

BROADCAST **engineering**

the technical journal of the broadcast-communications industry

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KPRC's new dream home page 14

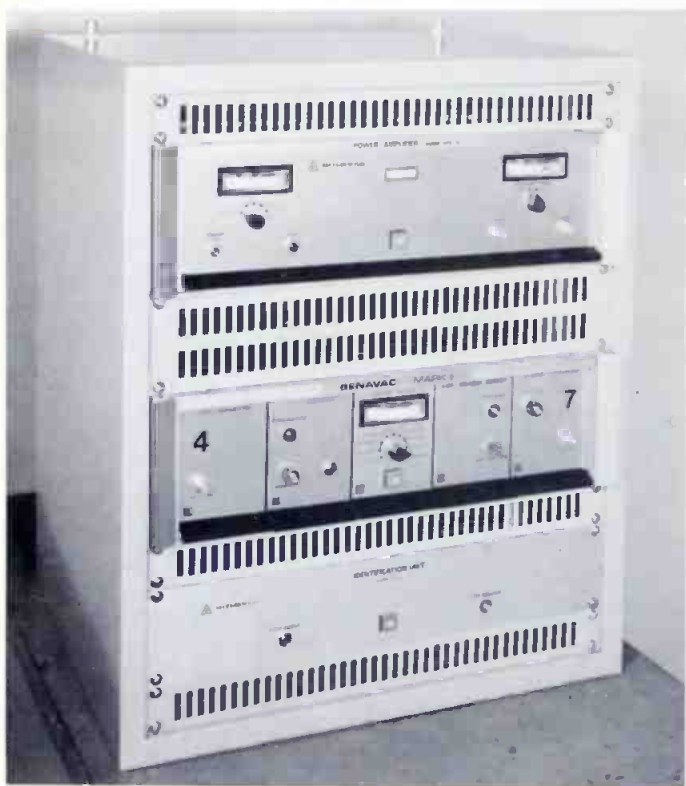
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BROADCAST engineering

The technical journal of the broadcast-communications industry

in this issue...

-
- 14 KPRC Moves Into Dream Operation.** An all new facility has been designed for KPRC. Their new operation is designed with functional and artistic concepts.
-
- 18 NAB Engineering Sessions.** Continued coverage of the 50th annual NAB convention. Focuses on papers and panels of the Engineering Conference. **Ron Merrell.**
-
- 24 NAB Management Sessions Attack Issues.** The story of how the NAB approached the major issues facing the broadcast industry today. **Ron Merrell.**
-
- 29 Update On Broadcast Automation.** BE's automation editor presents a roundup of automation equipment on display at the NAB convention and explains how the approach to automation should meet industry needs. **Morris Courtright.**
-
- 33 Operating Weather Radar By Remote Control.** A description of how one station installed a weather radar system to meet their unusual needs. Includes licensing and operator requirements. **Harold Dorschug.**
-
- 38 Lightning Protection For Antenna Towers.** Our maintenance editor shows how antennas and equipment can be protected from lightning strokes. **Pat Finnegan.**
-

About The Cover

This month's cover is an inside shot of the new KPRC Facility. For further details on their dream operation, see page 14. Photo, courtesy of Phil Dean & Assoc.

Departments

Direct Current	4
Letters to the Editor	8
Industry News	10
Cable	
Engineering	CE-1
Engineer's Exchange	41
New Products	42
Book Reviews	53
Tech Data	50
Ad Index	55
Classified Ads	55

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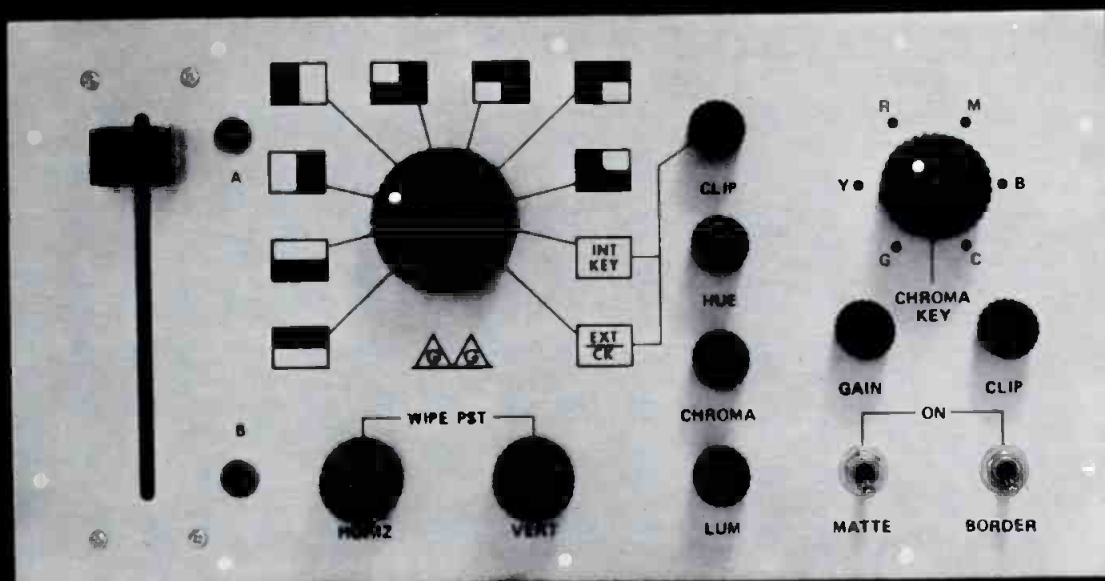
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DIRECT CURRENT FROM D. C.

JUNE, 1972

by Howard T. Head

New Operator Requirements for AM Directional Antennas

The Commission is preparing to issue new rules relaxing the present requirement that a first-class operator be on duty at all times at AM broadcast stations employing a directional antenna. The relaxation will apply also to higher power non-directional AM and FM transmitters which had previously required a first-class operator on duty. The Commission action was in response to a petition by the National Association of Broadcasters (NAB) requesting this relaxation.

Under the new rules, a first-class operator must be in regular fulltime employment by the broadcast station, but is not required to be on duty at the transmitter or control point during the hours of directional operation. The operator on duty is required to hold a third-class ticket with broadcast endorsement. Other requirements include a five-day-a-week inspection of the installation and the employment of a type-approved phase monitor.

Changes Proposed in Coding of Commercials

In a tacit admission of inability to produce coded film commercials meeting the requirements of the present coding rules, International Digisonics Corporation (IDC) has proposed that the Commission eliminate the present standards defining the areas in the four corners of the picture to which the code must be confined (See March 1972 Pompous Predictions). IDC now proposes instead that codes be permitted simply on the basis of non-degradation of the television picture.

IDC points out that the coding characteristics can be readily controlled on video tape. One of the principal features of the coding scheme, however, was the supposed ability to employ the coding scheme on film material, especially commercials, since film constitutes the great bulk of commercial material.

All comments and replies on the proposed relaxation have now been filed with the Commission. Coded material is still being produced under temporarily relaxed rules (See Nov. 1971 D.C.) pending final Commission action regarding new coding standards.

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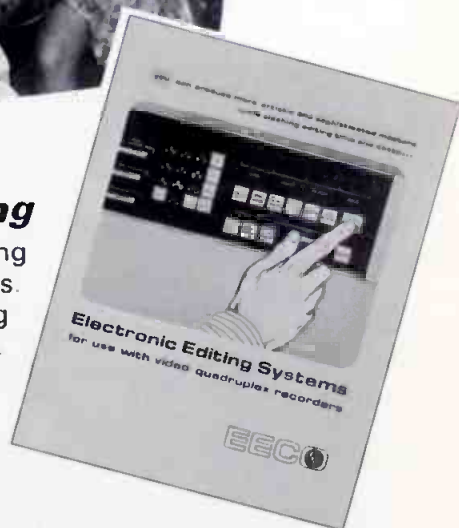
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CATV Committees Formed by Commission

The Commission has organized two new Government-Industry committees to consider both technical and non-technical aspects of the Commission's new CATV regulations (See April, 1972 B.E.). One committee will concern itself primarily with such matters as the relationship between Federal and non-Federal government regulation, while the other committee will deal with CATV Technical Standards.

The Technical matters to be explored include the adoption of standards governing color parameters, ghosting, studio origination equipment, two-way transmission, and non-TV use of cable channels. In addition, the committee will review technical standards already adopted in order to assure that they reflect the current state-of-the-technical art.

Commission Denies Petition for Nighttime AM Power Increases

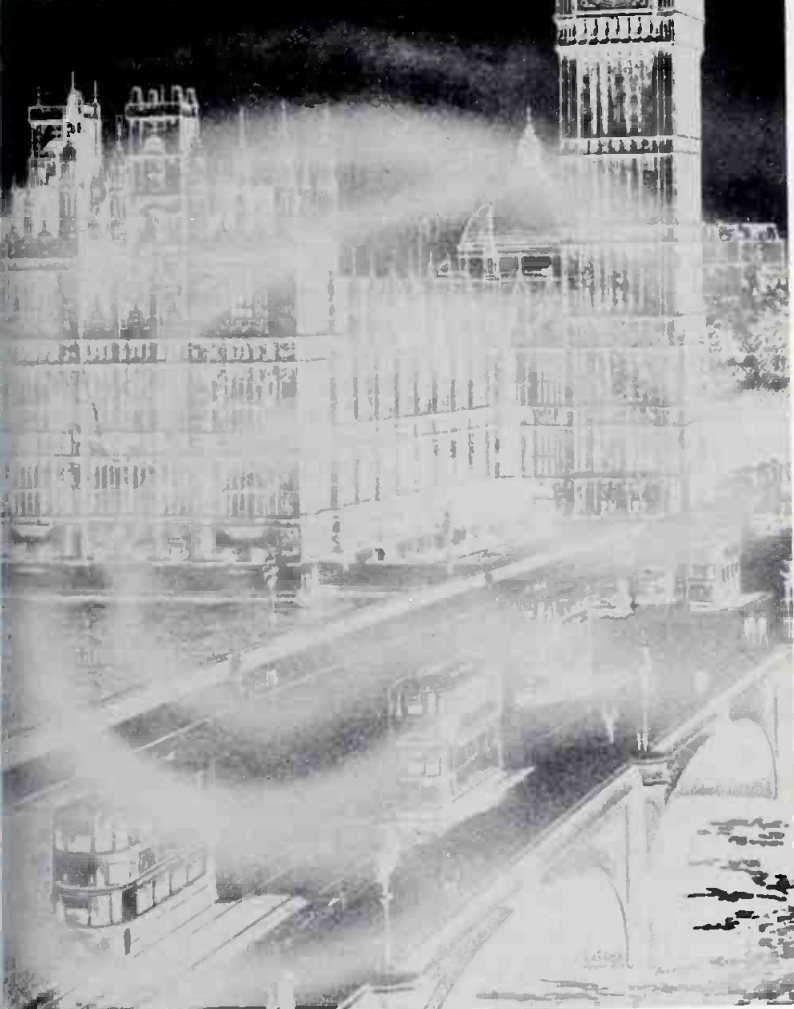
Acting with what for the Commission is something like lightning speed, the Commission has turned down a proposal filed barely a month earlier asking that all Class IV stations on the local channels be permitted to increase nighttime power from 250 Watts to 1 kW (See May, 1972 D.C.). Although the Commission conceded that the proposed power increase would provide the more than 1000 Class IV local channel stations with improved ability to overcome man-made noise at night, the Commission concluded that treaty restrictions with other North American countries, especially Cuba, imposed serious obstacles to the power increase.

The most surprising aspect of the Commission's action was its unexpected promptness. Now if the Commission can just dispose of the AM Clear Channel case (Docket #6741), which was opened on February 20, 1945 and is still not completely decided.....

Short Circuits

Neal McNaughten has been named Chief of the FCC Broadcast Bureau's Rules and Standards Division...A new four-channel Stereo Radio Committee (See March 1972 Pompous Predictions) has been formed and has held its first meeting...The Committee has abandoned a proposal to reduce channel spacing in the 450 MHz broadcast remote pickup band and to reassign a portion of the band to land mobile use; at the same time, the band 2110-2113 was made available for aural STL operation in ten major cities.

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does
your
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look
like
'Big Ben'
on a
foggy
day?

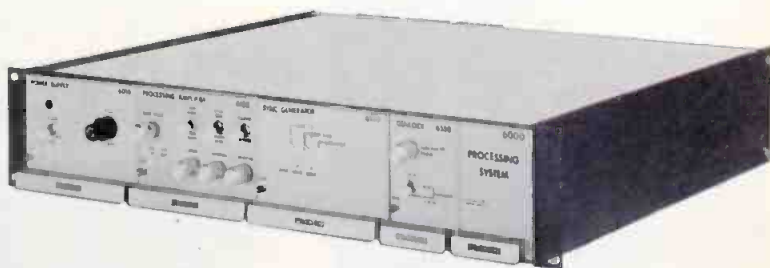
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"Big Ben" is the name given to the huge clock in the Parliament Tower, Westminster Palace, London England. The name originally was given to the tower bell, first installed in 1856.

why not brighten
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Meter Face Static Charge Solved

Editor's Note: Sounds like this solution to your problem may have other broadcast applications.

Since *Broadcast Engineering* operates as a broadcast forum, we're always glad to give space for ideas from the field. If you have a problem that seems impossible, drop us a line and we'll let the other *BE* readers take a shot at solving it.

Address your correspondence to: Letters To The Editor, *Broadcast Engineering* magazine, 1014 Wyandotte, Kansas City, Mo. 64105. Please indicate that we have permission to print your letter.

fied by wiping the meter face and observing if the needle deflects.

The solution is to install a static drain from the meter face to ground. I used GC Silver Print, a conductive silver paint. I painted a narrow stripe down one side of the meter face and then over the side of the meter case to the chassis. Be sure to scrape the paint from the chassis at the point of contact and be sure the meter face is clean.

N. Moss, C
WSJM AM-FM
St. Joseph, Mo

Dear Editor:

I have encountered a problem on our ITA AM transmitter recently, and I would like to share its solution with others with the same problem.

We have encountered a situation where a static electric charge builds up on the meter faces and deflects the needle away from the correct reading. In our case, the plate current meter was reading 480 mA when the actual current was 420 mA. This static buildup is probably attributable to the airflow from the internal blowers as well as the low humidity in the transmitter building. This problem can be veri-

AEL Officer Change

In the March issue of *BE*, we wrote in the People In The News section that AEL has a new president. At least that's what the headline said.

In the column, it was explained that Leonard L. Rosenfeld had been appointed President of AEL Communications Corp. (AELCO, not AEL), the CATV subsidiary of AEL. Dr. Leon Rieberman is still the President of American Electronic Laboratories, Inc. (AEL).

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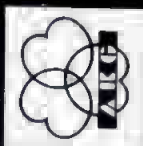
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Pending Congressional bills aimed at creating a Consumer Protection Agency with the power to intervene with other government agencies were labeled today "examples of enthusiasm for a good cause gone wild."

Richard W. Chapin, chairman of the Board of Directors of the NAB, opposed provisions of the bills that would make the CPA a super-regulatory agency ... with power to intervene in the proceedings of all other regulatory agencies in Washington."

Speaking during the University of Missouri's annual journalism week, Chapin, president of the Stuart Broadcasting Co., Lincoln, Mo., said that while such an agency may be "necessary and useful," the proposed "massive power of intervention would make nonsense" of proceedings of the Federal Communications Commission and other regulatory agencies.

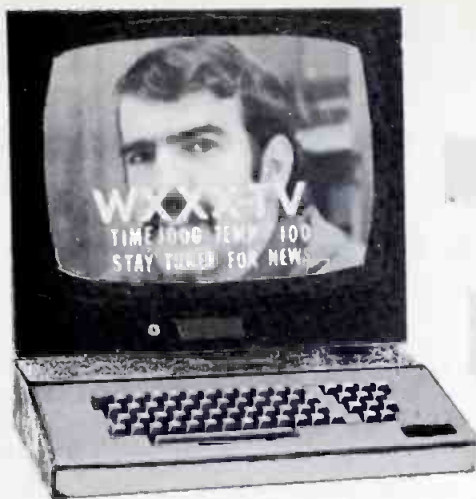
He said the CPA would be able to take the FCC to court if it disagrees with any Commission decision. Also, he added, it would have the power to demand that the FCC subpoena any information the CPA deems necessary to fulfill its mission representing the consumer.

The NAB Board Chairman said the implications to broadcasting of such sweeping authority are enormous.

"Broadcasting," he said, "always seems to draw most of the attention, and I am sure we would be very quickly the target of many of the Consumer Protection Agency's activities."

He said FCC proceedings, already excruciatingly slow and complex in many cases, "would be slowed as to make forward movement imperceptible if this super agency were granted the power to intervene in every situation."

Chapin said NAB has asked its member stations to oppose the intervention feature of the bills, and called on his audience to study them and lend broadcasters their support.



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SYSTEM INCLUDES:

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Simply plug this unit into your transmitter line and automatically display Time-Temp-ID plus one line promo's over program video at pre-programmed intervals or on manual command.

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Commission Lengthens STV Sports Restriction

Sports events which have been presented on conventional television may not be presented on subscription television (STV) unless they have been off the air for a period of five years under terms of an amendment to the rules adopted by the FCC (Docket 18893).

The restriction had previously been limited to two years. It applies to sports events that are regularly televised on conventional TV, either live or on a same-day delayed basis.

The Commission also extended a prohibition against the STV showing of regularly recurring sports events, such as the Olympic games, from two to ten years. New

sports events like the Super Bowl, which result from the restructuring of an existing sport, may not be shown on STV until five years after the events have been introduced. New sports events arising from situations other than restructuring, such as cricket or jai alai, will not automatically come under the five-year protected period, but will be dealt with as they develop.

Anti-Siphoning

The action amends Section 73.643(b)(2) of the rules and was initiated in a rulemaking notice released July 1, 1970. The rulemaking proposal was designed to prevent "siphoning" of sports events

from conventional television to STV. Proposals in the rule making applying to cable TV will be considered later.

