staff?

By extending the same professional courtesy to them, you are following the guidelines and leading by example. Have you ever been on the golf course on a sunny afternoon when your staff is working double time to complete a new promotional campaign on time?

Another way of leading by example is to be willing to do anything that you would ask a staff member to do. Managers are paid to think, organize and manage resources to the optimum. They are not paid to do the work that is delegated to another position. However, if you need ten copies of a report in the next fifteen minutes and the office administrator is out to lunch, would you interrupt the work of another subordinate, irately put the work on the office administrator's desk to wait for his return, or would you make the ten copies yourself?

I am not suggesting that you continually do your subordinate's tasks, but stepping into that role in peak periods or as the need arises, demonstrates your commitment to teamwork.

How would you react if you found one of your sales representatives typing his child's term paper on the station's computer during standard working hours? Most businesses would consider this a violation of professional ethical rules and most likely the station's policy. But would you ask another staff member to type your child's

school paper, pick up your dry cleaning, take your car to the car wash, or install a new TV antenna at your home?

All of these tasks use the station's human resources for personal tasks. If you would not tolerate these activities from a subordinate, then you cannot do them either and maintain respect for the operating policy and yourself as the General Manager.

Remember that you set the tone and are

Micro-management tends to inhibit the professional growth of the person responsible for the work.

the leading example for the staff. Your staff will be committed to the station's policy and procedure as much as you are committed to them. If they observe you disregarding the rules, they will feel less inclined to follow them.

Be the coach

If you are a manager who has been promoted through the ranks, you may have a difficult time allowing subordinates to do the tasks related to their positions. You may have done some of your staffs' exact jobs over the last few years. You know exactly what needs to be done and when to do it.

Armed with this type of detailed knowledge of the job, it is easy to micro-manage. A general manager's job is to provide the operating and financial guidelines for achieving the goals and objectives of the station. If you are doing the detail work, you will be doing the work that you pay someone else to do and you will not have time to manage the station's operations.

A manager is also responsible for reviewing, not doing, the work of the staff to assure that the goals and objectives are being met. Routine reviews of the work will help you track their performance against goals.

Micro-management tends to inhibit the professional growth of the person responsible for the work. If you have done your managerial duty of clearly defining the goals and objectives, let your staff use their talents to do their job. Create a climate where a well informed staff can make suggestions, make decisions and use their abilities to reach the goals.

Management should be providing the routine review as checkpoints. Those

checkpoints could be the weekly staff meeting. Make the checkpoints a time to review the work/project in progress; but, use it as an opportunity to provide guidance to the staff member(s). Give your subordinate the value of your experience and offer your suggestions.

Employees will perform better if they feel a sense of ownership of the job they do. Giving staff members the freedom to do their jobs with some suggestions and personal spin on the work will help promote that sense of ownership. Ask their opinion about a new idea—we all like to feel that our personal effort has made a difference for the station.

Remember that your staff will rise to the level of your expectations. If you only expect that they will put in their time for their jobs completing the minimum requirements, 99 percent of the time that is what you will get. However, if your working environment is team oriented and invites innovation without fear of retribution for honest mistakes, you will have a more highly motivated staff. Everyone makes mistakes. Advise staff members of the cost of mistakes and the steps they can take to prevent them.

In addition, your reaction to a mistake will have an impact on that person's performance. A private discussion on how he can do a better job instead of a public tongue lashing will usually improve lackluster performance.

Promote from within

One of the best incentives is to promote a highly motivated staff member who has performed well. Reward those who make contributions to the team effort and the station's goals. Make sure that you practice fair and equal opportunity. Perhaps you have a secretary who has expressed an interest in moving into sales and has been doing a fine job of assisting the sales team on several occasions. Giving that person a chance to enhance their skills will also build that staff member's commitment to your station.

The station will also benefit in that there will be no recruiting costs and, when other staff members see fellow staff members being promoted, it reinforces the idea that opportunity is available for them as well.

If you have an effective management tip that you would like to share, send it to me c/o RW for publication in future editions.

□ □ □

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



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UPLINK

Fielding 'Local-Programming' Questions

by Karl Baehr

ALBUQUERQUE, N.M. Let's continue our look at selling satellite. How many of you have run into a similar situation on the street? You walk into a potential client to introduce your new station to them and lo and behold "someone" has told them "K— isn't local, it's satellite."

First let me make a point. You are selling your radio station as a viable advertising avenue in your community. Whether or not this radio station is live, satellite or automated, it's a local radio station. It is a fact that unless it is pointed out that a station is satellite, most people don't even know, nor does it matter to them.

The answer to the question above is, no it is not a problem if someone tries to use

satellite as a negative, unless you treat satellite as a negative. Roger Dodson, President of Radio One, a group of nine satellite stations (all Unistar affiliates) says, "We have never made a negative issue of satellite. Keep in mind that all major TV networks have local affiliates. This is not considered a weakness at the local level, but a strength." He adds, "We are proud of what we provide, a higher

caliber of quality entertainment that would not be possible locally otherwise.

"We provide a higher caliber of presentation on the air and have embraced the latest in technology. We present the network more as a partner than just a programming source."

Positive vibes

On the streets be positive about your station and it's ability to help the advertiser. "The idea is to become an advertising consultant to the client. Present strong marketing concepts to assist clients in making their cash registers ring," says Harry Nelson of his "StreetSmart Marketing" radio sales program.

"Teach the clients to out-think their competition instead of outspending them. Show them how your station can help them do that... This takes effort as you need to stay up on current and the shape of things to come. Trendtraker, another aspect of StreetSmart Marketing can help radio sales people do just that.

At the RAB Convention back in February, the suggestion was made to form local cross-media cooperatives or affiliations. We are seeing that the future of radio sales lies in marketing solutions to clients, not just selling spots.

At Pinpoint Marketing and Research, President Mike Anderson won't give you any argument. Pinpoint specializes in

continued on page 30 ▶

Disk for the Bottom Line

▶ continued from page 25

which sends spots and other production to the satellite directly onto Audisk systems at each affiliate.

Computer Concepts (800-255-6350) introduced its Digital Commercial System first as a replacement for cart machines, giving it a jump on the market that was soon to open. Satellite automation is one of DCS's capabilities. The company has also patented the simultaneous playing of two audio files while recording a third, and now is introducing FlexKey, a feature that creates a combination of "virtual" cart machines with a push-button control pad suited for fast-paced morning shows and complex commercial rotations.

Smartcaster from SMARTS (800-747-6278) is a system that has found favor among stations switching to satellite music formats. When HVS Partners set up its LMA in Tallahassee, Fla., management put in two Smartcasters. One is installed at WBGm-FM, a live adult contemporary station, and WHKX(FM) (simulcast on WHBT[AM]) has the other, to run Satellite Music Network's "Touch" format.

"We could have put it all together, but we bought two systems because we wanted the flexibility to play separate commercials on each station," says WBGm-FM general manager Royce Plummer.

Digital DJ from The Management (800-334-7823) offers several versions of hard disk programming, depending on how automated a station wants to get and whether or not satellite capability is needed. Products range from the Sky Pilot and Digital DJ to the DJ Lite.

A few others you might want to consider are the DigiLink by Arrakis (303-224-2248); Broadcast Electronics' (217-224-9600) AudioVault; Rodman-Brown's (301-459-8800) Desk Jockey and the Media Touch (800-330-3004) Touchscreen system. 360 Systems (818-342-3127) makes a hard disk system that is fully compatible with the company's removable Bernoulli-type disks; Broadcast Programming (800-426-9082) offers the Sentry Systems, and TM Century (800-937-2100) makes a controller for hard disk automation called the Ultimate Digital Studio.

But keep your eyes and ears open because there are a variety of others who are making inroads into the industry and you'll see new ones springing up every few weeks.

Extra features

One of the big concerns with hard disk systems is reliability. Hard disk drives have gotten quite a bit more robust than they used to be and, now that these systems have been in stations for quite some time, reports of disasters, crashed sys-

tems and so on, have been surprisingly few to virtually non-existent.

How do you shop for a system? While a lot of hard-disk systems may appear to be clones of those already on the market, there are differences—some of them rather subtle.

A computer keyboard is usually the norm for recording and logging segments. Some systems have a touchscreen; some work with a mouse.

Software gurus have been particularly creative in the types of screens and menus that appear. Some are meant to imitate the fronts of cart machines and stacks of carts; others are simplified to make it easy to play selections, still others resemble computer files we have all come to know.

□□□

Judith Gross is a writer with Media/Scan and former editor of Radio World. She can be reached at 516-599-4564.



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Current State of the DAB Discord

by Clint Pinkham

SYRACUSE, N.Y. While many broadcasters worldwide—in particular Europe and Canada—plan for the introduction of Eureka-147 as the Digital Audio Broadcasting (DAB) standard, the U.S. will start an evaluation program this summer.

There is much left to do, however, before DAB becomes a reality in the U.S. For one, the three major groups involved in radio must reach a consensus: the Federal Communications Commission (FCC), the National Association of Broadcasters (NAB), and the Electronic Industries Association (EIA).

Vested interests

Each group has its own feelings toward DAB. In general, the FCC, a governmental agency, wants to manage the radio spectrum to achieve the most good for the most people, but there are lots of people asking for spectrum and only a limited supply available. The NAB, composed of about 9,000 broadcasters, favors the regionality (local nature) of the present system and generally is opposed to satellite radio delivery systems. The EIA, an electronic industry lobbying and standards organization, primarily views DAB as an opportunity to make and sell new hardware regardless of the system that is chosen.

In 1990, when DAB was becoming a buzzword in the U.S., the leaders of the

NAB decided that DAB was coming and the best way to control its implementation was to form an alliance with Eureka-147. Consequently, the NAB set up a DAB task force, which endorsed Eureka. The task force formed a Technical Advisory Group (TAG) to evaluate individual DAB systems.

Some members of the NAB did not agree that a partnership with Eureka was the best way to implement DAB in the U.S. A groundswell of opposition to the NAB position developed and the alliance between Eureka and the NAB ended.

The NAB's TAG systems evaluation suffered a similar fate. Few system proponents wanted to submit their systems to testing by an organization that had aligned itself with Eureka and also required "complete disclosure" of all system details.

Another route

Realizing that some form of DAB system evaluation was desirable, the EIA formed a Digital Audio Radio subcommittee in late 1991. By the spring of 1992, the subcommittee had established both a rough schedule for testing and a draft voting procedure to be used to select a recommended system for the U.S.

All proponents had to disclose system details (enough to facilitate testing) by Dec. 15, 1992. Submission of hardware for all systems is July 1.

The draft voting procedure gave a different number of votes to different industry segments—two to broadcast networks, two to stations or groups of broadcasters, one to broadcast equipment manufacturers, one to satellite broadcasters, four to receiver manufacturers, one to component manufacturers and one to software providers.

The schedule was generally acceptable to all parties, but the voting procedure was not. As a result, the EIA has yet to agree on a voting procedure, but is continuing with its competition under the assumption that the test results are more valuable than the vote anyway.

The number of systems submitted to the EIA has changed on a regular basis during 1992 as proponents developed new ideas, ran out of money or formed alliances with one another. The current list is as follows:

| PROPOSER | SYSTEM TYPE |
|---------------------|-----------------------|
| NASA/VOA | Satellite |
| Eureka-147 | New Band |
| AT&T/Amati | In-Band, On-Channel |
| AT&T | In-Band, Adj. Channel |
| General Instruments | In-Band, Adj. Channel |

Absent from the list is the in-band USA Digital Radio system from Project Acorn. Project Acorn is a highly publicized in-band, on-channel system that claims to work on both AM and FM. It is being developed by a group of broadcasters—Gannett Radio, CBS, and Group W—and was demonstrated (fixed point-to-point demo) at the 1992 NAB Radio Show in New Orleans (and recently in California).

(In a letter to the EIA on Dec. 16, 1992, Paul Donahue of Gannett declined to submit Project Acorn to the EIA testing

process, citing the conflict between NAB and EIA over NAB's desire to have in-band tested under the National Radio Systems Committee (NRSC). Although the EIA initially said no, it agreed in early March to provide the testing data after it tests in-band systems using NRSC guidelines as part of its overall DAB testing schedule. See related story, page one.

Despite the agreement, Donahue said USA Digital will not decide whether to submit its system to EIA until after the NAB convention this month.)

On July 1, Eureka-147 will submit hardware for a terrestrial system at L-band (roughly on 1.5 GHz) to the EIA.

At WARC 1992, most nations chose L-band for DAB transmission, but in the U.S., the military uses L-band for aircraft telemetry and steadfastly refused to relinquish the band to DAB. As a result, S-band was designated as the home for DAB in the U.S.

Eureka chose to submit its L-band plan in spite of the U.S.'s selection of S-band because currently available Eureka hardware does not operate at S-band, and because both Canada and Mexico are pursuing L-band DAB systems. Canada and Mexico feel that L-band is the future for DAB and that the U.S. military's objections will diminish in the time that it will take for DAB to become a mass market medium.

Eureka is a new-band system capable of satellite delivery that requires six broadcasters to use the same transmitter—thus eliminating signal strength from the station competition equation. It requires new spectrum and so faces a stiff challenge at the FCC.

Reasoning stated

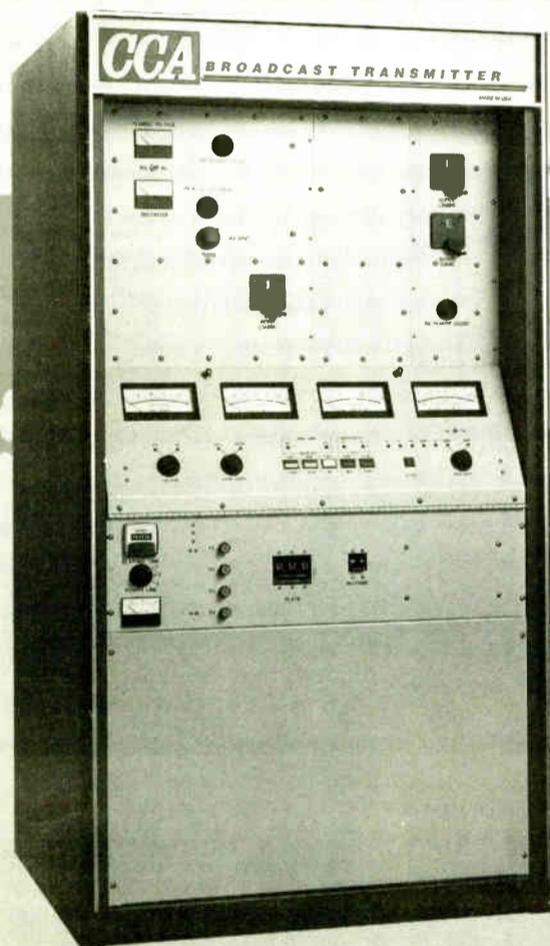
So, why is Eureka competing? Is there a chance for Eureka to win?

Eureka is competing because it is the

continued on page 35 ▶

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Satellite Programs, But Local Ads

► continued from page 27

providing "line-extension" and "brand-name-marketing" programs and research to radio stations who in turn can take them to the marketplace.

Beat a new path

These non-traditional avenues include food products, software and custom publications and can, according to Anderson, "Help a radio station access a resistive retailer while providing a profit center for the station."

Examples of this are the food products, which can help get a radio station into grocery stores and "quick stops." With computers in close to 50 percent of all

homes these days, computer software is another viable product. Pinpoint offers a variety of software covering such topics as insurance, home and automotive maintenance. Sponsorship of these items can be sold to insurance agents, hardware and auto parts stores.

Here again, you are providing a marketing outlet for your clients that's right up their alley, and your station is part of the marketing plan. Your station is helping the client address its individual needs.

Pinpoint also offers cost-efficient market research, a newsletter and support of all their systems. Call Mike Anderson at 314-878-0873.

What we are seeing is that selling satel-

lite does not have to be a battle over whether your station is live or not, but rather how your station can help advertisers in your market. As further evidence of the need for positive sales presentation of your satellite station, and the need to learn about the station, the market and the client I offer the following from Garry Wall's "Media Madness" Newsletter:

Why sales people fail

Researchers at Memphis State University surveyed 410 sales executives to come up with the six most common reasons sales people fail. They are: (1) Poor listening skills. (2) Failure

to concentrate on top priorities. (3) A lack of sufficient effort. (4) The inability to determine customer needs. (5) Lack of planning for sales presentations. Inadequate product or service knowledge. Try your own survey with your sales department and see how they do.

Another way of creating a long-term sales opportunity is to develop a sponsorship on your station. This could be news, traffic, a countdown, entertainment news, a health program, music or video review. If you are running *any* syndicated programming on your station that is not locally sponsored you are throwing away money.

Develop a sponsorship for a local client. Say you have a large video chain in town. How hard is it to tie them in and produce a local what's-new-in-video-rentals type show? How tough is it to go to your local teacher's association and set up a co-sponsored homework helpline with a TV station and major area business? If you are running a health program, tie in a gym, a medical center, the YMCA or YWCA.

Have an election coming up? Get the League of Women Voters to sponsor a town meeting on your station. Again, you are creating events, not selling spots.

There are a zillion, maybe two zillion sales, marketing and advertising books, publications and programs. Here are a few sources of and suggestions for books that I feel are worthwhile:

- Have a good dictionary and thesaurus in the radio station. There is nothing worse than misspelled/misused words in a crucial proposal.
- "Selling Radio Advertising Without Numbers" by Godfrey W. Herweg and Ashley Page Herweg available from the NAB.
- "Breaking the No Barrier" by Walter Hailey available from Planned Marketing Associates (800-749-7821).
- "How to Get Your Point Across in 30 Seconds or Less" by Milo O. Frank.
- "Confessions of an Advertising Man" by David Ogilvy.
- "NTC Business Books" has a variety of good marketing, media, advertising and sales books available. Call 800-323-4900 for a catalog.
- The Radio Advertising Bureau can be a powerful source for radio sales and related materials. Call the RAB at 212-387-2100.

To start receiving (at no charge) Garry Wall's "Media Madness" newsletter, another good source for current marketing and media trends, mention *Uplink* when you call Garry Wall Media at 619-576-2066.

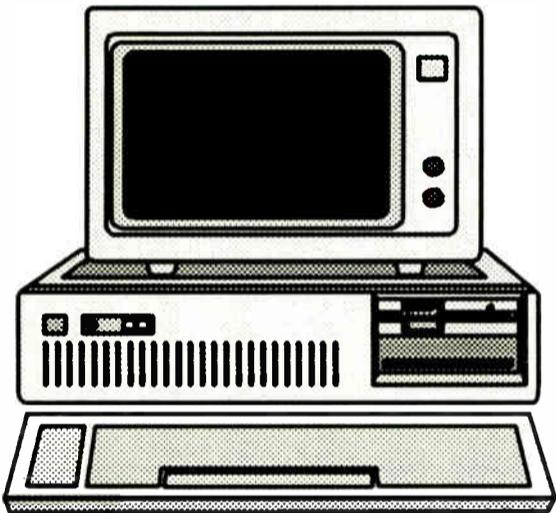
Next time we'll look at effective localization. The pros and cons of live dayparts, news, keeping those liners fresh, live local programming, creating local visibility, community involvement and more.

□□□

Karl Baehr is president of KBE "Broadcasting By Design" a radio consultancy that provides support services for satellite radio stations. The company also produces the Actual Radio Measurement (ARM) electronic survey system, and is involved in the development of Radio Tropico Internacional, a proposed tourist-oriented satellite radio network in Mexico. Baehr is a former radio programmer and air personality, currently pursuing a graduate degree in mass communication at the University of New Mexico. He can be reached at 505-828-0488.

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Pop Is in for OK Radio Listeners

► continued from page 19
artificially."

His inspiration came from waking up in his flat one morning and seeing the sun rise over the River Elbe. That was the mood he wanted his DJs to have as they worked.

In the end he came up with a 1 1/2 million D-mark project, carried out by GTC Electronics of nearby Grosshansdorf, which had little in common with the usual layout, where the DJ sits closely surrounded by his equipment so that he never has to get up.

As in a disco, at OK Radio, the DJ stands in front of the control desk. The desk can be hydraulically raised and lowered on polished steel columns to match the presenter's height, and the columns are topped with wooden cones featuring different colored lights that flash when police or come in.

The control desk itself is large, with 32 channels, so that all the possible sources have their own faders. The tape machines and the disc libraries are not within easy reach, so that the DJ has to get up and move around. Thus, according to Landmark, "setting free the DJ's energies."

All the surfaces are made of natural materials—birch wood, polished steel, deep blue woolen carpet with a pattern of

moon and stars—to add to the comfortable feel; and there is a grand view over the city.

