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A MONTHLY NEWSLETTER FOR BROADCASTERS

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RAY LIVESAY RECEIVES NAB NATIONAL RADIO AWARD

Ray Livesay, Chairman of the board, The J.R. Livesay Radio Broadcast Group, Mattoon, Illinois received the National Radio Award during the National Association of Broadcasters' Radio '89 Convention in September in New Orleans on Friday the 15th.

The management, programming, sales/marketing, promotion and engineering convention was held at the New Orleans Convention Center.

The award was for Livesay's "long-term involvement of continuing contribution to the radio industry."

One of the founders of the Daytime Broadcasters Association (DBA) in 1955, Livesay served the group as president, then chairman, until he stepped down in 1982. In January 1985, DBA joined the NAB. While head of the organization he was instrumental in leading the successful drive to persuade the Federal Communications Commission (FCC) to adopt pre-sunrise rules. They permitted most U.S. Daytime stations to sign on at 6:00 AM local time instead of waiting until local sunrise.

From 1966-1969, he was a member of the U.S. Radio Industry Advisory Committee to the FCC and the U.S. State Department during negotiations for a new radio broadcast treaty with Mexico. In the early 1980s he served as an industry advisor at radio conference in Buenos Aires and Rio de Janeiro involving the Western Hemisphere.

Livesay has a background in Radio and TV engineering having served two years in the U.S. Navy during WWII teaching radio, radar and basic electronics. In 1978, he engineered a workable Nine kilohertz spacing plan for the AM broadcast band for the United States and all the Western Hemisphere. (the hemisphere has operated with 10 khz spacing since the 1920s) The nine khz plan was officially approved by the U.S. Department of Commerce and the FCC but was strongly opposed by the NAB and eventually defeated by their efforts.

Livesay prides himself on his long-running radio editorial broadcasts. He started doing on-the-air radio editorials in May 1950, eleven months after the FCC lifted its ban on broadcast editorials, and by now he has aired more than 10,000 editorials. They are broadcast daily, Mon.-Fri.

He served on NAB's board of directors as director-at-large for small markets from 1957-1961 and again from 1966-1970. He was a board member of the former NRBA from 1975-1983; is a charter member of the Illinois Bdsters Association, serving as president in 1951; and is active in local Mattoon civic affairs.

Past recipients of this award are: 1984 Howard Cosell, 1985 Larry King, 1986 Douglas Edwards, 1987 Gary Owens, 1988 Ben Hoberman.

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NAB Asks FCC To Clarify, Reconsider New Class A FM Station Rules

The National Association of Broadcasters has asked the Federal Communications Commission to clarify its new rules allowing some Class A FM stations not meeting revised distance separation requirements (short-spaced stations) to increase their power. However, NAB applauded the FCC for its "selective" approach to Class A station upgrading which goes into effect later this year.

In its filing, NAB asked the Commission to clearly define how a "short-spaced" station planning to increase power should obtain the consent of any station that could be affected and what documentation is required. NAB suggested that affected stations be notified by certified mail of a proposed power increase and that the licensee seeking the increase obtain written consent from these stations.

NAB urged the FCC to reconsider its policy of allowing Class A stations to judge any interference to other stations by using signal contour measurements instead of mileage separation. NAB noted that the Commission's contour standards are inaccurate and can be misleading. NAB said power-increase applications based on contour should not be accepted until the agency's service and propagation modeling techniques are significantly improved.

NAB also said that since reconsideration of the Commission's directional antenna decision is

(cont. to pg. 3)

Safety Tips for the Transmitter Site

1. NEVER, NEVER, work alone at the transmitter site. Everyone at the site should know how to turn off the transmitter and any other power sources.
2. Always have some means of communication on the site (phone, 2-way or CB radio).
3. Prominently display the phone numbers of your FIRE DEPARTMENT, AMBULANCE and HOSPITAL. Determine the shortest routes from each, and let them know in writing. Some Emergency Forces have a system of assigning codes for your particular locations. When available, this speeds up their response times.
4. Install dead-bolt type locks on the building doors. This ensures your not being locked outside, away from your keys, with your means of communication inside. NEVER lock the door while you are inside. Your would-be rescuers will not be able to get in, as well.
5. Know your transmitter, especially which voltages remain after pulling the main breaker. Use the grounding-stick EVERY TIME. Disconnecting high voltage leads in troubleshooting may render the HIGH-VOLTAGE grounding switches inoperative.
6. Install a 'Local' control to disable the Remote Control, AND USE IT!! You don't need a studio operator resetting the transmitter while you are working on it! The transmitter should be interlocked so that NOTHING can turn it on while you are up to your elbows in it.
7. REMEMBER - are Pyranol filter capacitors will charge up spontaneously in high RF fields. For safety, short their terminals with a wire strap.
8. When switching off breakers for transmitter service, make sure the stand-by generator can't start automatically, re-powering the system.
9. Check your transmitter interlocks. Some transmitters do not have automatic 'high-voltage-shorting' when the doors open.
10. Serious burns result when ATU-hut doorknobs touch a coil as the door opens.
11. Make sure co-axial feed lines and phaser straps are not protruding or dangling, allowing them to come into contact with you.
12. Only CO_2 and DRY CHEMICAL fire extinguishers should be used at the site.
13. DON'T use aluminum ladders on AM towers. Use wooden or fiberglass only.
14. Keep a set of auto battery jumper cables at the site. They are perfect for shorting at the towers while working on ATU components or tower lighting. They may also start your vehicle from the 'standby' battery.
15. Transmitter sites are not to be general storage areas. Store props, remote booths & files anywhere else. Keep the site clean & tidy at all times.
16. Keep your vehicle gas tank topped up in winter. This lessens condensation, and the extra weight probably helps when you do get stuck.
17. A 'BROOKE' AIRWAY or BREATHING MASK should be in every first-aid kit. Mouth-to-mouth resuscitation should be a part of everyone's training.
18. THE LIFE YOU SAVE..IS YOUR OWN! So....LET'S BE CAREFUL OUT THERE!

— Reprint for use by any of the Broadcast Safety committees. —

NAB Seeks Congressional Review Of How Cable Television Is Regulated

National Association of Broadcasters President and Ceo Edward O. Fritts said it may be time for Congress and the Federal Communications Commission to regulate cable television systems in accordance with the common carrier principles of the Communications Act rather than its current "privileged status" under the 1984 Cable Act.

In a letter to Senator Daniel Inouye (D-HI), chairman of the Senate Communications Subcommittee, Fritts asked him to take a "hard look at cable's present regulatory treatment" during his committee's upcoming hearings on cable carriage issues. A request also was made of Representative Edward Markey (D-MA), chairman of the House Telecommunications Subcommittee, to hold hearings on that and other cable issues.

Fritts cited American Television and Communications' decision to program a cable channel in Rochester, NY, as an "independent" station in direct competition with the local broadcast stations in the market. He pointed out that this channel will not require an FCC license nor will it be subject to the public interest obligations that apply to broadcast stations under terms of such licenses.

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Warning: Keep Those Tower Lights Burning

The Federal Communications Commission has received reports of aircraft collisions with unlighted or improperly lighted communications towers. Accident reports and studies reveal that radio tower owners and FCC licensees need to be more aware of the need for conformance to FCC issued obstruction marking and lighting specifications.

