June, 1972 / 75 cents

BROADCAST ENGINEERING

the technical journal of the broadcast-communications industry

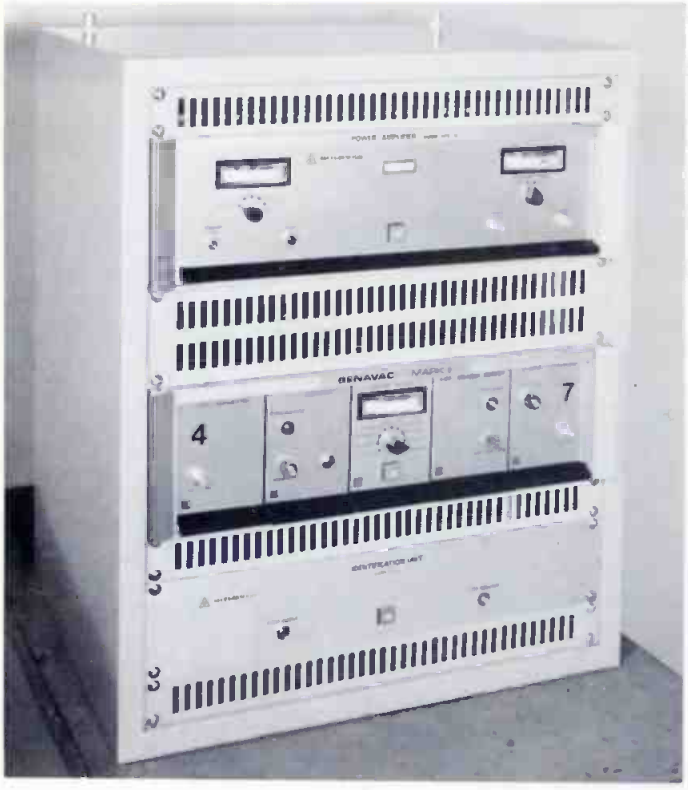
KPRC's new dream home page 14

Broadcast Automation
Lightning Protection
Cable Engineering

DELTA-BENCO ANNOUNC

THE TS-010D

SOLID STATE 10 WATT TV REBROADCAST TRANSMITTER



MODEL TS-010D with IU-TS

FCC APPROVED

The Model TS-010D comprises two self-contained units, the Benavac Mark II dual hetrodyne channel pr
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June, 1972 • Volume 14, No. 6

BROADCAST engineering

The technical journal of the broadcast-communications industry

in this issue...

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.

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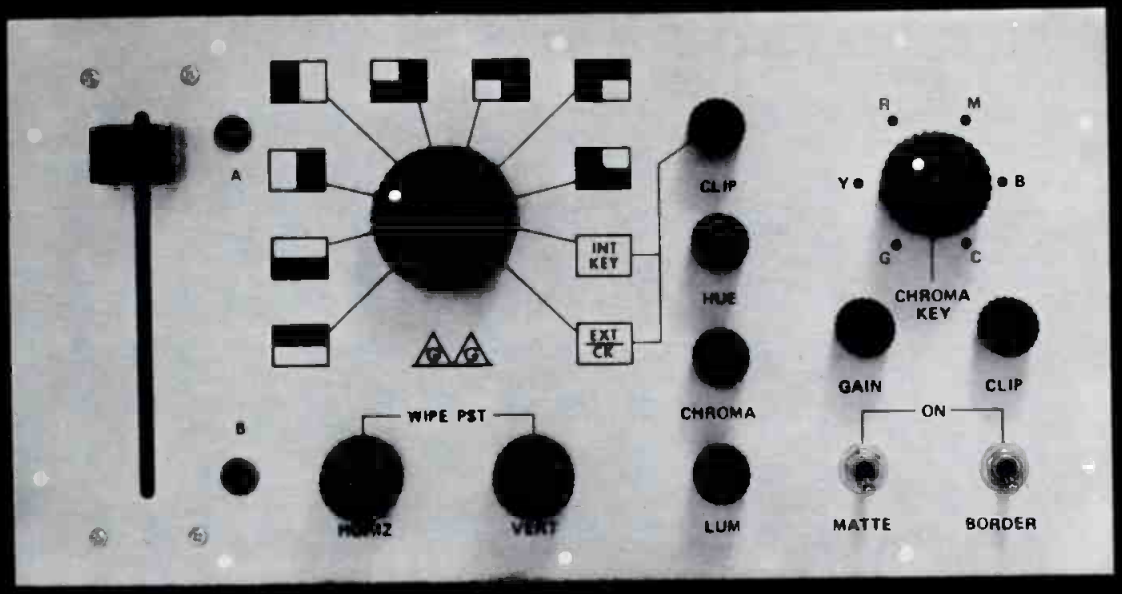
NEW! MODEL 900SE-5 SPECIAL EFFECTS SYSTEM