DJs express themselves

The 1000 W AES monitors allow the DJs to get the best sound possible for themselves, and 12 dimmers allow customized lighting. The station spared no money on the desk, an Acousta DCA 100E that can be computer operated. Landmark, however, does not want to use the computer option; DJs express themselves through their hands on faders, he suggested, and something would be missing if that expression were denied them.

Music comes from EMT 981 CD-players. Landmark and Otto said they want to change over to MODs, but they will not do so while the DJs still feel that they get inspiration from handling the CD boxes and reading labels.

Jingles and advertising spots are stored and recalled from the R. Barth Digispot computer system, which also offers overall control of the program running order. For the future, Landmark and Otto want to introduce a more unified planning and control system, so that music, spots, jingles and texts all appear on a central screen in the studio and can be activated from there.

The original approach to studio design is another risk for the station. It costs a lot more than they would have needed to spend for a conventional setup. But one gets the feeling that Otto enjoys taking risks and being proved right.

A 100 W challenge

OK Radio is a low-power 100 W station that competes against the 80 kW main rival. The big stations did not feel threatened when OK Radio changed its format.

The conventional wisdom—there was even an official report to prove it—was that there was no more market share to be gained from young people's radio because

young people were happy with what was offered. According to Otto, the "rules" say that with his listener potential, he should be turning over 3 to 5 million DM; he's turning over 10 million DM.

But the other stations in the area have awoken from their long sleep. They have started to move in the same direction as OK Radio, and the competition can only get tougher.

That presents Otto and OK Radio with new challenges. They have swept the board in the role of the little guy who comes up from nowhere. Can they keep the ideas coming to keep their little station in the big league?

□□□

Michael Lawton, a free-lance journalist, covers radio in Germany for RW from Cologne.

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With Digilink you can operate fully live or mix various automation types into your daily programming. You can store all of your audio on hard disk at an incredible price or you can use hard disk for only commercial material recording. Digilink has an internal audio switcher with machine logic control. Digilink therefore supports satellite automation, reel and DAT tape automation, CD automation, and full hard disk automation all out of one compact box. Because Digilink is a computer, you can print out a log of what you have scheduled to play *or* print out a log of what really did play. With Digilink, you can be live on the air with full CD quality audio or program the system and walk away forever. Digilink even interfaces with all major traffic and billing systems through a Digilink import-export routine.

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all tests performed at 1:1 compression

Digital Signal Processing System (DSP)

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Compression- 0,2,4...adaptive differential PCM

Controller -

Floppy Disk- 3 1/2" 1.44M capacity, System Hard Disk- 40MB
Printer Support- IBM compatible, parallel port

Audio Performance- Digital Record playback

THD- .008%, Dynamic Range >85dB,
Freq Response- (+)(-).5dB 10Hz-15kHz

Physical Specifications

Dimensions- 19" Rack mounted- 19"W x 5 1/4" (3RU)H x 16"D
Weight- 60lb's , Power- 110/220VAC, 50/60Hz, 100W

Audio Performance- Routing Switcher

THD- .005% typ, S/N < 100dB below +4dBm
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Trade Center Explosion Damages Five FMs

by Frank Beacham

NEW YORK All five FM radio stations with main transmitter sites atop the World Trade Center were temporarily knocked off the air due to lack of electricity on February 26 when a massive bomb blast rocked the huge office complex. None sustained major damage.

Three commercial stations—WQCD, WYNY and WPAT—switched quickly to emergency transmission schemes, while two non-commercial broadcasters, city-owned WNYC and Columbia University's WKCR remained off the air

until power was restored to the twin towers about 11 hours after the explosion.

WPAT "switched in two to three minutes" to a 21 kilowatt auxiliary transmitter at one of its AM towers in Clifton, New Jersey, Chief Engineer Jerry Corby said.

WYNY routed its audio through another station to a translator site across the Hudson River in New Jersey where it used a 1,000 watt transmitter to resume broadcasting in about an hour, said chief engineer Alan Kirschner.

WQCD, having already signed a lease to move its transmitting facilities to the Empire State Building in June, used a tran-

smit case of emergency transmission gear already at the new site to resume broadcasting in about an hour. "We used a little one bay Shively antenna mounted on a pipe out the window on the North face," said Andy Bater, technical director at WQCD. With the 100 watt emergency transmitter "we had pretty good coverage of most of the other boroughs, parts of Westchester, New Jersey and Long Island," Bater said.

In a report to station management on the disaster, Bater said the only apparent damage to WQCD's facilities at the World Trade Center was smoke related. "Most if not all equipment is covered with soot and any equipment that requires fan cooling is extremely dirty inside," Bater said. "I had to reset the FM master antenna air pressure system as it had lost all air pressure due to a tripped dehydrator."

WPAT's Corby said there was "quite a bit of soot" in his station's transmitter room on the 110th floor, just under the roof where the antennas are mounted. "Smoke reached the 110th floor within a couple of minutes after the explosion," he said.

None of the roof-top antennas used by broadcasters were damaged. However, some two-way whip antennas for private communications and remote pickups were removed so helicopters could land on the roof during rescue efforts, Kirschner said.

FCC officials, Kirschner said, should be praised for their quick response in issuing STA's (Special Temporary Authority) to the stations during the disaster. "It was an emergency situation and they allowed it to be done by FAX," Kirschner said. "I give them a lot of credit for hanging in there and issuing the authority quickly."

The explosion had a far greater effect on the city's TV stations. WNBC, WABC, WNYW and WWOR all lost their ability to transmit from the complex.

WCBS, which maintains backup equipment at the Empire State Building, was back on the air by mid-afternoon from those alternative facilities. Many workers

trapped in the twin towers called the CBS O&O as they watched the station's coverage on battery-operated TVs.

Since the New York television stations send their signal directly to Time Warner Cable, which operates cable systems in Manhattan and Queens, cable customers did not lose local TV signals in the aftermath of the blast. The three network affiliates—WCBS, WNBC and WABC—all began continuous news coverage within 45 minutes after the blast to serve those cable viewers.

All radio and TV signals were fully restored by 11:25 p.m., about eleven hours after the explosion.

GUEST COMMENTARY

In-Band, New-Band DAB Split

► continued from page 28

only system that has been successfully demonstrated so far. Actual broadcast tests have shown that it works. It can deliver CD-quality sound to mobile or home listeners and can completely eliminate multipath problems. No other system can make this claim.

The way Eureka works is to start with six CD-quality digital stereo programs. It sends each program through a digital-compression algorithm—ISO MPEG Layer II—so that the total number of bits to be broadcast is manageable. Next, the digital signals from all six programs are scrambled together to form a single digital signal that is fed to an orthogonal frequency division modulator. The resulting signal—with a bandwidth of about 1.5 MHz—is broadcast from a single antenna (or a satellite) at some frequency between 30 MHz and 3 GHz.

It is the broad bandwidth of the Eureka signal that gives it multipath immunity. Multipath, that annoying "picket fencing" we hear on our FM radios when driving in hilly or urban terrain, can be partially overcome by using error correction techniques on a digital signal, but complete

protection can be achieved only by using "frequency diversity"—i.e. broad bandwidth, as well.

Theoretically, the implementation of the Eureka system could be relatively smooth. Each existing broadcast station could be assigned a DAB "slot" and could begin transmitting according to a predetermined timetable.

Digital audio broadcasting is not a simple thing. "In-band" systems that are easy to implement place constraints on themselves that may limit performance to a level only slightly better than existing FM. If Eureka turns out to be the truly superior system, it is not difficult to imagine a scenario where the FCC defines a DAB band—at S-band, L-band, or even in the UHF band—and guarantees every AM and FM broadcaster a DAB "slot."

□ □ □

Clint Pinkham is manager of technology applications for the audio and communications division of Thomson Consumer Electronics in Syracuse, N.Y. Thomson is a member of the consortium that developed the Eureka system in Europe and represents Eureka-147 in the U.S.

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WORKBENCH

Power and Money Supply

by John Bisset

FALLS CHURCH, Va. Our tip for paralleling the Scientific Atlanta satellite power supplies generated some great comments. Bill Fawcett of Mountain Valley Broadcast Services in southern Virginia cautioned that this is not a permanent fix. We agree. Look upon the paralleling of supplies as a quick way to get a second set of SA modules working again.

Jim Lotspeich, chief engineer of KTSM-AM-FM-TV El Paso, called with an inexpensive alternative to returning the supplies to SA for repair. Send the supply to Test Engineering Services Inc. (TES), Pleasanton, Calif. These folks will repair a defunct supply and make it brand new for around \$150, depending on the problem.

I spoke with the TES customer contact, Ed Senesky, who said they repair all types of supplies, not just SA's. In fact, they service over 6,000 models of power supplies, including HP and Lamda. During repair their technicians look for degraded parts. Capacitors more than six years old are always suspect.

Their strategy is to replace questionable parts now rather than fix the supply and ignore parts that could cause future prob-

lems. Each supply is burned in before it's returned too. If you're a TV type, you've heard of the Grass Valley Group. Ed informs me that GVG sends all their power supply repairs to TES.

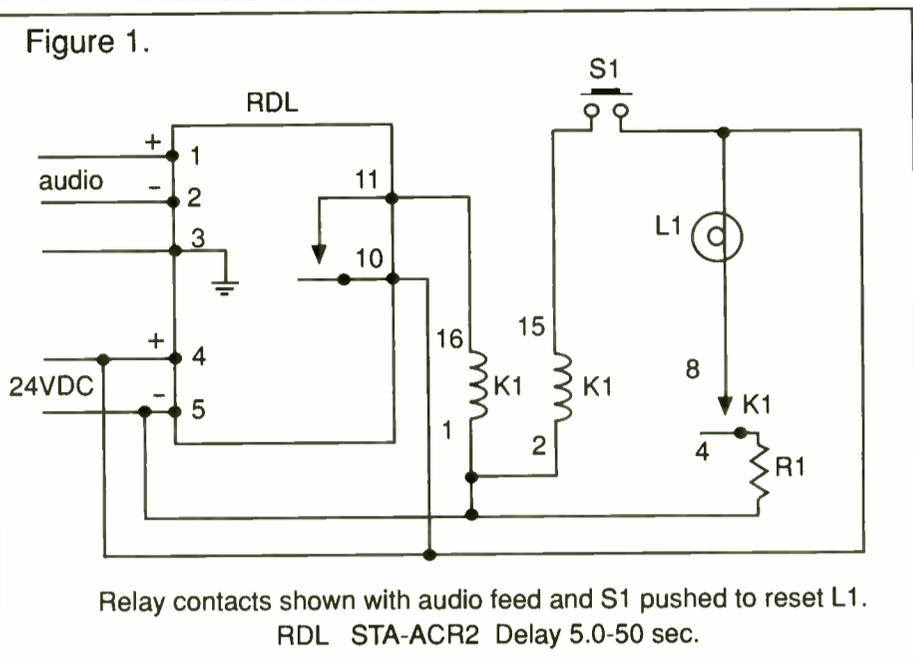
For more information on TES power-supply repair circle **Reader Service 29**. The toll-free number for T.E.S. is 800-842-0333. Thanks Jim for sharing your find.

★ ★ ★

LeRoy Wolniakowski, director of engineering, Heritage Media Corp., recently remodeled an FM studio and decided as a part of the upgrade to replace the silence sensor. At this station, the FM operator is responsible for the AM when it is automated.

A tube-type Silence Sense device was already in use, but it was not reliable, and the tubes were expensive. LeRoy wanted something that was inexpensive and simple to construct. Dave Kerstin of the Broadcaster's General Store recommended the Radio Design Labs Audio Controlled Relay (ACR).

There are three models of this relay, each with varying sensitivities and delay times. The STA-ACR2 was chosen. It has an input sensitivity of -30dBV to 0dBV, and an adjustable delay from five



to 50 seconds.

The 10k bridging input allowed the relay to be connected right across the mod monitor audio output terminals. If a lighted indicator is placed across the relay output, it might be missed if silence is sensed, since the indicator will extinguish when audio is restored.

To insure that any audio interruption was investigated by the jock on duty, a Potter and Brumfield relay, part number

T831 1D32-24, was added (See Figure 1).

The 24 volts that power the STA-ACR2 can also be used for the P&B relay and indicator. When audio is lost, the latching coil is held so the light cannot be reset until audio returns. The light can be reset manually when audio is restored. The silence sensor is simple, reliable and cost effective. LeRoy Wolniakowski can be reached at WEMP(AM)-WMYX(FM)

continued on page 51 ▶

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DIGITAL DOMAIN

Connect the Digits: Data Transfer Sync

by Mel Lambert

STUDIO CITY, Calif. As more and more elements in the audio production and broadcast chain are replaced with digital components, numbers assume an increasing significance in our lives. It is inevitable.

We now take it for granted that 16-bit/44.1 kHz digital audio is *the* way to go. But how accurate do these numbers need to be and what happens if we overlook their relationships during recording and playback?

Yes, I'm referring to relative and

If the transfer works, everything is fine; digital technology is very much a "yes/no" proposition.

absolute synchronization of sampling and data-transfer rates. I would estimate that, while answering broadcaster questions as part of my consulting business, at least one question in four relates to connecting digital information from one device to another.

If the transfer works, everything is fine; digital technology is very much a "yes/no" proposition. If, for whatever reason, the transfer of a digitized signal from, say, an outboard analog-to-digital converter to a workstation or DAT recorder results in intermittent clicks and pops, something is definitely wrong.

Masters of synchronization

The tolerances involved in reliably transferring digital data are extremely precise. Consider, for example, an AES3-format bitstream at a sampling frequency of 44.1 kHz. Each individual data bit within the AES/EBU I/O's 32-bit word occupies just 354 nanoseconds. A timing error of one third of a microsecond can dramatically upset the interpretation by the receiving device of this corrupted information.

The key to success is to use a master digital synchronization signal and ensure that every system component within the broadcast facility locks its master clock to this highly accurate "sync standard." Each device that's producing a digital signal will maintain a tightly defined timing accuracy to the master synchronization source.

As most of us are now aware, to ensure

reliable frequency and phase synchronization, the sampling rates should be equal (or to a very tight tolerance), and each bit of information should begin coincidentally. Frequency synchronization ensures that bits arrive at the correct intervals while phase synchronization ensures that each digital word matches at the source and destination.

It's easy when you know how.

Timing is everything

What if your particular system references its master clock to something other than the preferred house video sync or a specially-defined AES-11 Digital Audio Reference Signal (DARS)? Some workstations or editing systems lock to a familiar 80-bit SMPTE-format timecode source, or even an MTC signal (MIDI Timecode).

Now, all timing events relating to sound cues recorded from and to hard disk will be referenced to a timecode generator. What often happens, however, is that because of our unfamiliarity with timecode rate and references—something that poses far fewer problems for our video brethren—it is all too easy for the timebases to change during the course of a project, and for us to be totally unaware of it.

Because of an accident of fate some 40-odd years ago, the North American broadcast industry has adopted two frame rates for video. The original monochrome 30-frames-per-second (fps) rate (derived from the familiar 60 Hz line frequency) was joined in the 1950's by a color rate of 29.97 fps.

As a result, three timecode rates evolved for video synchronization: 30-fps monochrome; 29.97-fps non-drop, which doesn't follow real-time events (but leads at a rate of 1/1.001); and 29.97-fps drop-frame, which compensates for the difference by adjusting its frame count to match conventional time of day.

At a CD sampling rate of 44.1 kHz, referenced to 30-fps timecode, there are 1,470 digital samples per video frame. (We end up with the same numbers for signals correctly referenced to 29.97-fps timecode at a 44.056 kHz sampling rate.)

By the way, at digital-video sampling rates of 48 kHz referenced to 29.97 fps timecode sync, there are 1,601.6 samples per frame. To ensure integer numbers of digital samples per frame, various "leap-frame" schemes are used, such as 1602, 1601, 1602, 1601 and 1602 samples per frame in strict sequence.

If the timecode lacks sufficient stability or is modified during the session (referenced differently, perhaps, to a master video source), we can easily end up with

the receiving device flywheeling its master clock in an attempt to follow perturbations in the incoming bitstream, and maybe producing the occasional glitch as it attempts to accurately synchronize the start of each 16-bit word.

SACable situations

Mixed-media productions—a lip-sync soundtrack, for example—requires a technique for uniquely identifying each of the 1,470 samples (at a sampling rate of 44.1 kHz) contained within each timecode frame.

Why such precision? Simply because if we don't keep track of the position of each edit pointer to a resolution of a single sample, we might end up with too few or too many samples per second and the inevitable muted output.

Several solutions suggest themselves. We could rely on the timecode to provide markers every second and then interpolate between them. If the editing software monitors the timing accuracy, it will simply repeat or drop values if the edit either provides too little or too much data to fill up each subframe division.

What if we need to pass data from one system or storage device to another and then re-establish subframe synchronism with a timecode signal? A standardized "Sample Address Code" (SAC) that would allow each and every sample to be identified, just as we might use SMPTE-

format timecode to tag or label video frames, would be useful.

It just so happens that the new AES3-1992 Recommended Practice provides two, 32-bit words per channel-status (CS) block for a time-of-day SAC, and a local SAC for the first sample of each CS block. Time-of-day SAC might be used to label the actual recording time of the digital audio—and hence provide a unique, non-timecode based directory—while the local SAC could provide a relative offset for edits, or a simple index counter that tags the number of H, M, S and digital frames relative to a starting reference.

Such schemes also prevent corruption of channel-status blocks when various AES3-format digital signals are combined within a digital mixer. Imagine the situation if a workstation, for example, corrupted the vital sample rate, channel source/destination data, and other important channel-status information, while adding two or more signals together.

□□□

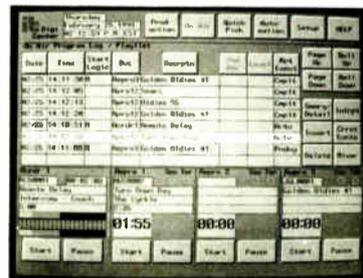
Mel Lambert has been intimately involved with the production and broadcast industries on both sides of the Atlantic for more than 15 years. Now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, he can be reached at 818-753-9510.

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Right Triangles for Correct Voltage

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by Ed Montgomery

Part IX

ANNANDALE, Va. In previous lessons you have been introduced to inductive and capacitive reactance and the phase relationship of voltage and current that is present when alternating current is applied to these components.

Remember, within capacitors and coils,

voltage and current are always 90 degrees out of phase with each other. When these components are combined in circuits with other devices that do not create a phase shift, the total resistance, now known as impedance, is a combination of electronic terms that are not in phase with each other.

Remember Pythagoras

The Pythagorean Theorem must be used to determine voltage, current, and total impedance. The parameters for series and parallel resistive-inductive, and resistive-capacitive circuits is illustrated in Figure 1.

Often it is inconvenient to express the solution to these circuits in a rectangular form. This would be a manner where the answer is illustrated with a right triangle depicting the electronic terms that are in-phase and 90 degrees out-of-phase, with the hypotenuse representing the totals. There is another way to express this information. It is called polar form or polar notation.

In mathematics, there are real and "imaginary" numbers. Real

numbers exist on a number line beginning at zero and extending away from that point in positive and negative intervals. This is illustrated in Figure 2. On this number line, conventional mathematical functions are performed: addition and subtraction. Multiplication and division are part of the addition and subtraction process.

There are numbers that cannot be located on the number line. The figures for electronic terms containing a phase shift cannot accurately be displayed on this line. These "imaginary" numbers can be

Using this arrangement, any number in any location of quadrants I through IV can be located. Points not located on the real number line or the X-axis are the imaginary terms.

In electronics the symbol for this figure is "j." For instance, "+j" indicates a value that is on the Y-axis in quadrants I or II. The term "-j" indicates a value on the Y-axis in quadrants III and IV.