When radio towers are greater than 200 feet in height and/or near an airport, the owner or licensee must apply for FCC issued obstruction marking and lighting specifications. During construction, temporary warning lights must be installed at the top of the structure, and at each level where permanent lights will be installed.

Licensees should insure that their towers are marked and lighted in accordance with the specifications on their permits. Daily inspections must be made to ensure that the lights are on and operating properly. Any variances must be approved by the FCC's Antenna Survey Branch.

If a light outage occurs which cannot be corrected within thirty minutes, the local FAA Flight Service Station (FSS) must be contacted immediately. The FSS will issue a warning to pilots. The FSS must be notified when the lights are again operational so the warning may be rescinded.

The FCC intends to continue its close scrutiny of radio towers. Appropriate action, including issuance of fines and/or revocation of the station license, will be taken against the user or owner of any unauthorized or improperly marked radio tower.

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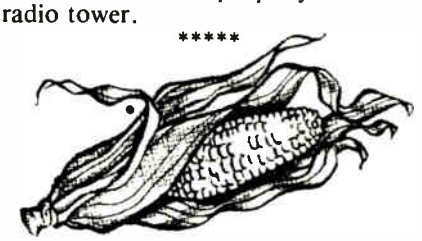

New Product

TFT has developed a synchronous FM broadcast system known as the Reciter, which was designed to help FM broadcasters keep their broadcast signals as clear as a CD played at home. According to TFT, it will also allow the broadcast signals to be relayed to booster transmitters located in areas physically shielded from the station's main signals by terrain. The Reciter incorporates proprietary designs which have combined the features of a program transmission link's receiver and the FM broadcast transmitter's aural exciter.

Electronic Industries, 19 E. Irving, Oshkosh, WI 54901; In-State 800-445-0222 or Out-Of-State 800-558-0222.

Beyer Adds Mic Line

Beyer Dynamics is planning to unveil a new line of microphones and upgrades to the wireless line.

The new TG-X line of microphones is said to be the first full line to combine radical design techniques with neodymium magnets. The line is specifically designed for high decibel, live concert situations, where high output levels and fast and accurate transient response is needed.

Beyer Dynamic is also said to be refining and upgrading its wireless microphone systems. These systems include the SEM 186 handheld mic transmitter with the EM 81 condenser capsule and the NE 185.10 non-diversity receiver.

(cont'd from pg. 1)

pending, the agency should not move toward contour protection by now exempting many Class A stations from the five-mile limit imposed on directional antenna use. To do so, NAB said, "would not only make a mockery of the reconsideration process but also place FM closer to the kind of rampant interference condition from which the FCC and industry are now trying to extricate AM broadcasting."

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"The Fluke Ad which appeared in the Oct. issue on page 6 had incorrect pricing. We apologize for the error. If interested in those items please call for current pricing."

FCC Asked to Suspend, Investigate AT&T's TV Rate Increase Proposal

The National Association of Broadcasters has asked the Federal Communications Commission to suspend and investigate the 572 percent rate increase planned by the American Telephone and Telegraph Company (AT&T) for television stations' switching operations.

The switching service is an operation performed by AT&T whereby an existing television component is connected to or disconnected from another existing television component at an AT&T central office. This particularly occurs when TV station receives programming, such as sports highlights from an unaffiliated broadcast station.

In its filing, NAB said the initial increase, which took effect August 29, would go from $5.95 to $22.50 per connect and disconnect -- without adequate notice or time for stations to prepare for such drastic changes. The second phase, to be implemented on January 1, would raise the rate to $40. The switching frequency varies from station to station, but in a separate filing by the three major networks, Capital Cities/ABC estimated that its annual television switching costs will increase from $29,000 per year to approximately $195,000 per year under the AT&T proposal.

These proposed increases, NAB said, "would have a severe adverse impact on broadcasters' television transmission costs to the detriment of service to the public." NAB pointed out that the time schedule does not give broadcasters adequate time to prepare for the change or provide data demonstrating that the rates are cost-justified.

NAB noted that the explanatory materials AT&T provided contain only bare, unsupported numbers and therefore are not in compliance with the FCC's price cap rules. Moreover, AT&T's submission lacks the underlying data necessary to calculate whether this price cap is in compliance with FCC rules and regulations.

NAB Television Board Chairman Thomas L. Goodgame said, "Without the financial data required by the Commission, neither the FCC nor NAB can verify whether AT&T has complied with the price cap rules. Without a rationale for this drastic rate increase, the FCC should suspend the proposal and require AT&T to provide more detailed information."

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NAB Publishes Second Edition Of A Broadcaster's EEO Handbook

The National Association of Broadcasters has published a new edition of A Broadcaster's EEO Handbook -- the comprehensive guide to Federal Communications Commission regulations and federal equal employment opportunity laws that govern broadcast employees.

The book provides a working knowledge of the requirements and prohibitions of federal laws, as well as suggestions for avoiding and defending against discrimination claims at every level of the employment relationship. It is geared to reduce the number of times a station has to deal with job-related complaints.

Among the topics covered are: EEO principles and the FCC's processing criteria; particular categories of illegal discrimination and how to avoid them; drug testing; discipline and terminating employment; affirmative action and reverse discrimination; and filing and record-keeping requirements.

It explains who is protected against discrimination, how statistics are relevant in job hiring, the exceptions to the discrimination laws, sexual harassment, and procedures that should be avoided when discharging an employee.

The book was authored by Stan Brown and Jay Birnbaum, attorneys with the Washington communications law firm of Arent, Fox, Kinter, Plotkin & Kahn. Brown, who also authored the first edition in 1986, said, "We believe the EEO handbook is the most comprehensive guide to EEO laws developed for any industry. It will give station executives and human resource officials practical answers to common questions and assist them in dealing with the array of EEO requirements stations face, including FCC rules."

A Broadcaster's EEO Handbook is available through NAB Services for $30 for NAB members and $60 for nonmembers. Toll-free number: (800) 368-5644.

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Otari's MX-50: Newest Addition to Line of Tape Recorders

The MX-50 proudly occupies the entry level rung on Otari's tape recorder product ladder, yet it provides many useful production oriented features not found in similarly priced competitive tape machines.

Much of the advanced technologv developed for our top of the line multi-track machines has filtered down into the MX-50, a machine targeted and priced for the discriminating professional who demands high quality, durability and reliability.

Among those features not found in our competition, but in the MX-50, are switchable reference flux levels which allow the machine to record and play at 185, 250, 320 or 514nWb/m thus making the machine compatible with popular tape reference flux standards.

An optional VEM (Voice Editing Mode) module may be installed allowing the MX-50 to run at twice the play speed while maintaining the original pitch of the tracks. Dialog editing sessions tape must be covered quickly while searching for edit points.

Pitch-shifting the audio down one octave greatly increases the intelligibility of the soundtrack because the tape travels at twice the play speed. This signal is available at the front panel headphone jack. The microprocessor-based transport allows future updates to be installed simply by replacing an easily accessed Eprom chip with Dynamic Braking in all transport modes.

When recording, the actual magnetization of the tape takes place at the trailing edge of the record gap. Therefore, the gap width of the record head must be optimized for best results. The reproduce head requires the narrowest gap as is practical in order to resolve the shortest wavelength signals (those of highest frequency). The record and reproduce heads of the MX-50 are fully optimized for their specific functions.

