April 1990

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2033 S. Augusta Place
Tucson AZ 85710
AZ - 857

BULK RATE
U. S. POSTAGE PAID
Permit No. 11
Winneconne, WI 54986

COMMON POINT®

A MONTHLY NEWSLETTER FOR BROADCASTERS

50 cents per copy

Out-Of-State 800-558-0222 Distributed by Electronic Industries Inc., 19 E. Irving, Oshkosh, WI 54901 In-State 800-445-0222

America's Broadcasters Give 1990 Census a Helping Hand

America's TV and radio broadcasters are organized and ready to promote America's 1990 census-taking, NAB President and CEO Eddie Fritts told top federal officials recently. A Broadcaster's Census Committee, comprised of more than 300 broadcasters nationwide, launched coordinating efforts with other local broadcasters earlier this year.

A once-every-ten-years-undertaking, the federal census will employ more than 565,000 census-takers in 1990. Before its completion, more than 106 million questionnaires will be mailed out, counting more than 250 million Americans.

At its kick-off campaign, U.S. Secretary Robert Mosbacher pointed out that U.S. taxpayers will save $10 million for every one percent of the population that answers the census by mail and on time.

NAB has prepared a complete census manual for broadcasters, providing radio and TV stations with key facts and contacts. "City by city, stations have begun a coordinated promotion effort," said Fritts. "The major networks have gone the extra mile and produced PSA's featuring its on-air personalities."

In 1980, a similar campaign by broadcasters boosted returns by three percent and saved U.S. taxpayers more than $30 million, Commerce Department officials said.

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New Communications Services Threaten to Overcrowd Airwaves, Broadcasters Tell Federal Regulators

America's radio and television broadcasters have cautioned federal regulators against crowding the marketplace with new communications services, arguing they threaten to interfere with or displace local radio and television signals already in use today.

In its filing before the Federal Communications Commission (FCC) February 16, the National Association of Broadcasters questioned whether the nation's broadcast spectrum could support the additional allocation of spectrum space. These new offerings could include mobile services and a proposed satellite sound broadcasting service in the 500-3,000 MHz range, as well as high definition television (HDTV) broadcasting by satellite.

NAB urged federal regulators to "responsibly (assess) whether there is any demonstrated need for the suggested services, especially in light of the intense use of these frequency ranges for conventional broadcast and broadcast auxiliary services."

NAB also urged regulators to adopt positions which support local interests in allocating spectrum space. In its filing, NAB said these "policies ... stress the use of terrestrial, local public interest."

NAB said these and other broadcast-related issues are likely to be raised at the International Telecommunication Union's World Administrative Radio Conference in 1992 (WARC-92). For this reason, NAB urges the FCC to adopt policies "that will recognize only documented needs for spectrum use and which will continue to foster the universal availability of free, over-the-air radio and television service."

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Helping Hand

Ampex Corp. has contributed to the rebuilding of the Romanian broadcasting service with a donation of an Ampex studio recorder and other equipment to Romania's state television system. The Romanian network, now called Free Romanian Television, was heavily damaged in the December 1989 revolution that led to the overthrow of the Ceausescu regime. The Ampex gift, which the company says is worth $75,000, was said to have been made in response to a request from U.S. Information Agency Director Bruce Gelb.

Ampex President and Chief Executive Officer Ron Ritchie said the company has had a relationship with FRT's deputy general manager, Dr. Nicolae Stanciu, since 1971. And, Ritchie said, "we realized we had equipment that could help FRT resume normal operations." Gelb wrote to thank Ampex for its quick response: "Your efforts to help your country make an immediate contribution to the 'televised revolution' will be long remembered and appreciated in Bucharest as well as in Washington."

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Editor's Notebook

In trying to come up with an idea for this month's column I happened to run across an article that I had tacked to my office bulletin board for quite a few years and while the more "experienced" engineers probably remember seeing the article the younger generation may not.

The article appeared in the April 1958 issue of "db" magazine, a publication which I have not seen for many years and which, I assume, no longer exists. I'm sure that with the advances in technology that have taken place since this article appeared there are probably a considerable number of additions that could be made to the "laws".

At any rate, here is a reprint of the article as it appeared in "db" in April of 1968. (Any typos are to be regarded as proof of the validity of Murphy's Law and are not to be regarded as typing mistakes by the editor or Sandy's computer.)

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The Contributions of Edsel Murphy to the Understanding of the Behavior of Inanimate Objects

The following article is reprinted from the April 1968 issue of "db" magazine.

D. L. Klipstein

This valuable contribution to the theoretical understanding of the engineer originally appeared in EEE Magazine. It is reprinted with their kind permission.

Consideration is given to the effects of the contributions of Edsel Murphy to the discipline of electronics engineering. His law is stated in both general and special form. Examples are presented to corroborate the author's thesis that the law is universally applicable.

I. Introduction

IT has long been the consideration of the author that the contributions of Edsel Murphy, specifically his general and special laws delineating the behavior of inanimate objects, have not been fully appreciated. It is deemed that this is, in large part, due to the inherent simplicity of the law itself.

It is the intent of the author to show, by references drawn from the literature, that the law of Murphy has produced numerous corollaries. It is hoped that by noting these examples, the reader may obtain a greater appreciation of Edsel Murphy, his law, and its ramifications in engineering and science.

As well known to those versed in the state-of-the-art, Murphy's Law states that "If anything can go wrong, it will." Or, to state it in more exact mathematical form:

$$1 + 1 \not\approx 2 \qquad (1)$$

where $\not\approx$ is the mathematical symbol for hardly ever.

Some authorities have held that Murphy's Law was first expounded by H. Cohen[1] when he stated that "If anything can go wrong, it will – during the demonstration." However, Cohen has made it clear that the broader scope of Murphy's general law obviously takes precedence.

To show the all-pervasive nature of Murphy's work, the author offers a small sample of the application of the law in electronics engineering.

II. General Engineering

II.1. A patent application will be preceded by one week by a similar application made by an independent worker.

II.2. The more innocuous a design change appears, the further its influence will extend.

II.3. All warranty and guarantee clauses become void upon payment of invoice.

II.4. The necessity of making a major design change

Manuscript received April 17, 1967; revised June 3, 1967, additional revision March, 1968. The work reported herein has not been supported by grants from the Central Intelligence Agency.