The new rules provide that sports events have been televised live or on a same-day delayed basis, on conventional TV in a community during any one year of the five years preceding a proposed STV showing there, then STV showing of the events, live or on a same-day delayed basis, is prohibited. (STV delayed showing is permitted if the delay is other than same-day delay.)

If a regularly recurring sports event takes place at intervals of more than one year, and the event has been televised live or on a same-day delayed basis on conventional TV in a community in any year during the 10 years preceding proposed STV showing in that community, then STV showing there on a live or same-day delayed basis is also prohibited.

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3C Invites Comments On Exclusivity Of Non-Network Programs

Additional comments have been invited by the FCC on two specific items in a Commission study on exclusivity of non-network television programming and ways to provide freer distribution of non-network programs to UHF television stations and cable television systems (Part 73 of the rules) (Docket #79).

The Commission on May 10, 1968 had proposed to prohibit agreements between stations and non-network program suppliers which may prevent television stations from presenting programs shown by other stations in nearby communities. The rule would apply to such non-network programs as syndicated features and feature films.

Exclusivity Time Limits

In a further rulemaking proposal, released January 18, 1971, the Commission concluded that the length of time a station has exclusivity rights to present programs should be explored. The FCC said it appeared that contracts for non-network programming are usually for extended periods and for multiple

showings, and that exclusivity generally lasts as long as the right to broadcast under the contract, including multiple runs.

Special Services

Amended rules in the Safety and Special Radio Services to provide a cut-off date for the filing of mutually exclusive competing applications have been proposed by the FCC. The rules would also apply to major amendments and petitions to deny applications on which public notice filing is required.

The proposal would amend Parts 1, 81, 87, 89, 91 and 93.

The rules would apply generally to applications for fixed microwave stations, industrial radio positioning stations for which frequencies are assigned on an exclusive basis, aeronautical advisory, en-route, fixed and airdrome control stations, and maritime public coast stations. They would require applications that are mutually exclusive with an application already on file to be accepted for filing if they are filed no later than one day before issuance of the Commission order setting the first application for hearing, or within 60 days after release of the public notice listing the first application, whichever date is earlier.

TV Tuner Data Available

A revised edition of the TV Tuning Panel bulletin on "INTERPRETATIONS OF THE FCC RULES ON COMPARABILITY OF VHF AND UHF TELEVISION RECEIVER TUNING" (OCE22) has been issued by the FCC. It updates a bulletin originally released in December 1971 and includes additional interpretations issued by the Panel since that date.

Section 15.68 of the rules requires that 40 percent of TV receiver models manufactured after July 1, 1972, for use in the United States must have comparable systems for tuning the VHF and UHF channels; after July 1, 1973, 70 percent of the receiver models must have this capability; and after July 1, 1974, comparable tuners must be

a part of all receivers.

The TV Tuning Panel was founded to consult with the Chief Engineer on the rules. The purpose of the interpretations is to provide guidance for manufacturers and others on interpretation of the rules.

The bulletin is in the form of questions and answers dealing with a particular aspect of the comparable tuning rules. A copy of the rules is attached to the bulletin.

Television receiver manufacturers may obtain copies of Bulletin OCE 22 at Room 756, 1919 M Street, N.W., Washington, D.C.

The Panel also answers written questions on specific problems. Questions should be addressed to the Secretary, TV Tuning Panel.

Here's today's newest 1 kW AM transmitter GATES' BC-1H



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Commission Sets Limit On Positive peaks

Amendments to the standard broadcast rules which will restrict the degree of modulation which may be employed by AM broadcast transmitters have been adopted by the FCC (Docket 18867). The new rules set a limit of 125 percent modulation on positive peaks and provide for separate definitions for modulation in the positive and negative directions.

In a rulemaking notice adopted May 22, 1970, the Commission stated that some AM broadcasters were now using transmitters with modulators capable of supplying more power to the carrier than necessary for 100 percent modulation with a symmetrical waveform—for example, a 5 kilowatt transmitter with a modulator normally intended for a 10 kilowatt unit. Concerned with the increase of sideband power and the possibility of interference to other stations, under audio distortion and excessive carrier shift, the Commission proposed that the 100 percent ceiling on negative peaks be applied to positive peaks as well.

Approximately one-half of the comments opposed the setting of positive modulation limits, one third favored a restriction but urged that the maximum permissible level be set from 115 to 130 percent, while some broadcasters supported the adoption of the 100 percent limit. A majority of the comments in favor of the higher limits came from broadcasters using equipment capable of producing positive modulation peaks in excess of 100 percent, the Commission said, pointing out that the practice is not confined to stations using excessively large modulators. The Commission said that a transmitter designed for operation at two power levels, such as 1 kilowatt daytime and 250 watts nighttime, can be adjusted to the lower power level by reducing the input power to the final RF stage and still produce high levels of modulation when operating at the lower level.

Commenting that it did not wish to place arbitrary restrictions on modulator design by type acceptance procedures because a transmitter with some excess modulating capability will provide a higher quality signal in normal operation, the Commission said it was imposing a restriction on modulation level and setting the ceiling at 125 percent because it would be high enough to accommodate the higher peaks of naturally asymmetrical programming but not so high as to increase average sideband power to troublesome levels.

In maintaining modulation levels within the new ceiling the effective amount of non-linear distortion may not exceed 7.5 percent—the maximum permitted by Section 73.40(a)(3), the Commission said, and the limit of 5 percent for carrier shift prescribed by Section 73.40(a)(5) applies in all cases. The Commission said that a modern transmitter should be able to meet these requirements unless excessive amounts of limiting are employed or the transmitter is driven beyond its linear modulation characteristic.

The Commission stressed that the 125 percent is an absolute ceiling" and emphasized that the rule amendment is not intended to "require or even to encourage" licensees to increase their levels of modulation, "nor should it be taken by equipment manufacturers as an excuse to alter their designs or specifications to facilitate the use of increased modulation levels." Again emphasizing that it was prescribing an absolute limit on positive modulation, the Commission reminded the licensees that modulation indicators must be accurate enough that the peak amplitudes observed do not exceed 125 percent.

New EANS-EBS Rules

Major revisions of the Emergency Action Notification System (EANS) and Emergency Broadcast System (EBS) rules and regulations have been adopted at the Federal Communications Commission. This is a broadcast system under which the Nation would be kept informed in case of National, State or Local emergency. The FCC, together with the Office of Telecommunications Policy and the entire telecommunications industry, have effected the substantial changes in the EBS.

Major changes recommended by the National Industry Advisory Committee include a simplified EBS checklist for receipt of an EA or tests; simplified authentication procedures; deletion of the Civil Defense Attack Warning from the EBS Emergency Action Notification; positive control and double-checked authentication at the origination source prior to release of an EAN or Closed Circuit Test. Improved arrangements have been made for use of the EANS and EBS by the State Governors and local authorities.

Defense Commissioner Charlotte T. Reid stated: "It is absolutely essential that the President and State and local authorities have an efficient and reliable means of communication with the public in times of emergency."

"The Emergency Broadcast System is totally dependent on the voluntary organized participation of the entire broadcast industry, including vital support from the Radio and Television Networks, Associated Press and United Press International, and the Communications Common Carriers." Mrs. Reid further stated: "I would hope that as the revised system is installed, more and more participation will be evidenced by the broadcast industry for the benefit of the public."

"We have done everything possible to reduce the elements of chance to a minimum in order to provide the public with the best system possible, and I am most grateful for industry's voluntary support."

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Station KPRC-TV/AM/FM, owners of one of the oldest sets of call letters in the broadcasting industry, moved to a new ultra-modern \$3.2 million building on Tuesday, March 21. But for all the capital expenditure, it has an even greater significance for the industry.

The move to the new building, a landmark in broadcast-integrated design, marked the third major facility change KPRC-TV/AM has had since the TV station operated from a quonset hut on Houston's Old Post Oak Road, in 1948.

In a new way, the third move to lavish new quarters, could well be a parallel of the overall growth of the broadcast industry itself.

From the tiny quonset hut site, KPRC-TV/AM moved to its second location in 1953. That building was dedicated on March 29, 1953 and on that same day, KPRC-TV celebrated its 25th year of affiliation.

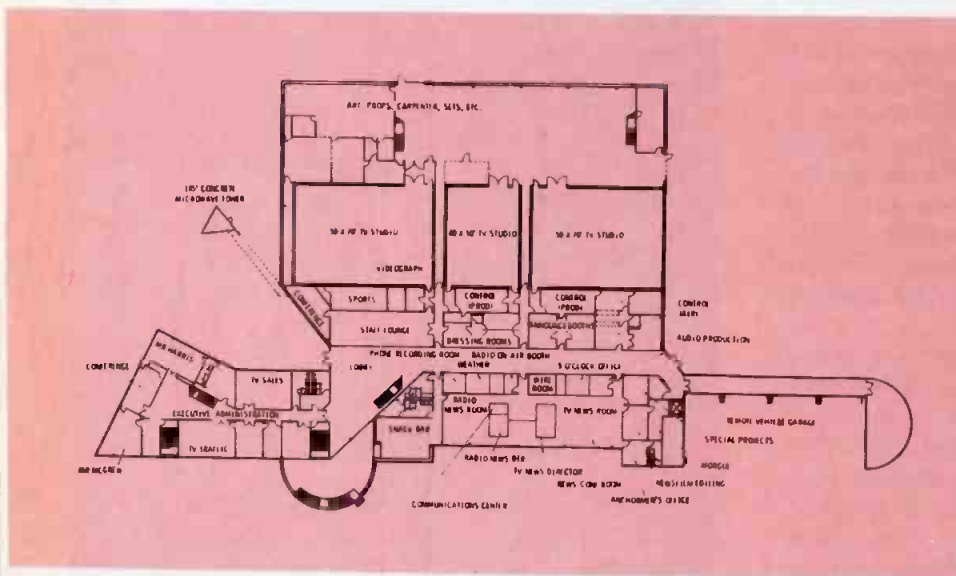


Fig. 2 First floor layout of the KPRC facility.

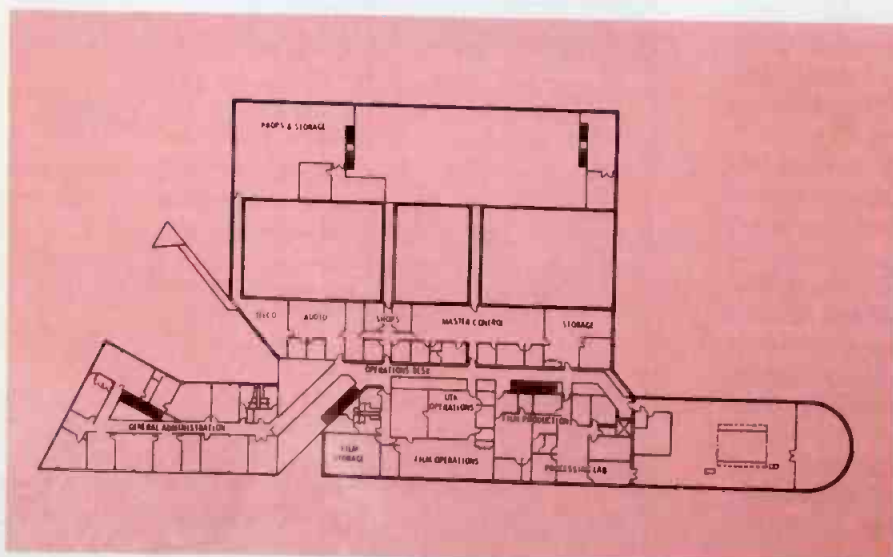


Fig. 3 Second floor layout.



Fig. 1 Four separate control areas, two for production and two for air broadcast, are provided and allow the three studios to be linked together in any combination through a separate master control.

TV's five remote color telecasting units plus six fully equipped news gathering vehicles for KPRC-TV News. The parking lot for employees and visitors accommodates 210 cars.

KPRC-TV has integrated the advanced state-of-the-art innovations into its new facility. The TV and AM studios have all been designed acoustically by Dr. C.P. Boner, a well known acoustical expert.

Complete Kleigel lighting systems, which give the TV studios the aspect of a Broadway theater, have been installed. And lighting, dimming, patching, raising and lowering and other functions can be controlled remotely in each of the studios.

The production control centers are equipped with four of the latest video switchers. There are four control centers; two production control and two air control which provides flexibility for use in network origination from KPRC-TV. Space has been provided for twenty monitors in the control room.

Radio Acoustics

The radio studios, all acoustically treated, are 10 × 12 × 15 and each is equipped with new console. Each studio can be used for announce or production purposes, and inter-mix capabilities have been built for tie-in with the TV studios.

Double-wall construction of high-density concrete provides complete sound isolation for each studio.

The studio windows are double, high-density Acustipane glass. Each pane is three-quarters of an inch thick and weighs approximately three-hundred pounds.

The ceilings, and all plumbing and pipes between floors, are sus-

Department, film and tape production facilities, film processing and storage area.

Executive, administrative and sales offices are housed in the three story unit at the end of the vaulted gallery. Also in this unit are the studios, sales, administrative and program facilities for KPRC Radio.

A concrete pylon, at the front of the building, supports the microwave relay system. The pylon is 187 feet tall, and is the world's tallest "slip-form" structure made of architectural concrete.

Technicians get to the top, for equipment maintenance, via an elevator inside the pylon.

The microwave support structure could have been just another steel skeleton. But, instead, it was designed to be pleasing to the eye and the pylon serves as a dramatic focal point of the broadcast center.

The building also includes an engineering annex with shops and a covered parking garage for KPRC-

on with NBC.

From a 2,000 set audience in the KPRC-TV (then KLEE-TV) signal area on that auspicious day in 1948, KPRC-TV's market area is now over 500,000 homes. From a single studio with two cameras in early KPRC-TV days, the new plant boasts three of the most modern studios ever built; two of them are 50 × 70 feet and one "small" studio is 40 × 50 feet.

The new KPRC-TV/AM studios and plant was on the drawing board for nearly three years. It has been designed both artistically and technically to provide the ultimate in broadcast efficiency and effectiveness.

The building plan features three basic units, clustered around a high vaulted gallery. The largest unit of the complex houses the television production studios and related control and engineering space. On the opposite side of the gallery from the production area, a two-story unit houses KPRC-TV's News

pendent on "shock-hangers" to eliminate any chance of unwanted sound from vibration or noise transfer from above.

Proper acoustical control is maintained by a mixture of sound absorbing and sound reflecting materials. The large three-inch thick panels on the walls and ceilings are Tecktum, an acoustical absorber, and the solid walls form the reflecting surface. The ratio of the absorbing surface to the reflecting surface determines the ideal acoustical properties of the studio.

Emergency Power

A stand-by power generator provides ample electricity to keep the radio station on the air during an emergency. In addition to one studio and control room, enough power is provided for lights and the pump system necessary to drain the Terrace Studios.

The emergency power supply is a natural gas-powered system

which eliminates the fuel storage problems associated with petroleum-fired generators.

The news department covers 6,000 square feet and production facilities for special documentaries, mixing, editing, interviews and other special events have been included within the news facility. Also included is available space for personnel working out of KPRC-TV for various activities.

To quote Paul Huhndorff, Vice President for engineering for the Houston Post Broadcast Division, "Anyone can always build something bigger and better. Wherever you go you'll find someone with a bigger and better lighting system, or studio or master control. But I daresay that you are not going to find under one roof anywhere all of the sophisticated items we have integrated here. I don't think that anywhere in the world you'll find a plant that's as complete in every respect as this one here."



Fig. 5 KPRC Radio also broadcasts from its terrace studios (see Fig. 6). The large space used by the two on-air studios is a result of experimentation in design of space for optimum acoustical response.

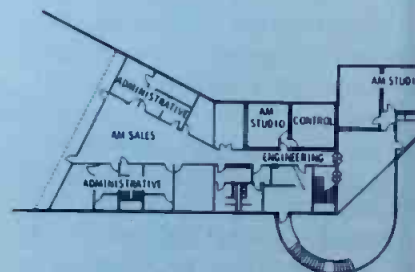


Fig. 6 Layout of the Radio facility

Fig. 7 KPRC Radio n
Note the acoustical material in the audio production facility.



Fig. 4 Three acoustically correct TV production studios, have been included in the KPRC complex. Eight color cameras may be used in any studio combination.

Faith In Our Times

The architectural firm for the new KPRC-TV/AM plant was Wilson, Morris, Crain and Anderson, which worked with the KPRC staff coordinated and directed by Huhndorff.

The new KPRC-TV/AM broadcast building was officially dedicated, Tuesday, March 21, with a gala open house and dinner party. And it goes into operation at a time when there are a number of serious threats to the industry. Instead of simply being a costly venture, KPRC rises up for us today as a symbol of industry faith and dedication.



At The NAB.....

Engineering Sessions Cover Wide Range of Interests

By Ron Merrell

In this section, BE continues its roundup of engineering sessions held during the NAB. New Products section focuses again on products displayed in the exhibits.