Expressed in polar form

Resistance and reactance values can be written quite simply in polar form and many of today's pocket calculators and personal computers will calculate answers without having to revert to trigonometric functions as was required

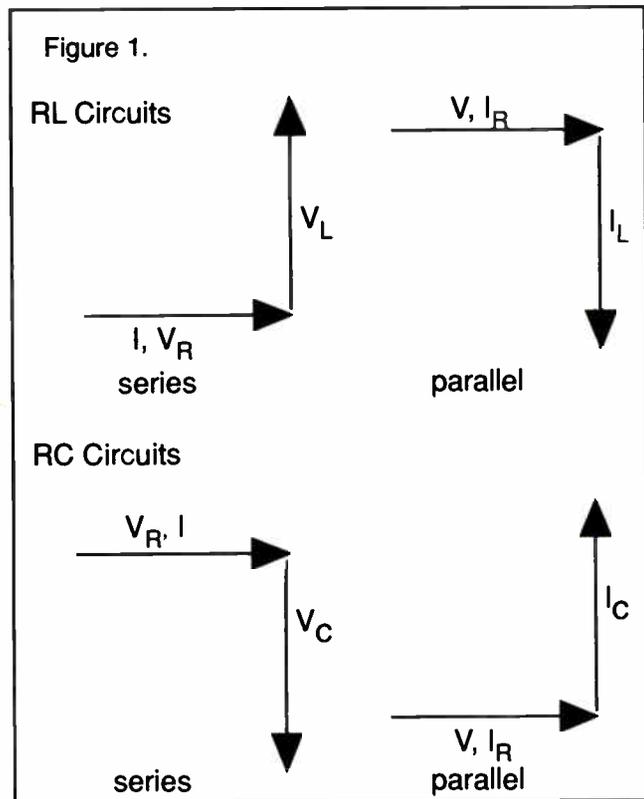
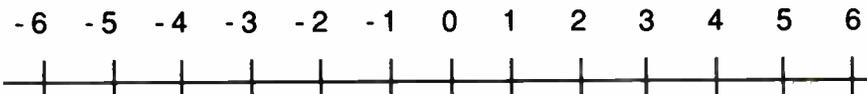
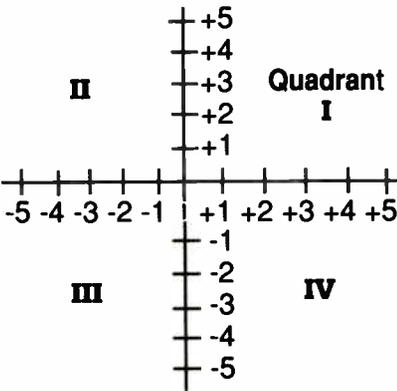


Figure 2.



located by adding an additional axis extending from zero, at a 90-degree angle to the number line, in positive and negative directions away from it. This is

Figure 3.



illustrated in Figure 3.

The conventional number line is often referred to as the X-axis while the imaginary number line is known as the Y-axis.

in the days of the slide rule.

Figure 4-A can be written in polar form as $10 + j15$. This indicates a positive phase-angle shift of voltage leading current in the inductor. Figure 4-B can be written in polar form as $10 - j15$, indicating a voltage-lagging current in the capacitor.

Parallel circuits are written as follows:

Parallel RL: $R - jX_L$
Parallel RC: $R + jX_C$

Using proper algebraic laws, one can add, subtract, multiply and divide complex numbers.

The polar expression of $4 + j3$ indicates that a circuit contains 4 ohms of resistance and 3 ohms of reactance. Calculators and computers will give an answer for total impedance of 5 ohms at 36.87 degrees. This is expressed on paper as $5/36.87$.

Polar notation is often used in antenna

continued on page 61

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OFFBEAT RADIO

Green Radio Network in Full Bloom

by Dee McVicker

MADISON, Wis. Few radio organizations take the Clean Air Act as seriously as Earthwatch Radio; perhaps none put as much effort into keeping the air clean.

For the past 20 years, Earthwatch Radio has been using the airwaves to inform the public of environmental issues ranging from air pollution and global warming to recycling and energy efficiency.

Over 5,000 two-minute news bytes on the environment have been produced by the environmental organization, sometimes featuring prestigious guests like Vice President Albert Gore during his tenure as junior Democratic Senator from Tennessee and the leading spokesman for environmentalism on Capitol Hill.

The pieces are jointly produced and distributed by the Institute for Environmental Studies and the Sea Grant Institute at the University of Wisconsin-Madison. To date, some 160 commercial and public radio stations in the United States and Canada, as well as a number of short-wave carriers, are airing the service.

Well-known radio

Earthwatch was a recipient of a 1992 Global 500 award, offered by the United Nation's Environment Programme

(UNEP). The annual award pays tribute to individuals and organizations for actions and leadership on the frontlines of the environmental agenda.

The award was presented on a global stage—the 1992 Earth Summit in Rio de Janeiro, Brazil—where the world leaders gathered last June to consider the state of the global environment.

Earthwatch Radio's origins were more humble. The brainchild of University of Wisconsin students, Earthwatch began on 12 radio stations in the Great Lakes area in the fall of 1972, a reaction to the first Earth Day in April of 1970.

"At the time there was this great surge in environmental consciousness; there had been some really notorious oil spills. Santa Barbara Channel off of California had this blow out of an oil well. It was the first time people had seen sea birds covered with oil," recalled Steve Pomplun, one of two producers for Earthwatch Radio. "I think people were looking for things to do to get involved."

A demand for awareness

Apparently encouraged by the rise in public awareness of environmental issues, the students sought and eventually were able to win support and funding for an environmental program utilizing the airwaves.

"A couple of students came up with the

idea here at the Institute of Environmental Studies to create an environmental radio feature. And at the same time, word got around and staffers over at the Sea Grant Institute were also thinking about radio as an outreach tool to spread the word about fishery issues in the Great Lakes area," Pomplun said.

Both the Institute for Environmental Studies and the Sea Grant Institute were involved from the start, he said. "Students and staff from these institutes got together and put together funding for these proposals."

Today the Sea Grant Institute, a branch of the National Oceanic Atmospheric Administration, is charged with the responsibility of covering oceanic and atmospheric issues. The Institute for Environmental Studies is responsible for other environment-related topics.

"We try to put in a mix of hands-on advice as well as national issues," said Pomplun. He cited a recent program featuring a story on a new research project studying global warming, an interview with a nationally acclaimed ecologist, and a how-to on recycling.

The two-minute features are produced at the University of Wisconsin and are sent free of charge to subscribing stations. Produced by graduate and undergraduate students at both institutes, Earthwatch Radio features are sent on

cassette, 10 to a package, every two weeks and occasionally will include sound effects.

Feature material

In one feature on the speech patterns of humpback whales, said Pomplun, "they had determined that there were actual speech patterns. At different parts of the ocean they found different dialects among these whales, and of course, they used some taped sounds to illustrate the point."

Radio stations use the features as inserts in a newscast or as public-service programming. "People like a certain amount of public-service programming, and the environment has been and continues to be a pretty hot topic. There isn't really a lot of good programming out there on the environment, especially in two-minute bytes that tend to fit nicely into a lot of different formats," said Pomplun.

For more information on Earthwatch Radio or to subscribe, contact Steve Pomplun at 608-263-3063.

□ □ □

Dee McVicker has been covering the broadcast beat for four years as a regular contributor to RW and as a freelance writer specializing in industry newsletters, manuals, and brochures. She can be reached at 602-545-7363.

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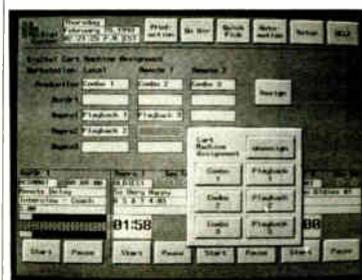
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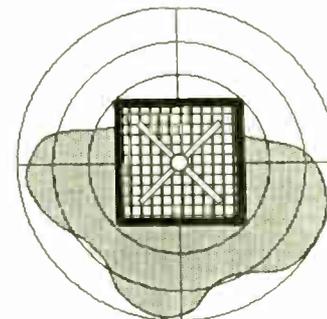
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INSIGHT ON RULES

Broadcasters' Take on Self Inspection

by Harold Hallikainen

SAN LUIS OBISPO, Calif. In part because of objections raised by the National Association of Broadcasters, an FCC effort to get Office of Management and Budget approval of proposed AM and FM Self Inspection Reports is on hold.

I am currently unsure whether the FCC plans to rework the forms taking NAB's suggestions into account or just drop the project.

NAB's Barry Umansky (phone 202-429-5430) discussed NAB's position with me and I thought he raised several points worthy of discussion.

A formal approach

NAB argues that the process of generating the self-inspection reports, or even considering the use of such reports, should have gone through a more formal procedure, including public-comment periods. I agree with NAB that the forms could have been improved through a public-comment period, but I don't know that every FCC form has to go through a rulemaking process.

If a public-comment process had been used, NAB says, "... the Commission would have been given a clear view of broadcaster dissatisfaction with this regulatory approach."

NAB lists several valid objections to

the report as submitted, but I wonder if these objections could be taken care of and the "regulatory approach" (mail-order inspections) be used with success. If the approach is unsatisfactory, I would wonder if a motivation for this objection is an effort by broadcasters to avoid the effort required to comply with the rules by making it difficult and expensive for the FCC to determine compliance.

Would broadcasters rather hide the non-compliance than fix it?

Apparently the FCC filing with OMB did not include the "cover letter" that was sent out with the forms during the pilot test. The FM reports cover letter assures: "We will not issue a forfeiture or violation notice for information you disclose in response to this program." If this letter had been included, perhaps NAB would have had one less objection.

What the FCC had in mind, it seems, is similar to a program run by California OSHA. That program allows a business to request an OSHA inspection. A report listing all violations discovered and a deadline for the violations to be fixed is prepared after the inspection. If the violations are fixed on deadline, no fines are issued.

To fix or to fine?

Businesses tend to take advantage of this program. Fixing problems is less expensive than fines.

NAB stated that "broadcasters were given no assurance that any defects, shortcomings, etc. detected in the self-inspection process could be corrected by the licensee prior to completion, signing and returning of the form, with no requirement that the broadcaster indicate that such problems—now corrected—had been discovered."

Would broadcasters rather hide the non-compliance than fix it?

Again referring to the FM cover letter, "If you discover areas of non-compliance as the report is completed, you should make the appropriate corrections." Perhaps the FCC could have been more clear here. I would suggest that any non-compliant conditions discovered should be recorded in the report along with the corrective action taken. This is similar to the station log requirement of 73.1870(c)(3).

NAB says the FCC OMB submission does not assure no forfeitures or licensee-specific investigation based on information reported. "Simply, stations could make honest mistakes in filling out the form; but they could have faced enforce-

ment penalties/jeopardy for doing so."

Perhaps the FCC could have made such assurances in the form. But I think good use of the form would be licensee-specific investigation (inspections). If there was an "honest mistake," an actual station inspection would show the station was indeed in compliance and no violation notice need be issued.

Fewer FCC Inspections

The FCC is making around 300 broadcast station inspections a year, down due to lack of resources. It would take 30 or 40 years to inspect every station. As part of its "justification statement" to OMB, the FCC said the form would "reduce the need to make regular field inspections to determine compliance."

Commission members have given no indication that the current pace of inspections will change, NAB claims. The FCC, I'd suggest, is currently falling far short of the required number of inspections to determine compliance.

The use of the self-inspection report could substitute for some of the needed inspections that are not now made, but the number of actual station inspections would remain the same or perhaps increase. The self-inspection report, combined with on-site inspections when the report yields deficiencies, seems to

continued on page 42 ▶

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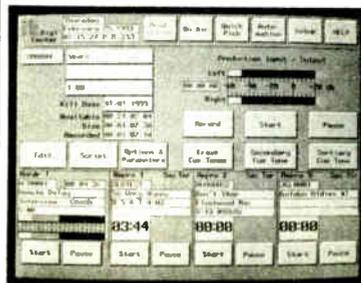
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Self Inspection from an NAB Angle

► continued from page 41

be a more efficient way of insuring compliance.

Again, are broadcasters arguing against more efficient ascertainment of station compliance, perhaps in an effort to hide rule violations?

Time enough to complete form

The FCC cover letter gives stations 20 days to complete the form. NAB argues 30 or 60 days is more like it. Additional time is required for stations using "contract engineers" to deal with "difficult technical issues."

Since every station is required to have a chief operator who is required to make a weekly review of the station logs, it would seem a technically competent person should be at the station at least once a week. Further, the chief operator of an AM directional station or an AM non-directional station with greater than 10 kW authorized power is required to be an employee of the station.

The chief operator should be able to answer all the questions quickly since that person is responsible for the technical operation of the station and insuring its compliance. Many of the questions (and calculations) are probably performed on a weekly basis by the chief operator as part of the weekly log review.

In any case, the form could easily be completed within the specified 20 days if

the station has competent technical personnel available.

NAB also says the FCC should address such a form to the station's general manager instead of the "chief engineer." I suggest that the FCC address such a form to the station's "chief operator," since every station is required to have one and that person should be most familiar with the technical operation of the station. That person can seek assistance from other station personnel and consultants as necessary.

Update the public files

The report should not ask about rules that do not exist or where enforcement is suspended, NAB appropriately says. Since the book—required by the rules to be in the public inspection file—is severely out of date, the FCC has indicated it will not issue a Notice of Apparent Liability for failures to have the book on file.

In any case, an FCC inspection (whether by mail or in person) should not be the first time the station becomes aware it does not have a book. There should be a periodic review of the public-inspection file. If the rules require the book to be present, either get a copy of the book or get a letter from the FCC saying it is not required and put it in the file. The same review process should go for the required weekly chief operator log review and periodic reviews of other requirements.

I agree with NAB's point that determining the fading of tower paint is quite subjective without a color chart. I suggest that every station with a tower that requires painting have access to such a chart. Recall that rules require a quarterly inspection of tower-light controls and indicators. At performing this inspection, I'd suggest comparing the tower paint color to a color chart and logging the results.

Kelly Williams of NAB Science & Technology told me of a color chart that shows a progression of fading aviation orange. If the paint is more faded than the last color, it's time to paint the tower. You can order this chart ("FAA Inservice Orange Color Tolerance Chart") from Hale Color Charts, Inc., 8950 Route 108, Suite 101, Columbia, Md., 21045; phone 800-777-1225 or 410-997-1880; fax 410-997-2191. The chart sells for \$30.

NAB self-inspection report

NAB is preparing a self-inspection report scheduled for availability by about the time you read this. In addition, the "NAB Guide For Chief Operators" provides suggested forms that can aid in insuring station compliance. It is available from NAB at 800-368-5644.

These publications can help stations determine compliance. Those stations currently ignoring the rules or without technically competent chief operators will

probably continue to violate various rules.

A "Mail Order Inspection" mailed out by the FCC would, in my opinion, be an efficient way for the FCC to increase compliance.

By the way...

In the last article in this series, I reminded you of the coming July 1 deadline for FCC type notified STL transmitters. The FCC is considering allowing the use of older, existing STL transmitters on an emergency basis pending the repair of a notified transmitter. As the rules stand at this writing, however, after July 1 non-notified transmitters will be illegal.

A public notice should be issued soon outlining under what circumstances a non-notified transmitter may be used. I'd expect it to be allowed for the temporary replacement of an existing notified transmitter for a limited period of time (similar to existing allowances for operation without an antenna monitor or EBS equipment pending its repair). The allowance for use of a non-notified transmitter will probably be on a non-interference basis. I'll let you know the details as soon as I hear from the FCC.

□ □ □

Harold Hallikainen is president of Hallikainen and Friends, a manufacturer of transmitter-control and telemetry systems. He also teaches electronics at Cuesta College, San Luis Obispo, and is getting better at Contra dancing. He can be reached at 805-541-0200. He can also be reached on Internet at ap621@cleveland.freenet.edu.

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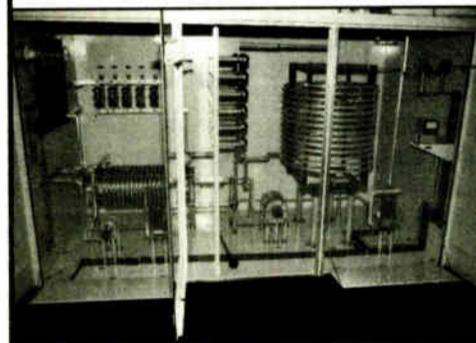
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'Decency' Requires Some Know-How

by Mike Meeske

ORLANDO, Fla. A U.S. Supreme Court justice ruling on an obscenity case once said he wasn't sure how to define obscenity, but he said he knew when he saw it. The FCC went one better. The agency not only has a definition for indecency, but it is finding plenty of examples of it on American radio.

Further, the Supreme Court gave the FCC its blessing. If you're a broadcaster who is not sure how the FCC defines indecency, read on.

Indecency defined

The FCC indecency policy went through two phases and operators should be clear about the rules. The first phase generated from the Commission's ruling against WBAI-FM New York, for its airing of George Carlin's "seven dirty words." That 1978 ruling was affirmed by the Supreme Court.

While the FCC announced a definition of indecency in the decision, in practice, it brought actions against stations until 1987 only for using the "seven dirty words." As a result, stations had a clear guideline: Avoid the seven dirty words and avoid an FCC action.

The rise of shock radio led the FCC to revise its position in 1987. The FCC stated it would apply the generic definition of indecency it advanced in the WBAI case, which is: "Language or material that depicts or describes, in terms patently offensive as measured by contemporary community standards for the broadcast medium, sexual or excretory activities or organs."

This change came about largely because the shock jocks were skirting the WBAI ruling by avoiding the "seven dirty words," but using innuendo and double entendre in such a way that only one meaning was likely.

Moreover, the broadcasts did not consist of occasional off-color references,

but instead dwelt on sexual and excretory matters in a pandering and titillating fashion that the FCC considered patently offensive.

The prohibition is not just against language that describes sexual or excretory activities or organs; the FCC also left itself room to take action against the use

Even during safe harbors, the FCC recommends warnings.

of expletives. The Commission stated that deliberate and repetitive use of expletives in a patently offensive manner could also lead to a finding of indecency.

Further, if a broadcast goes beyond the use of expletives, then the context is a factor. Are the words isolated or fleeting or repetitive? Finally, the nature of the program can be a factor. Is the questionable material part of the comments of a risqué DJ, or is it found in content that has some redeeming value, such as a news story?

Safe harbor

In the WBAI ruling the FCC expressed particular concern against programming indecent material at a time of day when there is a reasonable risk that children may be in the audience. That was the case with the Carlin broadcast, which aired in the afternoon. Morning drive-time programs also fall into this category.

Congress once tried to ban indecent material around the clock, but an appeals court turned that aside. It said that indecent material couldn't be banned completely; it just had to be kept off the air when children might be in the audience.

The FCC has had trouble deciding when children are really in the audience. In the WBAI ruling the FCC stated that a

safe harbor for indecent material existed from 10 p.m. to 6 a.m. because children were unlikely to be in the audience. But as of early 1993, its safe harbor for indecent material was from midnight to 6 a.m. The rest of the day children are thought to be present in the audience, and a station can be fined for programming indecent material.

Even during the safe harbor, the FCC recommends that stations broadcast warning announcements of their intention to broadcast indecent material. This may work when a station deliberately plans to air indecent material, but it places the station at risk if spontaneous indecent material is aired.

FCC standards

The FCC is cautious to distance indecent content from obscene content. Obscene material never can be legally broadcast, and in part, must be found obscene by an average person applying contemporary community standards. This means that material believed to be obscene is judged by a local jury in a courtroom.

The FCC varied that standard in the case of indecency. Material may be indecent as measured by contemporary community standards for the broadcast medium.

But there is no trial in a local courtroom. Instead, the determination of whether material is indecent is made by

employees of the FCC. So there are no "contemporary community standards for the broadcast medium;" there are national standards—the national standards applied by personnel at the FCC. A case doesn't go before a jury but before government bureaucrats.

Here's how the FCC applies contemporary community standards for the broadcast medium: At the FCC, a single investigator in the Mass Media Bureau examines a complaint. If that person believes the item might be indecent, the complaint is filtered up through other staff employees until it reaches the commissioners who, with their aides, make a final determination.

The FCC clearly has the authority to regulate indecency and has shown it will exercise its power. If your station feels compelled to broadcast content that fits the definition of indecency, it can safely be aired only during the safe harbor and preferably with a warning. To broadcast indecency the rest of the day from 6 a.m. to midnight is risky. A single complaint can bring an action by the FCC.

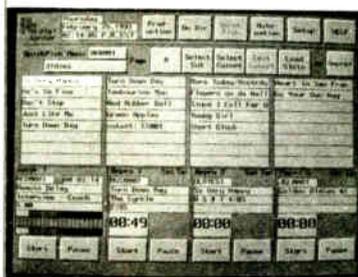
It's an easy matter for listeners to tape your station and provide the FCC with a tape or transcript. With such evidence, a finding of indecency can mean a fine and a record in your file that will be noted at license renewal.

□ □ □

Mike Meeske is a professor and head of the Radio/TV Division at the University of Central Florida. He is also the co-author of a textbook titled "Copywriting For The Electronic Media."



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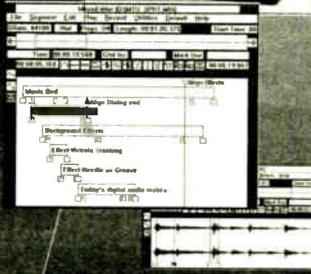
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ECLECTIC ENGINEER

Maintain Good Credit, Sleep Easy

by Barry Mishkind

TUCSON, Ariz. There are some things you really hate to learn at 3 a.m., such as the discovery of a transmitter problem and having no replacement parts.

Perhaps even more annoying is the middle-of-the-night realization that your station has no credit. There could be many good reasons for the problem, but that's no consolation to the frustrated engineer with a job to do.