The author is Director of Engineering at Measurement Control Devices, 2445 Emerald Street, Philadelphia, Pa.

increases as the fabrication of the system approaches completion.

II.5. Firmness of delivery dates is inversely proportional to the tightness of the schedule.

II.6. Dimensions will always be expressed in the least usable terms. Velocity, for example, will be expressed in furlongs per fortnight.[2]

II.7. An important instruction manual or operating manual will have been discarded by the receiving department.

II.8. Suggestions made by the value analysis group will increase costs and reduce capabilities.

II.9. Original drawings will be mangled by the copying machine.[3]

III. Mathematics

III.1. In any given miscalculation, the fault will never be placed if more than one person is involved.

III.2. Any error than can creep in, will. It will be in the direction that will do the most damage to the calculation.

III.3. All constants are variables.

III.4. In any given computation, the figure that is most obviously correct will be the source of error.

III.5. A decimal will always be misplaced.

III.6. In a complex calculation, one factor from the numerator will always move into the denominator.

IV. Prototyping and Production

IV.1. Any wire cut to length will be too short.

IV.2. Tolerances will accumulate undirectionally toward maximum difficulty of assembly.

IV.3. Identical units tested under identical conditions will not be identical in the field.

IV.4. The availability of a component is inversely proportional to the need for that component.

IV.5. If a project requires n components, there will be n-1 units in stock.[4]

IV.6. If a particular resistance is needed, that value will not be available. Further, it cannot be developed with any available series or parallel combination.[5]

IV.7. A dropped tool will land where it can do the most damage. (Also known as the law of selective gravitation.)

IV.8. A device selected at random from a group having 99% reliability, will be a member of the 1% group.

IV.9. When one connects a 3-phase line, the phase sequence will be wrong.[6]

IV.10. A motor will rotate in the wrong direction.[7]

IV.11. The probability of a dimension being omitted from a plan or drawing is directly proportional to its importance.

IV.12. Interchangeable parts won't.

IV.13. Probability of failure of a component, assembly, subsystem or system is inversely proportional to ease of repair or replacement.

IV.14. If a prototype functions perfectly, subsequent production units will malfunction.

IV.15. Components that must not and cannot be assembled improperly will be.

IV.16. A d.c. meter will be used on an overly sensitive range and will be wired in backwards.[8]

IV.17. The most delicate component will drop.[9]

IV.18. Graphic recorders will deposit more ink on humans than on paper.[10]

IV.19. If a circuit cannot fail, it will.[11]

IV.20. A fail-safe circuit will destroy others.[12]

IV.21. An instantaneous power-supply crowbar circuit will operate too late.[13]

IV.22. A transistor protected by a fast-acting fuse will protect the fuse by blowing first.[14]

IV.23. A self-starting oscillator won't.

IV.24. A crystal oscillator will oscillate at the wrong frequency – if it oscillates.

IV.25. A pnp transistor will be an npn.[15]

IV.26. A zero-temperature-coefficient capacitor used in a critical circuit will have a TC of –750/°C.

IV.27. A failure will not appear till a unit has passed final inspection.[16]

IV.28. A purchased component or instrument will meet its specs long enough, and only long enough, to pass incoming inspection.[17]

IV.29. If an obviously defective component is replaced in an instrument with an intermittent fault, the fault will reappear after the instrument is returned to service.[18]

IV.30. After the last of 16 mounting screws has been removed from an access cover, it will be discovered that the wrong access cover has been removed.[19]

IV.31. After an access cover has been secured by 16 hold-down screws, it will be discovered that the gasket has been omitted.[20]

IV.32. After an instrument has been fully assembled, extra components will be found on the bench.

IV.33. Hermetic seals will leak.

V. Specifying

V.1. Specified environmental conditions will always be exceeded.

V.2. Any safety factor set as a result of practical experience will be exceeded.

V.3. Manufacturers' spec sheets will be incorrect by a factor of 0.5 or 2.0, depending on which multiplier gives the most optimistic value. For salesmen's claims these factors will be 0.1 or 10.0.

V.4. In an instrument or device characterized by a number of plus-or-minus errors, the total error will be the sum of all errors adding in the same direction.

V.5. In any given price estimate, cost of equipment will exceed estimate by a factor of 3.[21]

V.6. In specifications, Murphy's Law supersedes Ohm's.

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**In some cases where no reference is given, the source material was misplaced during preparation of this paper (another example of Murphy's Law). In accordance with the law, these misplaced documents will turn up on the date of publication of this paper.*

FCC Proposes Shift In FM Translator Policy

The FCC issued a Notice of Proposed Rule Making Thursday designed to clarify and revise FM translator rules. The Commission action came in response to what NAB and others cited as widespread abuse of the original intent of such translators, to provide FM service to unserved areas. Unlike the FCC's Notice of Inquiry on FM translators issued last year, last week's Proposed Rule Making does not include allowing space satellite and microwave relays to distant FM translators.

Critics of current FM translators practices, especially in Western states, have asserted that abuses often lead to FM signal interference and unfair marketplace competition. NAB Radio Board Chairman Bill Sanders, KICD AM-FM/Spencer, IA, said he was "pleased" with the FCC's action. "NAB commends proposed limits on technical interference, translator geographic location, and financial support by stations being rebroadcast," Sanders said.The FCC's proposal seeks to classify FM translators into two categories:

1) "Fill-in service", to provide service within the protected contour of the primary station being rebroadcast.

2) "Other areas", when a translator's predicted 1 mV/m contour extends beyond the protected contour of the primary station.

"Fill in" translators may be owned by either the primary station or an independent party. They may rebroadcast the signal using off air pickup or terrestrial microwave. Financial support arrangements are left to the parties. "Fill ins" would be limited to 1 kW effective radiated power (ERP), and their 1 mV/m contours could not exceed the protected service contours of the primary stations.

"Other areas" translators may be owned only by independent parties. A primary station would be prohibited from supporting (directly or indirectly) any commercial FM translator providing other area's service. These translators, too, would be limited to 1 kW ERP, and the distance to these translators' predicted contour may not exceed 16 kilometers.