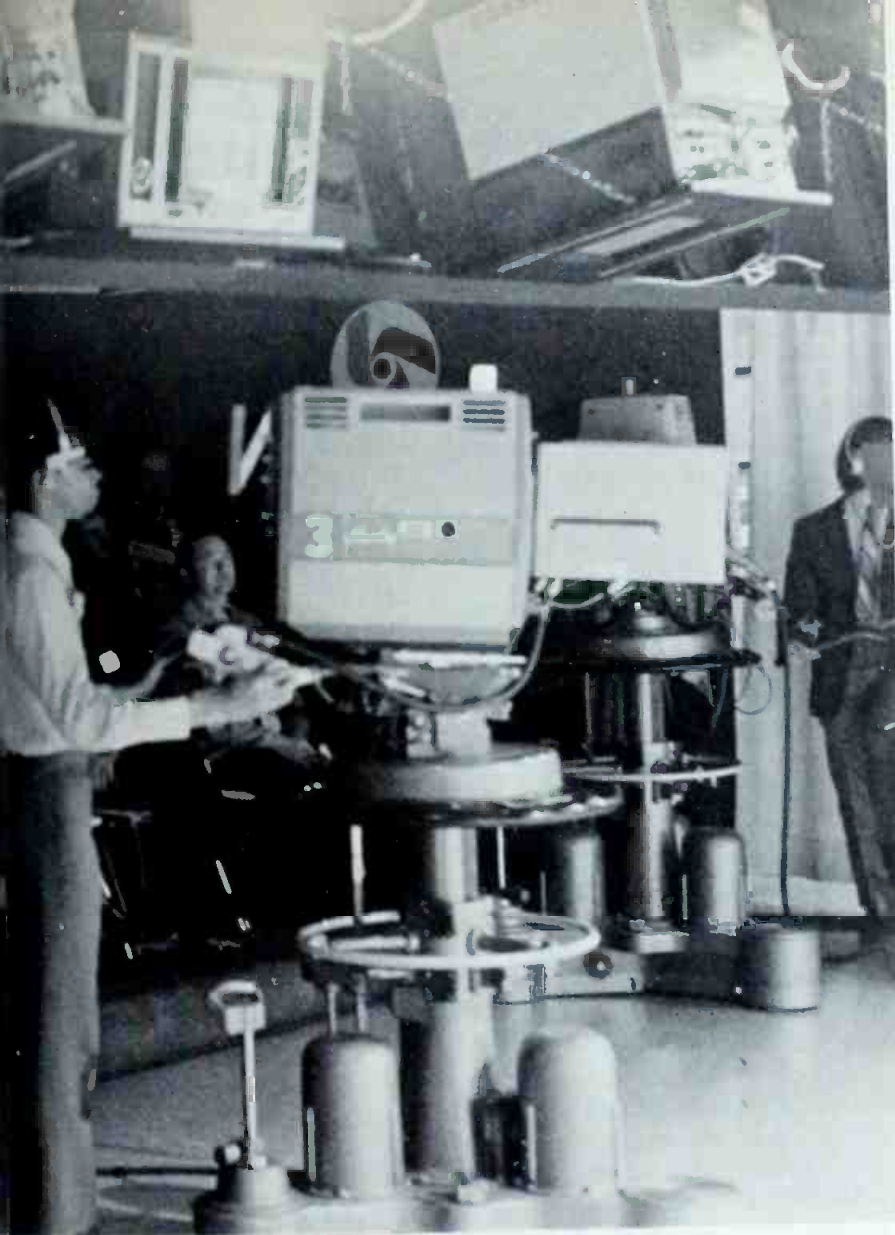
Lively Industry-FCC Panel Discussion

Industry-FCC Panel

The Industry-FCC panel, always a popular session, was more active than it has been for the last few years.

While the feeling often prevails that little or nothing can come from this session, the 1972 version was well worth the time and effort.

Notably, there were more engineers stepping to the audience microphones with challenges and questions. The engineers weren't in a lynching mood, but they came prepared to talk about the things that are... and about the FCC.



The Engineering Conference of the 50th NAB national convention was well attended this year by engineers from across the nation. Of course it was obvious that small market stations once again were not sending their engineers.

This edition of BE will cover some of the engineering sessions not previously covered in the May

The 50th annual convention was evidence of the economic revival among broadcasters and manufacturers. Most exhibits were the scene of live demonstrations and equipment purchasing. Pictured above is a theater-style camera demonstration by Philips Broadcast Equipment Corp.

engineers who inspect their plants.

It was on this point that Dave Hebert, engineer for KXRO, asked what training (by the Commission) these inspectors received before going into the field as FCC reps. He pointed out that (1) he had to show one how to use a FS meter, and (2) Rules interpretations in the field and at the Washington offices certainly do differ. To this first question the FCC members of the panel said there was no special training.

This FCC statement brought on

new interest when Wally Johnson said that the Commission was on the doorstep of beginning an overhaul of Part 73 of the Rules. (See Industry News.) The engineers who commented on this question wanted to be certain that the FCC field offices would be so well informed on the changes that their interpretations of the Rules would not conflict with Washington. There was concern for added confusion.

Barely a week earlier, the FCC adopted an amendment to the Rules (Docket 18867) on positive

modulation. (See Industry News of this edition.)

The FCC members pointed out that the 125 percent in the amendment is an absolute ceiling. And they were anxious to point out that they did not intend to "require or even to encourage" licensees to increase their levels of modulation.

On Rules interpretations, the engineers were reminded that a call to the Washington office is one sure way to clear up inspection problems. But even this comment was digested as one more proof of inconsistency.

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issue. There simply is too much happening to cover the entire convention. Also, please note that the New Products sections of the May and June issues focuses on new equipment shown at the convention.

And in order that management might follow the proceedings, this section will be followed by papers of special interest to management. We do feel that today's engineer must stay up-to-date on general industry problems, so we suggest careful study of the management section.

Engineers Urged To Participate

James D. Parker, a member of NAB's Engineering Advisory Committee urged broadcast engineers to participate in rule-making proceedings before the Federal Communications Commission and to make their views known on technical matters which have direct bearing on their operations.

"In one sense," Parker said, "it is a matter of self-protection, and in another sense you can assist in seeing to it that changes in the rules, in keeping with the times, are made that will be of benefit to you."

"Should it not be practical for you to participate as an individual station, you are encouraged to make your views known to the NAB Engineering Department, or to any individual member of its Engineering Advisory Committee—as well as to any other industry or professional group with which you may be affiliated—so that your views may be considered along with others in developing a viewpoint representative of the industry."

Parker pointed out that, at all times, there are many actions under consideration by the FCC staff, each of which require careful and painstaking scrutiny at each step in the chain of events.

Parker reviewed about a dozen dockets for which the filing dates have passed, but which are still awaiting final Commission action. He also mentioned three petitions which had been accepted by the Commission but on which no action had yet been taken.

The list of important technical issues before the FCC is long, Parker said, and broadcast engineers' expertise is important in helping

the Commission to reach decisions that are fair and equitable to everyone concerned.

We have no way of knowing how effective any one engineer's comment might be, but certainly the place to lodge your complaints or suggestions is with the FCC. Their address is 1919 M Street, N.W., Washington, D.C. 20554.

NAB Engineers Urged To Promote Translators

In a paper intentionally designed to be more persuasive than technical, Vincent E. Clayton, Director of Engineering of the Bonneville International Company of Salt Lake, told NAB Broadcast Engineers that television translators have been in existence for some time now but that many broadcasters have not fully realized their potential benefits.

Urging engineers to take the time and effort to present to their managers and owners an adequate explanation of what a translator is, how much it will cost and what it might mean to them in direct and indirect returns, Clayton stated that "The optimum broadcast use of translators is lagging."

"For instance, you might ask them how much capital outlay and operating cost increase they would be willing to expend for a 25 percent increase in ARB homes? This could be a starting point. Obviously, not all markets could be expanded this much by the use of translators but some have. Our station in Utah increased its coverage from about one half million to 128,000 by the use of translators," Clayton said.

He further pointed out that "The wired country concept," as exemplified by cable TV, has a definite weakness: the high cost of cabling rural and low population areas. "And here, translators shine. They can provide signals to these areas at a fraction of the cost of a cable system."

Two particular benefits of translators were cited by Clayton: One, the broadcaster can increase ARB home count and possibly audience share; and two, he can help preserve the spectrum for broadcasting.

He also emphasized the low cost of translator installation. One-wire FM translators cost as little as

100 each; VHF-TV at one-watt, 100; while both UHF and VHF-translators in the 100-watt size would average out at \$9,000. Operating costs, too, were described as extremely low.

See to it that your managers take a careful look before discounting the value of FM and television translators. They are important aids to enhance our image, our revenue and our survival as broadcasters; and it is the broadcaster's responsibility to make the most out of this facility for his ownership and his audience."

Effect of RF Output On TV Picture Quality

Speaking before the Broadcast Engineering Conference, Thomas Gluyas, Broadcast Systems, Camden, N.J., explored the effects of RF output systems on transmitter picture quality. Describing his subject as limited in scope, since he was discussing only the RF circuits which couple transmitter to antenna, Mr. Gluyas emphasized that, nevertheless, the problem was a multi-faced one covering a number of separate times relating to performance in terms of picture quality.

Gluyas listed seven parameters. Four of these parameters, he said, were significant for the transmitter output system: long delayed echo, "K" factor 2T pulse and bar, chrominance/luminance gain inequality, and chrominance/luminance delay inequality. The remaining three: differential phase, differential gain and signal to noise ratio are not ordinarily degraded to any measurable degree by transmitter RF output system.



HE'S A BROADCAST ENGINEER. THAT'S HIS MOONLIGHTING JOB.

Gluyas analyzed the causes and measurement techniques for each of the significant parameters, including picture impairment caused by internal components such as line joints, elbows, patch panels, coaxial switches and the reflections from test load, harmonic filters and bridge duplexers, each of which will reflect, at scattered times, a miniature replica of the main signal.

Parallel transmitters, or parallel amplifiers connected in quadrature, Gluyas said, absorb reflections from the antenna and reduce ghosting. "This arrangement is equally effective in absorbing reflection from the various RF components following the combiner in the transmitter room. This improves the amplitude versus frequency response of the system, the 2T pulse and bar "K" factor and, to a degree, the chrominance/luminance gain and delay inequalities," he said.

Careful testing by RCA utilizing parallel transmitters deliberately not tuned to optimize the ghost cancellation confirmed this statement, as Gluyas illustrated with charts and graphs of the tests.

Pulse Duration Modulation System

A new method for obtaining the audio power for high-level plate modulation of an AM transmitter was described to broadcast engineers attending the Broadcast Engineering Conference.

The new modulation system, known as PDM (pulse duration modulation) was described by Hilmer Swanson, a design engineer of the Gates Radio Company.

Pointing out that the new equipment was not only extremely lightweight as compared to presently used plate modulators—the Gates PDM at only a few pounds as compared to the tons of weight in present modulation transformers—Swanson also stated, "It is significant that this is accomplished without resorting to complicated hard-to-adjust circuitry. Transmitters utilizing a pulse duration modulator have a single final RF power amplifier tube and a one-tube final modulator stage."

Mr. Swanson compared the operation of the conventional plate-

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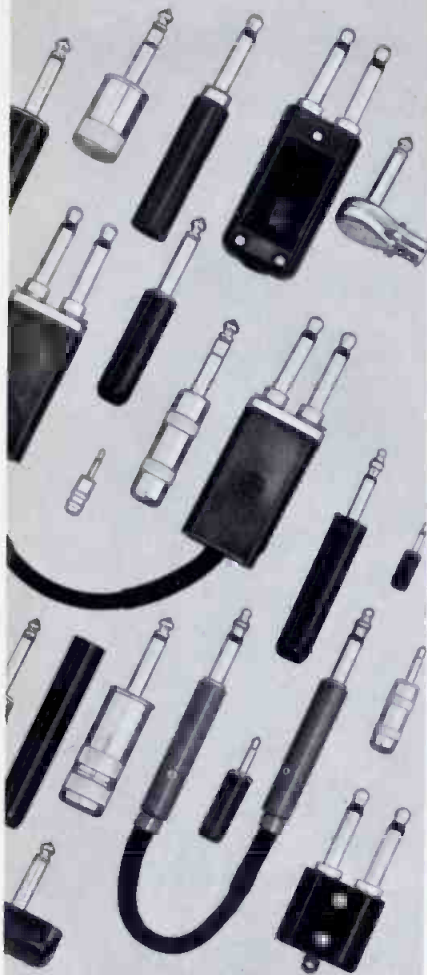
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modulated transmitter to the linear mode "similar to an analog computer." In the PDM transmitter, the modulator operates in a switching mode, as in a digital computer.

Claiming that no new RF modulation process is involved in the PDM operation, he said that it is still high-level plate modulation of a Class C RF amplifier. However, the difference lies in the manner in which the audio signal is translated and applied in series with the RF amplifier plate supply.

Salient features claimed for the PDM include: reliability, ease of maintenance, and operating economy.

The most troublesome components in an AM transmitter, the modulation transformer and reactor, have been eliminated by use of the pulse duration modulator. Because the modulator stages operate in a highly reliable saturated switching mode, small changes in component characteristics have negligible effect on the modulator performance. Tube and transistor linearity has almost no effect on the modulator performance. The modulator tubes and transistors operate in a manner similar to a switch. All they have to do is turn on and off. Tube life under this mode of operation will be increased greatly.

Because of the reduced cost of the components and the inherent low failure rate of the saturated switching mode circuit, maintenance costs are lower. Troubleshooting procedures are simplified by the fact that the modulator stages are inherently either operating properly or not operating at all. Linearity is not important. Most of the modulator is solid state.

With an overall efficiency of 65 percent normally achieved and the lesser number of tubes, transmitter operating cost is greatly reduced from that of transmitters using conventional high-level modulation.

Automation of WINS Transmitter

Details of the conversion of the WINS, New York, transmitter plant to automated operation were described by Bruce R. Ratts, Engineering Manager of the station.

Spurred to a revision of transmitter circuitry by the impending retirement of the veteran transmitter

chief who had designed the interface equipment in 1965, WINS engineers undertook the problem redesign with the intent of placing the entire transmitter plant in automated mode except for power and modulation adjustment and required FCC supervisory control by the licensed operator at the control point. The automated system was completed and put into operation in midsummer of 1970.

Credit for design of the system was given to Martin J. Petersen Jr., WINS assistant chief engineer. Edward W. Rose, transmitter engineer, was responsible for the mechanical construction and wiring.

The automatic installation consists of nine vertically mounted bathtub chassis, with full access both sides, and which house logic and switching equipment. The racks contain all automation equipment, plus audio and monitoring facilities. The remote control equipment occupies two more racks. One contains the original remote control and telemonitoring equipment less the buffer relay which were transplanted to the logic and automation section racks. The second contains the heliograph instrument pots for calibration, monitoring samples, the emergency STL link receiver and miscellaneous items. The whole is powered by floated storage batteries to ensure against interruption.

Ratts pointed out that, although the plant was designed for normal mode of automatic operation, "the control point engineer has full manual override, and monitoring of all necessary circuits." However, the automatic control is so designed that, were the control point engineer to make a mistake and choose an inoperative circuit, "the automatic equipment will switch back to the functioning circuit."

Special Effects

New techniques for special effects can yield results comparable to the high-quality capabilities of motion picture editing equipment, broadcast engineers were told today.

Albert E. Busch, Director of Engineering of the Broadcast Equipment Division, Sars & Tarzian, Inc., of Bloomington, described a newly developed special effects generator.

Describing currently used TV equipment for special effects as limited as to available effects, Busch demonstrated "Cinematte" as a completely new departure. A digital special effects generator, the Cinematte I is designed to provide a video production tool with superior technical specifications and with expandable production capability comparable to that of motion picture editing. The equipment also has potential for computer control and pre-programming.

The digital generator concept removes the noise, instability and non-linearity problems of the analog waveform generators. It also increases the available transition patterns by making transitions based on pulse code comparisons instead of voltage level comparisons.

Patterns available with the Cinematte I include vertical and guillotine wipes, horizontal, diagonal and circular wipes, squares, and a number of specialty patterns. "A family of precision rotary wipes and many specialty wipes such as stars, pentagons and curtain effects have been designed," Busch said. "The TV production man will have facilities at his command which rival those of motion picture in variety and surpass them in convenience."

Differential Phase And Gain Measurement

A new technique for differential gain and phase calibration of broadcast demodulators was described to broadcast engineers by John Venczel, Senior Engineer of the Telemet Company.

Venczel pointed out that the criterion of a good quality TV system can be formulated as one which will retain the identity of the input and output waveforms. However, in any practical case there will be a difference between input and output or, in other words, they will be distorted. To be able to tolerate distortions, they have to be classified," he said.

The most obvious way to determine the differential phase and gain distortion in a TV transmitter is to feed an appropriate test signal into the modulator, then modulate it and measure the differential phase and gain. The accuracy of this

measurement depends mainly on the accuracy of the modulator. Telemet engineers have developed a test modulator which can provide an undistorted signal for differential phase and gain measurement of TV demodulators, yielding a measurement by which the accuracy of the demodulator may be judged and compensated for.

Requirements for adequate performance of test modulators, Venczel said, are two:

- The 15 kHz sidebands of the

42.17 MHz spectrum line have to be negligibly low

- The parasitic phase modulation of the carrier must be lower than the required accuracy of the differential phase.

The first condition can be met in the modulator by proper use of a spectrum analyzer; the second condition requires a high quality modulator. The Telemet test modulator achieves the desired result by using double balanced mixers with a DC bias.



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NAB management sessions attack major issues

As a continuation of the NAB convention coverage in the April issue, this section will focus on station management issues. For those of you who did not attend, it's important to know that the management sessions were well attended . . . and in some cases, overflowing into the halls.

According to the equipment exhibitors, there was at least as much interest in the new equipment on display. Most exhibitors were recording their highest NAB convention sales in years.

NAB Meets The Issues Head On

The National Association of Broadcasters by resolution urged the Federal Communications Commission to reject proposals to expand the Fairness Doctrine to require counter-advertising and mandatory public access to broadcasting facilities.

Adopted at NAB's annual business meeting during the Golden Anniversary Convention at the Conrad Hilton Hotel, the resolution recommended that the Commission instead "adhere to Fairness Doctrine policies which recognize the right of the public to be informed, rather than the right of any individual to gain physical access to a broadcaster's facilities."

Counter-advertising and public access proposals by the Federal

Trade Commission and "special interest parties", it said, "relegate licensees to the role of common carriers without the freedom to make the journalistic judgments essential to an informed public."

Another resolution called on Congress "to move rapidly toward the enactment of fair and equitable renewal criteria which will restore stability to the broadcasting industry."

A third commended the FCC for "reappraising radio's role" and urged the Commission "to proceed with its efforts to develop simplified and realistic regulation of radio."