Otari's design philosophy extends beyond mere specifications and the design of superior tape transport. The MX-50, like all Otari products, is designed to be easily serviced. All printed circuit boards (PCBs) have component part numbers and trimmer designations silk-screened on both sides for easy identification while servicing.

The MX-50 also comes equipped with a DC servo hall-effect capstan print motor, identical to those used on the MTR-20 and MX-80. This motor design provides inherently low wow and flutter while allowing reliable 9.6kHz external control through our standarized 37-pin Parallel I/O "D" type connector.

Three speeds are selectable in pairs (15/7.5 or 7.5/3.75 ips) and switchable equalization (NAB or IEC) with built-in electronic tape timer readout in hours, minutes and seconds to allow non-volatile, standard equipment "on the fly" storage, instant recall of one cue memory position and, of course, search to zero capability.

Fixed speed, external control, VEM and varispeed (+/-7%) pitch control modes are all selectable from the front panel of the machine. Associated LEDs give instant indication of which mode is selected.

Other front panel features include input and output SRL buttons, individually switchable reel size selectors which allow mixed reel sizes and input/repro button and dump edit mode.

Rounding out this excellent complement of features are lit VU meters with peak indicators, solenoid operated lifter defeat switch, optional input/output transformers and 19" rack mount adapter kit.

As always, we have strived to extract value, performance and reliability from our extensive tape machine technology based to produce the MX-50. It is truly "technology you can trust" as its best!

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Telex Purchases RTS Systems

Telex Communications, Inc., has purchased the assets of RTS Sytems, Inc., from Compact Video Group, Inc, designers and manufacturers of high performance communications equipment for professional broadcast, teleproduction, aerospace and defense applications.

Telex Communications is an electronic products company with a wide range of products which focus, disseminate or facilitate communications.

"RTS" reputation for quality custom designed wired intercom systems, merged with Telex's expertise in radio frequency wireless technology, will improve the product offerings available to the market," said Jeffrey S. Wetherell, president of Telex.

The company will continue to do business in Burbank, CA, as RTS Systems, a division of Telex Comm.

HAMILTON TO HEAD COMPUTER ENGINEERING FOR ADVANCED TELEVISION TEST CENTER

Scott E. Hamilton had joined the Advanced Television Test Center (ATTC) as Manager, Computer Systems Engineering.

Hamilton's primary responsibilities will be the development and management of the broad range of computer and software elements required by the Test Center. These include data collection and mangement systems, automation systems in the Test Center laboratory, and the specialized computer and digital equipment developed by the Test Center to permit analysis of the many new and different ways of transmitting better television picitures and sound.

The Test Center was formed last year by a coalition of television broadcasting companies and industry associations to evaluate the many proposed advanced television (ATV) systems which are under consideration as the new transmission standard for 'high definition' television in North America. The Test Center will conduct and support impartial tests of ATV system alternatives in cooperation with the official Advisory Committee and Advanced Television Service of the Federal Communications Commission, and the resulting data will help industry, government and the public to determine the national standards to implement the new service. Testing is now expected to begin by mid-1990 and continue to late 1991. It is planned to focus at first on ATV transmission via the broadcast and cable media.

Hamilton comes to ATTC from GE Information Services, Rockville, Maryland, where he was Senior Consultant, responsible for the design and business development of large-scale data transmission networks for private corporations and government agencies.

Earlier, Hamilton served as Manager, Network Control Engineering at Satellite Business Systems (SBS), McLean, Virginia. He managed several systems projects, including the architecture and design of the Digitalk Satellite Communications Simulator; the Hyperchannel Satellite Link Subsystem; SBS's Customer Network Management Facility; and, SBS's ALERTS--the Automatic Line Evaluation and Reports Test System.

Hamilton also worked as Manager of Telecommunications Software Development at Litton Amecom, College Park, Maryland. Among his activities were the development of the operational software for the TRACON voice communications switching systems at the Dallas-Fort Worth Airport and three airports in Saudi Arabia. While at Litton, Hamilton also participated as a member of the ANSI X3S37 Subcommittee for the definition and specification of the X.25 data communications protocol.

His broadcasting experience includes engineering positions at KUON-TV, Great Plains National Instructional Television Library, the Nebraska Educational Television Commission and the Public Broadcasting Service (PBS). At PBS, Mr. Hamilton participated in the software development for the Closed Captioning system, the PBS switching plant automation system, the NOLA/DACS messaging system, and the Cable Television Impairment Analysis System.

Hamilton is a member of the Audio Engineering Society and the Association for Computing Machinery. He received a BS degree from the University of Nebraska-Lincoln in 1971, and has done post-graduate work in Computer Science at UNL and the University of Maryland. He is a Life Member of the ARRL, holds a 1st Class/General FCC Commercial License, and is Communications Officer for the Fairfax Composite Squadron, National Capital Wing, Civil Air Patrol. He resides with his wife in Fairfax, Virginia.

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FCC Revises FM Class A Table

The FCC recently published revised mileage separation requirements that Class A FM stations will generally have to meet before they can upgrade their power (see RW 7/24/89). The Commission decided that a doubling of power will only be accorded stations able to meet expanded mileage separation requirements designed to avoid significant increases in interference to other FM stations.

The "Mimimum Distance Separation Requirements" is for Class A FM stations that may operate with six kilowatts effective radiated power (ERP). The former limit was three kilowatts ERP limit.

Approximately 500 stations now fully-spaced under the new standards may be able to upgrade, without filing an FCC construction permit application, by as early as December. The FCC is expected to issue a list of these stations in November. Broadcasters may use the revised table to determine whether they likely will quality for the power increase, either through the FCC's expedited procedure or by other means requiring the filing of a construction permit application.

Minimum Distance Separation Requirements In Kilometers (Miles)

Relation	Co-channel	200 kHz
A to A	115(71)	72(45)
A to B1	143(89)	96(60)
A to B	178(111)	113(70)
A to C3	142(88)	89(55)
A to C2	166(103)	106(66)
A to C1	200(124)	133(83)
A to C	226(140)	165(103)
	400/600kHz	10.6/ 10.8MHz
A to A	31(19)	10(6)
A to B1	48(30)	12(7)
A to B	69(43)	15(9)
A to C3	42(26)	12(7)
A to C2	55(34)	15(9)
A to C1	75(47)	22(14)
A to C	95(59)	29(18)

Class A FM stations unable to meet this revised mileage separation table will be "grandfathered" in and, in most cases, need to conform to the former mileage separation table.

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Genter Restructures Marketing Team

Gentner Electronics Corporation has announced the restructuring of its marketing team in order to strengthen its support of distribution. In-house sales and marketing management have been effected by this move.

Gary W. Crowder has been named National Sales Manager. Mr. Crowder will oversee the sales process at Gentner including sales support for distributors and customers. He will also continue to supervise in-house telemarketing and sales order processing.

Elaine Jones has become Distribution Manager. Ms. Jones will be responsible for communications, training, and support for Gentner's representatives, distributors and dealers. Working as newly appointed regional managers with Ms. Jones, Curtis Carroll and Walt Lowery will support representatives and dealers in the Central and Eastern regions, respectively. Ms. Jones will also serve as the West Coast and Canada regional manager. International distribution will continue through Allied International of Richmond, Indiana.

Russell D. Gentner, President, will continue his responsibility as Marketing Team Leader. Mr. Gentner will work closely with the company's marketing coordination team on strategic planning and marketing implementation. He will also be the key contact for the company's editorial communications.