FM translators would be allowed to operate on all 80 non-reserved channels. Specific criteria would be applied for determining predicted and actual interference problems. The FCC is requesting comments on these proposals. For more information, contact NAB Legal at (202) 429-5430.

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New HDTV test date

The start-up of tests of the proposed high-definition and enhanced-definition transmission systems by the Advanced Television Test Center has officially been postponed by the FCC's advisory committee on advanced television service. In a letter to the members of the advisory committee and the system proponents, ATS committee chairman Richard Wiley of the Washington law firm of Wiley, Rein & Fielding, said that the May 1990 startup that he set last fall has been postponed until "early fall." A more exact date is expected to be announced. The postponement had been expected for several months due to problems in producing test images that would be fair to all of the systems.

Because of the schedule delay, ATTC has also moved the due date for all fees to be sent to the test center by proponents. Last fall, the ATTC set March 1 as the deadline for payment of $175,000 by each proponent as a form of "earnest money" to be certain that each seriously intended to take part in the testing. That deadline has been moved to June. 1. Proponents have also been given the option of paying half of the fees on June 1 and the other half on Sept. 1.

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LPTV Industry Concerned Over Bill

The proposed Cable Television Consumer Protection Act, now before the Senate, has drawn fire from members of the low-power television (LPTV) industry over provisions that exclude it from cable carriage.

The measure, introduced by Senator John Danforth (R, MO), defines "qualified commercial stations" that must be carried by cable systems but states that "such term shall not include low-power television stations, television translator stations, and other passive repeaters."

The low-power industry condemns the bill's language, which lumps low-power stations into the same category as translator stations under the designation "passive repeaters."

Writing in the LPTV Report, editor Jacquelyn Biel noted that Congress instructed the FCC in 1976 to create a low-power television service for underserved and unserved regions of the country.

"It ignores the objective of the FCC in creating the service as one distinct from translators (which are passive repeaters of full power signals), one permitted to originate programming (translators are not), and one designed to serve unserved for underserved areas of the country," Biel wrote.

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Video transformer to eliminate hum

North Hills Electronics has introduced its model NH-12847 video isolation transformer, designed to eliminate hum in TV and data systems.

The transformer provides 110 dB ground isolation at power line frequencies and 500 Vrms isolation between input and output and ground. It's NTSC and PAL compatible with a bandwidth of 10Hz to 5MHz. The video isolation transformer is priced at $104.00. For more information contact Herb Marx or Joseph Barbuto at (516) 671-5700.

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TV's Honeymooners' Cast To Be Inducted Into Broadcasting Hall of Fame

The original cast from the CBS classic, "The Honeymooners," has been named one of the television recipients of the National Association of Broadcasters' Broadcasting Hall of Fame Award.

The show's cast, with the exception of its late star Jackie Gleason, will each be on hand for the "reunion" award ceremony, scheduled from the television luncheon on April 2 during the NAB annual convention. Hall of Fame inductees include Art Carney and Joyce Randolph, who played Ralph and Trixie Norton, as well as Audrey Meadows who played Alice Kramden.

"The Honeymooners' is one of the best-remembered treasures from the early days of television," said NAB Television Board Chairman Tom Goodgame, president of Westinghouse Broadcasting's Television Station Group. "Playing some of life's most lovable losers, the show's cast time and time again brought a refreshing brand of cheer, joy, and humor to millions of Americans."

Although "The Honeymooners" was first seen in 1951 as part of the DuMont "Cavalcade of Stars," the show didn't become a regular series until CBS launched it in October 1955. "The Honeymooners" ran for two seasons and produced 39 episodes, later to be revived in 1971 as part of the "Jackie Gleason Show."

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FCC News

The FCC has adopted some new guidelines and made some procedural and staff changes which it hopes will cut the time it takes to process FM new-station applications from a high of 46 months to one year by Oct. 1. The FM branch is bogged down by some 2,200 pending applications for new stations. The new rules empower the staff to dismiss applications for incompleteness and other defects, and new guidelines will give parties the opportunity to correct applications under certain circumstances. Such as when a defective application is the only one filed for the station, or when an application belongs to a party that wants to buy other competing applicants as part of a settlement agreement.

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The FCC has affirmed a fine of $8,000 against KIQI (AM) San Francisco for repeated violations of tower lighting rules.

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The FCC has denied a request by three petitioners to reverse its decision of last year to mandate implementation of the NRSC AM radio emission standard. In spring of 1989 the commission ordered all AM stations to convert to emission standard by June 30, 1989. It also said that stations that converted to the less expensive NRSC audio standard by the deadline would be considered in compliance with the emission standard until June 30, 1994. FCC denied the request, it said, because the petitioners provided no new evidence to their claims that there has been insufficient research of interference on the AM band.

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While the FCC is showing increased vigor in enforcing rules, Congress has increased the maximum fine that can be assessed from $20,000 to $250,000. The increased ceiling was included in the fiscal 1990 budget enacted last November but the FCC is just now getting around to implementing it.

Another sanction which the FCC is considering the possibility of requiring forced divestiture of stations as an alternative to denying renewal or revoking of licenses of broadcast stations.

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New Service Allows Radio Listeners to Tune in Their Favorite Station by Format

America's broadcasters, meeting in Atlanta this spring, plan to demonstrate a new technology that allows FM radio listeners to tune in their favorite radio stations by format and receive electronic message displays on their radio receivers.

The new technology is called the Radio Data System (RDS) and the National Association of Broadcasters will show how this potential new service works at its annual convention March 31 - April 3, 1990, scheduled at Atlanta's Georgia World Congress Center. NAB's Engineering Conference also is scheduled at the same center March 30 - April 3.

Already in use in Japan and Europe, RDS could be easily introduced to the U.S. No regulatory approval is needed, and NAB estimates FM broadcasters could install the necessary equipment for about $5,000 to $10,000.

With RDS technology, radio listeners could scan stations by format, rather than by frequency or channel numbers. In addition, station logos, numbers, even electronic ads, could be displayed at the FM station's option.

NAB also said an RDS receiver can be programmed to interrupt a CD, cassette, or digital audio tape, in the event the FM station needs to report an emergency situation.