Whitehead Hits Counter Ads

Clay T. Whitehead, a man some have called "The Czar of the Airwaves," rejected the idea that a government czar for broadcasting would serve the public interest.

Dr. Whitehead, Director of the Administration's Office of Telecommunications Policy (OTP), called such an idea "fantasy" and warned broadcasters that the outcome of a pending Supreme Court case may well determine whether a government controlled broadcast system is "only my fantasy or your future reality."

Speaking at the Joint Radio-TV Assembly, Dr. Whitehead identified the court case as one involving the Business Executives Move for

Vietnam Peace (BEM) and its attempt to purchase anti-war editorial-type spots.

The Supreme Court will be viewing that BEM decision made by the D.C. Court of Appeals decision that there could be no ban against selling airtime for expression of controversial issues.

"Until BEM," Dr. Whitehead said, "it was thought that the different treatment accorded the print media and the broadcast media was constitutionally justified because of the scarcity of spectrum space. That was a rationale that kept broadcasters separate from the government and entitled to most of the benefits of First Amendment protection."

But the Appeals Court in BEM created a new rationale for singling out the broadcast media for unequal treatment under the Constitution, Whitehead said. That rationale is described as follows:

- (1) Broadcasting is now the most important public forum.
- (2) The content of such an important medium must be related for the public to derive full benefit from it.
- (3) The First Amendment barrier to content regulation of a communications medium does not shield government activities.
- (4) Therefore, content can be regulated if broadcasting is found to be the government's First Amendment purposes.

Dr. Whitehead then warned that "this kind of logic is specious and cannot support unique treatment for broadcasting under the Constitution. When the faulty logic of the BEM case is exposed, all that remains is the effort to control content in broadcasting because it is an important and effective communications medium," Dr. Whitehead said.

Such a conceptual approach "distorts the First Amendment protections of broadcasting simply as a convenience," he added, "and



Dr. Whitehead.... "It could get so bad that Archie Bunker could kickoff the broadcast week on Saturday nights and the rest of the week would be devoted to rebuttals."

...rned that this same type of ap-
 ...ach also underlies the recent
 ...nter advertising proposal of the
 ...ederal Trade Commission (FTC).
 ...The FTC plan calls for giving
 ...e air time for the discussion of
 ...vertising claims that are disputed
 ...scientist, or for the discussion of
 ...negative aspects of advertised
 ...products.

"What this boils down to," Dr.
 Whitehead said, "Is that there
 would be government-controlled
 access to the broadcast media to
 state a personal opinion on almost
 any matter. Although this proposal
 was made in the FCC's Fairness
 Doctrine inquiry, it has little to do
 with that Doctrine. Rather it would
 shape the Doctrine into a new tool
 to regulate advertising, and thereby
 expand it far beyond what was
 originally intended and is now ap-
 propriate."

The OPT Director then warned
 that, if approved, such a govern-
 ment-controlled right of access to
 advertising could be logically ex-
 tended to apply to **programming** as
 well.

"It's not as farfetched as it may
 sound," Dr. Whitehead said, then
 asked "How would the courts re-
 spond to claims that ... Sesame
 Street's Cookie Monster encour-
 ages poor eating habits? ... It
 could get so bad that Archie Bunk-
 er could kickoff the broadcast
 week on Saturday nights and the
 rest of the week would be devoted
 to rebuttals."

"Some may think that the public
 wants endless debate of the merit
 of aspirin ... and Marcus Welby,"
 Dr. Whitehead said, "but I hardly
 think that an infinite variety of
 charges and counter charges is
 what the public wants or what ad-
 vertisers will underwrite."

Klein Brings Nixon Message

"We believe in the stability of
 the license renewal process ... and
 we believe that counter-advertising
 is counter to the system of free



*NAB President Wasilewski ...
 "It does not mean that we throw
 in the towel ..."*



broadcasting," the Administra-
 tion's Director of Communications
 told his NAB audience.

In remarks designed to tell
 broadcasters where the Adminis-
 tration stands on issues of impor-
 tance to broadcasters, Klein said,
 counter advertising would be a
 great discredit to the United
 States.

Klein added his own personal
 view on two issues of interest to
 broadcasters. A broadcaster, Klein
 felt, should have "every right to
 develop CATV in his own com-
 munity." He also said that cross-
 ownership of broadcast and news-
 paper properties in the same com-
 munity does not necessarily rule
 out healthy competition between
 the two media.

Mr. Klein then read a five page
 greeting from President Nixon.

Push For License Renewal Law

The move to bring stability to the
 license renewal process is "the
 most powerful, concerted effort
 ever mounted by members of the
 National Association of Broadcas-
 ters," according to Mark Evans,
 chairman of its License Renewal
 Task Force.

Speaking to the Joint Radio-TV
 Assembly, Evans reported that 204
 Congressmen and 43 Senators have
 indicated support for license re-
 newal legislation with an additional

68 Congressmen and 18 Senators
 indicating they are "favorably in-
 clined" toward such a measure.

He congratulated broadcasters
 for efforts made so far and assured
 that the drive to secure passage by
 Congress is still going forward.

"The question we now must ask
 ourselves," he added, "is:

"Where do we go from here and
 how do we get there?"

He went on to outline the Task
 Force "game plan," urging broad-
 casters to take the following steps
 to help assure passage of license
 renewal legislation next year:

- (1) Contact those Congressmen
 who have not been reached
 about the need for license sta-
 bility.
- (2) Contact **once again** those
 Congressmen who have been
 reached.
- (3) Pay more attention to the
 responsibility broadcasters
 have to relay the thoughts and
 attitudes of elected representa-
 tives back to their public.
 "Surely," he said, "we can do
 better than scheduling mem-
 bers of Congress on our air for
 five or 10 minutes at 7 a.m. on
 Sundays."
- (4) Call on religious, charitable
 and ethnic groups, newspaper
 editors and local officials—all
 of whom broadcasters con-
 stantly work with. "Ask for
 their visible, tangible help in

Newly appointed FCC Commissioner Charlotte Reid. Treasury Secretary John Connally . . . pause and reflect and occasionally give credit that something has been accomplished in this country.



the form of letters, particularly to Congressmen, as well as statements of support."

If broadcasters will follow through on these suggestions, Evans continued "we will then face those hostile to this legislation with overwhelming evidence that this is legislation that many people, not just broadcasters . . . regard as being in the public interest."

CATV Rules vs. Small Market TV

The FCC's new rules for cable television and the problems they create for small market telecasters were discussed at a Television Assembly of the Annual Convention.

Participating were Jack Rosenthal, KTWO-TV, Casper, Wyo., a member of the NAB's Secondary Markets Television Committee; Sol Shildhouse, chief of the FCC's Cable Television Bureau, and Robert W. Coll of McKenna, Wilkinson & Kittner, a Washington law firm.

Coll gave an extensive explanation of the rules to open the discussion.

Shildhouse said the FCC was assured by adopting the rules that both CATV and television will "remain alive and healthy".

Noting that the rules settled a long-standing conflict, he said that no one side can have everything its own way.

He said the rules recognized the fragility of secondary markets, permitting only a minimum number of distant signals to be carried by CATV in small market areas.

He promised that the FCC would keep a close watch on how the rules operate in small market areas, and will adjust as necessary.

"Today, we have only a blueprint," he said. "Perhaps tomorrow we'll have a track record."

Rosenthal, representing small market broadcasters commented that in his opinion the new rules "take from the poor and give to the rich."

He pointed out that there is no restriction on CATV carriage of distant signals outside of a 35-mile zone, no protection to the broadcaster on syndicated programs, and no exclusivity on network programs except that CATV was barred from showing programs simultaneously with a local broadcast.

Small market broadcasters, he said, are particularly concerned with the 35-mile zone, feeling that it is inadequate. They also feel there is a lack of any protection on syndicated programming.

Regulation Need Common Sense

The Federal Communication Commission's goal is a "balanced, objective, realistic and common sense approach to the regulation of radio", radio broadcasters were told.

Discussing FCC radio regulations, Commissioner Richard E. Wiley said the public interest does not necessarily require that "one of the most widely admired and enjoyed service to the American people be subjected to what many of you regard as regulatory overkill."

Commissioner Wiley and Richard W. Chapin, Stuart Enterprises, Lincoln, Neb., board chairman of the National Association of Broadcasters, reviewed the efforts of the Commission and NAB to re-regulate radio at a radio management conference.

Chapin reviewed the progress of the NAB group he heads to suggest to the Commission ways to relieve radio broadcasters of unnecessary regulation. Commissioner Wiley heads the FCC group.

Chapin said the first recommendations submitted were in the technical area: use of remote monitoring, relaxation of first class operating requirements, auxiliary broadcast service, and the visibility and accessibility of transmitters.

Commissioner Wiley said he feels the need "to properly adjust our administrative focus to meet radio's particular problems."

He said he is committed to the view that it is very much in the public interest "that we continue to enjoy in this country a healthy and economically viable commercial radio broadcasting system."

All too often, he said, when the Commission has attempted to design "meaningful and appropriate rules for the regulation of broadcasting, it has tended to think in terms of large market, VHF television.

"Accordingly," he noted, "radio, and particularly small market radio, has sometimes been saddled with a regulatory burden which, at best, is out of proportion to what the public interest realistically may require and, at worst, is both impractical and wholly unnecessary."

He said the Commission was to determine if its regulatory authority is being exercised in a "meaningful and pragmatic manner" consistent with the public interest.

To this end, he said, the Commission will analyze each rule pertaining to broadcasting "in order

(Continued on page 26)

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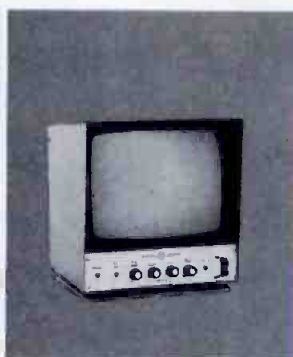
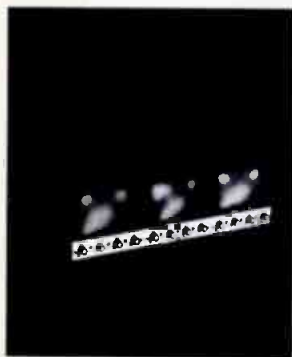
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Professional quality color video monitors offer broadcast quality at a modest price. Horizontal resolution 300 lines (color) and set-up controls are located behind a hinged front panel to prevent accidental misadjustment. Also available in 25" model.



The 23" monochrome video monitor offers excellent picture quality and attractive styling at a modest cost. Circuitry is 100% solid-state and the horizontal resolution is rated at 640 lines or better. Monitor has a variety of applications due to multitude of professional-quality features.

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Update On Broadcast Automation

This review of what's happening in broadcast automation reveals a new trend in the approach to real broadcast needs.

by Morris Courtright/BE Automation
Editor and head of Courtright
Engineering, Flagstaff, Ariz.

Not too many years ago large, glamorous machines with a multitude of switches, pins, pinwheels, keyboards, flashing lights and "brains" of innumerable composition were introduced with much hilly-hoo and fanfare. Install one of these marvels of engineering and, supposedly, you could cut your staff and sit back relaxing while all your programming and technical switching problems evaporated and the profits rolled in the door.

Not too surprisingly, and to the agrin of many, the veil of euforia disappeared and automation revealed itself as a very handy, workhorse machine to have around, but not as a panacea.

Emphasis On Simplicity

And, with very few exceptions, the automation displays at NAB this year reflected this trend. While the large, complex systems are available, the emphasis is on simplicity and practical flexibility. Trills and gimmicks were quite obviously absent. Not that there wasn't a variety of systems; there

were, and the broadcaster still must make a careful choice of the particular system for his station.

It is apparent, though, that the small market broadcaster now has a selection as well as those contemplating a highly sophisticated system. Also apparent this year is the willingness of manufacturers to assemble the system the broadcaster wants to do his job rather than just offering the so-called "stock" system and expecting the broadcaster to adapt.

As a result of the broadcasters' apparent disenchantment with highly sophisticated "do-it-all" systems and the manufacturers' trend to build machines and systems more practical for the smaller station, this year's NAB displays can be fairly well categorized by the function they perform: television switching, radio program operation, and administrative data processing.

Working In A Blizzard

It must be emphasized though, that systems to control switching as well as to perform the administrative functions are still available, particularly for television. Central Dynamics Corp., Sarkes-Tarzian and General Electric in particular offer total automation packages that handle everything from video

switching to traffic and sales. These same manufacturers provide master control automation as do Vital and Grass Valley Group.

Those stations more concerned with the blizzard of paper associated with station operation will find welcome relief. And, as with the programming systems, a trend to simplicity, including standard computer programming languages, and a slant to meeting the broadcasters' hard core needs are apparent.

Broadcast Computer Services introduced the use of the new minicomputers that have found much favor in science and industrial applications and is oriented to reducing the paper work headaches. Cox Data Systems and Data Communications Corp (BIAS) both demonstrated the use of terminal equipment connected to a central computer for a station management information system. A typewriter terminal, a cathode ray tube display, or both, are located on the station premises and these devices are connected to a large central computer, either through a minicomputer or directly, by data transmission lines. The station data base is maintained in the central computer and is instantly available to station personnel via the terminal device. These on-line real-time systems are designed to im-

prove operating efficiency, minimize revenue losses and increase response to the customer's needs by use of data processing techniques long ago accepted by business and industry.

Program Control

The most numerous displays, as usual, were equipment for automatic control of radio programming. As noted, the trend this year was to smaller, simpler systems and responsiveness to the needs of the broadcaster. The most noticeable change in equipment was Schafer's new 900 series and use of carousels instead of the old window tape spotter. The system can control programming by format, time insertion or a combination of the two. Not emphasized, but readily available is the Model 8000 automation system using a process control computer, and, tucked away upstairs, was the absolute minimum in program control—a simple sequential switcher running a bank of cassette machines.

The biggest splash was probably Broadcast Products who have gone contrary to the trend this year. Rather than scaling down an extremely large machine, BPI started last year with a small machine and this year introduced the AR-2000 complete with English print logging and facilities for computerized billing and traffic operations.

A newcomer to the automation field is VIF International displaying a very simple controller for sequential control of music with clock controlled commercials and IDs.

IGM came on strong with a new Model 700 using the instacart modules for talk or music and reel-to-reel for music. Still in the wings, of course, is the punch card 600 system as well as the compact 400 and 500 system. The instacart is one of the few alternatives to carousels for random access handling of the spot load with the demise of the window tape. Again, as last year, the demonstration of the Instacart's ability to split sentences between cartridges must be heard

to be believed.

SMC, another strong contender, showed the Model 600 Digi-c system which uses the small pla card for event control and the D digital programming system complete with English print logging. One of the few systems to use true ferrite core memory, the D does not lose memory, or use a battery to minimize chance of loss, the event of power failure. Of great interest is the fact SMC uses computer compatible ASCII coding the cartridge cue track to log spots while they are playing, not just when the event was scheduled.

A most useful ancillary gimmick is the ability of the system to respond to a sonalert buzzer tone on any phone line and make the call the next scheduled event. What an easy way to bring in on-the-spot news reports or remote broadcasts but be careful who has the machine's phone number.

Similar to last year, but on a grandiose scale, Gates Radio displayed a fully automated FM station, including a 1KW transmitter

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ing into a dummy load. A digital programming systems using OS memory and also featuring CII coding on the cartridges. is a custom installation as are ist of the Gates systems. The criterion vertical stack multiple bridge unit is the other alternative for sequential handling of cartridges.

Hiding in the midst of the glamorous video and transmitter displays was the RCA automation system which again is oriented to custom installation. Sparta Electronics seems to be concentrating on sequential program control for the smaller station with the Spartation 103 all cart or 121 reel-to-reel and cart combination and building upwards to add more audio sources. CCA has expanded its animation to include a little more flexibility, but is also a sequential controller aimed at the small market broadcaster.

Last, but by no means least, is the Autogram system shown in the Collins display. A relatively simple but quite flexible system, the Auto-

gram falls between the simple sequential switcher and the sophisticated card or digital programming system and is well suited for the small to medium market broadcaster. The lack of major changes to this system indicates the manufacturer is sticking to a reliable, time proven set of hardware. An item of no small interest to the engineer who must look after the system, or the manager who must live with it.

Automatic Logging

In a category by themselves, but a definite part of the total automation picture, are the automatic transmitter logging systems. Mosely Associates again offers its time proven digital transmitter logger and status indicator/alarm system, while Rust introduced a chart logging unit and new status and alarm system.

So, in a nutshell the picture of automation as shown at NAB this year is one of simplicity, perhaps even austerity, and a desire to meet

the real, specific needs of the broadcaster. Almost all manufacturers now offer a full line of automation ranging from simple sequencers to digital control systems. As always, the amount of flexibility is directly proportional to the cost and the broadcaster more than ever must make a careful comparison of different systems under consideration. With the many combinations now available, cost alone can not be taken as the sole indicator, as an inflexible sequencer with many audio source devices can cost more than a more sophisticated controller with less devices. The true decisive factor is what the station intends to do with, and expect from, the system.

Thus, this seems to be the key to finding your way through the maze of equipment shown this year. Define and state your needs, including format flexibility as well as just the kind and amount of audio sources devices, then carefully evaluate what is offered. There is a system to meet your needs, and, after all, it's a buyers market.

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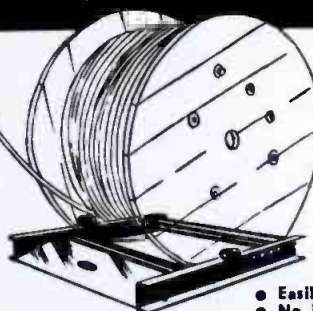
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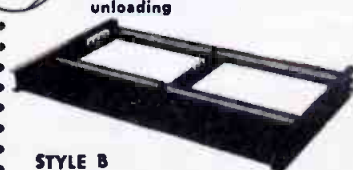
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Fig. 1 Photo of downtown Hartford with WTIC-TV at "A", Travelers Weather Service at "B", and microwave receiver at "C". Avon, where the transmitter is located, is beyond the top of the picture.