Mr. Gentner stated, "The purpose of this new marketing structure is to renew our emphasis on representative and dealer support. We now have three people committed solely to the support of our distribution system. The restructuring will also allow our Sales and Marketing Coordination teams to focus more on their individual responsibilities."

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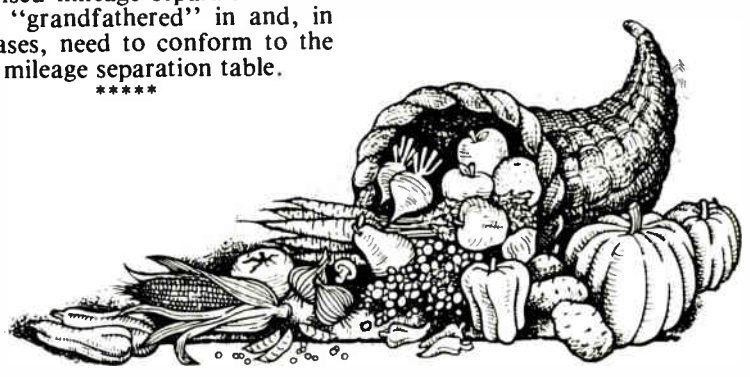

NAB Concerned with 'Active Video,' Affects Quality of Television Picture

The National Association of Broadcasters has told the Federal Communications Commission that it should consider initiating an inquiry to explore possible limits and standards for the use of National Television Systems Committee ("NTSC") active video. Active video is the portion of the television signal which is visible on the screen.

In its filing, NAB expresses concern over the long-range implications of the allocation of signal space reserved for active video to services that provide ancillary broadcast functions.

NAB's filing is in response to the Commission's request for comments on the effect of incorporating an information system of the A.C. Nielsen Co. on line 22 that is currently implemented on line 20, specifically whether or not such a move would have a detrimental effect on the visible television picture.

Although the maximum recommended vertical blanking interval (VBI) as specified in the Commission's rules is 21 lines, and active video technical constitutes lines 22 to 525, precedent has previously been set for the use of line 22 for services that would otherwise reside within the VBI. NAB is concerned that other active lines, currently used for video program content, remain safe from future encroachment of special signals.

Furthermore, NAB contends that line 22 is likely to become more observable in the future, and cites a number of factors that might cause this, among them the advent of new technologies not requiring over-scanning. Also a factor is the proliferation in classroom and corporate settings of multi-media displays, which allow one display to be used for both computer graphics and broadcast television signals. In computer graphics, underscanning is essential to retain the complete body of data, and in broadcast television, overscanning is necessary to maintain the integrity of the television picture.

In addition, NAB fears that line time in the VBI is currently being used inefficiently, precluding potential additional uses and increasing the pressure to add more active video lines.

******

Radio's All-Terrain Vehicle

A machine that pulls its own weight–and then some–the PR99 MKIII delivers top performances over some pretty tough terrain . . .

Whether you're downlinking or uplinking satellite feeds, taping news call-ins, producing commercial spots, or using the Playback Only version of the PR99, the new MKIII is the vehicle you want. This is a machine that won't quit. And proves it everyday in radio stations throughout the world.

The PR99 MKIII reflects the same engineering expertise that has made Studer Revox the world standard for excellence in audio recording.

Compare these MKIII features with the competition: • a solid die-cast aluminum transport chassis and head block • record and playback heads machined to the same tolerances as the heads for Studer multi-track recorders • easily accessible modular electronics for tough, reliable broadcast performance • a true Autolocator with digital counter in hours, minutes and seconds • speed configurations of 3 1/2 - 7 1/2 ips & 7 1/2 - 15 ips • rack mounts standard.

In whatever terrain you operate—in radio production or on-air work—the PR99 MKIII is a no-nonsense machine that gets you where you want to go. Before you buy, check out the MKIII for value and performance. Over the long haul, the Revox PR99 MKIII leaves the competition in the dust.

Available from Studer Revox Professional Products Dealers. Or contact us directly.

Electronic Industries Incorporated
19 E. Irving, Oshkosh, WI 54901
In State 800-445-0222
Out of State 800-558-0222

FCC's AM Radio Meeting Set

FCC Chairman Al Sikes has agreed to an "en banc" hearing on Nov. 16 to hear the concerns of AM broadcasters. Speaking of Radio '89, Sikes said one of the things the FCC will improve is the amount of time it takes to process station applications, Unnecessary regulatory delays "can constitute an absolutely crushing burden for many radio stations," he said. Sikes statements were in response to a letter the NAB Radio Board sent to him just after he was sworn in.

NAB and the Electronic Industries Association/Consumer Electronics Group (EIA/CEG) have agreed on a joint program to establish a certification mark or logo to help marketing of improved quality AM receivers. The mark is expected to identify receivers that meet NRSC standards for audio bandwidth and deemphasis. NAB will organize promotion for the mark in local AM radio station markets and help develop local retail tie-ins.

Denon America, a major manufacturer of consumer receivers, says it supports the NAB/EIA certification program and says that, by Christmas, it will produce at least one model tuner with NRSC specifications. All Denon products, in the future, will be designed according to NRSC.

Preliminary testing began last week of a four-wire elevated ground system that's part of NAB's AM antenna project near Beltsville, MD. Once that is complete, a standard ground system will be installed. The antenna system, designed by Ogden Prestholdt, might enable some AM broadcasters to increase their nighttime power in a single direction and improve nighttime coverage.

"It was extremely gratifying to see the tremendous interest in AM evidenced at Radio '89 from Chairman Sikes' announcement to Reps. Rinaldo, Slattery and Rowland's commitments to aggressively work toward viable solutions to AM's technical problems," said Ted Snider, president, KARN/Little Rock, AR, and chairman of the NAB Radio Receiver Manufacturer Liaison Task Force. Rinaldo's bill now in Congress, H.R. 2714, would require reduced interference on the AM band, daytimer "homesteading" on many band extension frequencies, and that all consumer radios be capable of receiving all AM and FM frequencies.

"With both Congress and the FCC on board, it's really up to broadcasters to do their part," Sinder said.