FEATURES

- 8 WIPE PATTERNS
- WIPE PATTERN BORDERS
- INTERNAL/EXTERNAL KEYING
- COLOR MATTE*
- BUS TALLY LAMPS
- BURST LOGIC
- WIPE PRESET
- CHROMA KEY*
- BUS TALLY RELAYS*
- NO DRIVE PULSES REQUIRED

*OPTIONAL EQUIPMENT

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Model 900SE-5 has been developed to fill the need for a professional, yet economical, color special effects system.

The switching amplifier and other modules are identical to those used in other GVG special effects systems. The compact remote control panel is designed for installation in existing switching systems or control consoles.

Model 900SE-5 will be offered in both 525/60 and 625/50 versions, either NTSC or PAL. Suggested applications for the 900SE-5 include small TV studios, remote vans, and industrial/educational systems.

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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 fulltim employment by the broadcast station, but is not required to be on duty at the transmitter or control point during the hours of directio 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 controll 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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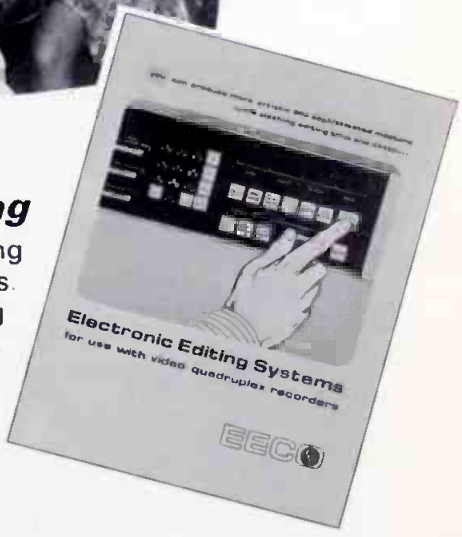

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12 page brochure describes electronic indexing and editing techniques as well as preview and post-production economies. Function and application of EECO's modular electronic editing equipment is included.

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Circle Number 6 on Reader Reply Card

(Continued from page 4)

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' 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 unexpecte 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.

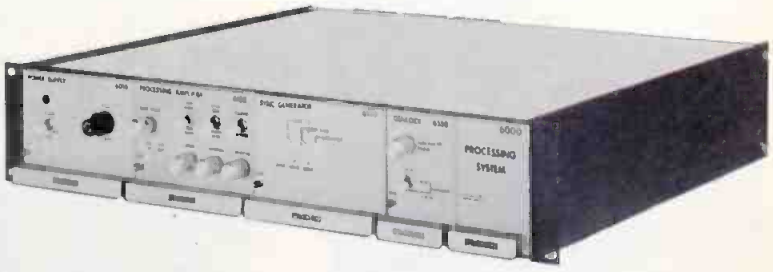
does your video look like 'Big Ben' on a foggy day?

DYNASCIENCES VIDEO PROCESSING AMPLIFIER SYSTEM, 6000 SERIES — CLEARS SIGNAL DISTORTION.

If you don't want your scene to be foggy, use the DYNASCIENCES VIDEO PROCESSING AMPLIFIER SYSTEM.

The Model 6000 Video Processing Amplifier System improves the scene. It is simple to operate (full video processing in one unit) and can be used with color and helical scan systems for CATV-ETV-CCTV and Broadcast. The system is complete with Sync Generator and Genlock. Sync pulses, blanking, chroma level, and burst phase can now be corrected. The Genlock compensates for delay of one or more scan lines.

"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 up your foggy scene!

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LETTERS TO THE EDITOR

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.

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 verified by wiping the meter face ar observing if the needle deflects.

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

N. Moss, C
WSJM AM-F
St. Joseph, Mic

AEL Officer Change

In the March issue of BE, w wrote in the People In The Nev section that AEL has a new pres dent. At least that's what the hea line said.