Operating Weather Radar by Remote Control

By Harold Dorschug*

*Director of Engineering Research, WTIC-TV, Hartford, Conn.

Weather radar systems are appearing in more and more television stations around the country and are no longer a novelty. However, WTIC-TV in Hartford, Conn. has recently installed a system containing a number of unique and practical features which make it of interest to other stations plan-

ning the purchase of such equipment.

What is different about the WTIC-TV installation? The RF unit is separated eight miles from the control point and operated by remote control. It also has two control terminals. Furthermore, it is believed to be the only system of its kind in the world, and one of a very few remote-controlled radars outside government or military activities.

This multi-terminal arrangement is necessary because the studios of WTIC-TV are situated in a relatively low spot surrounded by taller buildings as shown in Figure 1. These would cause severe blocking

of the radar beam in three directions. Consideration of all possible sites within reasonable distance disclosed that the WTIC-TV transmitter plant eight miles west in Avon, Conn. offered the most advantages. It is the highest point in the area with unobstructed views in all directions.

The main terminal is at the Travelers Weather Service, a commercial weather forecasting service and subsidiary of Broadcast-Plaza, Inc., licensee of WTIC-AM-FM-TV. It is indicated by B in Figure 1. A second terminal arranged for television use is in studio B at Broadcast House marked by A in Figure 1.

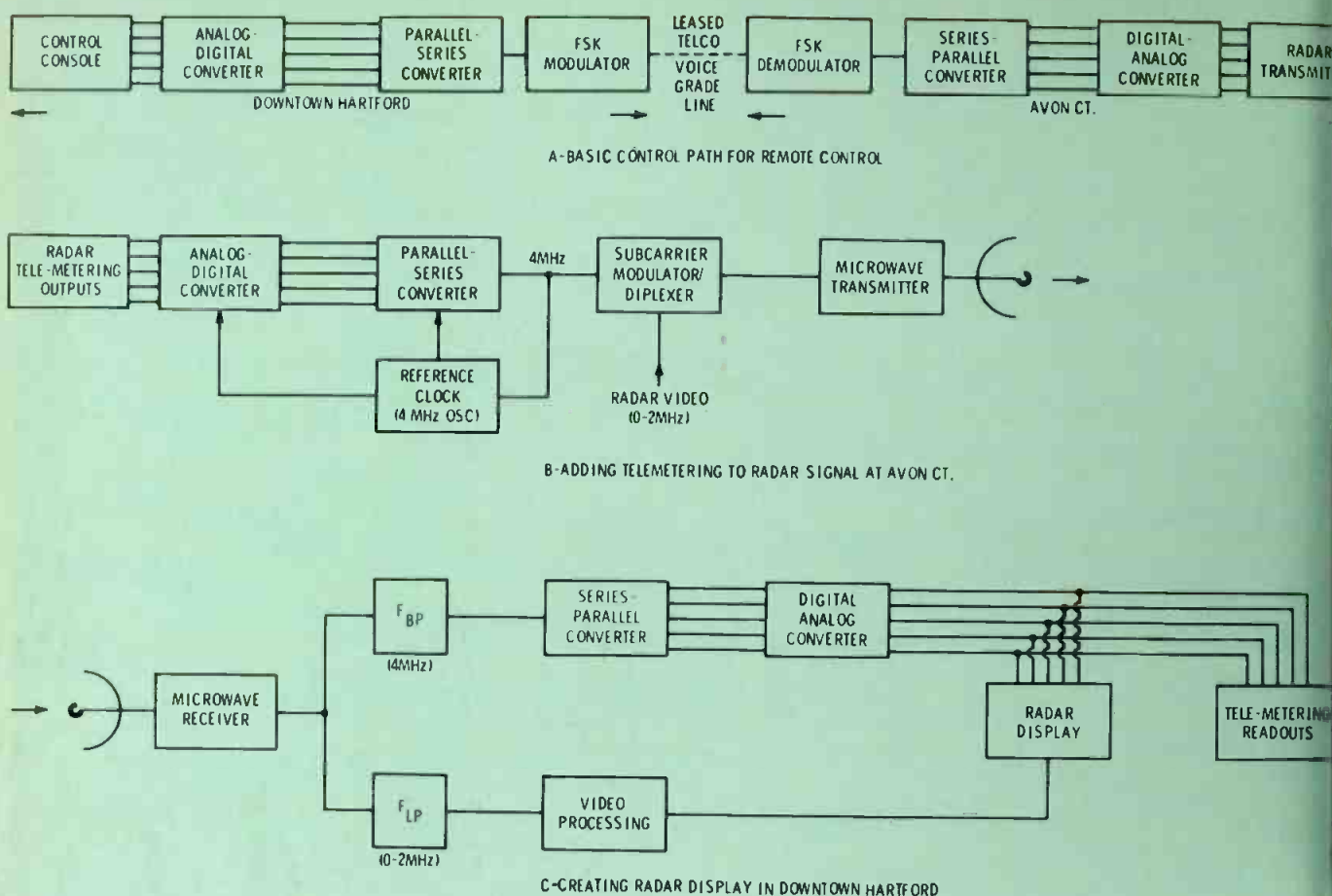


Fig. 2 Block diagram of the basic elements in the radar remote control system at WTIC-TV.

The WTIC Radar System

The remote control system which makes operation of this widely separated equipment possible, is shown in simplified form in Figure 2. The technique is to convert all analog control functions to binary coded digital form. When put in serial form, these functions can be handled by narrow band interconnecting circuits. At the far end of the circuit, a digital-to-analog conversion occurs making the functions available for direct control use.

Primary functions such as power application, elevation, azimuth, scan rate and certain mode instructions originating at either downtown terminal are carried to the transmitter at Avon, Ct. as shown in A of Figure 2. The frequency-shift keyer utilizes 1100 Hz for a binary code "0" and 2300 Hz for a "1". The voice-grade telco line has a 1200-baud capacity.

Antenna position information and certain other servo values are telemetered from the transmitter to the downtown terminals as shown at B. Basically, this consists of a regular television microwave relay system in which radar video occupies the lower 2 MHz of the channel and the digital BCD train is used to modulate a 4 MHz diplexed subcarrier.

At C of Figure 2 is the method of creating the radar display. Filters separate the two portions of the signal after which they are processed for their respective uses. In the case of the BCD bits, they pass into Digital-Synchro converters which control the servo units and Digital-Sine/Cosine converters which operate Azimuth and Elevation indicators.

The microwave receiver is located on the 18th floor of a nearby building to provide path clearance from Avon and is marked as C in

Figure 1. A co-axial cable connects that point with the Weather Service terminal. A similar cable plus D control circuits carry on from there to the studio.

The radar system is a type MR781 manufactured by Video Services Division of Automatic Industries, Inc., Fort Walton Beach, Florida. It operates in the range 5450 to 5825 MHz with a peak power output of 250 kW. The normal pulse repetition rate is 2 PPS, but it has been necessary to modify this somewhat to avoid interaction with the bit rate of the remote control system. Pulse width is 2 microseconds.

The antenna is a six-foot dish mounted atop an unused FM tower originally 200 feet high. Waveguide connects the antenna and RF unit which is housed in a small building at the base of the tower. This arrangement is shown in Figure 3.

The remote control sub-system



Fig. 3 Radar RF system at Avon, Conn. The range finder had not been installed when this picture was taken.



Fig. 4 Travelers Weather Service Terminal. Display at left is the Range Height Indicator (RHI) and at right is the Plan Position Indicator (PPI).

as designed and supplied by Lencom, Inc. of St. Petersburg, Florida, as a vendor to Vitro.

The main control terminal is shown in Figure 4. The right section contains the Plan Position Indicator (PPI) scope and the major operating controls. The left section has functions of special interest to the meteorologists. At top is the Amplitude Range Indicator and below it the Range Height Indicator. These two features allow investigation of specific weather phenomena useful in forecasting but which have no meaning to the television audience.

At Broadcast House the television terminal is built into the weather set in studio B as Figure 5 shows. Actually, only the control panel is visible since the PPI scope is concealed behind the set. This is possible because a vidicon camera is permanently attached to the PPI for conversion of the rho-theta ra-



Fig. 5 Studio terminal at right with camera monitor just above. The PPI and camera are behind the panel.

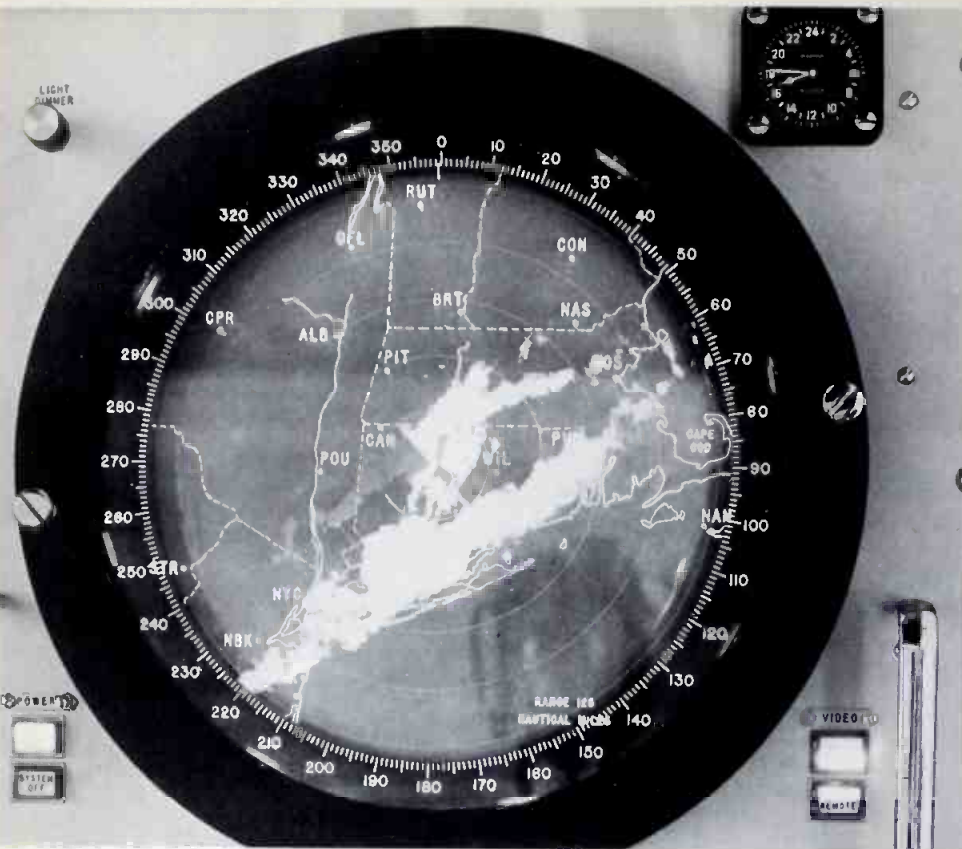


Fig. 6 Example of severe storm center displayed on PPI. The range was 125 miles.

dar scan to the X-Y television raster. The monitor visible in Figure 5 is fed from the camera output and is principally used by the forecasters in positioning a small white pointer in the picture for emphasis. The pointer, generated electronically, is controlled by a joy-stick on the panel and may be moved to any point the display requires.

Three overlays with maps outlining the area within 50, 125 and 250 miles are in place over both PPI terminals. Edge lighting illuminates the proper overlay automatically when the range selector is operated.

A recent storm center is shown in Figure 6 as it appeared on the PPI. A long persistence CRT is installed in the TV PPI terminal and a "sticky" vidicon in the camera for maximum retention of the image. Since the radar scanning rate is variable but usually between 4 and 6 RPM, it is a problem to maintain full video level for the 10 to 15 seconds between scans. Consideration is being given to using one of the high-resolution scan converter tubes available although this presents a problem with the overlays.

The FCC License

Weather radar stations are licensed by the FCC in the Industrial Radiolocation Service. Regulations for this service are contained in Subpart M of Part 91 of the FCC Rules and Regulations. Broadcast engineers faced with installing a radar should read Part 91 and Subpart M carefully because there are many differences between this part and the more familiar Parts 73 and 74.

FCC Form 400 is used to make application for the license. Since this form is used for all Safety & Special Services applications and does not pertain directly to radar installations, an engineering statement giving specific details must be supplied. Remote control features must be fully explained. If the equipment is not type accepted, additional information must be submitted.

Frequencies available for this service are listed in Section 91.604. All use is on a shared and secondary basis and every assignment by the FCC must be cleared by the Interdepartmental Radio Advisory Committee (IRAC). It would appear from our experience that an

application specifying any frequency between 5600 and 5650 MHz has little chance of being granted because of primary government use.

Licenses are issued for a five year period which is not concurrent with the broadcast license. Mark the termination date well so the renewal will not be overlooked.

The microwave station is licensed as an Intercity TV Relay. Application is made on Form 3 and about the only word of caution necessary here is that if the television station already operates an STL and one or more Remote Pickup Stations, selection of an additional frequency must be justified under the terms of Section 74.602. The emission designation for a radar with a control circuit subcarrier is F9.

Operator Requirements

Contrary to popular opinion, Ship Radar Endorsement is required on the operator's license. The person doing the radar service for this class of station at this time. Section 91.154 (a) requires that all transmitter adjustments be made during installation, servicing or maintenance shall be made by the holder of a First or Second Class commercial license.

For routine operation, Section 91.154 (c) permits an unlicensed person to perform all necessary control actions such as turning power on and off, changing scanning patterns and similar functions as long as the operations do not affect power or frequency.

Section 91.160 concerns itself with Station Records and should be studied carefully to determine what kind of a log must be kept. Compared to the relaxed conditions found in some other parts of Section 91, this portion is quite strict.

The weather radar at WTIC-TV is the only one at this time in the northeast and it is proving to be a valuable device for meteorological forecasting and a TV attraction which has been enthusiastically accepted by the public. The difficulties of operating a radar by remote control under adverse conditions have been overcome and a station with a similar environmental problem may now consider the benefits of radar without concern.

The Pick-Up Pros.



Artie Altro makes the WOR-FM sound, while Eric Small, Sebastian Stone and Promotion Director, Kim Olian look over a new album.

WOR-FM, the country's leading FM/Stereo rock station, has been using Stanton cartridges since its inception.

Program Director Sebastian Stone likes the smooth, clean sound the Stanton delivers; the way it is able to pick up everything on the record so that the station can assure high quality transmission of every recording.

Eric Small, Chief Engineer for WOR-FM, likes the way that Stanton cartridges stand up under the wear and tear of continuous use. "We standardized on Stanton a couple of years back," Small said, "and we haven't had a cartridge failure since. Studio Supervisor Artie Altro concurs.

Whether you're a professional or simply a sincere music lover, the integrity of a Stanton cartridge delivers the quality of performance you want.

There are two Stanton professional cartridge series. The Stanton 681 Series is engi-

neered for stereo channel calibration in record studios, as well as extremely critical listening. The 500 AL Series features design modifications which make it ideally suited for the rough handling encountered in heavy on-the-air use. In fact, among the nation's disc jockeys it has become known as the "industry workhorse."

All Stanton cartridges afford excellent frequency response, channel separation, compliance and low mass and tracking pressure. And every Stanton cartridge is fitted with the exclusive "longhair" brush to keep grooves clean and protect the stylus. They belong in every quality reproduction system—broadcast or high fidelity.

For complete information and specifications on Stanton cartridges, write Stanton Magnetics, Inc., Terminal Drive, Plainview, L.I., N.Y. 11803.



All Stanton cartridges are designed for use with *all* two and four-channel matrix derived compatible systems.

Circle Number 25 on Reader Reply Card

By Pat Finnegan*

Antenna towers projecting like needles into the sky, are tempting targets for lightning discharges. Such discharges can produce havoc with equipment on the tower, at the tower base, and inside the transmitter building.

Protection is based mainly on a static drain principle. Charges building up within the vicinity of the tower are drained off to ground before they can develop full damaging potentials. Lightning strikes nearby also can induce strong currents in the tower. These currents must also be drained before they can cause damage.

Grounded towers: These are the easiest to protect. The first requirement is a sharp pointed rod above the highest point of the tower, and this means above the top beacon. Some towers use three rods in a cluster. These rods must be securely bolted to the tower with a good electrical contact. During tower inspections, these rods should be inspected and especially the connection to the tower. Wind flexing of the rod can sometimes cause the bolts to work loose and the rod may break off.

Antennas and transmission lines should be grounded to the steel tower at various places down the tower. At the base of the tower, a heavy copper strap should connect the steel tower to one or more ground rods driven several feet into the ground. The concrete pier is not a good ground connection.

Insulated towers: The insulated AM tower presents more problems since the antenna base must be RF insulated from ground. Protection at the top is the same with lightning rods above the beacon. Since the lightning path will follow the lines

of least resistance, try to provide this. The RF feed line to the tower should have at least one or two loops in it about 12" in diameter so as to make that path inductive.