As the technical community tries to come to grips with the economic realities of 1990 and the resulting budgetary constraints, old problems sometimes jump

out and derail the technical process. The engineer can be pushed into being an advocate for his client, trying to repair financial problems before he can fix the technical ones.

Handling such situations, or avoiding them in the first place, isn't always easy.

Never shipped

One client station reported use of its last spare stylus in the control room and needed more immediately. A quick call to a supplier confirmed the part was in stock and a check was sent out to cover a cash-with-order price and second-day air shipment of the replacement styli.

About ten days later, another stylus bit the dust and no one could find the spares. Arriving at the station, I confirmed none had been received, although the check had been cashed and cleared the bank. The supplier's salesman transferred me to their bookkeeper. She told me the station had a past-due balance from a previous order, so the check was cashed as payment on the old debt.

My order had not been shipped.

"If there was a debt, I can understand your wanting payment. But since you knew I needed the styli immediately, why didn't you at least give me a courtesy call to let me know about the problem so we wouldn't be forced to use a damaged stylus?" I asked.

"We don't do that," she snapped. "You owed us, so we had the right to cash the check," was her final word.

This wasn't even a communication problem between the salesman and the bookkeeper. It was a very hard-nosed business attitude. No apology was ever offered.

Suppliers can't stay in business if customers do not pay their bills. But what about a supplier who turns an engineer into a collection agent? A supplier that refused even to provide a courtesy call to the engineer so his time wasn't wasted?

My answer: I haven't bought anything since then from this company and I've told many others both of the incident and my opinion of their honesty in dealing with engineers.

In fact, what the supplier did apparently wasn't even legal. I'm aware of a similar case where the station decided to unleash its attorneys who promptly showed the supplier the error of its ways.

In the end a different supplier shipped the needed styli immediately.

parts sent out air freight.

"Sorry, we can't send you any parts," was the reply. "Your station owes us \$200."

The engineer was stunned. He's off the air and prevented from making repairs. He didn't want to deal with the station's financial matters.

To make a long story short, the \$200 debt was from a previous owner of the station. The general manager offered to investigate the records and set things straight, but the manufacturer wouldn't budge until the money was paid. It wouldn't even send the parts COD.

What about a supplier who turns an engineer into a collection agent?

The station remained off the air for two days while parts were located elsewhere.

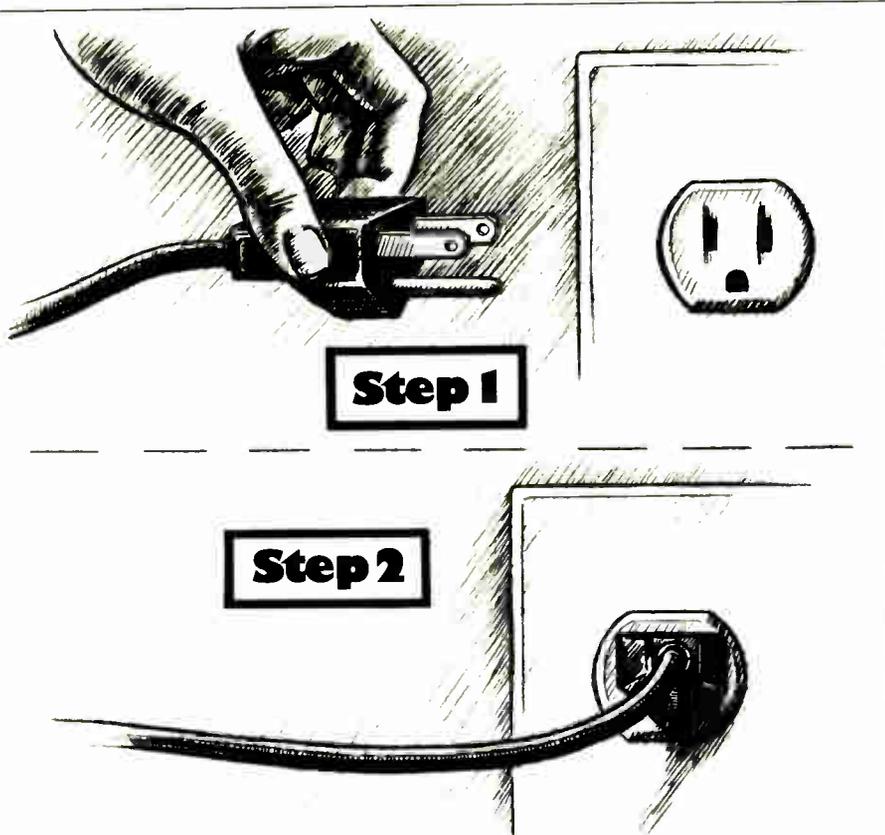
There's no question the phasor manufacturer had a right to expect payment for parts and services. A change in station ownership doesn't automatically nullify previous debts. Yet, this was more than a bent stylus. The failure to help a station in trouble caused loss of business and hard feelings. The manufacturer suffered its own loss later on when the station upgraded its directional system, money lost over a \$200 dispute.

With all the station trading over the past years, many manufacturers are left with all sorts of bad debts, big and small. Tracking the owners can be a fulltime job. On the other hand, station owners often learn the hard way about old debts.

What is the engineer's position in all of this? Shouldn't he be able to expect to call suppliers and place orders without problems? Indeed, how can he identify honest suppliers and develop a good working relationship with them?

□ □ □

Barry Mishkind, aka RW's "Eclectic Engineer," consults from his base in Tucson, Ariz. He can be reached at 2033 S. Augusta Place (85710). Electronic addresses: *BMISHKIND* on MCI Mail, or *barry@coyote.datalog.com* on Internet (also via CompuServe).



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BOTTOMLINE BROADCASTER

Use Voice Mail; Save Money and Staff

by Edwin Bukont

GREENBELT Md. Resistance to a productive new technology may be significant if that technology is poorly implemented and appears only to introduce a new set of problems. That describes the typical perception of voice mail and related call-processing systems.

While generally referred to as 'voice mail,' the menu choices with which callers are greeted are only a gateway to a wealth of call-processing options. To understand this technology and to ask the right questions, think in terms of intelligent call processing and realize that voice mail is one of many destinations to which a call may be sent.

Depending upon your needs, the application of intelligent call processing to your business may cost anywhere from \$1,000 to \$30,000.

Typical drawbacks

In the traditional 'operator' method of call processing, the first problem has arisen before a call is even answered. The call can only be answered when a live operator is present. Staffing your switchboard continuously is cost-prohibitive. Calls either go unanswered or fill an answering machine to capacity. Call forwarding to a pager or another number presents the same staffing problem and removes your control over customer access.

An answering service provides some relief in call screening and turnaround time, but involves recurring cost, constant training and potential miscommunication. To operate efficiently your staff must be able to meet changing needs with virtually instant control of access to each other and to the customer.

A properly implemented intelligent call-processing system can make it appear that no one is "out of the office at the moment."

The typical operator approach involves many people using only a few telephone lines. Any line in use is connected to a live staffer who is either answering, originating or holding a call. Such an approach is quickly overloaded, especially as your business grows. Callers then get frequent busy tones, are put on hold or go unanswered. Your staff may have to wait to return calls because all lines are busy.

More lines does not provide relief because additional personnel are needed to handle them and those lines are an unproductive expense during slow periods. Since all work is done by a live person, you do not need more lines than you can reasonably afford or expect your staff to handle. Therefore, call processing has been a personnel-management tool as much as a customer-service tool.

A better way

Those busy signals and no-answers are costing you business as potential new and repeat clients go where the customer service is better. I urge you to begin thinking from the customer angle and understand that with an intelligent call-processing system, you will be able to handle many more calls with the same staff and higher productivity can justify

additional telephone lines to separate outgoing and incoming calls without the need for operator assistance.

It is certainly cheaper and faster to meet your needs with hardware solutions than it is to add and train personnel. Many people expect to simply plug-in voice mail between the caller and the office staff. That approach wastes capital and labor dollars while increasing the turnaround time between answering a caller and satisfying his request.

The idea here is to get callers to their destination by the shortest route, for the shortest period of time and the route should not be dependent upon a live

operator. Leaving messages for your staff, getting directions to the station, general information such as contest rules and job openings do not have to involve the operator or other staff.

Research conducted on behalf of VMX Inc., which is a major provider of intelligent call-processing systems, shows that callers dial a business for one of three reasons: to find specific information about a product or service; to find general information about your business, or for assistance in solving a problem.

An operator will traditionally handle the first two tasks, either by taking a message or accessing some form of data

base or prepared comments (such as directions or contest rules) which are repeated to the caller. Both of these items are handled more quickly if the caller accesses the data base directly. Your staff is then free to deal with the final task, providing solutions.

The expense of the call processing system is offset and surpassed by improved productivity and better customer service. This productivity can be measured in higher sales, faster processing of orders and invoices and the ability to recoup travel time as work time.

Your sales staff need not come to the office, nor occupy a receptionist's time by leaving and retrieving messages. A message can be left or retrieved from anywhere, and, in some systems, forwarded to other users with added com-

continued on page 47 ▶

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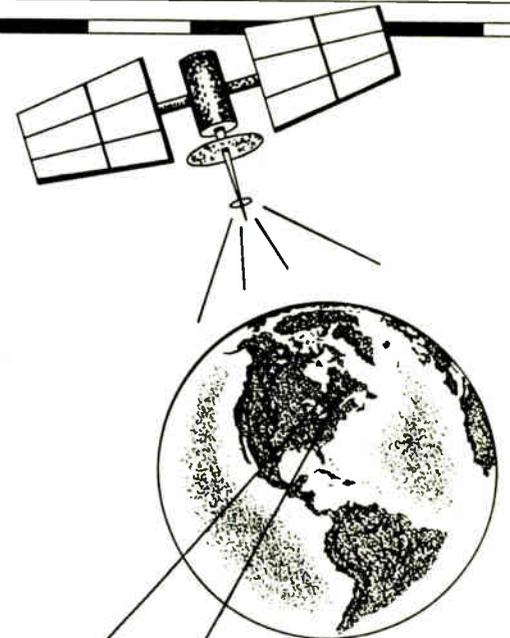
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The Truth About Digital Automation Systems

Why some systems are ^{Much} better than others..

Digital hard disk programming systems are not alike. There are one or two good ones, the rest aren't much. Don't get stuck. Ask the right questions. Use our free system comparison chart. Get your priorities straight. Take the time to compare carefully. Look for the best combination of features and price. This isn't the easy way, but it works.

Make your own, independent decisions. Remember that early purchasers of unsophisticated systems may say they're happy, but they really haven't had the chance to compare their systems against an intelligent system like Digital DJ, so they don't know what they're missing. And, they're missing a lot! Please read the non-technical discussion below. Then, call or FAX with your questions. Get a proposal. Compare Digital DJ with other systems on a point-by-point basis. Get the right system at the right price.

Why Digital DJ leads the pack

Absolute Audio Quality

Audio Quality: Digital DJ has superb audio quality, at no extra cost. Using the advanced apt-X™ compression technology, Digital DJ produces stunning, transparent, musical audio quality at high compression using only one megabyte per minute in mono for a full 16 kHz FM band response. No other audio card on any system at any price exceeds this. More importantly, the only two other systems that compare, sell for a premium price.

The Digital DJ apt-X™ system, unlike systems with low quality audio cards, requires no external processing or filtering to provide broadcast quality sound.

How can you tell which systems have low quality audio processing? The 'scope tells the tale. Just call and we'll tell you who they are, then you can check for yourself.

Stereo Background Record

Finally, there is a reasonably priced system that can do *stereo simultaneous record/play*. Some systems offer simplistic forms of *mono simultaneous record/play* for time shifting newscasts, dubbing spots, etc. Many of these systems impose some strange restrictions on the user that make you wonder if it really is simultaneous record/play.

Our new *Programmed Background Record (PBR)* option offers true simultaneous record/play in stereo. The only two other systems that do this come at premium prices. Call us to check it out.

Absolute Support

How many digital audio vendors offer 24 hour per day, 7 day per week *emergency factory Support*? Check carefully. Not many do. And there will be times when you need it. Our DJ support staff are all old radio staffers and they understand programming. If you have an *emergency*, then they will be there.

Absolute Format Control

Hall of Shame: It is a shameful fact that most of the digital audio hard disk systems (even the most expensive) are incapable of running a standard satellite format to the published specification. And, that most of them have only the most rudimentary live assist ability.

Other than audio quality, *nothing* is more important than the control software that runs your format. But the truth is, that beside Digital DJ and perhaps one premium priced system, there is really nothing out there but some pretty crude software.

Software Check List: Below are a few of the *basic* features that are necessary to run a reasonable format.

- Real Time operation.
- Audio Cut Number Rotations
- Auto Sub with Cut rotations for illegal Spots
- Auto Spot Set Fill-to-time with Cut rotations
- Automatic reboot and reset to correct Log position.
- Full satellite Jock work schedules with Cut rotations and day-of-week scheduling.
- True, log-based Live Assist operation
- Buffered Satellite closures
- Live Copy on Air Log
- Live rotating spot Tags
- LAN network compatibility
- Direct Air Log editing
- Programmable out-going control closures
- Automatic Air Log Loading
- External Air Log Editor

Sounds reasonable doesn't it? Well, it is. But not to some others. If you don't understand the terms above, then you need to before you get any system. You also need to know *why* these features are necessary and who has them and who doesn't. Call us, we've got the information. You'll be surprised.

Incidentally, Digital DJ has many more features than just the basics above. Ask us about *MACRO* programming time-based closure shifting and *jock sensitive* calls. We do software and no one does it better.

Absolute Magic

CD-Systems: Are you aware that most of the CD digital audio systems offered today are just barely capable of simple end-to-end sequential operation? And, that they have been designed to work like the tired old reel-to-reel dinosaurs? And, that they are essentially unloadable and uneditable once they are started? Or that several of them are hybrids of incompatible components? Call us about this..

In contrast, the CD version of Digital DJ is filled with features that really let the user *program* their format from a real Log. CD-DJ is a sophisticated, single PC, integrated control programmer that will handle up to 32 of the popular *Pioneer™* consumer PD-M501 and TM/2 players as well as the new *Pioneer™* CAC-V3200 300 disc player.

The CAC-V3200 sets a new standard in professional CD playback devices. With two turntables, the unit is capable of instantaneous and overlapped playback on a disc to disc basis. Unlike the consumer playbacks, the V3200 sends CD-DJ continuous player *status* information so that if a CD sticks or skips, then the DJ system can make a correction immediately.

Digital DJ is the only CD system to offer a fully integrated hard disk digital audio control system and seamless live assist with the superb audio quality of the apt-X™ audio processor. Everything is CD quality all the way.

SOS

SOS: The Station Operating System is our name for the tightly integrated Super Log Traffic, Digital DJ and CD-Music Log program set. Tied together by an extremely intelligent bidirectional interface and a low cost LAN network., the combination of these software systems is very powerful and very easy to use and the price is easily justifiable. We have had basic SOS system combinations in operation for more than two years. Call for information..

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Digital DJ - DJ-Lite - Super Log - Simple Log - EZ Log - CD-Music Log - Music Log

Voice Mail Saves Money... Really

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ments for appropriate action. The salesperson may retrieve a message and respond to it hours or even days sooner than would typically occur with a written message or even a pager.

Call processing in action

Food for thought: Check your reception area right now...How many messages are sitting there waiting for a response from someone who is either on vacation, coming in late or has left early? Suppose every third message for a salesperson can be tied to a lost sale. Multiply the messages by an average buy for your best day part and see what you are passing up.

Assume that this occurs everyday but you were previously unaware of such. Multiply the daily loss by 275 (the average number of business days per year). Can you really afford to be losing so much business? Probably not.

I'll bet your receptionist is giving out directions for the 20th time this hour.

What if each salesperson could retrieve messages from a voice-mail system, while your receptionist handles calls needing real assistance? That voice-mail message could be sent on to whomever in the office could best expedite the order before the salesperson gets back.

What if a client wants to leave a message or contact a rep outside of banker's hours? Early-morning and late-afternoon copy changes or a client's sudden demographic apprehensions are a fact of life in radio. With voice mail, the account rep could check for messages from outside and respond to the client's needs hours sooner, before the receptionist is in and before getting across town to the office. You have now turned driving time into productive time and saved the sale.

Taking it impersonally

Perhaps the biggest complaint about voice mail is that it is impersonal or difficult to use. The first is an implementation problem; the second a problem with specific hardware.

Regarding hardware, some call-processing systems are designed to support a company's existing product line. As such, the system may not offer the flexibility you need unless you already own the call-processing company's other 'family' products. Sometimes specific features are left out because they conflict with a company's existing products.

One popular system, for example, requires that if you dialed in through a receptionist and the party called does not answer, you must return to the receptionist or hang up and redial with the direct extension number. Guess what—that vendor sells talk time and makes a lot of money with first-minute charges and waiting on hold. A competitor's product does not have that limitation but allows you to leave a message regardless of how you entered the system.

The impersonal problem is easily solved. At WPGC we split the existing 12 trunks into two groups. Our published business number hunts five roll-over lines that still go to the receptionist. First-time callers are handled by a live operator. Business cards feature the voice mail 'hunt' numbers which

includes six roll-overs. Repeat callers immediately access a menu that allows them to leave messages or dial a direct extension. The receptionist can also route calls through this system. After business hours, all calls go through the call-processing system.

But the ability to split lines and change routing after hours has nothing to do with voice mail. Intelligent call processing is a gateway; voice mail is a destination, and the routing is a function of the telephone switch.

Things to remember

A) Cell phones can become hell phones when accessing call-processing

systems because of problems with the duration of DTMF tone sounds. This is a fault with the cell phone, not the call-processing system. Additional noise and switching silences can generate confusing commands to call-processing systems.

B) Older private branch exchange systems, especially TIE systems, were never intended to interface with anything except themselves and may not be adaptable to call processing. This is particularly apparent if you call outside from a TIE phone and reach another business's voice mail.

C) Unlike your present phone system, whose primary purpose is to access the

customer world, call processing will serve equal duty with your staff. Buy enough memory (hours of hard drive storage) and enough ports to facilitate the full use of the system. However, memory should not be used as audition tapes for aspiring air talent. Keep it short. A personal greeting should not take more than 30 seconds. You should not have to allow for longer than a two-minute incoming message.

D) Be sure the system is software programmable and that you keep the necessary disks and manuals to make routine changes and obtain system reports.

□ □ □

Edwin Bukont is the CE at WPGC-AM-FM Morningside, Md. (Washington). He can be reached there at 301-441-3505, ext. 8213; address: 6301 Ivy Lane, Suite 801, Greenbelt, Md. 20770.

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Color Your Workshop Secure, Neat

by Larry Albert

MURRAY, Ky. If you have ever wished for a fast, efficient, effective and, best of all, cheap method to color code connectors or terminals, listen to this. This method lets you apply any color of paint you choose, and you do not even have to clean a paint brush.

The supplies are found at your local truck dealer. The parts department knows it as "touch-up paint."

Touch-up paint is sold to repaint small nicks and scratches on vehicles. It comes in a small bottle with a brush built into the cap.

The brush need not be cleaned, as it is stored in the paint.

Because each color has its own brush and no cleaning is required, marking can be done quickly.

Getting paint colors for the standard resistor color code is not quite as easy as you might wish. When did you last see a factory original *violet* vehicle? Because auto colors tend to be muted and pastels, truck colors are a better choice. For example, orange is really orange. (Though violet is still not available.)

You can use this method to identify cabling to equipment. It is suggested that you choose colors for "IN," "OUT," "RIGHT," "LEFT," and "MONO" and use that code throughout your system. Use color bands on cables and dots at connectors. Multiple colors can easily be

used as adjacent spots or stripes.

Marking the cabling this way makes it easier to reinstall the tape recorder you just fixed.

If you are currently using labels then you know their problems; "upside down," "unreadable scribble," "rubbed off," and "it won't fit through the hole."

You know that the cable with "board out right" on one end is labeled "audio in right" on the other end, but matching up colors is easier and faster for you and your helpers.

A second place to find small bottles of paint is the hobby shop. The paint used for plastic models comes in small bottles. Though it doesn't have a built-in brush, you can use a wooden toothpick and paint dots with it.

If you haven't had your fill of tech tips, here's another:

Most stations have several small items that are subject to "disappearance." The consumer units are the ones that are most likely to "stray." These items include scanners, table radios, TV receivers and cassette tape recorders.

One way to reduce this problem is to make the unit unattractive to the thief. The uglier the better!

Units with plastic cases can easily be "branded" with a soldering iron. The easiest way is to put your call letter or other identification into the plastic surface. Brand each letter using the tip to make a group of dots—just like a dot matrix printer.

The defacing/identification works best if placed on highly visible surfaces. The purpose is to *deter* pilfering.