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MEMO FROM METZ

by
David L. Metz

Thermostatic Control of Fans

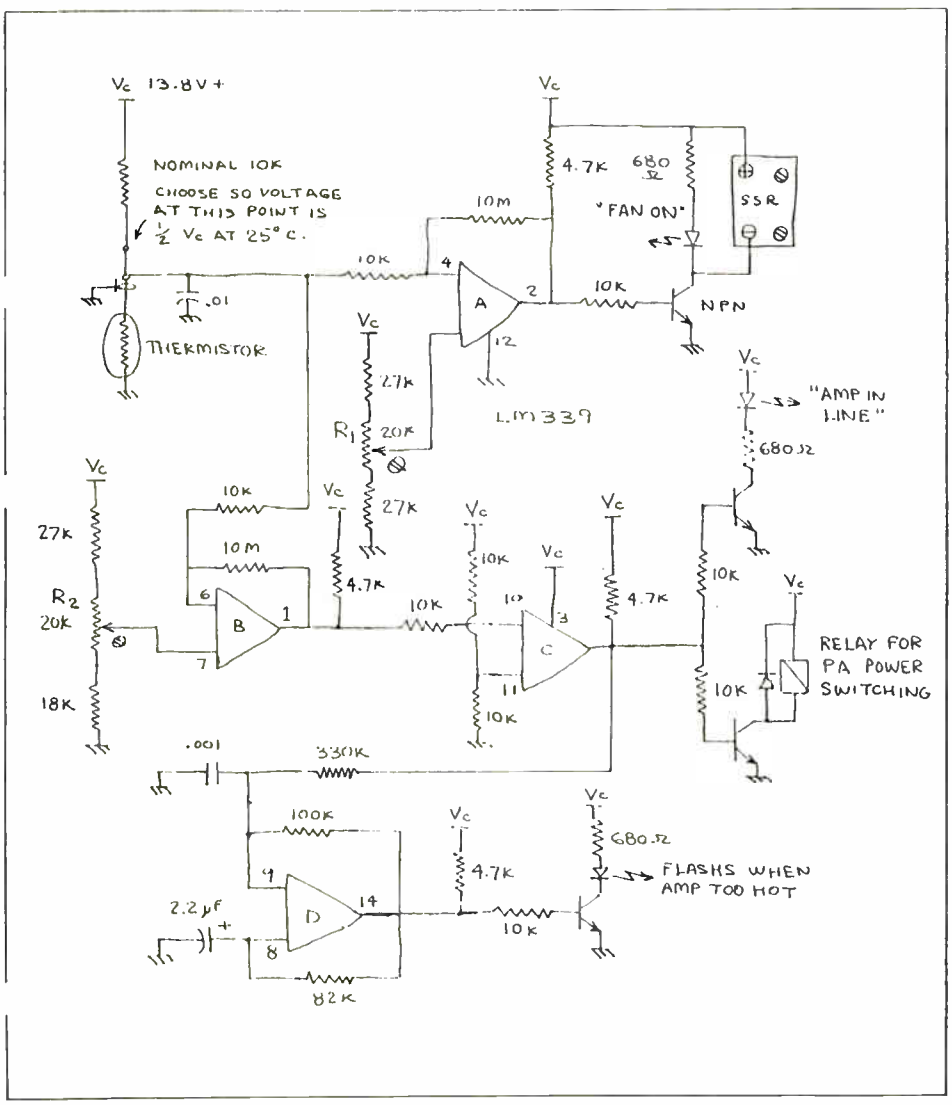
This month we tackle a method to automatically turn on/off cooling fans. I built this for a VHF radio repeater with a 120 watt solid state final that needed cooling. About now you might be asking, "why not just leave the fan on all the time?" Well, I used to.

Then it occurred to me (after replacing a couple of fans) that the amplifier never operated much over two hours a day. Since most of the time it needed no cooling, why shorten the fan life by cooling a cold amplifier? Worse when the fan did fail, the amp burned out!

At first I planned to use those nifty little Klixon thermostatic switches. These are great if you can find or afford them. In the end I decided against using them due to physical size and mechanical mounting considerations. The final design used a junk box thermistor and a quad comparator.

The controller gives you two options for fan operation. One is for a thermostat that turns the fan on only when cooling is required, the other is for an alarm that indicates fan failure (or any other cause of over temperature operation). The alarm can disable the unit (shut off Vc) until the unit cools down. This not only alerts you of the problem, it also prevents component damage.

The entire circuit uses one LM339 quad comparator. Note you only need to build the sections that your application requires. Section one turns the fan on/off. Section two shuts down the unit on over temperature. Section three serves as an inverter to drive the over temperature alarm LED and shut down relay. Section four is a square wave oscillator that blinks the alarm LED.



The on/off alarm sections work by comparing the voltage drop across a thermistor to a fixed reference voltage. The thermistors resistance decreases as the temperature increases. When the thermistor voltage drops below the reference, the output of the comparator goes high.

This drives a NPN switching transistor that lights the "fan on" LED and switches on the 120 volts AC to the fan motor with a solid state relay. Note that you can use a darlington such as a TIP120 to directly switch 13.8 volts to fans with DC motors.

The 10 megaohm resistor strapped between the input and output of the comparator controls the hysteresis. In practice this means the circuit doesn't "flutter" rapidly between on and off with small changes in temperature. The hysteresis feature keeps the fan on till a temperature several degrees below turn on is reached. Cycling of the fan has proved to be quite smooth.

Choose a thermistor that decreases in value as the temperature increases. The one I found had a resistance of about 7,000 ohms at 25 degrees centigrade. Choose the value of the series resistor to Vc to be as close to the thermistor value as practical. For mine, I used 8.2 K, that's all the closer you need to get.

Connection to the thermistor is made with small diameter shielded cable. I insulated the thermistor with a THIN coat of clear plastic spray to prevent shorting on the amplifier chassis.

Calibration is done with a stirred oil bath. I used about two cups of cooking oil heated in the microwave. I stirred the oil with a dial thermometer I have and set the "alarm/shut off" point first. Then as the oil cooled, I set the "fan on" point.

Close thermal connection between the thermistor and the unit being monitored is important. On my amplifier I used a extra nut and a thin plastic washer to secure the thermistor right to the stud of the final power amplifier transistor. A liberal daub of silicon heat sink grease finished the job.

Note that the "alarm/shut off" relay is wired normally on. This way if the fan controller fails the unit protected is shut off. Kind of a simple fail safe. The LED flasher sort of guilds the lily. I did it because I had the comparator section left over and a flashing LED draws more attention.

*****

Stations Praised For Hugo Efforts

Broadcasters in Hurrican Hugo-devastated Charleston, SC, got high marks from both city officials and residents for their many roles in helping to lessen the storm's brute impact on lives in the most destructive siege on this area in this century. Nonetheless, the vicious storm took its toll on broadcasters, too, compounded by at least two additional frustrating factors: A complete loss of electricity making most TV receivers inoperable without the use of generators (although battery-operated radios pulled in the few storm-weakened signals that remained on-air), and the fact that most stations were ordered to evacuate their facilities by city and state officials before the brunt of the hurricane swept across the South Carolina coastline.

Charleston County Emergency Preparedness officials praised broadcasters for their vital role in getting residents to evacuate the area.

One emergency official - echoing Mayor Riley's statement (above) said the storm-day evacuation (Sept. 21) highly publicized by broadcast stations before the storm hit probably saved thousands of lives.

Virtually all radio and TV stations were knocked off the air for several hours at a time and some stations (WXCH-AM, WWHT-FM, WOKE-AM, and WTAT-TV, among others) lost their towers. WWHT's tower was new. (It went back on-air shortly after the storm with an antenna atop a water tower.)

WCIV-TV and WCSC-TV signed off the air just prior to the hurricane's initial impact, although WCSC continued to broadcast from the emergency center until that remote, too, was knocked off the air.

WOKE-AM Pres./GM Harry Weaver told NAB staffers on the scene, "What's frustrating about being down is that I could be using my knowledge to get this community back on its feet. I just need to get my tower back up."

WPAL-AM president Bill Saunders said his station lost its ABC feed dish. "We were 'up' for about 12 hours trying to help people find each other. We didn't plan it, it just made sense." WPAL finally got knocked off the air when its propane generator failed. But, he said "people are still calling us for information. Somebody wants to know where the Red Cross is, where they can get food or gas. They're still calling us even though we're off the air."