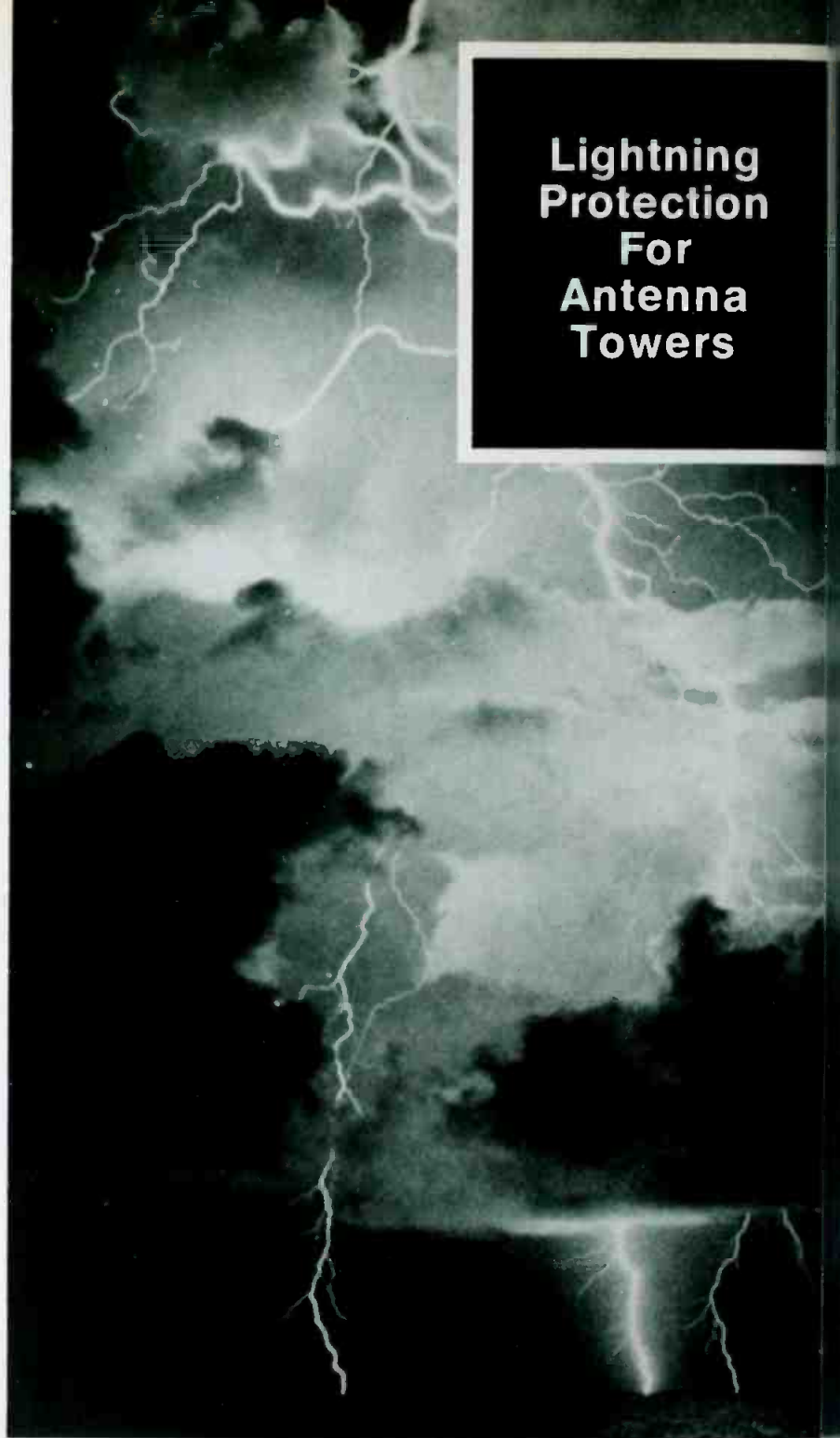
The path to ground across the insulator should be ball or horn gaps. These gaps should be as close together as practical so as to reduce the gap resistance. Adjust the gap so that it will not arc across on sustained 100 percent carrier modulation. The setting should be just beyond this point so as to allow a small

amount of leeway. Incidentally, these gaps need to be kept clear out as insects may build nests here and cause RF arcovers.

Precautions mentioned so far will not entirely eliminate current surges from lightning, so it is very important that line or antenna meters be not left active in the circuit. They should be either removed, or a ground meter shorting system used. A surge of current will invariably burn delicate meters left active.

Discharges across the gap will

Lightning Protection For Antenna Towers



*BE Maintenance Editor

Fig. 1 Various points on an insulated AM tower require special attention for minimizing damage from lightning.

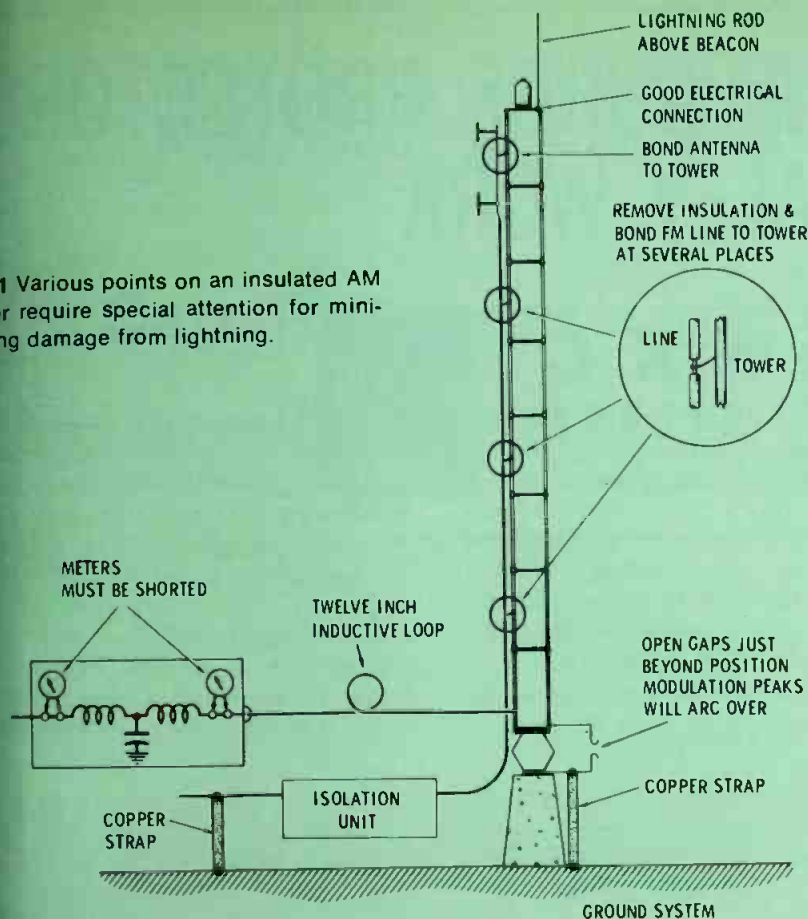
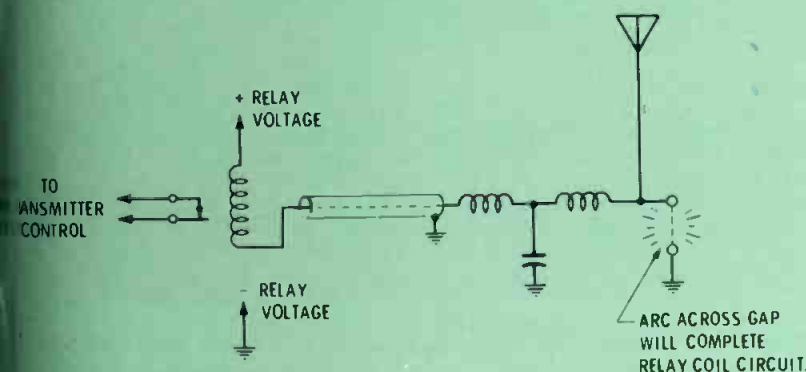


Fig. 2 General arrangement of an arc quencher. Arc across the gap will complete relay circuit and cause it to operate. Contacts may be normal open or closed, depending upon circuit operated. Capacitor in series with antenna lead for tuning purposes will prevent quencher from operating.



use a short of the RF and thus the load on the transmitter. The transmitter needs protection in the way of an arc suppressor. This is simply a relay device whose coil circuit is completed through the arc itself when one occurs. The relay operates to either remove plate voltage or RF drive so as to quench the arc. Once the arc is started, the RF will sustain it unless the RF is removed. When making changes in the antenna tuning unit, care must be taken not to add a series capac-

itor to the line or the relay circuit path will be broken.

The ground side of the ball gap at the tower base should be connected to the antenna ground system by a very heavy strap.

The side mounted FM antenna: It should be bonded to the tower with a good electrical ground, as should the transmission line up the tower. If the line has an insulating cover, this should be opened and the line bonded at various points.

Where the line crosses the tower base through an isolator or insulated section, the line should be bonded to ground at the nearest point after it crosses the base.

Guyed towers have insulators broken up into insulated lengths for RF detuning purposes. These insulated wires will have high voltages induced in them from lightning, and there is well enough charge to jump these insulators. Carbon can build up on the insulator can crack and fall off. Carbonized, cracked or missing guy insulators should be replaced as soon as possible.

All these techniques are not guarantees there will be no lightning damage. System elements in the tuning house should be inspected after storms for damage. The tuning house or at the ends of guys are not a safe place to be during a storm or the period immediately preceding. It is most unwise to try calibrating antenna meters or have someone on the tower during the period preceding a storm—let alone during the storm itself. Often, the atmosphere is highly charged just prior to the storm.

Recently, a new process has become available for lightning protection of broadcast towers. This has been made available through **Lightning Elimination Associates**, a California firm. The new process approaches the problem of lightning by elimination rather than protection. While the sharp pointed lightning rod normally used—and the new process have the basics in common—the new process speeds up the efficiency of the static drain principle so tremendously that charges are drained off faster than they can build up.

Not only will this eliminate lightning strikes on the tower and immediate vicinity, but will eliminate strikes over a wide area. Each tower is a customized job. An installation may include a top cone, side panels, special guys, or a combination of these, all containing thousands of scientifically designed sharp points, along with a very efficient grounding system, which will drain the static faster than it can build up over a wide area.

WILKINSON LINE SURGE PROTECTORS REALLY WORK



WKCI
STEREO



101.3 FM

2827 OLD DIXWELL AVENUE, HAMDEN, CONN. 06518

Wilkinson Electronics, Inc.
1937 MacDade Blvd.
Woodlyn, Pa. 19094
Attention: Guffy P. Wilkinson

Dear Sir,

In May of 1970 WKCI was thrown off the air by a large line voltage surge that arked our rectifier stacks in our FM xmtr. During July of 1970 we purchased and installed a Wilkinson Surge Protector model SLA3. Since that time I know of two times that the line voltage surges have been large enough to blow the fuses in the primary of the power companys on the pole distribution transformers which are located outside our building. Both times the Wilkinson has kept our equipment from being damaged.

I have a few questions that I would like to have you answer if possible. The last time we were hit only one fuse of the three phase line was blown and this left the other two legs in tact. It also made some of the lights in the building glow at half power. Our transmitter had low voltages and would not stay on the air but while this was happening the announcers reported that much smoke was coming from the Wilkinson surge protector. Visual examination revealed no damage. This brought up much discussion around the station as to:

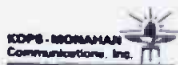
1. How can you tell if the Wilkinson is working?
2. How can you tell if the Wilkinson has been damaged?
3. How can you test this Wilkinson?

There must be some way to test this 'blue gray box' that just seems to keep working and working.

Thanks in advance for any information that you can send me, and many thanks for a piece of equipment that is really doing a job.

Very truly yours,

Winston R. Suitor
Winston R. Suitor
Chief Engineer



WILKINSON
ELECTRONICS, INC.

1937 W. MacDADE BLVD.

WOODLYN, PA. 19094

TELEPHONE (215) 874-5236/874-5237

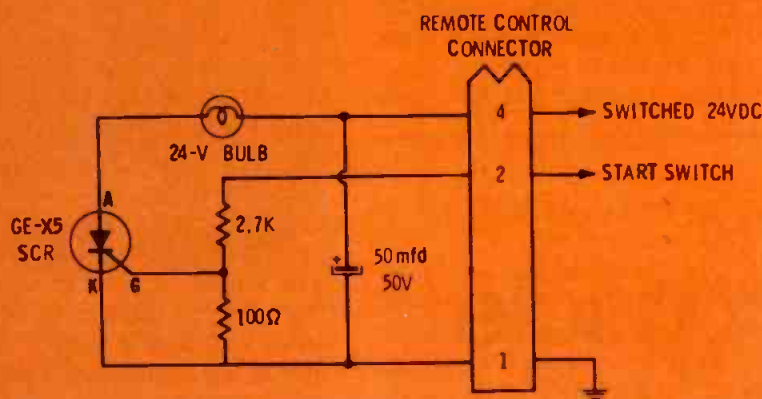
ENGINEER'S EXCHANGE

Cart Reminder Light

In today's fast-paced broadcast world, probably every announcer has found himself staring at a load-bd cart machine and wondering, "did I play that cart or didn't I?" At WSTM, a quick answer is available. When the start button is pressed, a simple circuit added to our ATC/Gates Criterion machines turns on a pilot lamp which will remain on until the cartridge is

the SCR will remain on as long as the voltage is present on pin 4, and it will be until the cartridge is removed. The 50 mFd capacitor is necessary because the relay power supply is pulsating DC, and without filtering the SCR would turn off when the voltage dropped to zero.

A relay could have been used instead of the SCR, but the SCR is cheap, reliable, and completely



removed from the machine.

When a cartridge is inserted, the 24-Volt relay power supply voltage appears on pin 4 of the remote control connector. This is wired to a pilot lamp which is controlled by an SCR. Pressing the start button momentarily applies 24 Volts to pin 2 of the connector. This is used to switch the SCR. Once turned on,

quiet. The pilot light assembly was easily installed on the front panel. According to the announcers, this is another one of those little things that helps make life easier.

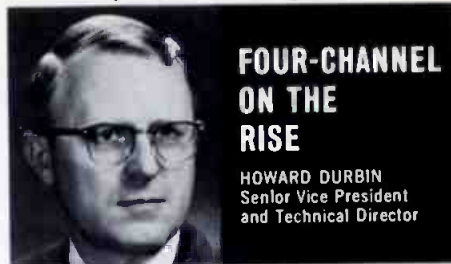
Charles R. Strickland
Chief Engineer
WSTM-FM
Louisville, Ky.

Mic Relay Modifications

Mr. Sweigart's circuit in the February, 1972 issue of **BE** prompted me to apply the idea here at WHUN. I began by making a few modifications, such as the addition of S3b and c, so that the black box could, indeed, be by-

passed. Due to the somewhat "live" nature of our studio, I felt that a delayed off feature for muting was desirable, regardless of how the mike was to be controlled. A series RC network across the muting relay coil in the console

Number 89 in a series of discussions
by Electro-Voice engineers



FOUR-CHANNEL ON THE RISE

HOWARD DURBIN
Senior Vice President
and Technical Director

With a variety of encoding techniques now available, either as records you can play directly, or encoders you can use to convert original 4-channel material to matrixed stereo, what is the effect on the listener who has selected a specific decoder for his 4-channel system?

In most cases he will hear a perfectly satisfactory performance, albeit in some cases slightly different from the specific locations intended by the recording engineer. But even this variation is now being reduced with the introduction of the new Electro-Voice "universal" decoder. This IC circuit is available in a separate decoder, in a receiver, and as an element for other manufacturers to include in either component or packaged stereo equipment. It decodes any of the known matrices with remarkable accuracy and without the need to change switches or settings on the part of the listener.

It is expected that in the near future the industry will settle on a recommended "standard" for matrix decoding. However, for many recording engineers this standard will simply be a starting point for variation, much as the RIAA curve is really just a reference standard rather than a firm rule to be followed.

For this reason our four-channel encoder, Model 7445, so widely used by FM stations and recording studios, will soon have several encodings selectable by the engineer. This permits favoring the left-right spread, or front-back separation depending on the needs of the program. Means to up-date E-V encoders now in the field will be available.

One other factor concerns many FM broadcasters today. It is the announcement of so-called "discrete" discs. It seems likely that the FCC will require revisions of present FM broadcast standards before any "discrete" broadcast technique is permitted on other than an experimental basis. Even so, "discrete" discs can be played (as stereo records) without broadcasting the directional information on the disc's sub-channels. And a listener with a matrix decoder can reconstruct an interesting 4-channel effect, just as he now "enhances" stereo records you presently play.

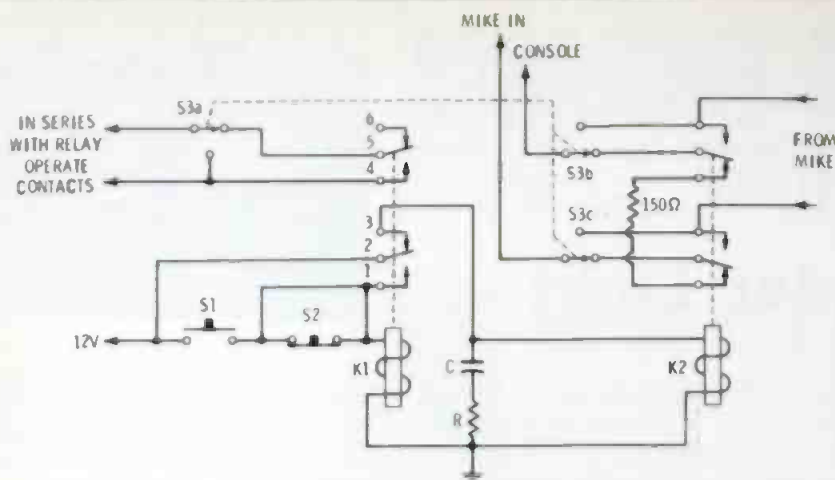
While some of the directional effects may be reduced, none of the music is lost with this technique. And it has been proposed that even "discrete" discs employ matrixing of the main channels so that either matrix or discrete demodulators can be used to play the same record. Thus the record would be truly compatible for all forms of playback equipment, including matrix FM stereo broadcasting.

Software for programming of 4-channel is continuing to increase in availability. And 4-channel hardware is expected to arrive in mass quantities this year. While stereo will remain with us for years, much as mono has survived, it is probable that 4-channel FM will soon become the rule rather than the exception.

For further information on 4-channel stereo,
or technical data on any E-V product, write:
ELECTRO-VOICE, INC., Dept. 624V
638 Cecil St., Buchanan, Michigan 49107

Electro-Voice
a GULTON subsidiary

Circle Number 26 on Reader Reply Card



insures that de-muting is delayed until the mike is off.