To further reduce temptation, items can be painted in an unattractive style. A paint scheme can make something so ugly that nobody will want to be seen with it.

And, oh, by the way, green stripes with pink polka dots are *really* ugly.

Most shops have more than one set of Allen wrenches because of the numerous styles. There are US and Metric sizes, the common bent type and those for insertion into an auxiliary handle, standard end and ball tips, some are regular hexagon type while others are splined. Combinations of the above styles exist and are commonly found, or misplaced, in shops.

Many shops have such tools "stored" as a pile of "mixed miscellaneous" in a box, tray, or drawer. Other shops make a diligent effort to keep the different types separated; and, in some rare cases organized.

Sometimes these tools do not get replaced with the correct set after use. Incorrect or omitted tool replacement will cause problems and lost time later.

US and Metric sets will have tools which are almost the same size. There is very little difference in these tools to the eye. They may look the same, but they are not interchangeable because they don't fit. When you are working on

equipment with metric screws, it is no fun to select a tool which "looks right" and it still be the wrong size because it is really a US size tool improperly placed in the Metric set. Time will be lost analyzing the problem. More time will be lost locating the misplaced Metric tool.

Carefully sorting these tools into separate groups will solve this problem—today. Keeping them from becoming mixed up again is another problem completely. All is not lost. A solution follows.

One solution is to color code the wrench sets using different colors for different sets. You could spray paint each set completely. Painting a band, stripe, or a dot of color on the tool with a brush is usually neater. *Remember Auto Touch-Up paint.*

If you still store handle and insert types in their plastic cases keep the following in mind. Paint the tool so that the color marking is visible when tool is stored in the case. You may also want to paint a few color stripes on the clear plastic cover to ease selection.

A little time now with a small cost in paint will save time in the future. The ease of tool sorting and selection will eliminate some stress.

□ □ □

These tech tips were supplied by Larry Albert, television engineer at Murray State University's MSU-TV in Kentucky. Albert believes cheap engineering is an acceptable term and is a self-professed "cheapskate." He can be reached at 502-762-4664.

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Q-TIPS

Shoot the Trouble; Save the Station

by John "Q" Shepler

ROCKFORD, III. You hear a metallic *thunk* from the direction of the transmitter room. At the same instant the air monitor goes dead quiet. You're off the air.

Within five seconds you're standing face to face with the 25 KW FM, but not before the production engineer and the afternoon announcer grab for the controls. They jab the buttons a couple of times. Nothing happens. They swing around in unison to look at you. The icy stares make your heart stop.

Now you're starting to sweat. The transmitter is clearly dead, with no obvious cause. You'll have to open it up and start troubleshooting. Now, where's that manual?

Everyone is waiting

Minutes seem like hours when a station goes off the air. Hours seem like days when the rest of the crew is standing there egging you on. If you're lucky, they're professional enough to retreat to the studio so you can think in peace. Even so, you know they're in there waiting. The audience or what's left of it is out there waiting. Better hustle.

Speed is everything in solving broadcast problems. A transmitter running at half power is infinitely preferable to a transmitter that is off but going to be at full power in a couple of hours. A working CD player with clip leads dangling out the back always beats a shiny new one that's sitting there stone cold. An engineer who runs in the studio, yanks a faulty channel module from the board and rams in a new one within the duration of a single song is a hero. An engineer who says "live with it until I can do the job right at midnight" doesn't get the same level of admiration.

Sure, not all problems have ten-second solutions. Nevertheless, those people depending on the equipment want ten-second solutions, and it's in your interest to accommodate them as much as you can. Life is so much more pleasant when they think you're a hero instead of just a necessary evil.

Think in terms of speed. Design your system and methods for speed. If at all possible, have more than one way to quickly accommodate any problem.

This is the best argument for not scrimping on production studios. OK, you're a whiz at production on a five-channel board. How well does that board do when it's used as the main studio?

Design your AM, FM, news, and production facilities to be as interchangeable as possible. Don't just buy the same boards. Bring in the same sources, monitors, network feeds, phones, and other goodies so that any room can sub for any other in an emergency.

Interchangeable facilities

Make it easy to switch. A remote relay panel works, but guard those switches to prevent accidental transfers. Patches work fine, too. Be sure to run the program output of each board to an input channel of the others. That way you can have both boards on the air for seamless switching.

Many problems such as failed carts or CD players, noisy pots, blown speakers, dead amps, scratchy mic cables and so

on can be fixed pronto as long as you've made everything modular. Make it easy to unplug the audio and power for a cart machine and replace it with one from another studio. This means connectors and levels must match exactly.

Cords should be long enough to facilitate jostling equipment around. It's amazing how many people don't think to include an extra inch of audio cable. These are the same folks that staple down the power cords or tie them in knots under the board. The result is that a 30-second swap takes 30 minutes and upsets the flow of programming.

The same reasoning applies to audio

amplifiers, muting relays, on-air controls, preamps, turntables, tape recorders, and everything else electronic or mechanical. Design the studio so that you can change out the problem piece in a matter of a couple of minutes, without going off the air.

Don't get the idea that repair efforts are welcome in the studio. It may be fun to socialize with the talent for a few minutes, but the relationship can get strained as minutes become hours and tools and test equipment are scattered over the work area. Better to get in and out and take your time solving the problem in the shop.

How about that dead transmitter? Transmitter problems can certainly take awhile. The pressure comes off if you have a spare, even an obsolete low power junker transmitter or just an exciter. Once again, something on the air beats nothing every time.

Keep tools handy

Make your life easier for inevitable transmitter failures by keeping the manuals and schematics handy. A copy of the schematic laminated in plastic and hung on the transmitter's back door makes for quick reference.

How about likely spare parts such as tubes or solid-state power modules? They should be close at hand. It's nice to have shelves or a cabinet within arm's reach. The most likely parts to fail

continued on page 51 ►

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The Ultimate Digital Studio is a powerful broadcast tool that saves you time and money. The UDS controls music from CD jukeboxes or consumer-type compact disc players and computer audio hard disc systems so that all your music, commercials, jingles and voice tracks can be viewed and scheduled on one screen. TM Century has also developed interfaces for a wide variety of music and traffic scheduling systems.

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WORKBENCH

► continued from page 36

Hales Corners, Wisc., by calling 414-529-1250. For information on the Radio Design Labs Audio Controlled Relay, circle **Reader Service 115**.

★ ★ ★

Conference rooms or demo vans are great places for TV/VCR/stereo remote controls. All too often, however, these devices sprout legs and vanish. An alternative to fighting the missing remote control problem is to chain the control in place, like the stores do.

Unsurely you say? Not if the control is secured under the conference-room table. The Se-kur Corporation sells a chain and adhesive clamp for under \$5. They can be reached at 312-728-2435, or circle **Reader Service 41**.

After attaching the adhesive chain to the remote control, attach the other end under the conference-room table. Stick a strip of Velcro™ on the control and its mating piece under the table. The remote stays on a chain and out of sight. It is easily retrieved from underneath the table when needed.

★ ★ ★

Steven Crowley, popular **RW** columnist, formerly with du Treil, Lundin, and Rackley, a division of A. D. Ring, did not join the firm in their move to Florida. Steve stayed behind in Washington and hung out his own shingle. In doing so, Steve has also started a free client newsletter. It focuses on FCC activity in frequency bands other than broadcast which may impact broadcast stations in the future.

In addition to his broadcast consulting work, Steve has spent a lot of time studying emerging technologies, so this newsletter could be something of a crystal ball. The newsletter is free to stations making written requests on a company letterhead. Mail your request to Steven J. Crowley, P.E., 1133 15th Street NW, Suite 1200, Washington, DC 20005.

★ ★ ★

Mervill Lawson from WMOR-AM-FM Morehead, Ky., offered another tip for

Getting Back On the Air

► continued from page 49

should be the easiest to find.

Give yourself some space when you install transmitters. Remember somebody, probably you, is going to have to crawl inside that beast someday. Add some light fixtures and power outlets nearby. You need them for test equipment, soldering irons, and maybe a clamp-lamp to light up the interior.

Don't get in such a hurry that you forget proper safety procedures. Just make sure everything you need is close at hand and easy to deal with. Those high stress repair jobs can be a lot less nerve wracking and they can even help you gain points with the rest of the staff.

□ □ □

John Shepler is an engineering manager, writer, and longtime **RW** columnist. He can be reached at 5653 Weymouth Drive, Rockford, IL 61114 or on Prodigy Email as GJMS86A.

satellite users. His receiver lost a crystal, and the manufacturer said a replacement would run \$150 for four. Mervill only needed one. A friend told him about International Crystal Manufacturing (ICM) in Oklahoma City.

These folks sound like a worthy addition to anyone's Rolodex. This company builds the crystals used in both the Fairchild DART and SA receivers. The only things they need to build a replacement are either the crystal frequency or transponder number and the receiver model number. Delivery is 2 to four weeks and the crystals cost less than \$15 plus shipping. That's a far cry

from \$150.

In addition to satellite crystals, ICM manufactures a wide variety of communications crystals which are contained in a reference catalog. For orders use ICM's toll-free number, 800-426-9825. If you'd like to receive their cross-reference crystal catalog, circle **Reader Service 152**. Mervill Lawson can be reached at WMOR, 606-784-4141.

★ ★ ★

We'll wrap up this issue with a little trivia. Can you name the console that was introduced in 1980 and now numbers nearly 2,000 installed in the field? It's the Pacific Recorders BMX Series II.

Pacific President Jack Williams notified customers in November of plans to discontinue this console, given the higher performance and better value offered in

the BMX-III and Radiomixer consoles. Customer feedback has slowed the phase-out.

If you own a PR&E BMX, you'll be glad to know that confirmed orders for complete consoles and console mainframes will be accepted through June 30, 1993. Replacement modules will be periodically manufactured and will be available through 1994. Most of the non-structural replacement components will be available for the next five years. For more information on BMX upgrades, circle **Reader Service 77**.

□ □ □

John Bisset is a principal with Multiphase Consulting, a contract engineering and projects company. He can be reached at 703-764-0751. Fax tips or comments to his attention at 703-998-2966.

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Tips for Weighing Tapeless Options

Before Cart-Replacement Purchase, Judge Long-Term Cost Benefits and Applications for Automated Systems

by Yasmin Hashmi

LONDON With so many tapeless systems aimed at cart replacement and station automation available, the choice may be somewhat confusing. There are some general "common sense" pointers that may help to narrow the field down for you.

The first step is assess your needs. This includes defining why you are interested in the technology in the first place. The general answer to this seems to be that tapeless systems offer more flexibility, better audio quality and better reliability. However, the main worry, apart from cost, is depending on one storage source. If the bulk of material is stored on one disk and the system breaks down, the results could be catastrophic.

Budget

In determining how much to pay for a system, it helps if the longer-term financial benefit of using the system can be estimated. An obvious, if somewhat contentious, example is when a system is interfaced with a CD jukebox and fully automated for night time operation. The costs benefit can be calculated directly in terms of wages.

Other examples may be less dramatic, but, nonetheless, could involve direct

cost savings in terms of consumables. Unfortunately, the financial advantages of going tapeless are often more speculative than directly calculable and may be based on enhancing the station's appeal to potential advertisers—assuming it is a commercial station—by improving its overall performance.

The first step is to assess your needs. This includes defining why you are interested in the technology.

In such cases, it may be more appropriate to concentrate on how operational procedures and the quality of the new product will be improved.

When considering what type of system to select, one of the first problems is to establish basic functional requirements.

For example, if the station is large and there are several studios to service, there are several options available. One solution is to purchase multiple sample cart replacement replay machines and one production machine.

Multiple replay machines

Material that has been recorded and edited on the latter can then be passed

around the various studios via a removable medium such as floppy disk or RAM pack. This has the advantage of providing familiar control and, should any single unit break down, other units will remain unaffected.

An alternative is to install a network where material can be transferred to multiple studios/sites without having to physically transport it. This has the advantage of being quicker and does

away with the need for transportable media. An additional advantage is that a network may be able to support administrative software that can log what is being passed where, what should be played and what has been played.

A disadvantage is that if the network relies on a central file server, the whole system will be affected should the file server break down. There are, however, network configurations that do not rely on a centralized unit but can bypass any individual unit in case of problems.

For the smaller station, the cheapest option is the basic cart replacement system that is intended to replace the traditional cart with a tapeless medium. The

advantage here is improved reliability, better audio quality, and a saving on consumables since the floppy can be reused again and again.

The next step up is to provide basic playlisting or sequencing, whereby takes can be "chained" to play one after the other with the sequence being manually triggered. By adding a personal computer, more sophisticated editing and playlisting features can be provided, including the ability to automatically trigger a number of playlists at specified times.

The timing reference may be internally generated by the system—in which case the user is cautioned to check for drift against actual time—or external timing references via an interface.

Beyond this are systems that can automatically fill stop sets, support traffic and billing software, download updated playlists and audio via satellite or digital telephone lines, interface with CD jukeboxes and provide a host of other automated functions.

System operation

Having narrowed the number of systems down by price and functionality, the next step is to assess the system's ease of operation. If other users are to be involved, their operational needs should be considered.

For example, a disk jockey may require simply and obvious control; hence, the number of systems which emulate the traditional cart machine.

This does not mean, however, that

continued on page 61 ▶

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ROOTS OF RADIO

Seeds of the Powerful and 'Invisible Medium'

by James Wold

MINNEAPOLIS In its most basic form, radio today is essentially unchanged from its earliest days: A person. A microphone. An unseen audience.

An invisible medium, perhaps the most intimate ever devised by man. Radio is deceptively simple. There is less to it, yet more to it, than meets the ear.

In its first decade, stations like WEA in New York helped create the first national advertising medium. Such stations challenged, said someone, "the stability of the printing press itself." The medium was, said one radio executive in 1922, "an unlimited theater, where rear seats are hundreds of miles from the stage and where the audience, all occupying private homes, can come late or leave early...."

It unleashed the imagination of millions who listened to music, drama and information, creating private images in their mind's eye. Several existing radio stations were a part of this great national medium almost from the beginning.

Early stations

In its earliest incarnation, radio was an experiment for ship-to-shore communication. Before long, however, experimenters began to apply radio as a mass medium. Generally recognized as the first commercial station to sign on was an experimental venture in 1909 built by Dr. Charles Herrold, which later evolved into KCBS. With studios in the Garden City Bank building in San Jose, Calif., the station broadcast mostly ads for Dr. Herrold's School of Radio.

Herrold would do anything for his station and school. During the night, for long-distance tests, he began to appropri-

ate power at 600 volts from the Street Railway Company, tying onto trolley lines from the roof of the bank building by means of a long bamboo pole with a hook at the end. He also strung an antenna between two mountain tops and took his students into the hills to test reception at a radio-equipped shack with four bunks.

World War I stopped Herrold's operation. He tried but failed to revive it after the conflict, and sold the station to the Second Avenue Baptist Church, which ran it as KQW. The church later turned it over to a commercial operator, who sold it to another, who sold it to Columbia Broadcasting System which made it KCBS San Francisco—the 50,000 W descendant of a 15 W school station of 1909.

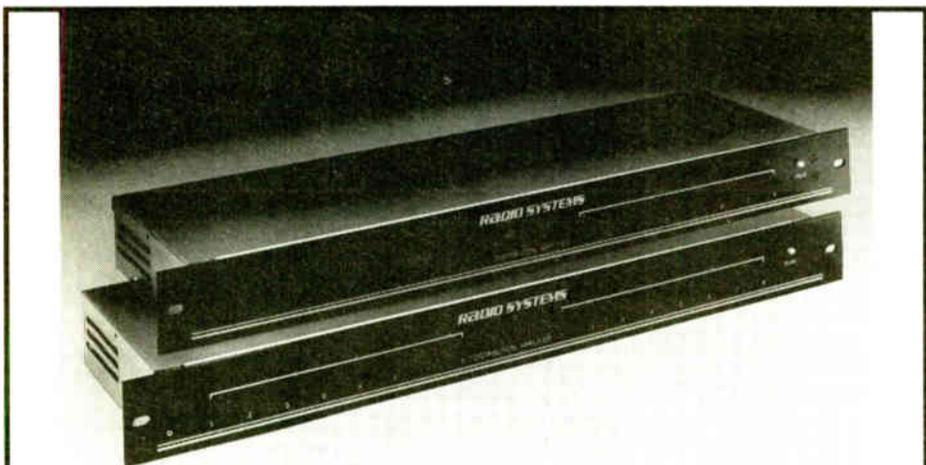
Radio after WWI

World War I had produced thousands of radio fans. Wirelessmen in the Signal Corps, discharged from the service, went back to their homemade sets. Some built transmitters as well as receivers. Every such amateur sender was a broadcasting station in the making.

Take for instance Lester Spangenberg, whose story is told in Alfred P. Morgan's "The Story of Electricity." After a year as a radio expert in the U.S. Navy, Spangenberg set up his own station, W22M, in Lakeview, N.J. Spangenberg's telephone microphone was in the living room near the piano, the transmitter tubes on the second floor, and aerial on the roof of his home.

Within reach of his transmitter were several hundred amateurs with receiving sets. He talked to them and they replied with postcards and letters. Early in 1920,

continued on page 62 ▶



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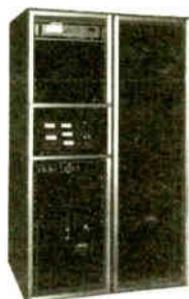
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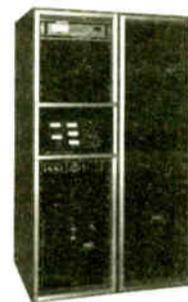


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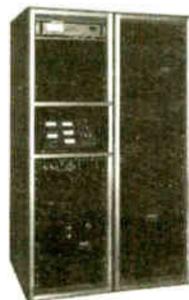
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Dynaco Dynakit Stereo 70. K Heyne, Feral Enter, 149 Dominica Ave, Fairfax CA 94930. 415-453-4084.

Dynaco ST120, fact bit, gd cond, BO. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Dynaco ST120, fact built, gd cond, BO. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Bext PJ-100 used less than 2 yrs, broad-band, \$1295. R Newton, Family 105.3, 266 Lantz Rd, Lawrenceburg TN 38464. 615-766-1022.

BWG Mdl 85 (2) pwr amp, stereo, 35 W/chnl, 1RU, exc cond, \$250 ea/\$400 both; Shure M-267 rem. \$275. J Somich, Somich Prods, 1208 Stoney Run Trl, Broadview Hghts OH 44147. 800-334-3925.

Gates MO-2696 rk mount, prof tube amp, 1950s, \$200. R Franklin, Franklin Studios, 1004 Dekalb St, Norristown PA 19401.

AB Syst 205A stereo, new, \$500 ea/BO. J Diamond, Blue Diamond, Box 102C Chubbic Rd RD1, Canonsburg PA 15317. 412-746-3455.

Haeco (2) 1x16 audio DAs, \$50 ea. L Houck, Rollin Rcdg, 210 Altgelt, San Antonio TX 78201.

New 250 W solid state amp, \$1800. Call for details. Bill Hoffman, 518-583-9490.

RCA, Altec, Dynaco tube amps, sell of trade. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

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McIntosh/Marantz, Fairchild 670/602. K Gutzke, 612-866-6183.

Mick-Lock 2-3 line amp. M Gimenez, WPAB, POB 7243, Ponce PR 00731.

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CCA Watchdog II VSWR protection/alarm w/manual, gd cond. M Rice, Cont Media, 222 Indacom, St Peters MO 63376.

200' 6" hard line, low loss 72 ohm, for TV/FM, \$4700. C Hwait, WTNN, 13206 Buttermilk Rd, Knoxville TN 37932.

Shively 6-bay. K Stone, KLTD, 12710 Research Blvd #390, Austin TX 78759. 512-331-9191.

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Scala PR450U (3) paraflectors on 950 MHz, \$300 ea. R Thompson, KOLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Andrew 1061 90 degree, 1 5/8" elbows, (2). BO. B Ladd, WNRN, 108 1/2 E Main, Bellevue OH 44811.

Belden 8281 (3) 200' pieces, yellow; (1) 150' red; (1) 250' equiv, BO; various lengths, indiv shielded, BO. L Houck, Rollin Rcdg, 210 Altgelt, San Antonio TX 78201.

Andrew 3 1/8" rigid, 360', 13 yrs old, \$200/20'+s/h. T Nelson, WCAL, St Olaf College, Northfield MN 55057. 507-646-3328.

Andrew LDF5; LDF4; FHJ5 1/2"; LDF4-50A 80'/60'/25'.25', 7/8"; FHJ5-50A 24'/45'.50'+s/h. K Kuespert, TPC Tech, 1794 Russell Rd, Baroda MI 49101. 219-291-6996.