One exception to a sustained broadcast blackout in the 24 hours following the storm's impact appeared to be WCBD-TV. VP/GM Bill Evans III told Radio Week the station was ordered by the city officials to evacuate its facilities by 6:30 p.m. WCBD was back on the air from its transmitter site in Awendaw by 6:30 the next morning and continued emergency coverage at full power. (In the immediate aftermath of the storm, according to some Charleston residents, WCBD was the only local TV or radio station they could receive for several hours.) WCBD, like most other TV and radio stations, sustained major damage to its facilities. Evans puts the preliminary estimate at $1 million.

WPDQ/Jacksonville, FL, took over for radio over the entire South Carolina coast and was relaying messages throughout the night of the storm, reported Gene Jeffers, NAB VP Public Affairs & Communications.

According to Jeffers WXLY is operating out of a rental van as the tower site WAZF has no power but has a generator keeping it going at 100Kw.

Channel 5, WCSC and Radio WXTC have been simulcasting a continuous relief program since the storm passed. The WXTC studio was destroyed by two-three feet of water.

Also, WWWZ production director Phil Allen was running his show at the tower cite using a CD boom-box while answering phone calls for help from the community. Generators were being refueled every three-four hours.

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F. David Harris Joins NAB as Director of Special Projects

F. David Harris has been named director, Special Projects, of the National Association of Broadcasters' Science and Technology Department, effective Sept. 5. He previously was head of the Electrical Engineering Technology Department at Purdue University, Calumet. The announcement was made by Michael Rau, the department's vice president.

From 1976 to 1986 Harris was associate professor of engineering technology at the University of Hartford's ward Technical College. He formerly was a consultant to the telecommunications industry, general manager of a company that produced specialized electronic equipment, staff engineer for the National Aeronautics and Space Administration and staff engineer for Blonder-Tongue Laboratories, and a technician with the U.S. Navy.

In 1981, while at the University of Hartford, he conducted an extensive test of FM receiver performance characteristics on behalf of the National Radio Systems Committee. The study was very useful to NAB and the FM industry during the FCC's Docket 80-90 proceedings which created new classes of FM stations.

Harris received his B.S.E.E. degree, summa cum laude, from Newark College of Engineering, and his M.S.E.E. degree from Rensselaer Polytechnic Institute.

He has published a number of technical papers and is a member of the Institute of Electrical and Electronics Engineers, American Society of Engineering Education, Society of Broadcast Engineers and the Society of Wireless Pioneers.

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RED AUERBACH GIVES TIPS ON EFFECTIVE SALES MANAGEMENT

Broadcasters attending the National Association of Broadcasters Radio '89 convention, held September 13-16 in New Orleans, got some expert advice on how to get the most out of station sales personnel from former Boston Celtics coach, general manager and president Arnold "Red" Auerbach.

Auerbach addressed a Saturday morning session on "Building a Winning Team."

Rated a master in knowing people and utilizing them in specific roles, Auerbach's skills in the front office equalled his success on the bench. He rebuilt the Celtics in the 1970's and again in the 1980's and produced winning teams over four decades.

He began his coaching career with the Washington Capitals in 1946 and joined the Celtics in 1951 where he revived a sagging Boston franchise.

He was inducted into the Basketball Hall of Fame in 1968 and when the NBA chose its Silver Anniversary Team honoring the best of the league's first 25 years, Auerbach was chosen as coach. In 1965, he was elected NBA Coach of the Year and in 1980 was named NBA Executive of the Year and head coach of the NBA's 35th anniversary team. In 1982, he was elected to the Washington Hall of Stars, which involved people from all sports. He has received six honorary degrees and is the author of four books.

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ATSC Recommends United States Position On HDTV

The Executive Committee of the United States Advanced Television Systems Committee (ATSC) has recommended a negotiating position to the Department of State for the upcoming Final Meeting of Study Group 11 of the International Radio Consultative Committee (CCIR). The CCIR, an organization under the United Nations International Telecommunications Union, met in Geneva October 9 - 25, 1989 to consider standards for production of High Definition Television (HDTV).

The ATSC recommendation contains a full set of Colorimetry and Transfer Characteristics. "Our support of these complex technical parameters, if accepted by all nations, would be a major step forward," said James C. McKinney, Chairman of the ATSC. "Never before have all countries been able to agree on such basic definitions of colors and other values which would assure that all televisions viewers will see exactly the same video pictures regardless of where they are watching television," he continued. The ATSC recommendation was based on agreements reached by international colorimetry experts last week in Australia.

Representing the United States in the series of international meetings was Mr. LeRoy DeMarsh of Eastman Kodak who also chairs colorimetery groups for both the ATSC and the Society of Motion Picture and Television Engineers.

ATSC also provided an update to the Department of State concerning scanning parameters. "Consensus certainly seems to be at hand on some parameters. The United States clearly wants to explore 'square pixels' based on 1080 active lines. There is a very strong opinion within the ATSC that progressive scanning should be used in future HDTV production while interlaced scanning will likely be used in the short run," McKinney said. "It is clear that television stations in the United States will operate at 59.94 fields per second, and there also appears to be a need for 60 Hz in other production houses. But one thing is clear," McKinney continued. "There is no support for a field repetition rate of 50 Hertz in the United States."

Work on the optimal amount of blanking and the total number of lines will contine. The ATSC reported that consensus has not been reached in these areas. The ATSC also suggested that the Department of State should not enter negotiations on a partial list of scanning parameter values but should wait until a complete set is developed.

The ATSC reported strong private sector support for Common Image Format and against Regional Standards to the Department of State.

The recommendations were adopted, without exception, by the Executive Committee of the ATSC in Washington on September 19, 1989.

*****

Manufacturer's List Price
$524.00

Electronic Industries
19 E. Irving - Oshkosh, WI 54901
Out-of-State: 800-558-0222 or
In State: 800-445-0222

The CROWN D-75 power amplifier, requiring only 1¾" (4.45cm) of vertical rack space, was designed to operate safely and continuously into a variance of load requirements. The D-75 provides 35 watts per channel minimum RMS (both channels operating) into an 8 ohm load over a bandwidth of 20 Hz-20kHz at a rated sum total harmonic distortion that is 0.05% of the fundamental output voltage. The frequency response of the unit varies no more than +/−0.1dB from 20Hz-20kHz at 1 watt into 8 ohms. Features of the D-75 include active balanced inputs, XLR connectors, an easily accessible mono-stereo switch, and front panel LEDs indicating overloads and signal presence. A special feature of the D-75 is the provision for isolating chassis ground from electrical ground. The D-75 offers traditional Crown durability and a full 3 year warranty.