In the "black box", K2, which is normally "picked-up", is an instant on-delayed off unit, by virtue of the series RC network across it's coil. The 150 resistor across contacts 1 and 4 (of K2) loads the mike input of the console to prevent the pick-up of "audio crud" as sometimes happens with an un-terminated high-gain input.

The operation of the circuit is as

follows:

- Pressing S1 operates K1, which is sealed in by it's own contacts 1 and 2. The console muting relay is operated by contacts 4 and 5 (K1). Contacts 2 and 3 (K1) are opened, opening the circuit to K2, which after a time delay determined by R, C, and R coil drops out. Contacts 2 and 3 and 5 and 6 (K2) are closed, turning on the mike.
- Pressing S2 drops out K1, seal-

ing in K2, and opening the circuit to the console muting relay. When K2 seals in, the mike input is opened, and the 150 resistor substituted for the mike. After a delay, the console muting relay drops out, de-muting the speakers. The sequence is: mute, mike on, mike off, de-mute.

- Operating S3 restores normal muting control (S3a), and bypasses the mike around K2, (S3b, S3c) restoring normal operation.

This circuit is particularly useful in a studio or announce booth, giving the announcer control over the mike and monitor, but still permitting over-ride control by the engineer. My thanks to Mr. Sweig for the idea.

Jeff Bixby,
WHUN, WHUN-AM
Huntingdon, IL

Quad In Virginia

The acceptance of quadraphonic broadcasting has been terrific in the Richmond area. And we have found that in order to have good direction and separation for the quadraphonic, exact phase relationships must be maintained in the whole audio chain of the station. The telephone lines which we use from the Holiday Inn to our studios were balanced within 2° of phase across a 15,000-cycle range. All our exciter separation was checked and phase relations in the exciter were tuned and corrected. The better the separation, the more exact the phase relationship, the better the quadraphonic broadcast.

We also found that the London Phase-4 recordings are excellent quadraphonic records. They contained quite a bit of good directional information. We did use them during the live broadcast, and are now preparing to go into more depth in recording quadraphonic music. We will expand our hours of broadcasting as more and more material becomes available. We have also added a Type B Dolby to our FM system, and found remarkable reduction in tape hiss noise on the air, but this is an article and story in its own.

Sam Straus,
WRVA
Richmond, VA

another new mcmartin console "FIVE"channel mixer



B-501 Mono Console \$750.00

B-502 Stereo Console \$1,050.00

McMartin has designed a series of 5-mixer consoles for production or subcontrol room application ... with enough flexibility to serve as the main control console in smaller station operations.

Two models are available: The B-501 mono and the B-502 stereo version.

Plug-in card design for all program circuits permits full latitude in assignment of ten input sources to the five mixing channels.

Professional performance ... human engineering ... attractive design ... combine to offer the user the ultimate in monaural and stereo five-mixer consoles.

For complete information, contact: Director of Sales (402) 342-2753

McMartin

• 605 north thirteenth street • omaha, nebraska • 68102 •

Circle Number 27 on Reader Reply Card

NEW PRODUCTS

(Use circle number on reader service card for further information)

Video Cassette Machine

Broadcasting executives and engineers, meeting for the National Association of Broadcasters convention saw the first public demonstration of the Norelco "VCR" or video cassette record/playback machine. The unit was shown operating in the exhibit area of Philips Broadcast Equipment Corp., a subsidiary of North American Philips Corporation.



The Norelco VCR demonstrated at NAB records and plays back in color and black & white through conventional home receivers. The unit itself is compact, rectangular, and fits easily on a small tabletop. It is highly portable, weighing approximately 33 pounds. Both sound and picture are carried on one-half-inch magnetic video tape

which is contained in a cassette about the size of a paperback book. One cassette records/plays 50 minutes of color or monochrome programming.

The Chicago color demonstrations were comparable to the best reception one is likely to receive under favorable circumstances on a home TV set.

John S. Auld, president of Philips Broadcast Equipment Corp., says that the early market for the Norelco VCR will be education, industry and government, not the consumer market. Price, he says, will be competitive and consistent with the high quality of the Norelco unit. No quantity production commitments will be given at this time.

Circle Number 60 on Reader Reply Card

FCC Type Approved AM Monitor

A new AM frequency and modulation monitor that measures frequency and percent modulation of AM broadcast transmitters off the air without using an RF amplifier was introduced by **TIME AND FREQUENCY TECHNOLOGY, INC.** at the NAB convention.

Called the Model 713, the new monitor has a sensitivity of 2.5 mv,

(Continued on page 44)

ask about our new am | fm | tv monitors



Call or Write ARNO MEYER

BELAR ELECTRONICS LABORATORY, INC.

Delaware & Montrose Avenues, Upper Darby, Pa. 19084 Box 83

(215) 789-0550

Circle Number 49 on Reader Reply Card

Little power giant 1.

Hybrid amplifier delivers 10 full watts distortion free.

\$44.95



Applications:

- ☐ General purpose power amplifier.
- ☐ Studio monitors.
- ☐ P.A. systems.
- ☐ Line amplifiers.

Specifications:

Input Impedance: 10,000 Ohms
Nominal (Gain Control)

Output Impedance: .3 Ohms
Typical

Input Voltage: 300 MV. for 10
Watts Output

Output Load: 8 Ohms

Frequency Response: 1/2 DB
20-100,000 HZ

Power Output: 10 Watts RMS
(Harmonic Distortion: <0.5%)

S/N Ratio: 90 DB Typical

Idling Current: 30 MA Typical

Size: Rack Mounting, 19 1/2" Long,
3" Wide

RHA

Audio Communications Corp.

625 - 60th Street,
West New York, N. J. 07093
201-854-1950

- ☐ Please send me _____ RHA-10 at \$44.95 each.
- ☐ My check for _____ is enclosed. (Include \$1.65 postage per unit.)
- ☐ Please send C.O.D.
- ☐ Please send, FREE of charge, your spec sheets on your complete line of Solid State Amplifiers, Oscillators, Power Supplies and R.F. Boards.

Name _____

Address _____

City _____ State _____ Zip _____

Circle Number 28 on Reader Reply Card



... for your every broadcasting need, and with 100% financing!! It's faster, easier, and less costly for you to let SPARTA service your needs.

A smooth and profitable operation is yours with SPARTA equipment because value is built in, in such a way that dollar for dollar you can't find a better buy in quality broadcast products.

Call or write us today and we'll send you colorful brochures detailing our complete product line.

SPARTA HAS EVERYTHING!!!



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5851 FLORIN-PERKINS ROAD SACRAMENTO, CALIFORNIA 95828 (916) 383-5353

A DIVISION OF COMPUTER EQUIPMENT CORPORATION

Circle Number 29 on Reader Reply Card

(Continued from page 43)

a 40 dB of AGC range, and provides digital readout of frequency error in 1 Hz resolution. Interference due to intermodulation products of unwanted signals are substantially minimized due to the absence of the RF amplifier.



Model 713 maintains a frequency accuracy of ± 2 Hz per year and can be used as a 10-MHz general purpose frequency counter. Besides the built-in modulation calibrator, there are two peak flashers in the Model 713 to provide simultaneous display of positive modulation up to 129% and negative 100% modulation.

Optional accessories include, off-frequency alarm, telemetry output, BCD or analog output of frequency error for automatic logging and plus 5% and minus 10%

carrier level alarms. A remote meter panel, Model 704A, is available for duplicating the display of the Modulation Meter and the two Peak Flashers.

Circle Number 61 on Reader Reply Card

Low Cost Color TV Camera

Shibaden Corporation introduced their all new professional color camera, the FP-1200.



The new camera is a 3-tube Plumbicon design with specs that make it applicable for broadcast, cable, medical, educational and industrial TV.

The FP-1200 features include: standard NTSC encoder, color bar generator, aperture correction,

masking amplifier, electronic temperature compensation, neutral density filter turret, remote registration, red channel compensation, EIA sync generator, and cable compensation (1,000 feet).

The FP-1200 package includes camera head, 5-inch viewfinder, 50 feet of cable, camera control unit and 10:1, 16:160mm F2.5 lens (includes cable driven zoom and focus and auto iris).

Circle Number 62 on Reader Reply Card

Time Mark Gen For Calibrating Scopes

A new time mark generator, 100 Hewlett-Packard Model 226, supplies narrow one-volt pulses at precise time intervals for calibrating the time bases of oscilloscopes and recorders.

A single front-panel control selects 30 time intervals. They range from 2 ns to 10 s in a 1, 2, 5 sequence, and correspond to 10 sweep timing on most oscilloscopes. A crystal-controlled clock assures $\pm 0.002\%$ interval accuracy after only 1/2-hour warm-up. Marker output impedance is 50 ohms.

A 1-volt trigger output pulse is also available. It can be used to externally trigger the oscilloscope using calibrated or other equipment. Trigger rate is coincident with the markers up to the 100-ns range. The trigger on faster ranges automatically counted down to 1 MHz.

A TTL-compatible programming option makes all ranges programmable with a 6-bit binary instruction. This enables computer control of oscilloscope calibration, for example. The option requires 6 parallel lines plus 2 timing lines.

Circle Number 63 on Reader Reply Card

Lens Extender

The new lens extender manufactured and marketed by Birns & Sawyer is designed for Angenieux lens applications for both the Arri 35 and Arri 35. Firm president, Dick Birns, reports significant improvements in the new extenders, one a 3-element and the other a 5-element lens, to double the focal length of all Arri Angenieux lenses. Called the TeleZoom, the 3-element lens converts the 12-120 Angenieux to 24-240 and the 9.5 to 19-90. According to Birns, the TeleZoom 5 is the most brilliant extender for the Arri 35 Angenieux zoom lens ever made, doubling its focal length. TeleZoom 5 can also be used for the Arri 16.

Circle Number 64 on Reader Reply Card

Wideband Scope

The Hickok 5000A Wideband Oscilloscope offers wide dynamic range and sensitivity (10 nV/division) at an economical price. The 5000A Oscilloscope has features ideal for field service applications as well as for a wide range of general purpose applications, as in research and development laboratories, quality control and production testing.



Vertical bandwidth is from DC to 25 MHz (-3 dB point). An ultra-

stable triggering circuit provides solid waveform displays beyond 50 MHz. Either the positive or negative slope of the input waveform may be selected to start the sweep. From the internal source, the sweep will trigger on a waveform as small as 0.2-division deflection.

Built-in vertical delay line provides 50 nanoseconds of display prior to the trigger point on the input waveform.

The 5000A has 3% calibrated vertical sensitivities from 10 millivolts to 50 volts per division in 1, 2, 5 sequence. Input impedance is 1 megohm, 30 picofarads. Overload protection is 600 volts on all but the most sensitive range, where it is 300 volts. Rise time is 14 nanoseconds.

The overdrive characteristic of the vertical output section facilitates critical viewing or measurement of the waveform in detail. The vertical amplitude of any waveform may be increased to five times screen height without more than 3% distortion.

The 5000A oscilloscope sweep speeds range from 50 nanoseconds to 2 seconds per division in a 3% calibrated 1, 2, 5 sequence. It also has continuously variable sweep speeds between ranges.

The Hickok 5000A Oscilloscope is small—6 $\frac{7}{8}$ " high $\times$ 11 $\frac{1}{4}$ " wide $\times$ 19" deep, including handles—and weighs only 24 pounds.

Circle Number 65 on Reader Reply Card

GET COMPLETE DETAILS

Use Free Readers
Service Card.

Be sure to
include your
name and address.

Little power giant 2.

25 full watts of Audio
from one hybrid package

\$69⁹⁵



Delivers power for:

- ☐ Hi-Fi stereos.
- ☐ General purpose power amplifiers.
- ☐ Studio monitors.
- ☐ P.A. systems.
- ☐ Line amplifiers.
- ☐ Musical instrument amplifiers.

Specifications:

Input Impedance: 10,000 Ohms
Nominal (Gain Control)

Output Impedance: .2 Ohms
Typical

Input Voltage: .5V for 25 Watts
Output

Output Load: 8 Ohms

Frequency Response: $\frac{1}{2}$ DB
20-100,000 HZ

Power Output: 25 Watts RMS
(Harmonic Distortion: <0.5%)

S/N Ratio: 90 DB Typical

Idling Current: 30 MA Typical

Size: Rack Mounting, 19 $\frac{1}{2}$ " Long,
3" Wide

RHA

Audio Communications Corp.

625 - 60th Street,
West New York, N. J. 07093
201-854-1950

- ☐ Please send me _____ RHA-25 at \$69.95 each.
- ☐ My check for _____ is enclosed. (Include \$2.75 postage per unit.)
- ☐ Please send C.O.D.
- ☐ Please send, FREE of charge, your spec sheets on your complete line of Solid State Amplifiers, Oscillators, Power Supplies and R.F. Boards.

Name _____

Address _____

City _____ State _____ Zip _____

Circle Number 30 on Reader Reply Card

the first step toward standards

Two industry bodies of international standing have finally undertaken, after deliberate study, to lead the way out of the quadraphonic matrixing jungle. Without dictating a fully developed system to anyone, the Record Industry Association of Japan and the Electronic Industries Association of Japan have promulgated a set of basic standards and ground rules. The effect of these standards is twofold: First, they attempt to establish satisfactory compatibility among different systems while still permitting freedom for further development and ultimate refinement. Second, by establishing relationships between the direction for sound sources and corresponding vector directions of modulation, they attempt to point out the correct path to be followed in development while avoiding pitfalls that may lock serious anomalies into the system.

Most current matrix encoding systems but not all—as far as they go—fall within the standards prescribed for “regular matrix system disc recordings.” (The one conspicuous exception is pinpointed in the standards reproduced here, in the form promulgated by the RIAJ.) But only one of the acceptable regular-matrix systems now in actual use offers total realization of the defined capabilities.

It is our proud claim that the Sansui QS coding system faithfully reproduces every modulation condition set forth in the master diagram of the standards. Where other systems fall short in some directions, Sansui QS can accept and accurately reproduce all sounds in every direction of the sound field and at any point within the field, including sounds at the center. It is free of dropouts, cancellations, discrimination, shifts in position, false localization or directional ambiguity. It is the only fully developed system now in use with the same symmetrical, omnidirectional capability of a discrete tape system, and for which compatible decoding equipment is widely available.

Standard of the Engineers

REGULAR MATRIX SYSTEM DISC RECORDING

Promulgated on March 23, 1972 by the Engineering Committee of the RIAJ.

1. SCOPE OF APPLICABILITY

This standard shall apply to commercially marketed regular matrix system disc recordings. JIS regulations set forth under S. 8502 (Disc Recording) shall apply to all aspects of such recordings not covered by this standard.

2. RECORDING SYSTEM

The sound groove of the regular matrix system disc recording shall be modulated by two signals, left and right, in two directions at 90° to each other and at 45° to the record surface. These two signals shall be converted from multiple original signals in accordance with the regulations given under sub-section 2.1. The left signal shall be recorded in the wall of the groove which is closer to the center axis of the record, and the right signal in the opposite wall.

If the two signals are in phase with each other and identical in quantity, they shall be recorded in such a manner that they can be reproduced by the movement of a reproducing stylus tip in directions parallel to the record surface and lateral to the sound groove.

2.1. Conversion of Signals

The two signals that modulate the sound groove shall consist of one left signal and one right signal converted from multiple original signals. The conversion of original signals into these two signals shall basically be achieved in the manner described below.

2.1.1. Front and Back Signals

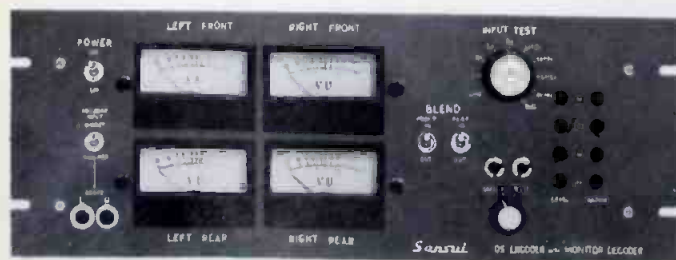
A signal originated at the front center shall be converted into a left signal and a right signal which are mutually in phase and of identical quantity. A signal originated at the back center shall be converted into a left signal and a right signal which are out of phase with each other by 180° but of identical quantity.

2.1.2. Left and Right Signals

A signal originated on the left-hand (right-hand) side of the front and back centers shall be converted so that the left (right) signal is of greater quantity than the right (left) signal.

2.1.3. Center Signal

A signal originated at the center of the original sound field shall be converted so that the left and right signals are of identical quantity but so that the former has a phase lead of 90° relative to the latter.



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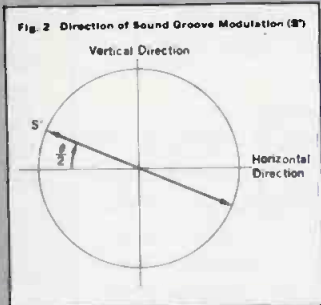
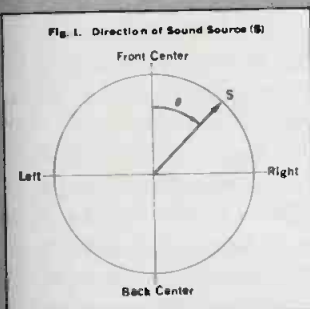
Put it to the test yourself. Compare it with any other. For a demonstration or literature, call or write us directly at any of the locations listed below.

for four-channel matrixing

Committee, Record Industry Association of Japan

2.2. Relationship of Direction of Sound Groove Modulation to Sound Source Direction

The relationship of the direction of the modulation of the sound groove to the direction of the corresponding sound source in the original sound field shall, in principle, be such that the angular direction of the former is half the angular direction of the latter (See Figures 1 and 2).



ELABORATION

FOREWORD

The Engineering Committee of the Record Industry Association of Japan has compared and examined the various matrix system disc recordings being marketed by various manufacturers to date. Results of such studies have ascertained that all of them, with the exception of the SQ matrix system, are based fundamentally on one and the same system, that they are encoded similarly, and that they possess satisfactory compatibility with one another. Hence the same committee hereby standardizes them as "regular matrix system disc recordings."