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New Laser Radar Developed

A laser radar that shows not only the distance to a sighted object, but also an image of it, and updates that image four times a second, has been developed and tested at Sandia National Laboratories (Albuquerque, NM). The new laser combines some of the advantages of conventional radar with those of video imaging, and has capabilities about midway between the two. Its frame rate is fast enough for possible short-range military applications.

The Sandia range-imaging laser uses a small gallium-arsenide semiconductor laser diode that emits continuous near-infrared light that is just beyond the range of the human eye. The signal is amplitude modulated at 4 MHz. The phase of the return signal is measured to obtain the range of the viewed object, and its image is displayed on the video screen as a 64 x 64-pixel pseudocolor map. The present maximum range is about 50 meters.

(cont. to pg. 8)

Harris adds digital training class

During the Society of Broadcast Engineer's national convention in Kansas City, Harris announced that it will add a five-day training program to its roster of regularly scheduled Broadcast Technology Center training classes in 1990. The additional program is aimed at giving broadcast engineers a comprehensive overview of digital control logic.

According to Harris, the classes will offer extensive hands-on experience, along with digital theory. The classes are open to any broadcast engineer and the tuition is $649.

"It is well known that broadcast engineers themselves rank knowledge of digital technology as an industry-wide weakness," said Dave Kobe, manager of Technology Training. "In fact, only about half of all engineers participating in Harris' training programs say they are comfortable with the basics of digital!"

Kobe stressed that, today, digital control logic is universally used on trasmitters and switching circuits in such studio equipment as consoles. "Not understanding digital logic control, the heart of many systems, can make equipment troubleshooting a nightmare."

Through its Broadcast Technology Training Center, Harris annually conducts more than 50 regularly-scheduled classes each year. In addition to training on specific Harris equipment, general RF training courses are offered.

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Study Determines Coax/Fiber Hybrid Best For Now

A draft version of a study by Columbia University has concluded that a hybrid fiber optic/coaxial cable network is the most feasible near-term solution as well as the most cost effective means of ensuring widespread deployment of two-way residential broadband services.

But cable's highly leveraged structure is not conducive to supporting two-way broadband residential service, according to the report by Columbia Business School's Center for Telecommunications and Information Studies.

Comparing telephone companies with cable companies, the study found that telcos' debt ratio amounted to 41 percent while that of cable amounted to 72.45 percent. Neither telcos nor cable can foresee enough net revenue to justify aggressive fiber-to-the-home building.

The most advanced broadband networks, those with two-way, on-demand, fiber-to-the-home, would be priced in the range of $2,500 to $15,000 per subscriber. A hybrid fiber/metallic network with a fiber backbone interconnected to twisted pair or to coaxial cable for the last segment is projected to cost telcos and cable alike about $100 per subscriber.

Fiber backbones installed by telcos have the additional advantage of allowing cable to interconnect to this backbone from headend or fiber-hub points in order to achieve intercity, two-way switched and point-to-point service capability for its customers.

In this way, both industries benefit. Telcos would have high bandwidth interoffice and intercity facilities and cable high bandwidth local distribution facilities.

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Michael Rau Named Senior Vice President, Science & Technology

Michael C. Rau has been promoted to senior vice president, science and technology, for the National Association of Broadcasters.

Rau joined NAB in 1981, working on radio developments as a staff engineer. After steadily increasing responsibilities, Rau was promoted to vice president in December 1987 and became head of the department in May 1988. Today, Rau shepherds NAB's efforts to improve the technical quality of radio and television broadcasting.

Considered a leader and innovator in the broadcast technology community, Rau has been involved in a wide scope of technical concerns on behalf of NAB members. He has played a key role in AM improvement, radio technology development, FM and TV spectrum policies, advanced TV systems, ghost canceling, convention management, and technical publications.

Rau began his career as a country music radio announcer, production director and later chief engineer for WDOV/WDSD-FM, Dover, DE. In 1980, Rau came to Washington as director of engineering for his family's Rau Radio Stations, a 12-station radio group headquartered here.

Rau holds a B.S. degree in physics from Clarkson University, Potsdam, N.Y. In 1988, he earned his J.D. degree from Catholic University and was a member of his school's law review.

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(cont'd from pg. 7)

Future plans include efforts to integrate the electronics, replace the present low-power laser with a higher-powered one, and extend the range to the hundreds of meters necessary for a military version of the system.

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Markey Sees Fast Action on House Radio Bill

Making his most positive statement yet about pending radio legislation in Congress, House Telecommunications Subcommittee Chairman Ed Markey (D-MA) told NAB's State Leadership Conference that he would like to see bipartisan legislation to aid the radio industry developed "in the next several weeks."

In a speech at the Conference's Monday luncheon, Chairman Markey said he "guaranteed" action on a bill to make technical improvements to radio, along with codifying the FCC's "abuse of process" rules against payoffs during license renewal. "Rep. (Matthew) Rinaldo (R-NJ), the ranking minority member of the subcommittee, long has been a supporter of legislation improving the technical quality of radio, particularly AM radio," Markey said.

"I have pledged to work with him to produce bipartisan legislation addressing technical issues confronting radio braodcasters. It is my hope that such legislation also would include language codifying the Commission's rules prohibiting abuses of the renewal process."

Markey added: "Since the Commission's adoption of the rules, more than 3,000 radio licenses have come up for renewal and not one competing application has been filed. I think there is a pretty clear message there. Congress can, and certainly should, codify the Commission's rules to ensure broadcasters protection from the next generation of stickup artists."

NAB has been pushing H.R. 1136, Rep. Rinaldo's license renewal legislation, and H.R. 2714, the Rinaldo technical improvements bill.

In concert with the recent action by the NAB Radio Board to attempt to merge portions of those bills, the statement by Chairman Markey has given radio legislation "huge momentum," according to NAB Exec VP/Government Relations Jim May.

Markey also voiced his desire to move forward on legislation he is proposing to help advance the entry of U.S. broadcasters into advanced television.

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Symetrix

528 Voice Processor

LIST PRICE
$679

Five high performance signal processors in a single rack space.

Complete microphone input signal processor: mic preamp, compressor/limiter, downward expander, parametric equalizer/notch filter, de-esser, all in single rack space package. Phantom powering for condenser mics, balanced line input for high level signals. LED metering indicates output level, gain reduction, de-esser activity.