In the column, it was explaine that Leonard L. Rosenfeld ha been appointed President of AE Communications Corp. (AELC not AEL), the CATV subsidiary AEL. Dr. Leon Riebman is st the President of American Ele tronic Laboratories, Inc. (AEL).

'ending Congressional bills ied at creating a Consumer Pro- tion Agency with the power to ervene with other government ncies were labeled today "ex- ples of enthusiasm for a good ise gone wild."

Richard W. Chapin, chairman of Board of Directors of the AB, opposed provisions of the ls that would make the CPA a uper-regulatory agency . . . with power to intervene in the pro- edings of all other regulatory ncies in Washington."

Speaking during the University Missouri's annual journalism ek, Chapin, president of the tuart Broadcasting Co., Lincoln, br., said that while such an ency may be "necessary and eful," the proposed "massive wer of intervention would make ness" of proceedings of the Fed- al Communications Commission d other regulatory agencies.

He said the CPA would be able take the FCC to court if it disa- ees with any Commission deci- n. Also, he added, it would have e power to demand that the FCC bpoena any information the CPA ls necessary to fulfill its mission representing the consumer.

The NAB Board Chairman said e implications to broadcasting of ch sweeping authority are enor- ous.

"Broadcasting," he said, "al- ays seems to draw most of the tention, and I am sure we would very quickly the target of many the Consumer Protection Agen- 's activities."

He said FCC proceedings, al- ady excruciatingly slow and mplex in many cases, "would be slowed as to make forward ovement imperceptible if this per agency were granted the wer to intervene in every situa- on."

Chapin said NAB has asked its ember stations to oppose the in- rvention feature of the bills, and alled on his audience to study em and lend broadcasters their pport.

INDUSTRY NEWS

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 if 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 each year during the 10 years preceding a proposed STV showing in the community, then STV showing there on a live or same-day delayed basis is also prohibited.

FCC Invites Comments On Exclusivity Of Non-Network Programs

Additional comments have been sought by the FCC on two specific points in a Commission study on exclusivity of non-network television programing and ways to provide freer distribution of non-network programs to UHF television stations and cable television systems (Part 73 of the rules) (Docket 18379).

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 programing 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, enroute, 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 FOR 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.

Commission Sets Limit On Positive peaks

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

In a rulemaking notice adopted May 22, 1970, t Commission stated that some AM broadcasters w now using transmitters with modulators capable supplying more power to the carrier than necessary 100 percent modulation with a symmetrical wavefo —for example, a 5 kilowatt transmitter with a mo lator normally intended for a 10 kilowatt unit. C cerned with the increase of sideband power and possibility of interference to other stations, und audio distortion and excessive carrier shift, the Co mission proposed that the 100 percent ceiling on ne tive peaks be applied to positive peaks as well.

Approximately one-half of the comments oppos the setting of positive modulation limits, one third vored a restriction but urged that the maximum p missible level be set from 115 to 130 percent, wh some broadcasters supported the adoption of the 1 percent limit. A majority of the comments in favor the higher limits came from broadcasters using equ ment capable of producing positive modulation pea in excess of 100 percent, the Commission sa pointing out that the practice is not confined to s tions using excessively large modulators. The Co mission said that a transmitter designed for operati at two power levels, such as 1 kilowatt daytime a 250 watts nighttime, can be adjusted to the low power level by reducing the input power to the fi RF stage and still produce high levels of modulati when operating at the lower level.

Commenting that it did not wish to place arbitr restrictions on modulator design by type acceptan procedures because a transmitter with some exce modulating capability will provide a higher qual signal in normal operation, the Commission said it w imposing a restriction on modulation level and setti the ceiling at 125 percent because it would be hi enough to accommodate the higher peaks of natura asymmetrical programing but not so high as to crease average sideband power to troublesome level

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

he Commission stressed that the 125 percent is a absolute ceiling" and emphasized that the rule endment is not intended to "require or even to encrage" licensees to increase their levels of modula-, "nor should it be taken by equipment manufacers as an excuse to alter their designs or cifications to facilitate the use of increased modula- levels." Again emphasizing that it was prescribing absolute limit on positive modulation, the Commisn reminded the licensees that modulation indicators st be accurate enough that the peak amplitudes served do not exceed 125 percent.

ew EANS-EBS Rules

Major revisions of the Emergency Action Notifican System (EANS) and Emergency Broadcast stem (EBS) rules and regulations have been adopted the Federal Communications Commission. This is roadcast system under which the Nation would be pt informed in case of National, State or Local ergency. The FCC, together with the Office of Telcommunications Policy and the entire telecommunitions industry, have effected the substantial changes the EBS.