Hum and noise: From 20Hz to 20kHz the hum and noise level is 110dB below the rated output.
Phase response: +10 degree, −15 degree 20Hz-20kHz at 1 watt.
Imput impedance: (XLR balanced) 20,000 ohms
(XLR unbalanced) 10,000 ohms
(Phone jacks unbalanced) 25,000 ohms
Turn on: Instantaneous, with minimum thump and no program delay.
Controls: Two input-level controls and a power switch on the front panel. A mono stereo switch, located next to the input jacks, on the rear panel.
Indicators: 2 IOC indicators (red).
2 signal-presence indicators (green).
1 power indicator (amber).
Connectors, input: XLR 3 pin audio connector in which pin 2 is positive, (for a positive output signal) or ¼" phone jack.
Ground link: is a means for isolating chassis ground from electrical ground is provided on the rear panel. The grounds are always connected internally by 2.7 ohms.
Output: is color-coded dual binding posts and a ¼" stereo headphone jack on the front panel.
Dimensions: 19" long, 9" deep, and 1¾" high. (8½" deep from mounting surface). A 19" Western Electric standard rack-mounting system is utilized.
The entire amplifier is used as a heat sink. Front-Panel extrusion acts as a sink along with the chassis covers.
Aluminum-chassis construction for maximum heat conduction and minimum weight.
Weight: 10 pounds net weight.
Finish: Satinized aluminum front panel with gray suede Lexan insert.
1kHz power: 40 watts RMS into 8 ohms, per channel, both channels operating, 0.1% total harmonic distortion: 55 watts RMS into 4 ohms, per channel, both channels operating, 0.1% total harmonic distortion (stereo).
80 watts RMS into 16 ohms; 110 watts RMS into 8 ohms, 0.1% total harmonic distortion (mono).
Frequency response: +/−0.1dB20Hz-20kHz at 1 watt into 8 ohms (stereo).
Harmonic distortion: Less than 0.001% from 20Hz-400Hz and increasing linearly to a 0.05% at 20kHz at 35 watts RMS per channel into 8 ohms (stereo).
Less than 0.001% from 20Hz-400Hz and increasing linearly to 0.05% at 20kHz at 70 watts into 16 ohms (mono).
I.M. distortion: Less than 0.05% from 0.01 watts to 0.25 watts, less than 0.01% from 0.25 watts to 35 watts into 8 ohms per channel (stereo). Less than 0.05% from 0.01 watts to 0.25 watts, and less than 0.01% from 0.25 watts to 70 watts into 16 ohms (mono).
Slewing rate: 6 volts per microsecond (stereo) 12 volts per microsecond (mono).
Damping factor: Greater than 400, DC-400Hz into 8 ohms (stereo).
Output impedance: Less than 15 milliohms in series with less than 3 microhenries (stereo), Less than 30 milliohms in series with less than 6 microhenries (mono).
DC output offset: (shorted input), less than +/−10 millivolts.
Load impedance: Rated for 8 and 4 ohm usage: safely drives any load including completely reactive loads (stereo). Rated for 8 and 16 ohm usage, safely drives any load including completely reactive loads (mono).
Voltage gain: 20.6 +/−2% (or 26.3 +/−2dB) at maximum gain (stereo). 41.2 +/−2% (or 32.3 + −0.2dB) at maximum gain (mono).
Input sensitivity: .812 volts +/−2% for 35 watts into 8 ohms (stereo) and .812 volts +/−2% for 95 watts into 8 ohms (mono).
Amplifier output protection: Total protection against shorted, mismatched or open outputs. Volt-ampere limiting circuitry acts instantaneously with no annoying thumps or cutouts.
Overall protection: AC line fused. The controlled slewing rate of the voltage amplifiers protect the overall amlifier against RF burnout. Input overload protection is furnished by an internal resistance at the amplifier's inputs.
Power requirements: AC voltage of 100, 120, 200, 220 and 240 volts +/−10% at a line-frequency between 50 and 400Hz may be used.
Power consumption: +/−15 watts while at idle. AC power required: 240 watts maximum.
Power supply: A specially designed low profile transformer, two regulated supplies for complete isolation and stability plus computer grade filter capacitors serve to power the D-75.

NAB Asks FCC To Improve Portions Of The Emergency Broadcast System

The National Association of Broadcasters has asked the Federal Communications Commission to improve some provisions of the Emergency Broadcast System (EBS) in order to increase the system's reliability and usefulness.

In its filing, NAB called for a shorter EBS attention signal, revision of the test script, further automation of the system's operations, and a rule making proceedings to explore these and other system improvements.

NAB asked that the 20-second minimum attention signal be reduced to eight seconds and that the 25 second maximum be retained. NAB said that with the 20 second requirement, "many listeners and viewers become annoyed and may either tune to another station or turn on the radio or TV off." This would frustrate EBS's purpose of alerting the public that an emergency may be present.

NAB also suggested that rather than using a standardized test script broadcasters should be allowed to tailor the test script to local conditions. NAB said a station could announce the availability of air raid shelters, Red Cross centers, or hospitals. "With a variety of test announcements, the station could use the opportunity of the EBS test to impart useful, community-oriented information."

NAB said that the FCC should lift its requirements that a station staff member monitor the EBS receiver even at an off-premises remote control point. With today's technology, NAB said, a designated person can be notified wherever he or she may be located and provide for immediate EBS monitoring and control.

*****

COMMON POINT CLASSIFIEDS

EI Classifieds

EI Classifieds are free to the readers of Common Point Magazine. To place an ad, simply write it on the Acknowlegement Card that comes with each issue and mail card.
WANTED TO SELL

ATTENTION

We have had a problem with reading the writing of ads sent in for the classified section, therefore we will **only** accept typed written copy.

WANTED TO BUY — S. A. or Fairchild digital receiver and dish for ABC radio network. KQID, 1115 Texas Ave., Alexandria, LA 71301.

FOR SALE: Belar Monitor Package FMMI, FMSI, SCAI, RFAI; 1 Electro Voice RE-20 microphone; 2 Sennheiser MD421; 1 McMartin TBM 2200 FM mod. Monitor; 1 3500A Stereo Monitior; 1 ATI 100P Stereo Pre Amp; 2 Russco Turn Tables; 1 Ramsa WR130 Portable Mixer; 3 ITC Premium R/P Mono; 1 ITC premium Delay R/P; 1 Digimax D-1200 1.2 GHZ Frequency Counter; 2 Spotmaster-BE Cart Machines 75.00 ea; 1 QEI FM Mono Modulation Monitor-Stereo Maybe; 1 Micro Trak 4 Pot Stereo Board; 1 JBL Rack Mount Pro Mixer; 1 Marti 160 MHZ Pre Amp; 4 EV 664 Microphones $35.00 ea; 2 Dry Air dehydrator; New Andrew 1-5/8" to "N" connectors Round Member Adapter; 1 Dictaphone 1000 Logger System Complete; 1 McMartin Rack Mount AM Receiver; 1 B & K Oscilloscope; 1 Bird 3" Line Section 4610-000 (new); 2 Andrew 87R Connecto 1-5/8" (new); 4 Revox PR-99 With Persons 3A Auto-Programmer. Call Jim Phillis at 419-784-1059, WZOM 408½ Clinton, Defiance, Ohio 43512.

TALKBACK

NORMAN, OK -- I just purchased & installed two new pieces of CRL equipment. The ads I read in Common Point helped sway me. The information aimed at managers is a big help.

MISHAWAKA, IN -- Mike Shannon has a Broadcast Bulletin Board Service for computers called "Ambersoft III". 219-256-2255.

BOISE, IDAHO -- When replacing those old high voltage Pyranol (PCB) Capacitors with the new units, be cautious with voltage ratings. The old capacitors were much more forgiving of surges, quick discharges, etc., than some of the "newer" Non-PCB Capacitors.

MATTOON, IL -- Ray Livesay (my father) received the NAB National Radio Award on Friday, Sept. 15th at the Annual Fall RADIO Convention in New Orleans. He first entered broadcasting at a small station in Tuscola, Illinois on Oct. 1, 1936. He had always had a hobby and a great interest in the technical aspects of radio. Because of his technical interest, he entered the U.S. Navy in early 1944 during WW-II in their radar and electronics program where he became an instructor in their training program.