Used for broadcast announce mics, public address, and specialized processing in recording and high level sound reinforcement.

Mic Preamp: *Gain: 0-50dB EIN - 127dBm Phantom power + 48Vdc THD - 035% **Parametric/Notch Filter:** Boost/Cut + 15dB 30dB Bandwidth 05-3 3 octave **De-esser:** Range 20dB I_C 1kHz 8kHz **Comp/Limit/Expander:** THD - 035% Max gain reduction/attenuation 40dB **Output:** Gain 0-25dB Metering de-esser, comp/limit/exp, output*

Controls: *Preamp Gain, De ess Frequency, De-ess Range, Compress Threshold, Compress Ratio, Gate Threshold Cut/Boost (x3), Bandwidth (x3), Frequency (x3), Output Level **Switches:** Bypass (x3), Meter Select*

A-220 Stereo Amplifier

LIST PRICE
$349

Stringent noise and distortion specs in a compact, professional power amp.

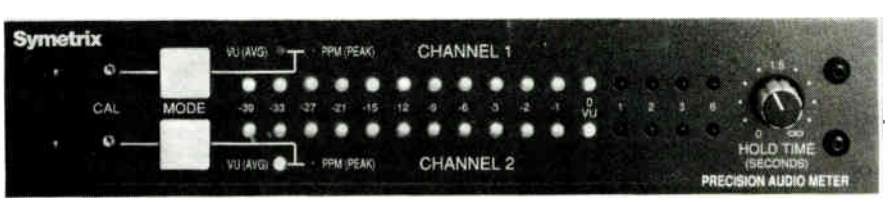
High performance, low price. Specifically designed for video production, near-field monitoring, headphones, and small reference speakers. Stereo two channel or mono-bridged operation. Balanced XLR, balanced/unbalanced ¼" input connectors, barrier strip output terminals, independent or dual tracking input level controls for two channel or true stereo use.

Used in video suites, television studios, radio stations, recording studios and paging/music systems.

Stereo Power Output: *20w/channel into 8 ohms, 20w/channel into 4 ohms **Mono-bridged Power Output:** 40w/channel into 8 ohms **THD:** 05% 20Hz to 20kHz **S/N Ratio:** 93dB (20kHz NBW)*

Controls: *Level 1, Level 2 **Switches:** Independent/Dual Tracking, Power, Dual Channel/Mono-Bridged (rear panel)*

LIST PRICE
$339



SX205 PRECISION DIGITAL METER

- **Calibration oscillator**
- **Reads VU and watts**
- **Digital accuracy**
- **Average with peak hold**

The Model SX205 Precision Digital meter is a microprocessor controlled, two-channel level display that measures both voltage (VU) and power (watts across 2, 4 or 8 ohms). Included is a 1000Hz sine wave calibration oscillator. Each channel may be individually set to display average level (with adjustable peak-hold), or peak level (with adjustable peak hold). The SX205's intelligent display driver allows bargraph or dot format to be selected. Peak-hold time may be set from zero to infinity. The voltage scale, in volume units, is −39VU to +6VU. The power display may be set for a full scale reading of 100W or 1000W, referenced to 2, 4 or 8 ohms.

To extract full 16-bit performance from digital systems, precision metering is essential. With ½dB accuracy, and its ability to indicate crest factor (peak-to-average ratio), the SX205 is an ideal reference standard for digital recording, digital signal processing, radio, television and teleconferencing studios, MIDI/sampling suites, and high performance concert sound systems. For convenience, Symetrix recommends terminating all of the SX205's inputs, and its oscillator output, in a patch bay.

Specifications

OVERALL ACCURACY	
VU: 50µV RMS to 7.5V RMS W: 50mW RMS to 1000W RMS rel 2Ω, 4Ω or 8Ω	±½dB (−33dB to +6dB), 20Hz to 20kHz
RELATIVE ACCURACY between any two LED's	±½dB (−15 to +6)
DISPLAY RANGE	
VU	45dB, −39 to +6
Watts 100W scale	013W to 400W
1000W scale	13W to 4kW
INTEGRATION TIME	
VU	per ASASI (ASA) C16.5-1961
PPM	per DIN 45406
PEAK HOLD TIME	off to infinity
VOLTAGE INPUTS	
Impedance	electronically balanced >40k balanced >20kΩ unbalanced
Sensitivity	0VU = −20dBv to +12dBv
POWER INPUTS	floating
Actual impedance	>100kΩ
Reference impedance	switchable for 2Ω, 4Ω, or 8Ω
CALIBRATION OSCILLATOR	
Frequency	1kHz
Output Level	0VU +4dBm into 2kΩ
THD	< 2%, 0VU, 600Ω
Output impedance	<100Ω unbalanced

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MEMO FROM METZ

by
David L. Metz

SURFACE FINISHING OF METALS
Part III

Last month we got started on electroplating. Being able to plate metals with gold and silver comes in very handy if you build VHF & UHF devices. If you have not read the first part of this article with the safety warnings, please do before attempting to do your own plating.

You can do a good job plating any metal but common solder because of its lead content. If you want to plate any object that is soldered together, use a lead free solder like "Stay Bright" or one of the new lead free silver bearing plumbing solders.

Before you can plate anything, it must be CLEAN! CLEAN! CLEAN! I mean cleaner than you have ever made anything before in your life. The main cause of plating failures is surface contamination by oxides, oils and greases. Never forget that your fingers are the most likely cause of contamination. So never, never touch the surface of what ever you're planning to plate with your hands.

Cleaning goes in stages. The first stage is often sanding and polishing. This is done to remove tool marks and improve cosmetic appearance. To remove deep tool marks, start with a fine emery cloth like a 400 grade. Then switch to a muslin buffing wheel.

You can buy buffing wheels and polish from the same jewelry supplier that you got your plating chemicals from. You will need one cloth wheel for each grade of polish you use. The wheels are mounted on a screw like mandrel on the shaft of a small 1/4 horse motor. Try to find a 3600 RPM motor. If you can't a 1750 RPM motor will work fine.

For simple shop work only two wheels are needed. Start out with "bobbing" compound to remove the rough scratches. Then change wheels and use "White Diamond" to produce a smooth finish. If you want a mirror bright finish use a third wheel with red jewelers rouge or "Fabulustre." These compounds will do a good job on almost any metal.