Shively 6813 2-bay, new w/radomes tuned to 96.1, BO. D Magnum, WBOG, 1021 N Superior Ave, Tomah WI 54660. 800-736-WBOG.

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Hughey-Phillips 36" flasher beacon, exc cond, BO. H McDonald, KKJV, POB 807, Verdale WA 99037. 509-535-7535.

Utility 340 in 9 sections, 1 tapered base sect, 1 1/2-section tube leg, painted, 210' w/o base insulator/hdwr, \$3500/BO+s/h.

Potomac Instr AM-19 4-tower ant mon & PMA-19 prec adap, like new, \$6500 both. D Dybas, WPNT, 875 N Michigan, Chicago IL 60611. 708-869-0001.

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FM 103.3 2-bay, pref ERI, 100' cable w/conn & access, 100' free-standing. 305-292-5009.

Rohn 55 in 10' sections, nd 17-20 sections; 12-bay on 92.3 MHz, low pwr, any make, will pick up/pay s+h. R Whitlock, KITE, 838 G Sidney Baker, Kerville TX 78028. 512-792-4560.

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4-8 bay FM on 91.9 MHz. M Latham, KAGY, POB 1307, Buras LA 70041.

2-bay, circ polar on 91.1 MHz. B Dodge, WNNH, Rte 155, Dover NH 03820. 603-742-8575.

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UREI 1178, dual, \$400 ea; Dictaphone logger w/2 mo tape sply, \$1000 ea+s/h. N Doshi, WQCD, 220 E 42nd St Ste 2812, NY NY 10017. 212-210-2771.

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Studio Sound S305 filter sets, matched pr, rackmount, rare, \$250 ea/BO. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Cinema Aerovox 6517-E filter, \$40; Sparta A15B mixer, \$40. R Thompson, KOLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Audio Dig TC-2 dig delay nut, new, \$890; Spare TPA 71 25 W audio mods, \$45 ea/\$100 for 3. D Peluso, KJUL, 2880 E Flamingo Rd Ste E, Las Vegas NV 89121. 702-732-2200.

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Studio Sound 305 passive filter, sets, Studio Sound 305, matched pr, consec #, rk mt, \$250 ea/BO. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Soundcraftman EQ PE2217 gd cond; (2) JVC 5-band EQs, fair cond, BO. B Spitzer, KKLS, Box 460, Rapid City SD 57701. 605-343-6161.

TEAC EQA-3034 10-band graphic EQ, real time freq spect analyzer w/LED display, new, less than 10 hrs, \$175. H Guetzloff, Trinity Found, 5634 Columbia Ave, Dallas TX 75214.

Gentner Versapatch (2) prewired patch bay, perf cond, \$360 ea+s/h. B Lord, Lord Bldg, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Eventide H910Hharmonizer, gd cond, \$325. J Addie, 708-579-3749.

Prophet 600 synthesizer, \$450; Spectro Acoustics rk mt 200 W amp, \$150; Crown VFX2 elect crossover, \$125. W Gunn, 619-320-0728.

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TM Cent UDS system with controller, Digicart, CD players, monitor, printer, cables & conn, 5 months use, \$14995. T Hodgins, KLYK, 14 E Main St, Walla Walla WA 99362. 509-529-7094.

Harris SC-90/9000, working, several, BO. R LaFore, WQPW, POB 1327, Valdosta GA 31603.

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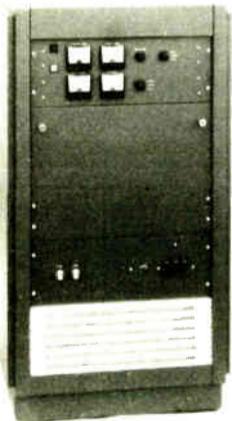
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Harris 9000 w/kybd, mon, disk drive & (4) Carousels p/ys; (3) Gates mono cart plyrs, BO. A Russell, WNL, 90 Foster Rd, Waterford CT 06385. 203-442-5328.

SMC (4) mono Carousels, \$500 ea; MEI SaiMaster, not working, w/extra chips, parts, BO. T Pancoast, WMTK, POB 106, Littleton NH 03561. 603-444-5106.

Systemation X7/D w/brain, 2 cfrs, 8mm Sony decks, little use, \$8500/BO/part out. C Windsor, WWM, POB 20000, Lynchburg VA 24506.

SMC ESP-1 w/(4) SMC R-R stereo tape PB, (3) SMC Carousels, Bdct Auto Carousel w/racks, gd cond, BO. A Beaulieu, WCWC, POB 156, Ripon WI 54971.

SMC MSP-1 w/(5) Ampex 440s, (4) SMC 250s, Xtel printer, (5) racks, manuals, \$5000. Jim, KNGT, POB 609, Jackson CA 95642. 209-223-0241.

SMC 350 (3-4) Carousels, gd cond. B Dodge, WWHN, Rte 155, Dover NH 03820. 603-742-8575.

Harris 909000 w/2 pwr splys, brain cntrl hd, (4) ITC 750 R-Rs, 2 single play, 1 R/P, (2) IGM 78-trays, ext pts, \$1500+s/h; TM Cent AutoSegue seqncr & (3) Pioneer PD-M730 plyrs & (2) 6-pk cts, \$2600. J Evans, KNTI, 75 4th, Lakeport CA 95453. 707-263-1551.

Cetec Schafer 7000 Lvl 2 VEL printer, (3) audio file/2A 48-tray, \$4000. C Gillespie, WBDY, POB 509, Bluefield VA 24605. 703-326-2207.

3A programmer, \$1000. H Hoyler, KIRC, 120 E Main, Shawnee OK 74801. 405-878-1803.

SMC 250RS (3) Carousels w/front prls, mntg hwr & documentation, working, full/pts, \$100 ea+s/h. J Schreck, 315-539-4240.

Systemation X7/X7D w/brain, (2) cntrls, 8mm Sony decks, \$3500/BO. C Windsor, WWM, POB 20000, Lynchburg VA 24506.

Cetec 902 (5) ReVox I/O cards w/cables, BO. B Spitzer, KKLS, Box 460, Rapid City SD 57701. 605-343-6161.

Want to Buy

ATC/Gates SC48 thumbwhl syst program-mer. F Hollon, WAHI, Rt 1 Box 72, Plymouth IL 62367. 217-392-2340.

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Pana WV RC-30 for Pana 777 color cam-era, 50' of cable, \$500+s/h. D Hurd, Harding Univ, 805 Park St, Searcy AR 72149. 501-279-4017.

Hitachi FP 15 (2), 1 1/2" & 4 1/2" viewfind-ers, rear servo zm & manual focus cntrls, rem cntrl units & cbls, ext pwr sply, ext rds; 10:1 Hitachi zoom; \$2500 both+s/h; FP21 w/1 1/2" viewfinder, Anton batt brkt, plate, VTR cbl, \$1500+s/h; (3) Pana 777, EFP, Anton batt brkt w/ocase, \$750 ea+s/h, all are col, 3-tube Salicons with cases, manu-als, ext cards. D Hurd, Harding Univ, 805 Park St, Searcy AR 72149. 501-279-4017.

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Sparta 4010, \$50; 40110, \$50. R Thompson, KLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Spotmaster 500C compact desk top, solid state, R/P w/manual, refurb, gd cond, \$300+s/h. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Audicord dual stereo, R/P, gd cond, \$500. G Smith, 915-672-5149.

BE 3200 mono R/P, \$650; (2) BE 3100P mono PB; (3) ITC SP stereo PB, \$600 ea, ITC stereo R/P, \$750, ea w/1 tone; ITC stereo R/P w/3 tones, \$800, \$750. D Hood, WXXP, POB 151, Anderson IN 46015.

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ITC SP-0005 PB, mono w/tones, \$400; Harris PB, \$200. R Mayhugh, KLOA, 731 N Balsam St, Ridgecrest CA 93555. 619-375-8888.

ITC Delta stereo R/P, 3 yrs old, very gd cond, \$2200, R/PB, mono, \$300. C Knerr, KCNA, 139 SE J St, Grants Pass OR 97526.

ITC Delta (2) mono PB, exc cond, \$1000 ea. T Pancoast, WMTK, POB 106, Littleton NH 03561. 603-444-5106.

BE Spotmaster 53 triple-deck mono, PB, \$750. M Gollub, WMJS, POB 547, Prince Frederick MD 20678.

Spotmaster 505 mono/play, gd hds, new paint & prch rtr, \$250; Tapecaster 700-RP mono, R/P, new cond w/seco cue tone, gen & detector, \$750. R Franklin, Franklin Studios, 1004 Dekalb St, Norristown PA 19401.

ITC 3D Delta 3-deck PB, mono, gd cond, \$1400/BO; (2) IGM Instacur 24-deck, \$1500 ea/BO. T Toenjes, KOLA, Box 104, Manhattan KS 66502. 913-437-6549.

BE 2100 R/P, exc cond, \$450; ITC PDII R/P, mint, \$450. B Spitzer, KKLS, Box 460, Rapid City SD 57701. 605-343-6161.

Fidelipac Dynamax CTR112 (5) stereo, perf cond, \$1300 ea+s/h. B Lord, Lord Bdcg, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

ITC PDII R/P, 5 yrs old, exc cond, \$250+s/h; (4) ITC PDII, play, \$200+s/h, ea mono w/30 free cts. H Hayes, Hot Prods, 1748 70th St, Brooklyn NY 11204. 718-234-9374

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Tapecaster RP-700, \$150; X-700 R/P, \$150. R Chambers, KSUE, 3015 Johnston-ville Rd, Susanville CA 96130. 916-257-2121.

ITC 99B stereo 3 tone, \$795; ITC Premium 3D, \$1895; ITC Premium R/P, \$1595, all are rebuilt & include manuals, connectors & a 90 day warranty. Phil Davis, Hall Electronics, 804-974-6466.

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ITC 99B repro, \$1295/BO. J Addie, 708-579-3749.

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BE 5300C tripledeck, stereo, PB, mint under 50 hrs, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

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Ampex 850 (2) xport w/Inovonics elects, for parts \$100 ea; (3) Scully capstan motors, new, \$20 ea/\$50 all; (2) Scully 275-2 w/xport & cabinet, w/o meter bridge, \$40 ea. R Thompson, KLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Pana SV-255 port DAT rec, \$1100; SAE 5000 impulse noise reduc sys, \$150; Nakamichi MR-1, \$600; Nakamichi 1000II, \$200, all gd cond. J Patrych, 212-367-5385.

Studer C270 2-trk, analog mastering, \$2950/BO; HS77 MK IV full-trk, mono, 10 hrs use, \$875/BO/trade; A77 case w/moon spkrs & pwr amps, exc cond, \$375. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Technics RS-1520, \$1000; RS-1506, \$800; Tape-a-Thon 900, \$100. J Patrych, 212-367-5385.

ITC 850 full-trk, mono, \$600/BO; Scully 280 2-trk, both in roll around consoles, \$750/BO. R Hedrick, WNU, 118 Wright Pkwy, Walton Bch FL 32548. 904-243-6188.

Tascam 34 4-trk, great cond w/manual, \$1800. M Green, Aug Coll, 639 38th St, Rock Island IL 61201. 309-794-7333.

ReVox PR99, \$2000; reproduce only, \$900. M Persons, KVR, 402 Buffalo Hills Ln, Brainerd MN 56401.

Tascam TSR-8, mint cond, \$1800; MIDizer MTS-1000 A/V synch, \$1000; IF-1000 inter-face, \$400. P Bombar, Open Studios, 102 Coleman Ave, Elmira NY 14905.

Scully 280 parts. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

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December grad sks sports/news pos, public & comm exper, pref midwest, will relocate. Rob, 618-533-2851.

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Exper AT seeks FT air shift in any rated midwest/southeast mkt, C&W/AC/oldies/AOR/classic rock. Jack, 414-242-4357.

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Engr w/many yrs exper, flea pwr to 50 kW, freelance avail, studio & xmtr constr, DA fld work. 412-942-4054.

Prog/engr pos in radio/prod co, 10 yrs exper in San Fran & LA, will relocate. Bruce, 415-388-8368.

8 yr pro w/pipes, prog & prod, can organize your station into smooth running oper, TV & computer exper. Jim, 313-234-0899.

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Over 5 yrs exper, young AT, seeks FT gig at AC/CHR/oldies in East, call for R/R/Phios. Rich, 716-285-0327.

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Salesman, for very small market radio in southwest Arizona, retired or semi retired for Winter Visitor season. Would need to work out of a Motor Home. KBUX, POB 1, Quartzsite AZ 85346.

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Ampex AG440B 2-trk, fair cond; AG440B, mono, parts; AG440B 8-trk, parts; Scully 280 4-trk, exc cond, BO all. B Patrick, ARCA, 100 N Rodney Parham, Little Rock AR 72205.

Ampex 440C-8 1", 8-trk, 15-30 ips, roll around, rem, manual, mint cond, \$3500/BO. B Ganslen, Ganslen Audio, 1250 Valencia, Lewisville TX 75067. 214-436-2206.

Tascam MS 16, 1", 16-trk w/16 chnls, dbx 150x, roll around stand & AQ65 autolocator/rem, \$5000. J Trevino, Blue Cat Rcdg, 327 Cumberland Rd, San Antonio TX 78204. 512-341-2979.

Telex Copier 1 & 2, duplicating, fact refurb, gd cond, \$300. P Russell, Bowdoin College, Sills Hall, Brunswick ME 04011. 207-725-3066.

ReVox A-77 (2) 2-trk stereo R/P, \$350 ea. D Hood, WXXP, POB 151, Anderson IN 46015.

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Otari MX5050 (3) B2-2; Nagra 4S mic pre w/leather case, gd cond, \$4000/BO. R McMillen, Super Duper Audio, 1634 Salder St, Portland OR 97205.

MCI Sony 110C 8-trk, 1" w/Auto Locator III, \$1500. R Leonardi, Voices, 16 E 48th St, NY NY 10017. 212-935-9820.

ReVox A-77, (2), \$100 ea. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Ampex ATR 700, very gd cond, \$500/BO. L Houck, Rollin Rcdg, 210 Altgelt, San Antonio TX 78201.

Tascam 22-2 2-trk, 2-chnl rec/repro, new, less than 5 hrs, \$500; Foslex 260 multi-trk combo 6, 4-trk, 4-chnl, new, 3 hrs use, \$1100. H Guetzlaff, Trinity Foundation, 5634 Columbia Ave, Dallas TX 75214.

ReVox A-77, (2), \$100 ea. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

MCI 110B spares, boards, etc. M Shea, Precision, POB 727, NY NY 10276.

Ampex ATR-700 7 1/2 & 3 3/4 ips, gd cond, \$600. G Smith, 915-672-5149.

ReVox A77 w/new hd, rbt 1/4" 2-trk, \$500. D Dent, Winds of Music, 3230 Pt White Dr, Bainbridge Is WA 98110.

Scully 280 parts. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Tascam, \$1000. H Hoyle, KIRC, 120 E Main, Shawnee OK 74801. 405-876-1803.

Ampex ATR700 w/low hrs, gd cond, \$700; TEAC A3340s, \$800; Pioneer RT1020L, little use, \$300; TEAC A3300SX, new, \$450; TEAC X1000R, recond, \$400. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

Ampex 30960-02 rk mt, tube R/P for parts, large VU meters, input xformers, tubes, BO; Wollensak 1500-SS 1/2-trk, mono, port, built-in 10 W amp, preamp output, gd cond, \$45. R Franklin, Franklin Studios, 1004 Dekalb St, Norristown PA 19401.

Ampex Q-Mat R/PB units, orig floppy disk, BO. L Houck, Rollin Rcdg, 210 Altgelt, San Antonio TX 78201.

Otari ARS-1000 7 1/2 or 3 3/4 PB w/25 Hz dtr, gd cond, \$600. L Salge, KCMR, POB 979, Mason City IA 50402. 515-424-9300.

Ampex 440, 2-trk, PB, rbt 3 yrs ago w/roll around cab, \$975; Otari MX-5050 BII 2-trk, R/PB/mastering, 2 yrs old w/documentation, \$1950/BO, both 1 owner. B Danton, Ewing Enter, 2927 W 141st St, Gardena CA 90249. 310-532-9216.

Ampex ATR-700 2-chnl, gd cond, \$700. B Kidd, VPI, 510 W 2nd, Rayville LA 71269.

Otari MX5050-85D 1/2" 8-trk in console w/rem control, low hrs, exc cond; Tascam M50 12x8x2, like new w/manual & cable harness, \$4800 both. G Jones, SW Mediacast, 110 Sierra Rd, Kerrville TX 78028. 210-367-4587.

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Tascam MS-16 1", 16-trk w/dbx, rem locator & svc manual, \$5000/BO. B Westfield, Westfield Audio, 2905 Boswell Ave, Alexandria VA 22306. 703-768-8443.

Ampex 601 suitcase w/elects w/o deck, gd cond, \$50/BO. J Schreck, 315-539-4240.

Radio Syst DTC-1000 DAT rec, \$1100+s/h. B Lord, Lord Bdgct, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

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Otari Mark IHV 1/2" 4-trk, multi-trk, mint, less than 50 hrs, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

Tascam 32 2-trk & 38 8-trk, like new, \$2000/both; Teac 3340 4-trk, 1/4" deck, \$375; Tascam 80-8 8-trk never really used/perf, \$1600. W Gunn. 619-320-0728.

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Sony TCM 5000 EV, port, \$100-200. W Shoecraft, KIKO, 401 Broadway, Miami AZ 85539.

Otari MK III 8-hd bridge w/o hds. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Nagra 3S/4S w/NAB hds; Sony TC880/8750; ReVox B215. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

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Wollensak T1500/1515 tube-type, circa 1961, 1/2- or 1/4-trk w/orig mic. J Addison, Stowe Media, 171 Hartford Rd A-7, New Britain CT 06053. 203-827-0325.

Otari MK III 8-hd bridge w/o hds. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

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Ampex ATR100 taperecorders for pts. Circuit cards, heads, motors, machine pts, or elect ronic pts. Call 818-907-5161.

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TM Century Mellow AC w/optional vocal EZ library, \$2500; (5) Pioneer PDM 450 w/18 CDs ea deck, interface panel, \$2500. T Hodgins, KLKY, 14 E Main St, Walla Walla WA 99362. 509-529-7094.

Nikko MCD 600 CD auto change plyr svc manual, and information to connect units to PCs. R Meyers, Benchmark Comms, 4700 SW 75th Ave, Miami FL 33155. 305-264-5963 FAX 305-264-2357.

Denon DN-950FA, \$725+s/h. B Lord, Lord Bdgct, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Philips CD recorder, w/2 blank unrecorded CDs, \$5395. Phil Davis, Hall Electronics, 804-974-6466.

Want to Buy

Denon 2560/similar. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Player w/varispd. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

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Want to Sell

Yamaha QX5, MDF-1 hardware, MIDI sequencer & matching disk drive, \$150 ea/\$250 both. P Cibley, Cibley Music, 138 E 38th St, NY NY 10016.

Tandy 2000 w/software, \$375; Kaypro port, \$200; Texas Instr 810 printer, \$450. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Univac mainframe w/printers, drives, cables, \$1000/trade. B Kelley, WYQAK, 4237 Airline Rd, Muskegon MI 49444.

Tandy 2000 w/software, \$375; Kaypro port, \$200; Texas Instr 810 printer, \$450. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Goldstar 286 16 MHz AT w/2MB RAM, 5 1/4" HD, 20MB HD, modem, VGA card, \$450. C King, MST Comms, 1703 Avondale St, Amarillo TX 79116.

Want to Buy

BE 8M250 in excel cond, \$3500/BO; Sparta A16R in excel cond, \$1000/BO. Call Mark at 619-598-3311.

CONSOLES

Want to Sell

Peavey MK3-16-FC 16-input, phantom pwr, 4-band EQ, stereo mix buss, 2 cue & mon outputs in flight case, \$800/BO+s/h.

Harris Stereo 80 w/manual, \$1500. R Muselman, KTIN, POB 307, Trenton MO 64683. 816-359-2261.

Snake (16) phantom-pwr inputs wext ps; 25' Belden 19 pr cable, mil conns, ss strain reliefs; 10' Neumann XLR snake mates w/box; Belden snake, exc cond, \$750/BO/trade. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

Gates Studioette 5-chnl, tube-type, gd cond, \$375; Harris Stereo 80, exc cond, \$2500/BO. J Schloss, KICD, 2600 N Hiway Blvd, Spencer IA 51301.

Autogram IC-10 10-chnl stereo w/all mods, clean, \$3500. W Blackwelder, KNUE, 3810 Brookside, Tyler TX 75701.

Gates/Harris Dualux II 8-chnl, stereo, \$300/BO+s/h. J Hoff, KRED, 5640 S Broadway, Eureka CA 95503.