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

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

"The Emergency Broadcast System is totally deendent on the voluntary organized participation of e entire broadcast industry, including vital support om the Radio and Television Networks, Associated ress and United Press International, and the Comunications Common Carriers." Mrs. Reid further tated: "I would hope that as the revised system is intalled, more and more participation will be evidenced y the broadcast industry for the benefit of the publ."

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

KPRC moves into dream operation

This TV-AM operation moves into its third home, where each step in its facility development was based on technical and architectural compatibility.

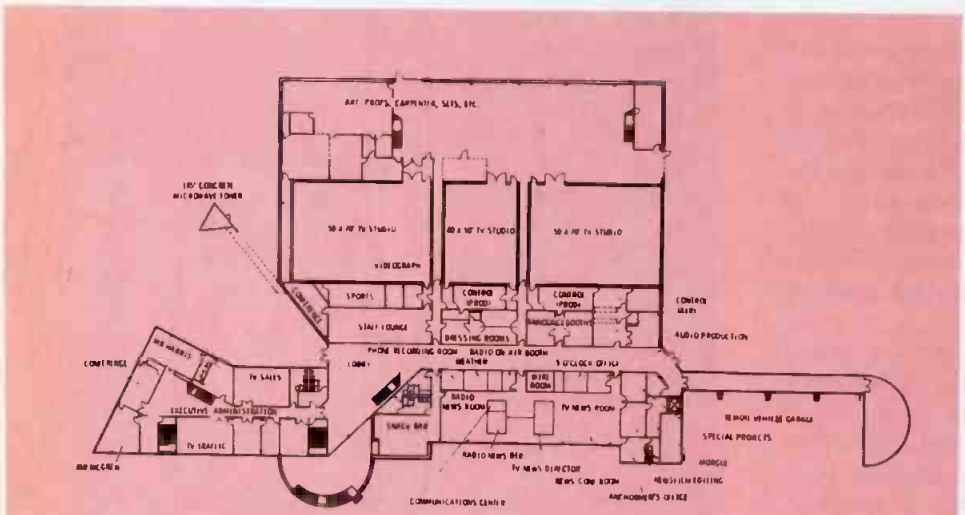


Fig. 2 First floor layout of the KPRC facility.

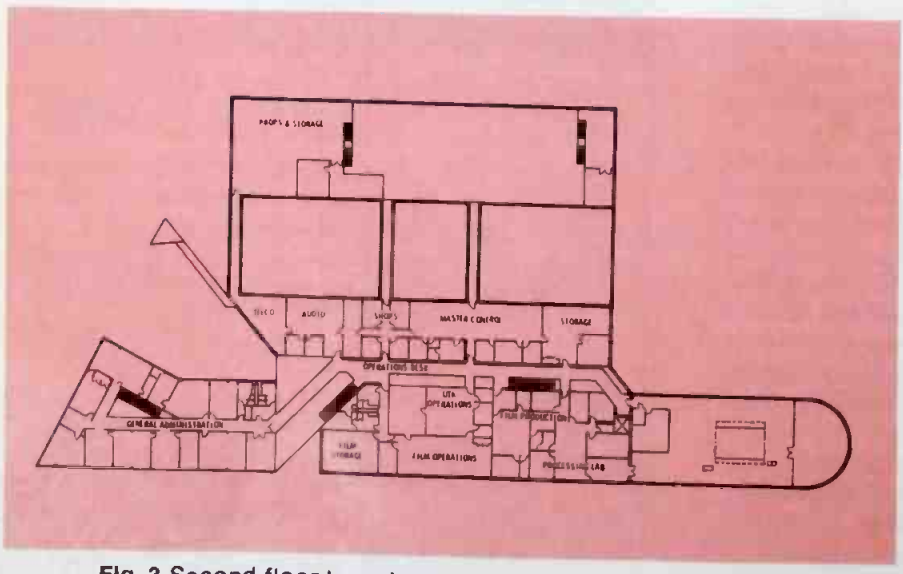


Fig. 3 Second floor layout.