After polishing comes the boil out or ultra sonic cleaning. I give the work piece a good hand scrubbing with hot soap and water with some house hold ammonia added. Then attach a copper wire to the work piece so you have a safe way to handle it and attach the positive lead. I use an ultra sonic cleaner for a half hour or so to clean out the pores of the metal. If you don't have an ultra sonic cleaner, simple boiling in a soap and ammonia solution will do a great job.

Set up your plating apparatus somewhere close to a wash basin. I use a table covered with a rubber mat next to the basement sink. Use plastic vessels such as tupperware for your electroplating tanks. Make sure you have good ventilation and that you use gloves and eye protection.

After "boil out" comes electrocleaning. This step uses a strong caustic solution and vigorous electrolysis to clean off the last traces of contamination and oxides. Mix the electrocleaner solution according to directions using distilled water. Use a stainless steel anode and a current of at least two amps for objects the size of your hand.

Leave the work piece in the electrocleaner for at least ten minutes. Carefully remove it, letting the excess cleaner drip off. Rinse the work piece with distilled water and place it in the next cleaner drip off. Rinse the work piece with distilled water and place it in the next solution. Most metals require an underplating of copper (brass does not) before you plate with silver or gold.

Reduce the current down to about 100 ma. and place the work piece in the copper solution. A low current and longer time will always do a better job than a high current will. The copper should come on at first a light shade of pink. Then a deeper and deeper red. If it comes dark ruddy or grainy then the current is too high.

To get a uniform plate it helps to move the anode about the work piece as the metal tends to move directly from the anode to the side of the work piece that faces it. I turn the work piece or move the anode at least once a minute. Once you have a uniform bright copper plate, remove the piece from the solution and rinse it with distilled water.

Immediately move the work piece to the next solution. I'll discuss silver first since that's what you'll use for most radio work. Silver goes on very fast! Some pieces even self plate before I turn the power on! As before keep the current low, agitate the work piece and move the anode about it. Once the work piece takes on a milky white appearance, it has taken on all the silver it will.

Remove the piece from the bath and rince with water one last time. Dry and polish with common silver polish if you wish. If you feel the piece needs more silver, DO NOT TOUCH IT! Polish with "Semichrome," re-electroclean and give it another coat of silver. Finish with gold unless the work piece had a highly polished surface to begin with.

The technique for gold is the same as for silver.Except that you can plate on as much gold your patience and pocket book can afford. Move the anode every couple of minutes to keep an even coating of metal going on the work piece. Don't expect a bright finish with gold unless the work piece had a highly polished surface to begin with.

A FEW MORE HINTS:

Use your plating solutions at room temperature. The instructions with the solutions recommend using them hot. That would require the use of glass containers and a hot plate. It is absolutely foolish to expose yourself to the danger! Use safe unbreakable plastic containers.

Plating also works in reverse, you can electro-strip metals off a work piece back to a anode. Clean up your work area carefully after you're done. Place your solutions in clearly marked containers and then LOCK THEM UP! Once your electrocleaner starts getting dirty looking, discard it and mix clean solution.

Once you start to have some success, don't be afraid to experiment. Depending on the size of the object you are plating, you may be able to use more current. Also you may not need the copper under plating or be able to get by with a less vigorous cleaning. Like all such matters, you'll find what works best in your particular situation.

Next month I'll fill in some more odd details and flesh out some of the things I've discussed.

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A-T Adds Three Boundary Mics

Selection and versatility highlight a recently-expanded series of boundary microphones by Audio-Technica that debuted at last month's NAMM show. Added to the AT871 UniPlate is a smaller version of the microphone, the AT851A Micro UniPlate; a phantom-powered design, the AT871R; and an omnidirectional model, the AT841A Omni Plate.

The series is designed to offer audio specialists flexibility and naturalness for sound reinforcement, conferencing, recording, television and other applications that demand surface mounting and minimum visibility.

The AT851A incorporates a Uni-Point element in a housing that is less than three—inches wide by four—inches long and 3/4inch high. The microphone offers a 30-20,000 Hz frequency response and 200 ohm balanced output.

The new AT841A OmniPlate is wellsuited to situations requiring sound pickup over a broader area and, like the AT851A, can be battery or phantom powered.

The AT871R is a phantom-powered UniPlate with 10 dB more sensitivity and is designed to plug directly into a mic jack with phantom power, providing greater working distance flexibility.

SMPTE To Move Convention From New York

The Society of Motion Picture and Television Engineers (SMPTE) will hold its 1992 fall conference and equipment exhibition at the Metro Toronto Convention Center, bypassing the conference's regular New York site, SMPTE's annual fall conferences have traditionally alternated between the Los Angeles Convention Center and the Jacob Javits Convention Center in New York, but equipment exhibitors in recent years have complained of difficulties in dealing with the electricians' unions in New York.

Toronto in 1991 (Nov. 10-14) will be a test show. If all goes well, it could become a permanent alternative to New York. In the meantime, SMPTE's 1990 conference will be held in New York as scheduled , Oct. 26-30. In spite of heavy exhibitor complaints that the last Los Angeles conference drew poor attendance, there has been no move by SMPTE to replace it. SMPTE will next meet at the Los Angeles Convention Center Oct. 26-30, 1991.

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European FM Receivers Test Well

A recently completed European test of FM radio receivers has shown that modern radios outperform sets made ten years ago.

Fifty home and auto radios from all price categories were tested to see how well they rejected interfering signals. The receiver was tuned to an RF generator that simulated the "desired" signal. Another RF generator, offset from the "desired" frequency, was then modulated with weighted noise and fed to the receiver as the "undesired" signal.

The strength of the undesired signal was then increased until the signal-to-noise ratio at the receiver output fell to 45 dB. The ratio of the strength of the desired carrier to the strength of the undesired carrier is called the RF Protection Ratio. The protection ratios were measured for various frequency offsets.

The results of the test show that for stereo reception, the protection ratios for the average home receiver are 10 dB better (lower) at the first adjacent channel, and 15 dB better at the second adjacent channel than receivers that were manufactured and tested ten to twelve years ago.

These results are not unexpected, because receiver manufacturers are well aware of the spectrum-crowding that plagues the European FM Band.