Collins Rock 10 10-chnl w/formica cabs, \$3000; RCA dual-chnl, 5 pot, 15 inputs, \$300. R Mayhugh, KLOA, 731 N Balsam St, Ridgecrest CA 93555. 619-375-8888.

Auditronics 110 A-4 12-chnl audio, stereo w/4 output chnls & instruc book, \$3100. R Rice, Conti Media, 222 Indacom, St Peters MO 63376.

Ramsa WR-T820 20-input, 8-group/16-output for 8-16-trk w/meter bridge, \$3100. R Haggar, Haggar Audio Prods, 4902 Hammersley Rd, Madison WI 53711. 608-274-4000.

RCA BC-8A 8-chnl, solid state, self contained dual output w/30 inputs, plug in mods, gd cond, \$650+s/h. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Edcor 400 4-chnl auto, 1 rack, \$99; JBL mdl 7510 16-chnl auto, 5 1/4" rack, \$165. G Wachter, 602-258-6161.

Ramko DC5AR, clean w/plug ins, \$250 ea; Grommes Precision M5, new, \$275; Altec 1592B, \$250 ea, all 5-chnl, mono. J Parsons, Parsons Sound, 2781 Fayson Cir, Deltona FL 32738. 904-532-0192.

Presto 900A1 1940s, tube-type, port tape/disk rec/mix, spare tubes, collectors item, \$250. R Franklin, Franklin Studios, 1004 Dekalb St, Norristown PA 19401.

PR&E BMX-22 Series 22 mainframe, Digitimer, Digiclock, (17) line cases, (2) mic mods, Telco mod, exc cond, \$9900. S Horner, KMRO, 2310 Ponderosa, Camarillo CA 93010. 805-654-0577.

Sparta 8-chnl, mono, gd cond, \$500; 4-chnl, \$250. R Chambers, KSUE, 3015 Johnstonville Rd, Susanville CA 96130. 916-257-2121.

BE 4S50 4-chnl stereo, gd cond, \$900. L Salge, KCMR, POB 979, Mason City IA 50402. 515-424-9300.

Collins 212G-1 w/9 chnls, 18 inputs, mono, very gd cond, \$800/BP+s/h. J Evans, WSHF, POB 3115, Valdosta GA 31604.

EV/Tapco Catalina C-12 w/20 mic/line inputs, 3-band EQ, 3 sends, patch pts. 4 subs w/road case, very gd cond, \$1000. E Kizer, CTW, 407 Park Ave Ste 102, Scotch Plains NJ 07076. 201-450-5983.

Shure M-260 mic mixer, 4 mix/1 aux, \$200; Ramko SideKick port ENG, 4 mix/2 line, master, cue, ball oper, \$225; Orban 622B para EQ, \$600. J Somich, Somich Prods, 1208 Stoney Run Trl, Broadview Hgts OH 44147. 800-334-3925.

Tascam M-308 8-chnl stereo, 8 mic/line inputs, EQ mod on ea chnl w/documentation, \$950. B Danton, Ewing Enter, 2927 W 141st St, Gardena CA 90249. 310-532-9216.

Russco Studio Master 505, nds minor work, \$500. G Smith, 915-672-5149.

Gates Yard Board, painted white, \$300; Bogen CSM remote mixer, \$125. W Gunn. 619-320-0728.

Want to Buy

RCA BC7B mods; 1A2 syst phone hybrid; A/C & Gold reels w/25 Hz tones. K Haight, KCMX, 820 Crater Lake Ave #213, Medford OR 97504. 503-482-2614.

Autogram, Auditronics, McCurdy, LPB & related consoles. Will buy or trade for new equipment. Phil Davis or Jon Hall, Hall electronics, 804-974-6466.

DISCO & SOUND EQUIPMENT

Want to Sell

Tannoy 6.5 spkrs, (3), \$259 ea; (3) Bose 802 II loudspkrs, \$549 ea. P Bombar, Open Studios, 102 Coleman Ave, Elmira NY 14905.

dbx 180 2-chnl noise reduc, encode/decode, \$225. J Tamburello, Burello Sound, 16 W 86th St, NY NY 10024.

JBL 4412 3-way, 12", low end, new telephone, \$675. K Para, Para Studio, 8562 Longwell Cross Rd, Hammondspont NY 14840. 607-868-3482.

dbx 120x sub harmonic bass proc, mint cond, \$225. M Mottsey, MAM Sound, RD 1 Box 116 John St, E Kingston NY 12401.

Ashley SC-63 para EQ, mint cond, \$125. M Mottsey, MAM Sound, RD 1 Box 116 John St, E Kingston NY 12401.

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Want to Buy

Burwen/KLH DFN1201A & TNE7000A transient noise eliminators. F McNulty, WLS, 190 N State St, Chicago IL 60635. 312-750-7446.

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EQUIPMENT Financing, Lease Purchase Option. Need equip for your radio, television or cable operation? New or Used. No down payment. Carpenter & Associates, Voice 501-868-5023 Fax 501-868-5401.

LIMITERS

Want to Sell

Orban Optimod 8100A-1 w/6-band multi-band & sep studio chassis, perf cond, BO; Mod Sci Comp Clipper, perf cond, \$400. B Watson, KSAK, 3352 Honeybrook #7, Ontario CA 91782. 909-947-8440.

CRL SPP800/SEP800/SMP900 AM stereo proc, \$900/BO. Shannon, WRFA, 800 8th Ave SE, Largo FL 34641. 813-581-7800.

Dorrough DAP-310 audio proc w/AM & FM cards, \$300. D Hood, WXXP, POB 151, Anderson IN 46015.

CRL AM-4, mono, exc cond, \$1700/BO. M McNeil, Guardian Comms, 800 Compton Rd #33, Cincinnati OH 45231.

UREI 1178 stereo peak limiter, \$750; Orban 424A dual-chnl, comp/lim, de-esser, \$650; Orban 622B stereo para EQ, \$600; (2) Orban 526A dynamic sibilance cont, \$175 ea; Ampex ATR-800 w/rem, \$2000; A&V patch bays, mint cond. S Fox, Country Club Studios, Roslyn Hgts NY 11577. 516-826-0154.

CBS Labs Audimax III Mdl 444, \$150. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

Kahn Symetrapeak. G Gibbs, KMNS, 901 Steuben St, Sioux City IA 51102. 712-258-0628.

CBS 4450A & 4110, BO. B Spitzer, KKLS, Box 460, Rapid City SD 57701. 605-343-6161.

Orban Optimod 8000, exc cond, \$1500. C King, MST Comms, 1703 Avondale St, Amarillo TX 79116.

Gregg Labs Series 2530 (2) tri-band audio proc amp, \$400 ea. T Nelson, WCAL, St Olaf College, Northfield MN 55057. 507-646-3328.

Mod Sci CP803 composite clipper, Mod Sci CP803, new w/manual, \$675. J Addie, 708-579-3749.

UREI 1176LN mono, \$400; Mdl 1178 stereo, \$625, both peak, excellent condition. J Somich, Somich Prods, 1208 Stoney Run Trl, Broadview Hgts OH 44147. 800-334-3925.

Radio Design Labs NRSC PR & FL stick-on pre-emphasis & bandstop filters, \$100 pair. P Beckman, Filbec Audio, 5535 RTL-SNK Hammock, Naples FL 33962. 813-261-4600.

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Want to Buy

UREI 1176 LN/Teletronix LA2A. J Trevino, Blue Cat Rcdg, 327 Cumberland Rd, San Antonio TX 78204. 512-341-2979.

Orban XT2 6-band for 8100/A, gd shape. B Garcia, KBUR, 1411 Roosevelt Ave, Burlington IA 52601.

Orban 8000A/8100A for educ FM. B Dodge, WWH, Rte 155, Dover NH 03820. 603-742-8575.

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MICROPHONES

Want to Sell

Microtech Gefell M71, \$657. P Bombar, Open Studios, 102 Coleman Ave, Elmira NY 14905.

EV 666, \$30; (3) EV RE-85 lavaliers, \$30 all. R Thompson, KLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Telefunken/Schoeps CM 61 tube, rare, new cable, mint cond, \$3475/BO; CR-176 large diaphragm tube, new, \$1250. R Katz, Allegro Sound, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-377-5264.

EV 103 handheld cardioid XLR type (like 635A), \$25 ea; EV 644 shotguns, \$100 ea; also dynamic "nostalgia" mikes from 1940's, '50s; also Shure mixers. Ugly George, Satellite TV, 212-969-0240.

Sony C-351 condenser, \$150; AKG C414/48, \$500; beyer M107 dynamic, \$75. R Leonardi, Voices, 16 E 48th St, NY NY 10017. 212-935-9820.

Shure Level-loc controller, unused, \$75. B Spitzer, KKLS, Box 460, Rapid City SD 57701. 605-343-6161.

EV RE-20, exc cond, \$275; (3) Sennheiser MD-421U, \$310 & \$200; (2) Neumann KMM84 condenser, exc cond, \$250 ea/\$400 both; (3) Shure SM-58, avg cond, \$70 ea/\$160 all. J Somich, Somich Prods, 1208 Stoney Run Trl, Broadview Hgts OH 44147. 800-334-3925.

Sennheiser HD-421-u, exc cond, \$275. C King, MST Comms, 1703 Avondale St, Amarillo TX 79116.

EV N/DYM 308 (2), mint cond, \$100 ea. M Mottsey, MAM Sound, RD 1 Box 116 John St, E Kingston NY 12401.

EV 676 supercardioid mics 3/\$200; EV RE10 mic, \$125. W Gunn, 619-320-0728.

Telefunken M921 dual (2-way, not front/back) nickel capsules, cardioid only, classic tube mic; Neumann KM84 pair, mint, \$1100. W Gunn. 619-320-0728.

Telefunken tube mic pre amps V-76, U-73 limiter's; RCA BA-21As, BA-1As; Altec tube mic-pres. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

Telefunken M-250, U-67, 221-A; Neumann U-67, KM-56, UM-57; RCA KV3A-10,0001, 44-BX, 77-DX, BK-4, BK-5, 74-B, varicustics; Altec M-20, M-11, M-30 tube type mics. Trade or sale. Tracy Eaves, 615-821-6099 (evenings before 10PM EST).

RCA 77DX and 44 ribbon mics, will pay shipping. P Davis, 804-980-2940.

Want to Buy

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RCA 44BX, gd cond. M Rice, Contemp Media, 222 Indacom Dr, St Peters MO 63376. 314-928-6569.

CBS/NBC call-tr plate & antique floor mic stand for RCA 44 mic. M Harrington, POB 7619, Little Rock AR 72217.

RCA DX77, top price, cosmetically gd, need not work. E Dachel, WNYC, 1 Centre St 26th flr, NY NY 10007. 212-669-7706.

RCA 77DX dead/alive, complete. D Repino, Repcomco, 1 Glen Cir, Hummelstown PA 17036.

RCA 77DXs/44BXs ribbon, chrome/TV grey, gd cond, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

77-DX's, 44-BX's, KU-3A's On-Air lights. Top price paid. Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131.

Shure M-267 & M-67 mic mixers. Phil Davis or Jon Hall, Hall Electronics, 804-974-6466.

Audiolab TD-3 in excel cond, \$325/BO. Call Mark at 619-598-3311.

MISCELLANEOUS

Want to Sell

WE 189D xformers, \$35 pair; UTC LS-141 hybrid xformers, new, \$50; Cinema Engrg 64266 xformers, \$30 pair; 6" Anvil case w/whls, \$1000. Moog 902 VCA mod w/PS, BO. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

500 ohm line xformers, \$10 ea. B Fulgham, KBRA, POB 148, Freer TX 76357.

Victor pressure reg, \$50; Inovonics 360 repro amp, \$30; Metrotech xport 400 disassembled, \$50. R Thompson, KLON, 1288 Bellflower Blvd, Long Bch CA 90815.

Alertite 3V on-air warning light, new, \$50. R Franklin, Franklin Studios, 1004 Dekalb St, Norristown PA 19401.

Superior Elec Stabaline pwr cond, \$140+s/h. B Lord, Lord Bdcgt, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Lyrec tape timer, 15 ips; MAP 2-unit rack shelf, \$25; 3M 1/2" paper loader tape, \$5/roll; Yamaha MDF-1 disk drive & QX-5 MIDI sequencer, \$150 ea/\$250 both. P Cibley, Cibley Music, 138 E 38th St, NY NY 10016.

Rotron Blowers for Elcom, Harris, CCA, CSI, McMartin, rebuilt & new. Goodrich Enterprises Inc. 11435 Manderson St. Omaha, NE 68164 402 493 1886 FAX 402 493 6821

Key phone system, 1A2 type, 5-6 phones, 1 wall set, 6-button, intercom, 4-line KSU, TT, \$300. L Houck, Rollin Rcdg, 210 Altgelt, San Antonio TX 78201.

1972 motor home mobile studio w/an-nouncers booth lrg window, A/C, carpet, bench seats, table, insulated, 20' length, \$5000. H Hoyle, Real Country, 120 E Main, Shawnee OK 74801. 405-878-1803.

WE 189D xformers, \$35 pair; UTC LS-141 hybrid xformer, new, \$50; Cinema Engrg 64266 xformers, \$30 pair; 6" Anvil case w/whls, \$1000. Moog 902 VCA mod w/PS, BO. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Henry Telecart II, \$95; (2) Lil Miss Moffat, 48 V phantom pwr sply, \$25 ea+s/h; 6" equip mounting rails, \$25 ea+s/h; (2) Electrocom JBL ceiling spkr, housing & vol controls, \$39 ea+s/h; Realistic TM 150 AM/FM tuner, \$25 ea+s/h. B Lord, Lord Bdcgt, 13313 SE 208th St, Kent WA 98042. 206-631-2374.

Valentino prod library w/220 10" recs, 78 rpm discs, excel cond, including catalogue, \$300/BO+s/h. M Kuehl, Passage Prod, 1418 N Stevens, Rhinelander WI 54501. 715-369-4007.

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MISCELLANEOUS...WTS

Star case, black, used once, 45x21x21. R Hagggar, Hagggar Audio Prods, 4902 Hammersley Rd, Madison WI 53711. 608-274-4000.

Radio sales training tapes, (16) VHS, covering 30 topics, \$2000. R Trumbo, New Life Bdg, POB 117, Quincy CA 95971.

Symetrix TI-101 telephone hybrid, \$279; TFT 7601 remote control. Phil Davis, Hall Electronics, 804-974-6466.

Want to Buy

UTC LS-10X, 12X, LS-15, LS 15X, LS-18, A-10, A-11, A-12, A-24, A-25, A-26 xtomers; W Electroacoustic Labs PA 120A mic schematic; Hycor 4201 passive EQ; Gates Sta-Lvl M-5167 lmr; Gates M3592B lmr; CBS decibel meter Mdl 600 manual & schematic. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

Schematic for Sparta Spartamic mono PB cart. L Johnson, 3928 Red Oak, Doraville GA 30340.

Instruc book for Gates tube-type Yard console & GTM88S stereo mod mon; Gospel programming for NC educ FM, tape & satellite. F Hollon, WAHI, Rt 1 Box 72, Plymouth IL 62367. 217-392-2340.

UTC LS-10X, 12X, LS-15, LS 15X, LS-18, A-10, A-11, A-12, A-24, A-25 & A-26 xtomers; W Electroacoustic Labs PS 120A; Hycor 4201 passive EQ; Gates Sta-Lvl M5167 & M3529B limiters manuals; CBS Decibel meter mdl 600 manual. R Robinson, TNA Rcdg, 10 George St, Wallingford CT 06492. 203-269-4465.

'30s-'50s Broadcast News, pickups, oscillator magazines, RCA, Collins, W.E. catalogs/xmtr brochures. Sam, Box 101, Alameda CA 94501. 510-521-1429.

Radio transformers by Chicago, UTC, Triad, Peerless, Freed, Sola, send list. J Gangwer, 942 32nd St, Richmond CA 94804. 415-644-2363.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, Nyny 10003. 212-674-3060.

MONITORS

Want to Sell

Belar SCM-1 SCA w/67 + 92 kHz crystals, \$1000; Collins 900 F-1 67 kHz, \$300. M Persons, KVRR, 402 Buffalo Hills Ln, Brainerd MN 56401.

Harris M6659 AM mod mon w/manual, gd cond, \$100. P Beckman, Filbec Audio, 5535 RTL SNK Hammock, Naples FL 33962. 813-261-4600.

Belar SCA, \$1500. H Hoyer, KIRC, 120 E Main, Shawnee OK 74801. 405-878-1803.

McMartin TBM 3700/2200A FM stereo, \$1200/BO; TBM-2000B SCA, \$600; TBM 8500B AM, \$600. T Toenjes, KQLA, Box 104, Manhattan KS 66502. 913-437-6549.

Want to Buy

McMartin (buy & sell) any model. C Goodrich, 11435 Manderson, Omaha NE 68164. 402-493-1886 or fax 402-493-6821.

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Singer/Graflex 1140A 16mm carbon arc proj, \$1500+s/h. D Hurd, Harding Univ, 805 Park St, Searcy AR 72149. 501-279-4017.

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Patents rights for OFDM digital communications technology are available for assignment. Applications include Digital Audio Broadcast (DAB), Mobile Radio Data Terminal (MRDT) and High Speed Data Rate Subscriber Loops (HDSL). Patents No. 5063574 of Nov. 5, 1991, "MULTI-FREQUENCY DIFFERENTIALLY ENCODED DIGITAL COMMUNICATIONS FOR A HIGH DATA RATE TRANSMISSION THROUGH UNEQUALIZED CHANNELS" is the basic patent. Patent No. 5166924 of Nov. 24, 1992, "ECHO CANCELLATION IN MULTI-FREQUENCY DIFFERENTIALLY ENCODED DIGITAL COMMUNICATIONS" is a continuation in-part of the basic patent.

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Symetrix 108 8-line, 3-hybrid phone syst w/2 consoles, nice cond, \$800/BO. Shannon, WRFA, 800 8th Ave SE, Largo FL 34641. 813-581-7800.

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Moseley 505 STL, \$500/BO. R Thompson, KLON, 1288 Bellflower Blvd, Long Bch CA 90815.

QE1 7775 FM ATS, \$800. M Persons, KVRR, 402 Buffalo Hills Ln, Brainerd MN 56401.

Moseley MRC-1600, studio & xmtr units w/radio modems, exc cond, \$1200; Mark 4' grid microwave ants from 940-960 MHz, \$800 ea. T Pancoast, WMTK, POB 106, Littleton NH 03561. 603-444-5106.

Moseley 505, 950 MHz, \$2500; TRC-15, BO. H Hoyer, KIRC, 120 E Main, Shawnee OK 74801. 405-878-1803.

Intraplex TDM-153 T-1 syst w/2-15 kHz, 3-7.5 kHz, 3 voice mods per side & CSUs, 9 mos use, BO. R Russ, KBLA, 1700 N Alvarado St, Los Angeles CA 90026.

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Comrex TCB-1 telephone voice coupler. S Kirsch, Silver Cake Audio, 2590 Hillside Ct, Baldwin NY 11510. 516-623-6114.

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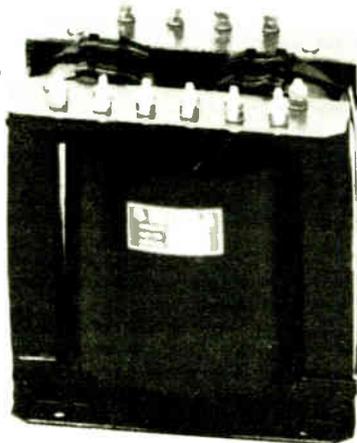
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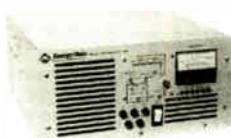


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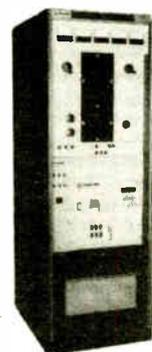
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Pana AVE-5 SPC EFX mixer w/char gen w/ over 100 FX, \$1600. M Camargosiva, NPS-IMC, 125 E Ave IMC, Norwalk CT 06852.

NEC FS-18 frame sync/TBC w/new card, manual, \$5000+s/h; Pana 3/4 edit syst, NV9600/NV9240/NVA960, \$2000. D Hurd, Harding Univ, 805 Park St, Searcy AR 72149. 501-279-4017.

Want to Buy

JVC R9U/Sony PVM 8220 8" col w/rk mntng hdwr, J McLean, Stagedoor 1, 9915 MacArthur Blvd, Oakland CA 94605. 510-562-4818.