The war was over and he was mustered out in early 1946 at which time he returned to Illinois and applied for a 250 Watts daytimer on 1170 Khz, in Mattoon, Illinois which was the largest city in the State without a local broadcast station. Less than three years later he built WLBH-FM which went on the air in August 1949. In 1974 he upgraded the AM to 5,000 Watts on 1170 with a DA, and boosted the FM to Maximum Class B with 50 KW and 500 feet HAAT.

It was in 1954 that the FCC adopted Docket 8333 at the insistence of the Clear Channel Broadcasters which was referred to as the "Daytime Skywave" Docket. The Clears petitioned the FCC to keep daytime only stations off the air until two hours after sunrise and must sign-off at two hours before sunset. There were only a few hundred daytime stations on the air at that time but this caused them to organize as the DAYTIMER BROADCASTERS ASSOCIATION (DBA). Ray Livesay was their first Secretary/Treasurer and a couple years became President and spearheaded their crusade for the next 28 years.

In preparation for WARC-79 and the Region II Western Hemisphere Radio Conferences in 1980, Livesay noted that Region I and Region III of the world were already operating their "AM" stations with nine kilohertz spacing instead of ten as in Region II, in North, Central and South America. He inquired and learned that no one had engineered a plan to study the possibilities of 9 khz spacing in Region II.

Livesay applied his engineering talent and put a plan on paper whereby no existing "AM" station would be required to move more than 4 khz from their present spot on the dial and no towers in directional antenna systems would have to be relocated.

Under Livesay's 9 khz plan, twelve new channels would be created in the "AM" broadcast band from 540 to 1600 khz. The U.S. Department of Commerce became interested in the plan and after carefully analyzing and studying the plan, petitioned the FCC to adopt 9 khz spacing for the USA and promote it for all Region II.

After considerable testing in mid 1979, the FCC adopted the 9 khz plan in December of 1979 and supported the plan at the Region II Western Hemisphere Conference in March 1980 in Buenos Aires, Argentina. The NAB took an official position against the 9 khz plan and defeated it before the next Region II Conference which was held in Rio de Janerio, Brazil in Nov. 1981.

Ray Livesay is a "hands on" engineer who has the ability to improvise and where many engineers will have to wait for an exact part to arrive from the manufacturers of the transmitter, he will keep it operating, even at perhaps lower power until the new replacement part arrives.

When the FCC approved pre-sunrise (PSA) operation at extremely low power (such as 2 to 20 watts) for daytime stations on clear channels, he pointed out how to operate a 250, 500 or 1000 watts transmitter into a dummy antenna and place a pickup loop near the transmitter tank coil in the final to bleed off and feed the correct low power to the antenna. This way the quality of the transmitter was not impaired as it working into it's designed RF load. Later some of the equipment manufacturers designed and built low powered transmitters for this very purpose.

While serving as DBA President, Livesay gave testimony many times before U.S. House and Senate Sub-Committees on technical matters relating to "AM" radio matters in Washington, DC.

Since yours is more technical magazine, I thought your readers might appreciate acknowlegement of my father's technical service to the radio industry.

FLUKE

45 Dual Display Multimeter

LIST PRICE
$595.00

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16 measurement functions and two 5-digit displays for maximum versatility in a single instrument

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- Audible continuity and diode test
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The Fluke 45 is a feature-rich 5 digit, 100,000 count DMM with a unique multi-function dual display, allowing measurement of two signal parameters from a single test connection. The 45 offers high performance and versatility for manufacturing test, depot and field service, and research and development. A standard RS-232 interface makes it ideal for PC instrument applications.

Dual Display

The Fluke 45 is the first DMM with a multifunction "dual display," allowing the user to select a wide variety of measurement combinations. It is particularly useful in applications requiring two different measurements of the same signal; i.e. power supply testing, where Vdc output can be viewed on the primary display while the Vac ripple is shown on the secondary display.

Standard RS-232 Interface

The RS-232 interface, standard in each instrument, allows measurement data to be filed, manipulated, printed or transmitted by modem. The print mode automatically formats measurement data for printing on an RS-232 printer. Rates for automated printing over RS-232 are adjustable from 1 reading every 50 ms to 1 reading every 5.6 hours. The optional "QuickStart 45" Software Package allows automated communications and filing of measurements with the Fluke 45 and an IBM-PC or compatible via RS-232.

dB Measurement

The Fluke 45 provides digital read-out of decibels with front panel selection of any of twenty-one reference impedances from 2Ω to 8,000Ω. For 2Ω, 4Ω, 8Ω and 16Ω impedances, the meter automatically calculates and displays audio power in watts.

Compare Function

The Fluke 45 has a compare function for fast in-tolerance limits testing. Upper- and lower-limits are entered through the front panel. Readouts show both a Hi/Lo/Pass evaluation and measured value.

Touch Hold®, Relative and Min Max

Touch Hold captures the measurement, beeps and locks it on the digital display until you are ready to view it. It automatically updates with each new stable measurement. The Relative mode remembers a reading and shows the change (difference) between it and any readings that follow. Min Max records the highest and lowest values measured. Either can be recalled and displayed at any time.

Optional Battery and Case

An optional rechargeable battery and soft carrying case are available for precision field service applications. These options, coupled with a 30 mA dc current range and 0.05% accuracy, allow calibration of 4-20 mA loops in process control applications. The battery is available as a factory installed option or can be user-installed at a later date.

Optional IEEE-488.2 and Rack Mount

The Fluke 45 may be used with IEEE-488.2 systems, including existing IEEE-488 implementations. The IEEE-488.2 option is available as a factory installed option, or can be user installed and does not require removal of the RS-232 interface. A rack mount kit is also available.

Closed-Case Calibration

Calibration can be performed via the RS-232 (or optional IEEE-488.2) interface or manually from the front panel. No internal adjustments are required.

Standard Equipment

Each Fluke 45 Dual Display Multimeter includes an operator's manual, quick reference guide, line cord, and test leads.

Basic Accuracy (1 year except where noted)

(% of reading + number of digits)*

DC Voltage (6 months)	0.02% + 2
AC Voltage (50 Hz - 10 kHz)	0.2% + 10
Specified from 20 Hz to 100 kHz	
Ohms	0.05% + 2
DC Current	0.05% + 2
AC Current	0.5% + 10
Frequency	0.05% + 1

*30,000 count mode

One Year Warranty

One year calibration interval

Size

3.67 in high, 8.5 in wide, 11.27 in deep (9.3 cm high, 21.6 cm wide, 28.6 cm deep)

Weight

Net 5.2 lb. (2.4 kg), with battery: 7 lb. (3.2 kg)

Order

Fluke 45 Dual Display Multimeter	$595
Fluke 45-01 with factory-installed battery	$715
Fluke 45-05 with factory-installed IEEE-488.2	$745
Fluke 45-15 with factory-installed battery and IEEE-488.2	$865
Fluke 45-01K rechargeable battery kit	$120
Fluke 45-05K IEEE-488.2 interface kit	$150
C40 Soft Carrying Case	$ 50
M00-200-634 Rack Mount Kit	$ 95
RS40 6' RS-232 terminal cable	$ 30
RS41 6' RS-232 modem cable	$ 30
S45 "QuickStart 45" Software	$ 95