Receivers marketed in the United States and Europe do an excellent job in rejecting adjacent interfering stations but there is a trade-off that should be mentioned. An increase in distortion and a decrease in separation will occur if the receiver bandwith is too narrow to pass all of the information transmitted on the desired channel. Since audio processing can significantly increase the amount of space an FM signal occupies around its carrier frequency, these "better" receivers will not always faithfully re-create the program material.

If more spectrum crowding in the United States occurs, receiver manufacturers can certainly make more selective sets but the quality of the sound could suffer.

*****

Japanese DBS bird destroyed

Not quite 48 hours after NBC, News Corp., Cablevision Systems and Hughes Communications announced plans to launch the first true direct broadcast satellite system for U.S. consumers, Japan's second DBS bird, BS2X, disintegrated when, shortly after its Feb. 22 liftoff from French Guiana, an Arianespace rocket experienced engine pressure drop and exploded in the stratosphere, ending Arianespace's string of 17 successful launches since a similar explosion May 31, 1986. Japan's state-owned broadcaster, NHK, which already operates BS2B, had refurbished a never-launched Comsat direct broadcast satellite to provide three 200 w TV channels in Japan. Also aboard the rockets (and destroyed) was Superbird B, a medium-power Japanese bird owned by Mitsubishi.

*****

New Products

Gentner Telephone Hybrids

The SPH-5 and SPH-5E telephone hybrids utilize improved analog technology to provide superb audio quality for on-air broadcast, according to the company.

Both units provide a smooth connection to the telephone line, eliminating annoying clicks and pops. An adjustable caller control gives the announcer any desired amount of dominance by reducing the caller level when the announcer speaks. The units' record feature starts and stops a tape machine with the push of a button. Cue allows the user to talk to callers on or off air with equal ease.

The SPH-5E houses a built-in single line frequency extension, a feature not offered in the SPH-5. This feature preserves low frequencies that are normally lost on standard phone lines, and eliminates the need for a separate frequency extender.

Gentner Electronics Corp., 1825 Research Way, Salt Lake City, UT 84119 (801) 975-7200. Fax (801) 977-0087.

TFT has incorporated shorter programmable tone-duration settings in its new EBS systems, Models 886 and 887, in anticipation and support of a proposed FCC regulation for shorter attention signals. The 886 AM and 887 FM EBS systems now have tone duration settings of six, 12 and 24 seconds, and detection times of two, four or eight seconds.

TFT, 3090 Oakmead Village Dr., P.O. Box 58088, Santa Clara, CA 95052; (408) 727-7272.

Symetrix introduced the SX206 multidynamics processor. The SX206 operates as a compressor/limiter, gate, downward expander or ducker. A full complement of controls is provided for all functions. Silent CMOS switching changes the operating mode, and simultaneously shift the function of the range/ratio control to match the mode selected.

Symetrix, 4211 24th Ave. W., Seattle, WA 98199; (206) 282-2555.

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ViaSat Portable Satellite Terminal (PSAT)

ViaSat's PSAT is a Ku Band Portable Earth Station packaged in a suitcase configuration. The PSAT may be used to support 7 KHz digital audio transmission from temporary remote locations.

In various configurations, the system provides the capability of full duplex dial-up telephone service as well as two-way data communication at various speeds. With the appropriate options, multiple voice and data channels may be operated simultaneously.A PSAT Direct Line Service provides a wideband digital channel ("bit pipe") at various speeds up to 128 Kb between the PSAT and a customer premised antenna. This "bit pipe" may be multiplexed into multiple voice and/or data channels to fit specific applications. Direct Line is generally used to support high density, continuous services, i.e. up to 8 voice conversations on a 56 Kb channel.

For more information, contact: John Mehroff, ViaSat Technology Co., 150 Executive Drive, Edgewood, NY 11717 or call (516) 243-5500.

TFT Advances Aural STL System

TFT, Inc. has announced production of the 8600A, an advanced update of the original 8600 aural Studio-to-Transmitter System.

The 8600A has been optimized for either mono channel for redundant dual channel operation for stereo. The three year old original STL, is designed for narrowband systems for operation in congested STL environments. The 8600A expands on the original system with an improved signal-to-noise ratio of 72 dB (compared to 65 dB), and a transmitter power output of 7 Watts (compared to 6 Watts).

Other features include: internal phase and gain matching, 0.2 percent T.H.D., direct power amplification, 940-960 MHz standard, and interface to optional automatic changeover units.

For more information, contact: TFT Inc., 3090 Oakmead Village Drive, P.O. Box 58088, Santa Clara, CA 85052-8088, or call (408) 727-7272.

Computer Aided Broadcast System CABS

DKW Systems has announced the integration of large scale digital audio playback and storage systems with their supermicro based Computer Aided Broadcast System-CABS.

With this enhancement, CABS offers features including: random access music and commercials, music and commercial library, programming and scheduling, live operator assist, full automation, master log analysis (on-line), and newswire capture retrieval and editing.

For more information, contact: DKW Systems Inc., 730, 9919-105 Street, Edmonton, Alberta, Canada T5K 1B1, or call (403) 426-1551.

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3M Introduces Pro DAT Cassette

3M has unveiled its new Professional DAT cassette in standard playing times of 120, 90, 60 and 46 minutes to meet the needs of the professional user.

The new tape uses a high-coercivity, ultra-fine metal particle coating on an extremely smooth base film to deliver a high output and the wide bandwidth required for digital recording, as well as a very low error rate. A durable binder handles the stresses imposed by high-speed rotary head scanning.

A minimum amount of friction and static charges are encountered due to a special back coating on the tape that takes advantage of 3M's long experience in the manufacture of video cassettes.

"With the introduction of the 3M Professional DAT cassette, 3M is increasing its dedication to providing products that help the professional user to garner better results from the DAT format," said Don Rushin, marketing director, 3M Professional Audio/Video and Specialty Products Division.

New L2 Handheld Added To Shure Line

An L2 handheld transmitter was recently added to Shure Brothers' L Series line of wireless microphone products. The L2 is available in three different versions including the Model L2/58, which features Shure's SM58 dynamic microphone element; the Model L2/96, which incorporates the same condenser element used in Shure's high-performance SM96 vocal condenser microphone; and the L2/Beta 58, which features Shure's Beta 58 element.