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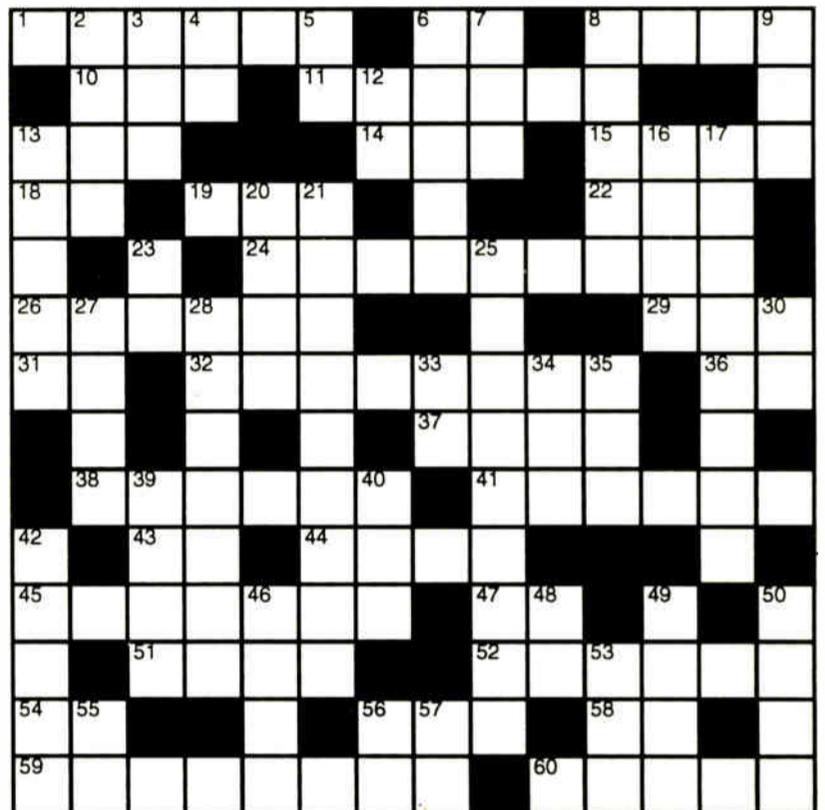
JVC CR-6600U (2) 3/4" U-matic VCRs, \$225 ea. C Baker, Sound Rcrdrs, 9136 Mormon Bridge Rd, Omaha NE 68152.

Pana NV-9100 (5) color 3/4" U-matic, auto repeat, RF out, \$100 ea; Sony VP-1000, VP-1200, BVE 500 & 500A edit criers & 1/2" EIAJ R-R rcrdrs, BO. J Krepol, JVK Studios, 7 Dustin

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Space Available! Call 1-703-998-7600 for information

This Month's Crossword



by Steve Walker

solution in next issue of RW

ACROSS

1. Industrial Strength CDPlayers
6. Logical function
8. Reed instrument
10. TVs, NBC,...
11. Digital Broadcast Association
13. Transmitter mfr.
14. Big communications company
15. Calculated by integration
18. New form of "hey, you!" or "hi"
19. Candied _____
22. Revolution
24. BSW is Broadcast Supply _____
26. Man's name
29. 2834[enter]3892[-]1059[+] (RPN)
31. Roman Numeral Eleven
32. Merely Superb
36. The Lonestar state
37. Sandwich
38. ETs
41. Where Manitoba is
43. Logical function
44. Do not
45. Mariner
47. About
51. Abbv. for radio tech person
52. Not wholesale
54. Another place you'll find engineers
56. Trade association
58. Radio with pictures
59. Amos & Andy character
60. "Obstruction Lighting That's Not Sky High"

DOWN

2. Big oil company
3. Subcarrier
4. Big state
5. Doctor
6. Base 8
7. Rodent
8. ProDisk 464
9. Industry group
12. Having to do with the number 2
13. PC-Companion Plus
16. Do again
17. "You Don't Know What You're Missing"
20. Wrong
21. "Modulation Readings you can Trust"
23. Painful exclamation
25. Those who direct
27. Prima donna
28. Pain killer
30. Former
33. Digraph
34. Type of investment
35. Serial communications signal
39. Theatre box seat
40. Siamese distance measure
42. "Cable company that listens ..."
46. What you say when Thursday's gone
48. Iron
49. Volcanic output
50. Feeling of malaise
53. Type of logic
55. Small state
56. Like
57. What?

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No Lack of Tapeless Alternatives

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unconventional methods of control should not be considered.

Operation based on the personal computer, for example, may be just as feasible, but may initially require some training time. In addition, there may be optional tactile controllers available, such as touch screens or small remotes, all of which have been designed to provide more intuitive operation.

The prospective purchaser should look at how logical and practical the operational layout and project management are; how many steps are required to perform a basic set of functions; and how fatiguing displays are if a screen-based system is used.

In addition, if the system is to be operated by multiple users, it may be prudent to choose a system that allows special passwords to be used in order to limit access by certain users who could potentially cause grievous damage.

Hardware

In some cases, the potential purchaser may be unsure as to how much or how little will be required from the system in practice. In cases where costs are the prime consideration, it may be appropriate to choose a system that is modular and can grow according to both the budget and the needs of the station. This may start off as a small cart replacement system with limited storage to a larger

system with production software, various interfaces and networking.

The support arrangements offered by the supplier also should be considered as

Perhaps a modular approach is best when cost matters.

well as provisions made in the design of the system in case of failure. Some systems for example, support drive mirroring whereby if one drive fails the other

will automatically take over. Others may support the use of optical media, whereby if the system fails, the source material can at least be quickly transferred to another system.

Full evaluation

In evaluating the wide range of systems on the market, one of the ways to make an informed decision is to talk to existing owners. Although they may be in competition with you, many are prepared to give pointers and advice. Above all, see as many systems as you can and, if possible, try them out on

your premises for a reasonable period of time.

It is one thing to see a slick demonstration, but the true test is how the system works in practice. □ □ □

Yasmin Hashmi is the co-operator of the independent consulting firm Sypha in London.

Sypha has just published the third edition of the Tapeless Directory. It gives details on all available tapeless systems and includes a background to the technology and a quick reference guide.

The directory is available from Old Colony Sound Lab, telephone: 603-924-6371 or FAX: 603-924-9467.

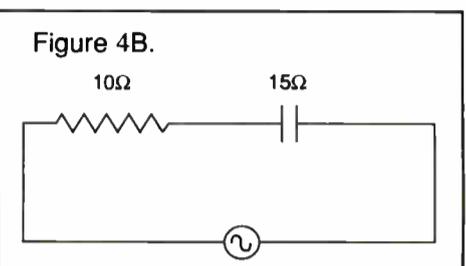
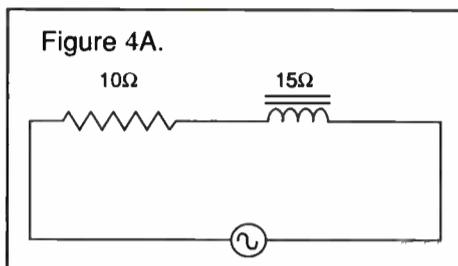
For additional information from Sypha, circle Reader Service 80.

Pythagorean Calculations

► continued from page 38

analysis. It can be found on Smith Charts as well as on the schematic diagrams of AM directional antennas. AM stations often employ an operating impedance bridge to monitor the resistance/impedance of the antenna array.

When the meter on the impedance bridge is nulled, the instrument will display how much resistance and capacitive or inductive reactance is in the antenna. This can be compared with the original readings that were filed with the FCC when the system was placed on the air or



rebuilt. One can use this information to determine how things have changed as time passed.

Further study of complex numbers can be found in "Basic Electronics," by Bernard Grob, published by McGraw Hill.

The answer to the last installment's problem: 90 ohms of resistance in series with 120 ohms of inductive reactance will produce a total impedance of 150

ohms at a positive phase angle of 53.13 degrees. □ □ □

Ed Montgomery is a communications teacher at Thomas Jefferson High School for Science and Technology. He has taught broadcast engineering at Northern Virginia Community College and worked as a broadcast engineer for several radio stations. He can be reached at 703-750-5090.

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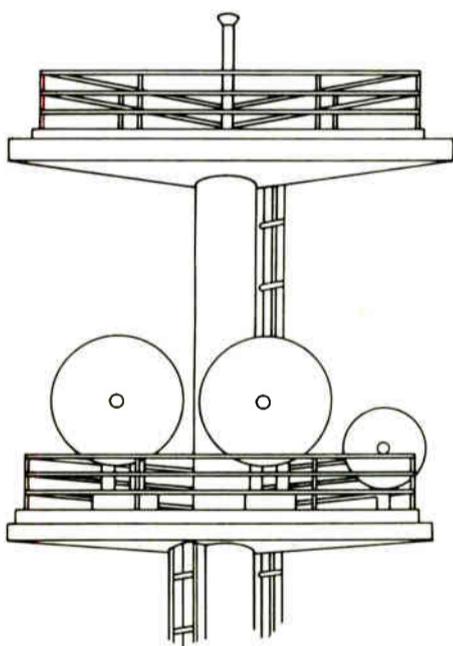
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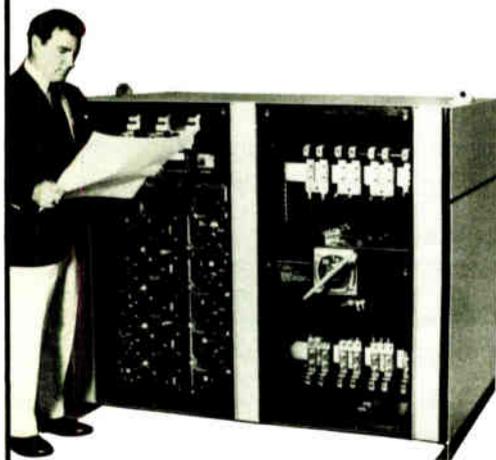
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FEED LINE

The Great Monitor-Point Adventure

by W.C. Alexander

DALLAS I found recently that several of the monitor points at our Dallas-area station were quite high, a rude awakening. I have, in past columns, written about what to do in just this situation, and here I had the opportunity to practice what I preach. With the FCC making an inspection sweep of all directional AM stations, this might be a good time to ask yourself: "When was the last time I read my monitor points?"

We read ours at least quarterly in this company, but the difference between the last reading and this particular one clearly demonstrated that a lot can happen between regular monitor-point (MP) readings. An instance occurred recently where a communications tower was built right on the station's monitor point. That's something to think about.

Finding the problem

In this case, all the MP's were out on both patterns—way out. That started ringing alarm bells, all pointing to a sampling-system problem.

We started our troubleshooting by checking all the channels of the antenna monitor against one another to see if there were any discrepancies. We did this by taking one tower's sample (other than the reference tower) and connecting it in turn to all the other towers' antenna monitor inputs and comparing the indications. This is always a good place to start.

Lightning can damage detector diodes, relays, terminating resistors and other components in the monitor. While checking the channels against one another is not proof positive that the monitor is okay, at least it generally verifies that the input circuitry for all the towers is correct.

While you're at it, run through the manufacturer's setup procedure. This usually involves setting the phase null on the reference tower and setting the zero and

180-degree points on the phase meter.

Sample-line damage

In our case, the antenna monitor checked out okay, so we moved out to the sample loops and performed a close physical inspection. We tightened all mechanical and electrical connections, removed the sample lines and looked in the connectors for water and other contaminants, and checked loop alignment. Remember, as a general rule for triangular towers, the sample loops should be oriented so that they are perpendicular to the opposite tower face (that is, the loops should point down the guy wire).

All our loops were in good shape so we

Lightning can damage detector diodes, relays, terminating resistors and other components in the monitor.

moved into the tuning units. We checked the sample line connections into and out of the isocoils, as well as the sample line egress point beneath the tuning units.

This is where we found our problem. Beneath the tower 3 ATU, the sample line had been moved back and forth enough times that both the inner and outer conductors had broken with the outer jacket remaining intact. Presumably, this occurred when the area was being mowed.

At this point we assumed there was enough capacitive coupling that the current readings on tower 3 were close to nominal, but the phase was way off. Unwittingly, we had been chasing this problem with phasor controls for a couple of months prior to this discovery.

This defective line was repaired by cutting a short section (about 10") out and reinstalling the connector. Following the repair, both patterns were readjusted for nominal antenna monitor indications and the monitor points were read. As expected, the MPs came back to normal.

All except one, that is.

No amount of tweaking would bring that one MP for the night pattern below the limit. It wasn't far out, but any is too much.

I recalled from the last proof that this particular point had been strange—when the pattern was adjusted just right, the field strength would be quite low and rotating the meter did not make much difference in the reading. At that particular point, in other words, it appeared as if a true zero null had been achieved (although the rest of the ratios on that radial did not reflect this).

Whatever the case, something had changed since the last time the MP had been measured to make its field strength high. To verify that the array was not out of adjustment, ten points on the radial were measured, both non-directional and directional. As expected, the radial was fine.

Normally, at this point, one would simply change the monitor point to the next measurement location out on the radial according to FCC rules and procedure. In this case, that wasn't really practical because the MP is the only measurement location on that radial on the transmitter-side of a large lake. Designating the next location as the MP would mean an hour's drive to measure that single point.

I elected to go ahead and run a partial proof of performance on both the day and night patterns. This would do two things: give us an idea of what the field strengths were in the wettest time of the year (as opposed to when the last proof was run, during the driest time of the year), and second, all new MP limits would be established. We ran the partial over a week's time using three men and three meters, starting with non-directional.

Following the proof, we readjusted the night power to maintain the errant monitor point below its licensed limit. This turned out to be a 40 percent reduction in night power—not terrible, but at night we need all we can get. This reduction seemed silly when we had just proven that no interference was being caused, but it is a rule of the game. We are still operating at reduced nighttime power pending FCC action on our partial proof and request for special temporary authority to operate with the new MP limits.

Government guidance

When a monitor point exceeds its limits, I suggest checking the sampling system first. Follow that with ten measurements along the radial in question if necessary. File an application to change the MP to the next location on the radial in accordance with the FCC rules. If you can't do that for whatever reason, go ahead and run the partial proof.

Whatever the case, if you have a high MP, make certain that you reduce power or take whatever other action necessary to keep that MP below its licensed value during all operations when you are not actually engaged in making proof field-strength measurements. Remember that the licensed limit remains in effect until you get something from the FCC saying otherwise.

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting. He can be reached at Box 561307, Dallas 75356.

The Intimate Medium Dawns

► continued from page 53

entirely for the fun of it, Spangenberg and his friends sent out piano music, phonograph records, and banjo solos, night after night.

Who was on first?

Two other stations are included in what historians consider the foundation of radio in America.

On August 20, 1920, at 8:15 p.m., two records were played on an Edison phonograph with the speaker horn directed into a microphone connected to a de Forest transmitter. This experimental broadcast of WWJ, the Detroit News station, worked so well that it was followed the next day by a broadcast of the Michigan election returns. The station captured attention with its newspaper-radio mobile unit.

In November the same year, station KDKA in East Pittsburgh, Pa., signed on with the election returns of the Harding-Cox race. The flagship station of what was to become known as the Westinghouse Broadcasting stations, KDKA has frequently been dubbed the first radio station in the United States; actually it was the first station with regularly scheduled continuous programming. If you were to travel to San Jose, Madison, Detroit, or Pittsburgh, you would find commemorative plaques claiming first-broadcasting honors for each of these pioneer stations.

□ □ □

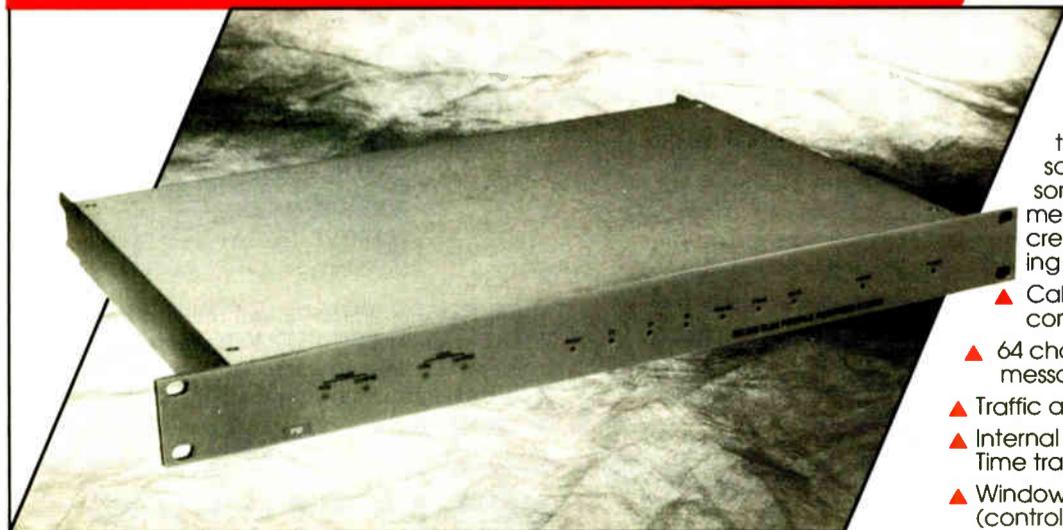
James T. Wold is a free-lance writer based in Minnesota. He is author of Minnesota Microphones, published by Northstar Press. Wold can be reached at 1106 South Seventh St., Minneapolis, Minn. 55415.

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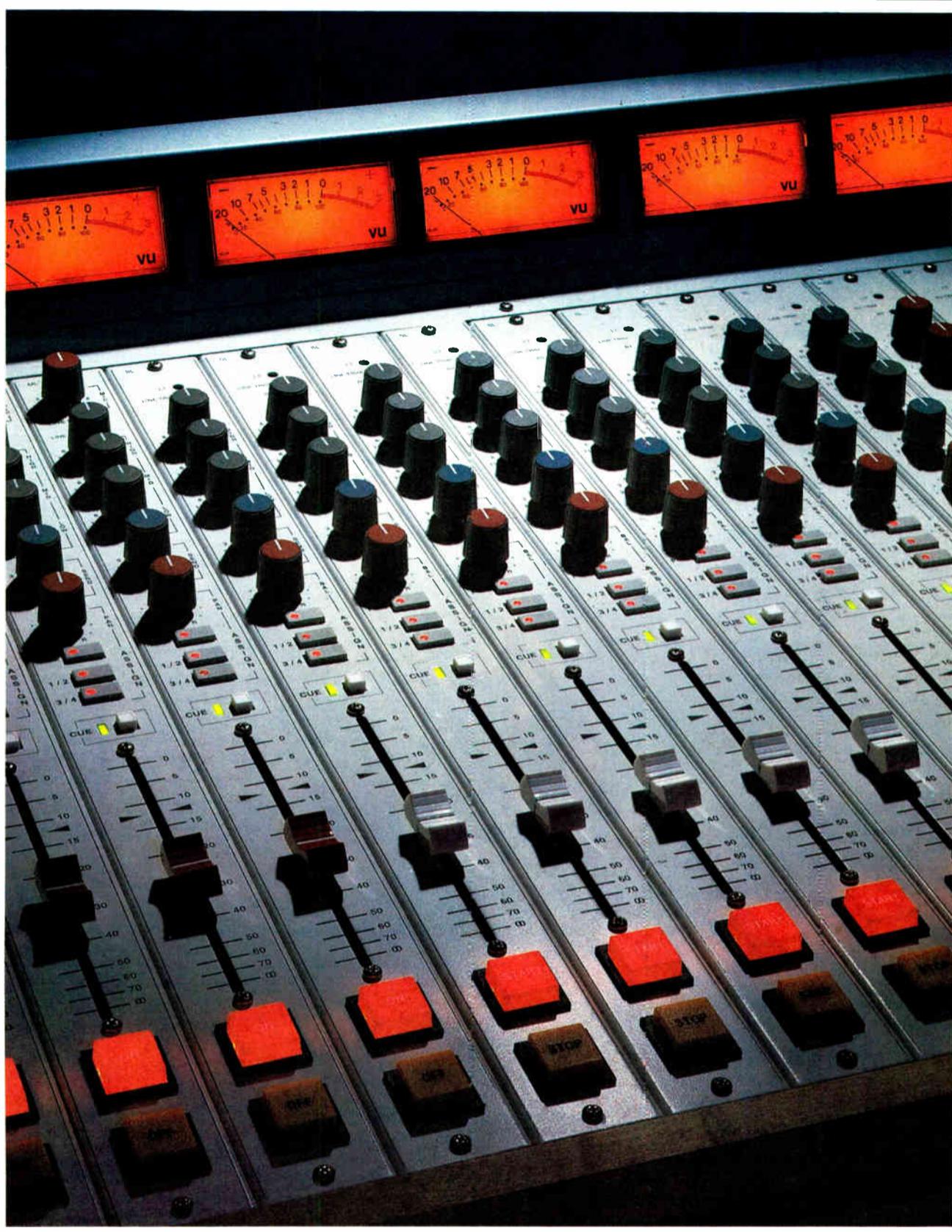
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