1. SCOPE OF APPLICABILITY

This standard governs only those aspects which are peculiar to the regular matrix system disc recording. All other aspects, such as its physical dimensions and quality, shall be regulated by JIS. S. 8502 (Disc Recording).

The regular matrix system disc recording which this standard regulates encompasses all matrix system disc recordings that are cut by converting the information of sound source directions into linear modulations of a spiral sound groove.

2. RECORDING SYSTEM

So as to ensure compatibility with two-channel stereo playback, this standard is formulated in compliance with the stereophonic recording system stipulated under JIS. S. 8502.

Thus the regular matrix system disc recording manufactured to this standard, when and if reproduced by regular two-channel stereo playback equipment, does not impair the relative sound image and sound volume balance between the left and right channels.

3. RELATIONSHIP OF DIRECTION OF SOUND GROOVE MODULATION TO SOUND SOURCE DIRECTION

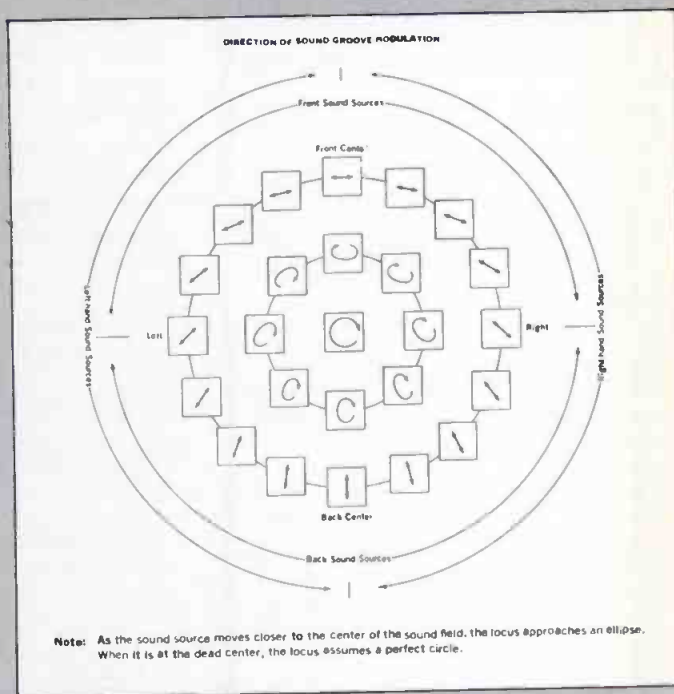
The relationship of the direction of a sound source in the original sound field to the direction of the modulation of the sound groove on the regular matrix system disc recording is set forth in Figure 3.

The term "the direction of a sound source in the original sound field" is used to describe the direction of a sound source intended at the time of recording, while the term "the direction of the modulation of the sound groove" is used to describe the locus of the vibration of a cutting stylus tip.

To reproduce the regular matrix system disc recording in more than two channels, it is thus possible to place three or more loudspeakers freely, depending upon the matrixing parameter of the decoder used (including a speaker matrix type).

4. ABBREVIATION

When there is a need to abbreviate the regular matrix system disc recording, it is recommended that "RM" be utilized.



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Nab Management Sessions

(Continued from page 26)

assess the current validity of the rule and whether it should be continued, modified or replaced by some new and better rule."

Commissioner Wiley also said he finds it difficult keeping up with the constantly changing FCC regulations and it is his full time job.

Employee Motivation

There are three possible approaches that a broadcaster might choose to use in seeking to motivate employees, according to Professor Gregory D. Barnes of Purdue University.

Speaking to the Secondary Markets TV Program, Professor Barnes said two new theories on how to get people to perform had been advanced in the last two years. One, he felt, will replace the current popular motivational theory that he calls "The Old, Old Story."

"The Old, Old Story" theory, according to Barnes, is based on basically nothing but stimulus-response. Motivation is simply a matter of finding the right stimulus."

He said these four stimuli are available to the broadcast general manager:

- (1) The Club ("If you don't do what I want, I'll beat the hell out of you.")
- (2) The Cross ("Do it because it is right.") This is effective with the over-30 set since it implies that if you don't do what is right you may get away with it in this life but not the next.
- (3) The Buck ("If you do what I want, you'll get some pleasure out of it.")
- (4) The Ego ("Man wants to be more competent tomorrow than he is today.") The advantages of this approach are simplicity, generally acceptability and individuality.

Professor Barnes said a variation of this approach is currently proposed by B.F. Skinner in his book *Beyond Freedom and Dignity*.

This approach, the "Behavior Technology" approach, Professor Barnes said, has one basic premise: that behavior is determined by its consequences—that Tuesday's action is caused by Monday's consequences of "Sunday's action."

According to this approach, continued, man has no brain, and

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his mind is a blank slate upon which experience writes." So, "if behavior is determined by its consequences, then the way to change behavior is to change the consequences and rearrange the way in which the consequence is related to the behavior," Professor Barnes said.

General managers wanting to motivate employees with this approach, he said, must follow this pattern: If permissiveness is a problem, the manager must "crack down," because behavior followed by punishing consequences is less likely to occur again. And when the offender has modified his behavior, a kind word should be given soon after."

"One should not have to bribe and manipulate people," he said. "This theory denies that man has a brain... Skinner did a lot of his work with pigeons, but he should remember that people are not pigeons!"

The final motivational approach discussed by the Purdue Professor is called "The Law of the Jungle." He described it as one that appeals to the instincts in order to motivate. Pointing out that this one is covered in a new book, *Corporation Man* by Anthony Jay, he said, "this approach tells us that man is a brain that takes the raw material of the senses and shapes and organizes it into thought in accordance with its own built-in structure. The more we meddle with his brain, the worse it gets."

If management would "motivate," the professor said, "it must talk to—and listen to—the animals."

Connally Reveals Income Tax Survey

In a luncheon address before the 10th annual convention of the National Association of Broadcasters, Treasury Secretary John Connally said this country no longer is alone on a pedestal, but is among nations that are equal.

Mr. Connally also brought per-

(Continued on page 50)

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S-6	1/1000 min.	10 min.	±.0002 min.
S-1	1/100 sec.	60 sec.	±.01 sec.
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(Continued from page 49)

sonal wishes from President Nixon who praised broadcasters for the "outstanding service the industry has rendered this nation" and its continuous efforts to inform the American people.

The Treasury Secretary said this is a time of trial and turmoil, marked by the divisiveness of Viet Nam and the dissension at home. Those in political life and our system in general are being challenged, he said.

He cautioned the people to pause and reflect and occasionally give credit that something has been accomplished in this country.

Turning to the economic policies instituted by the President last August, the Treasury Secretary said the Administration does not believe in controls, but it also does not want to see the ruins of runaway inflation.

He said the people must face up to the fact that we live in a competi-

tive world and there is rough economic competition from abroad. Japan is increasing competition so is the European Common Market.

This should concern us, he said, if we want to maintain our standard of living.

Connally also disclosed that a recent survey of income tax returns in the southeast part of the country revealed that 97% of those not prepared by the individual taxpayer were fraudulent.



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TECHNICAL DATA

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100. Ballantine Lab., Inc.—The 1972 condensed catalog details the company's complete line of electronic test and measurement instruments including automated and programmable equipment. Many of the products listed are state-of-the-art designs and several are unique in their classes of instrumentation. The company's products strike a fair balance between frequency-domain and time-domain instruments. The catalog (#142) has sectioned each Ballantine product category. Within these sections are individual product descriptions and detailed specifications. The product categories covered are: Computer-Compatible Digital AC Instrumentation; True RMS Wideband AC Voltmeter/Amplifiers;

Logarithmic Voltmeter/Amplifier; "Classics"; Wideband Portable Oscilloscopes and Accessories; Oscilloscope Calibrators; AD/DC Precision High Voltage Calibrators; Primary AC/DC Transfer Standards and Accessories; and Accessories (usable with a number of instruments rather than one particular instrument).

101. BURWEN LABORATORIES—A series of data sheets entitled "Stop Noise Pollution in your Program Material" is now available. The series includes information on the company's Model 200 Noise Eliminator, Model 100 Dynamic Noise Filter and Model 1030 Amplifier-Noise Filter. The data sheets include photos, illustrations, features and specifications.

102. EICO ELECTRONIC INSTRUMENT CO.—Eico's 1972 catalog features the company's complete line of over 200 electronic kits and factory assembled instruments in the fields of Test Instrumentation, Security Electronics, Stereo Hi-Fi

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Automotive/Marine Electronics. For the HiFi enthusiast, Eico offers the new "Quatrasonic" and "Sound-4" channel adaptors. The audiophile will also find Eico Solid State Stereo components high in performance and quality.

103. FUJI FILM—A new 12-page brochure on the Fuji Film High Band Video Tape H701 is now available. The brochure covers such areas as friction coefficient, magnetic field angle of orientation, behavior on high band video recorder, mechanical properties, tape durability, splicing properties and storage.

104. GENERAL AUTOMATION, INC.—A new 30-page brochure describing the new SPC-1 family of minicomputers is now available. This low-cost, high performance computer is designed for automation projects in industrial applications, such as manufacturing, process control, data acquisition, communication control, laboratory instrumentation, and machine tool control. It is ideally suited to any application where a high performance, low cost computer can be justified. The new PC-16 is available in three different cycle times and six different off-the-shelf configurations. The two-color fully-illustrated brochure provides up-to-date information and detailed specifications on the complete SPC-16 product line including available software, interface units, and compatible peripherals.

105. GULTON TECHNI-RITE ELECTRONICS—Described in this bulletin is the company's new 8 channel event recorder, Model R-820, that provides "on-off" information via a new stylus-less on-impact thermal printing technique. The recorder optionally provides simultaneous printing of numeric data on the clear center strip of the chart—also by the new on-impact thermal printing technique. Eight chart speeds are offered and an internal chart rewind is standard. Suitable for rack-mounting or portable use, the TR-820 offers greatly improved reliability and maintenance characteristics over any other event recorder presently on the market.

106. GRAY RESEARCH—A product specification sheet is now available on the company's Professional Turntable Preamplifiers. The 6400 Series professional turntable preamplifiers are self contained, self powered, RIAA/NAB equalized units, designed to provide high quality disc reproduction for the professional user. Application of state of the art, low noise, integrated circuits allow higher output levels (0 dBm into 600 Ohms) and smaller package sizes than ever before possible. The 6400

Series preamps are available in two configurations; the Model 6400 for monaural FM, and AM applications, and the Model 6401 for full two channel recording and FM stereo requirements.

107. HUNTER ASSOCIATES—The new 19-page Technical Aid Catalog features many new items invaluable to engineers, technicians, and scientists—including a complete line of precision portable drafting boards, a micrometer-ad-

(Continued on page 52)

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Tech Data

(Continued from page 51)

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109. INTERNATL. RECTIFIER CORP.—The Spring Edition of "Semiconductor Cross Reference and Transistor Data Book" is now available. The completely revised 64-page volume contains over 35,000 listings, including 10,000 types not previously shown, making it one of the most comprehensive cross reference books in the industry. Types included are transistors, diodes, zeners, capacitors, rectifiers, and SCRs. Specifications,

electrical characteristics and line drawings are given for 1 line of silicon and germanium transistors. An applications orientable table permits the user to locate description which fits his requirements, and determine the proper transistor; prices are shown for each unit in the table.

110. MOHAWK WIRE AND CABLE CORP.—Mohawk now has literature and specifications for their Television Color Camera Cables and Connectors. Price lists are also included.

111. NEW ENGLAND LAMINATES CO.—A new two-page data sheet describes the 205NM and epoxy glass laminate of exceptional homogeneity which virtually eliminates printed circuit board processing problems. Advantages of this high reliability, flame-retardant substrate are given. Complete property values under stated test conditions are presented along with comparable NEMA specification.

115. RENTAL ELECTRONIC INC.—A new 60-page, 1972 Instrument Rental Catalog containing specifications and rental prices for more than 25 different kinds and hundreds of different models of electronic test and production equipment is now available. The company's catalog offers 1-month, 3-month, and 6-month rental rates.

116. ROH CORPORATION—Manufacturers of audio processing equipment now has available specification sheets on their equipment. Included are Module Card Frames, Module Socket Assemblies, Program Amplifier, Circuit Board Extender, Microphone/Line Pre-amplifier and Distribution Amplifier. Price lists are included.

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bookreview

Semiconductor Diode Lasers was written by Ralph Campbell and Forrest M. Mims. Chapter 1 discusses the history and development of the laser with the attention to light-generating devices in general, light generation by semiconductors particularly, and the LED might be considered the direct ancestor of the semiconductor laser. The theory of lasing action is explained. The need for cooling in some lasers is discussed.

The next two chapters describe the fabrication and electrical properties of the injection laser. Coherence, the most important aspect of laser light, is explained. The remaining chapters of the book are devoted to circuitry and practical applications. Circuitry includes pulse generators, modulators, power supplies, detectors, and receivers. Optical systems and viewing devices are described. The last chapter covers several of its many applications already a reality and suggests others to come.

This book is available through the Howard W. Sams Co., Inc., Indianapolis, Ind.

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Transistor Specifications Manual, Fifth Edition, has been written by the Howard W. Sams Engineering Staff. In this updated edition, the electrical and physical parameters, along with the manufacturers, of nearly 10,000 transistor types, have been compiled. The manual is an excellent reference for engineers, technicians, servicemen, or anyone who enjoys working with transistors.

The manual has three main sections designed to supply a maximum of data about the transistors: a specifications section, a lead identification section, and an outlines section.

The specifications section contains the electrical information needed for most applications. The maximum voltage, power, current, and temperature limits that should not be surpassed are given as well as the clarity, leakage, gain, and frequency parameters for each transistor. Even a special section of specifications for RF power transistors is included.

In the lead and terminal identification section, the manual provides the physical arrangement of the leads and identifies each as to whether it is collector, emitter, or base.

The outlines section has drawings of the physical shape and contains all important physical dimensions. This section assists tremendously in determining whether or not a transistor will fit into a desired physical area.

When available data indicates that a specific transistor type is no longer being made, the last known manufacturer is furnished, and that particular transistor type is tagged obsolete.

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New Rules Affect Antenna Resistors

The FCC has finally adopted a Rules amendment that will, in some instances, eliminate the use of antenna power resistors. The move is aimed at improving specifications and measurements of the power of standard broadcast stations.

The new rules (Docket 19200) will do more than improve measurements. These resistors waste power and are a burden to licensees.

Where necessary, and subject to safeguards to insure satisfactory performance, the new Rules will allow operation of AM transmitters at less than the rated power.

(To protect other stations from excessive interference, certain AM stations are required to restrict power delivered to their antennas to a value lower than the normal transmitter output power. In the past, the Commission has required that in such instances a transmitter be operated at its rated power and that an excess radio frequency power be consumed in a resistor inserted in the antenna feed system. This procedure wastes power and burdens licensees.)

Change In Licensing Procedure

The Commission also provided for certain changes in the licensing procedures for AM stations. Under the new procedure, each licensee will specify the actual antenna input power, as well as the rated or "normal" power of the station. While these two values sometimes differ, it has previously been the practice to make them equal, on paper, by arbitrarily adjusting certain of the antenna parameters. It is believed that the new licensing system is more realistic and less prone to error. Changes in station licenses will ordinarily be made at renewal time.

To implement the modified licensing procedure, the Commission is requiring that applications for license renewal filed after October 1, 1972, include certain additional information, specified in a Public Notice being sent to all broadcast licensees. This Notice also contains information for those licensees who wish to file applications for modifications of license to eliminate antenna resistors.

This proceeding was initiated with a rulemaking notice on April 8, 1971, in response to a petition by Chesapeake Broadcasting Corporation, licensee of station WASA, Havre de Grace, Md.

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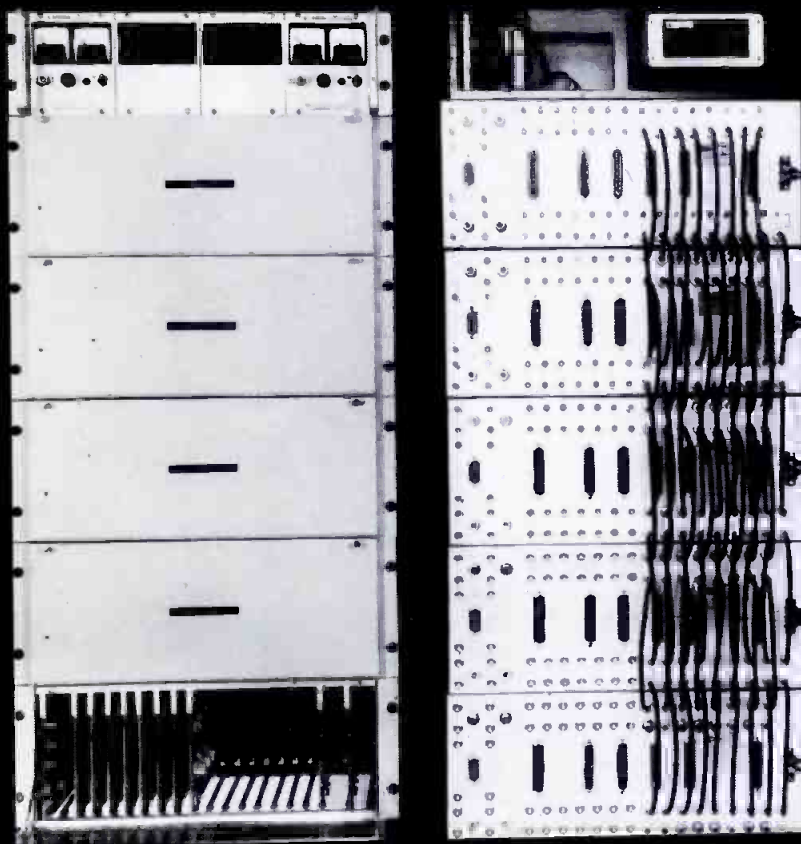
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