"The big difference here, aside from the ruggedness, sleek look and appearance, is that we've basically preserved the sound of the wired versions. We truly offer the sound of wired in the wireless product," said Sandy Schroeder, director of microphone products.

According to Shure representatives, the L2's designers paid special attention to preserving the sound quality of the SM58, SM96, and Beta 58 in the L2 series.

Other L2 features include a durable ARMO-DUR case, separate audio mute and power switches with continuous battery condition indicator and doubletuned RF output stages.

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CD sales have increased while LP's have plummeted in the 1980's. The Recording Industry Association of America says that in 1980, annual LP sales totalled $2.29 billion, compared to $530 million in 1989. CD sales, on the other hand, accounted for $100 million in 1984 and increased to $2.09 billion by 1989.

Cordless telephones may spring up in the workplace. american Telephone & Telegraph last week unveiled a phone that can be carried on a belt, says *The Washington Post.* AT&T plans to market the devices, able to pick up five lines, to small businesses as part of its Merlin line.

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EI Classifieds are free to the readers of Common Point magazine. To place an ad type it on the acknowledgement card that comes with each issue and mail to us. We assume no responsibility for the condition of any of the equipment or services in these ads.

FOR SALE: Phelps-Dodge three-bay FM antenna w/radomes, 105.5 MHz. $1300 Contact Rick Martin, KWYD, Box 5668, Colorado Springs, CO 80931.

FOR SALE: 100 ten-inch reels of Ampex tape, bulk erased. $5.00 ea. Contact Tom Moore, WQEL, P.O. Box 789, Bucyrus, OH 44820. (419) 468-2326.

WANTED: Chief Engineer for 5000 watt AM, ND-FT. Board shift/maintenance. Contact Jim Baine, KKMO, P.O. Box 1277, Tacoma, WA 98401.

WANTED: Schematic for B & W Model 210 Audio Oscillator. Contact Roy Butler, Director of Engineering Texas A&I University, (512) 595-3497.

FOR SALE: Systemation automation controller for cassette based on-air system. Supports 24 cassette decks, weather, time & temp. and networks. Also have production system controller. $3000 or best offer. Call Bruce Effron, KJLA, 816-753-7707.

Talk Back

New Concord, Ohio--Always enjoy Metz. Being a "youngun" in the industry, I appreciate any hints and help I can get. Also, enjoy the rest of the publication.

ENGRS.--Can you help me with a project? I'm the type of "engineer" who knows enough to be dangerous, so I'm not as good as I'd like to be with home brewed projects. I've tried to figure out a simple RF strength meter to monitor power changes of our 1KW AM transmitter. Fortunately (or unfortunately) I live about 350 feet from the base of the tower so the device would not have to be extremely sensitive. Our contact engineer and I tried to make a simple device but could not get the thing to work. I have two junk meters, on is a DC ammeter 0-5 scale and a DC kilovolt meter, 0-1 which is the meter we were using to test the device. We know both meters are good. I would like to measure the power changes at my house, but I can't justify stringing a conductor from the base meter to the bedroom. I can detect the RF with a diode and resistors connected to my Simpson VOM, but I'd rather have a "box" on the wall. Does someone have a circuit that would work? Thanks for any help you might be able to give.
James M. Nickel
Operations Mgr., "Engineering"
KJSK, Box 99, Columbus, NE 68601
(402) 564-2891.

Park Rapids, MN--It is a gross error to believe the NAB speaks for all broadcasters. I read with interest their replies to comments. They, frankly, don't know what the h... they are talking about. One owner of two AM's in the same community, come-on you've got to be kidding! Whatever happened to the public interest? I am a NAB member but their AM ideas, for the most part, are out of step.

Thornton, CO--Enjoy your publication!

Centerville, TN--Interesting & informative!

Olivia, MN--Look forward to it!

Columbus, IN--Enjoy your magazine very much, especially "Memo from Metz". Always good tips and economical, too. Keep it up!

Lenoir City, TN--Very good publication!

Mishiwaka, IN--Another great issue!

Freeport, IL--Look forward to reading COMMON POINT each issue. Keep it up!

Savannah, TN--Many thanks for COMMON POINT. I enjoy reading the articles which are very practical.

Imbalance in Cable/Free TV Marketplace Threatens Local TV Programming

America's broadcasters say the competitive imbalance between Free TV and the cable industry now threatens TV operators' ability to produce news, information, and public affairs programming, a spokesman for the National Association of Broadcasters said today at a Federal Communications Commission (FCC) field hearing in Los Angeles.

"We are seriously concerned about the future," said Edward Quinn, vice president and general manager of KGTV, an ABC affiliate in San Diego, CA. Unfair cable competition, Quinn told FCC commissioners, threatens broadcasters' "ability to provide locally originated programming to our audience." He predicted broadcasters "may eventually be forced to cut expenses to such a point that our community service will begin to erode."

Nationwide, ad revenues are down, in part, Quinn said, because of an overall slow-down in the national economy, but also because of unfair cable competition. "Cable gets our programming for free and then sells those signals to the consumer." He said cable operators "then use that money to compete against us for program acquisition and advertising dollars."

Over-the-air broadcasters find themselves in an "inequitable position," Quinn told FCC regulators studying the effect of cable deregulation. "We believe it is in the best interest of the American people that free over-the-air television be preserved and that stations continue to have the resources to provide local services."

The solution, broadcasters assert, is fair competition. This means guaranteeing free over-the-air broadcasters access to cable homes, Quinn said. Without carriage requirements, "cable has greater incentives to drop local signals as they compete with use for viewers and advertising dollars."

For the long term, Quinn said cable operators must begin to compensate local broadcasters, networks, public broadcast stations and program suppliers for the use of their product. Quinn urged federal regulators to adopt a plan called "if carry, must pay."

Under the broadcasters' plan, cable operators would be given the option of carrying no local broadcast signals, or carrying a group of over-the-air local broadcast signals for a fee, Quinn said. In the future, cable operators would pay cable programmers such as CNN, The Disney Channel & ESPN.

"Only by a combination of carriage and compensation can the television broadcast industry be put in a position of competing with cable and cable program suppliers in the future," said Quinn.

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