Station KPRC-TV/AM/F owners of one of the oldest sets call letters in the broadcasting dustry, moved to a new ultra-m ern $3.2 million building on Tu day, March 21. But for all the ca tal expenditure, it has an ev greater significance for the ind try.

The move to the new building landmark in broadcast-integrat design, marked the third major cility change KPRC-TV/AM h had since the TV station operat from a quonset hut on Housto Old Post Oak Road, in 1948.

Looking At History

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

From the tiny quonset hut s KPRC-TV/AM moved to its s ond location in 1953. That buildi was dedicated on March 29, 19 and on that same day, KPRC/A celebrated its 25th year of affil

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.

on with NBC.

From a 2,000 set audience in the PRC-TV (then KLEE-TV) sig- al area on that auspicious day in 948, KPRC-TV's market area is ow over 500,000 homes. From a ngle studio with two cameras in arly KPRC-TV days, the new ant boasts three of the most mod- n studios ever built; two of them e 50 × 70 feet and one "small" udio is 40 × 50 feet.

The new KPRC-TV/AM studios nd plant was on the drawing board or nearly three years. It has been esigned both artistically and tech- ically to provide the ultimate in roadcast efficiency and effective- ess.

The building plan features three asic units, clustered around a high aulted gallery. The largest unit of he complex houses the television roduction studios and related con- rol and engineering space. On the pposite side of the gallery from he production area, a two-story nit houses KPRC-TV's News 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-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-ing 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-

pended 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.

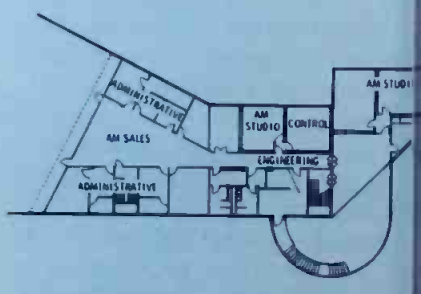


Fig. 6 Layout of the Radio facili

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

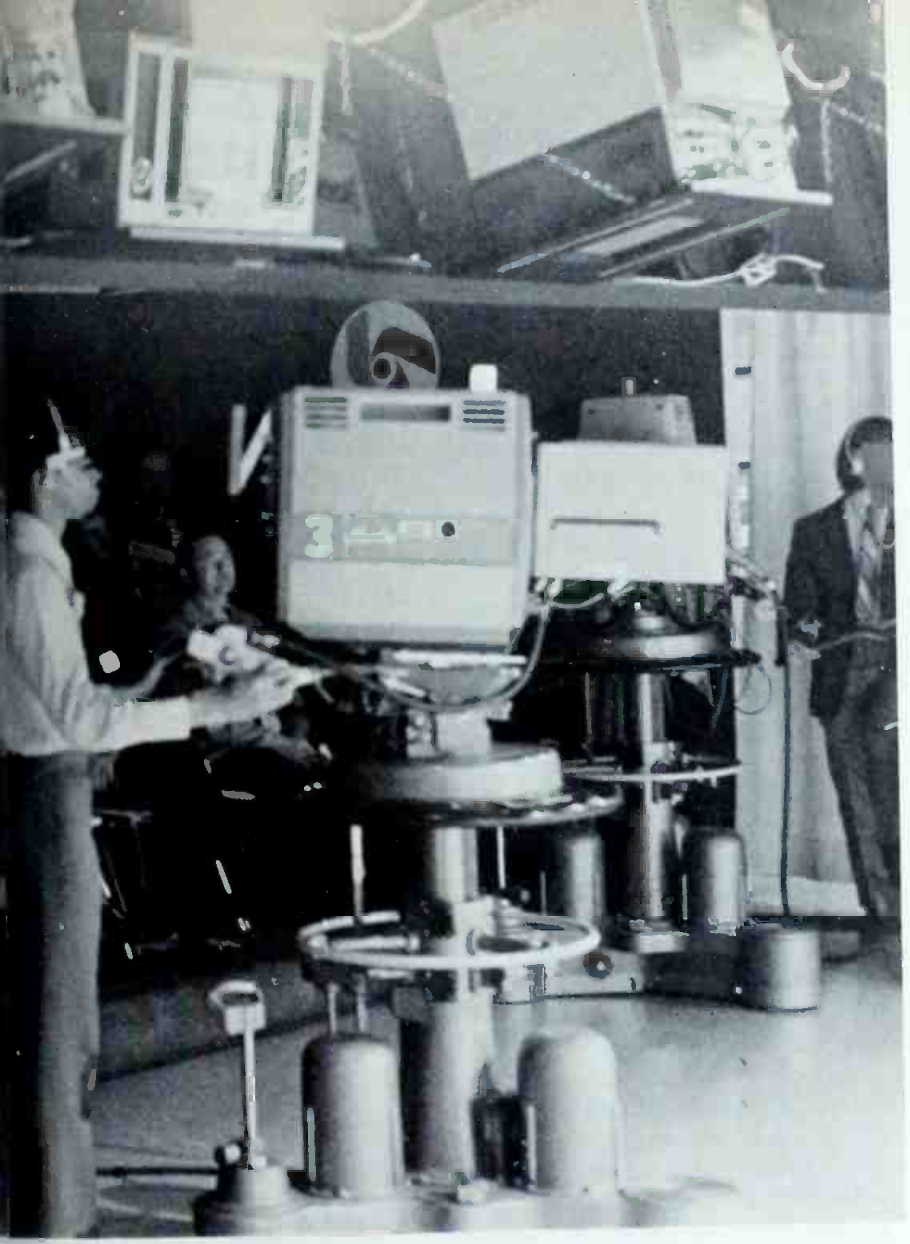
Lively Industry-FCC Panel Discussion

Industry-FCC Panel

The Industry-FCC panel, ways a popular session, was mo active than it has been for the la few years.

While the feeling often preva that little or nothing can come fro this session, the 1972 version w well worth the time and effort.

Notably, there were more en neers stepping to the audience n crophones with challenges a questions. The engineers were in a lynching mood, but they ca prepared to talk about the w things are . . . and about the FC



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.

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

ngineers who inspect their plants.

It was on this point that Dave lebert, engineer for KXRO, sked what training (by the Commission) these inspectors received efore going into the field as FCC eps. He pointed out that (1) he had o 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.

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 decisi that are fair and equitable to eve one concerned.

We have no way of knowing h effective any one engineer comment might be, but certain the place to lodge your complai or suggestions is with the FC Their address is 1919 M Stre NW., Washington, D.C. 20554.

NAB Engineers Urged To Promote Translators

In a paper intentionally desig to be more persuasive than tech cal, Vincent E. Clayton, Direc of Engineering of the Bonnev International Company of S Lake, told NAB Broadcast En neers that television translat have been in existence for so time now but that many broadca ers have not fully realized th potential benefits.

Urging engineers to take the tie and effort to present to their m agers and owners an adequate planation of what a translator how much it will cost and what might mean to them in direct a indirect returns, Clayton stat that "The optimum broadcaste use of translators is lagging."

"For instance, you might a them how much capital outlay a operating cost increase they wo be willing to expend for a 25 p cent increase in ARB homes? Th could be a starting point. Obvio ly, not all markets could be e panded this much by the use translators but some have. Our s tion in Utah increased its cover from about one half million to 128,000 by the use of translator Clayton said.

He further pointed out that "Te wired country concept," as exe plified by cable TV, has a defin weakness: the high cost of cabli rural and low population are "And here, translators shine. Th can provide signals to these are at a fraction of the cost of a ca system."

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

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

)00 each; VHF-TV at one-watt,)00; while both UHF and VHF- translators in the 100-watt size ıld average out at $9,000. Oper- g costs, too, were described as emely low.

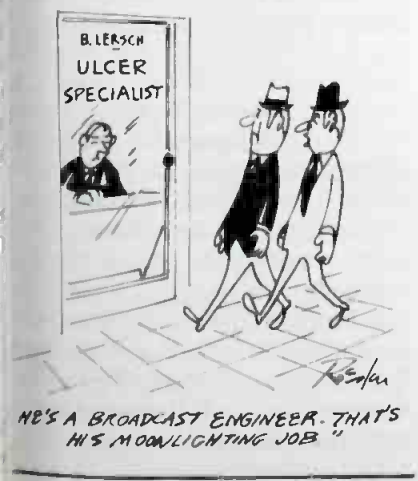
See to it that your managers : a careful look before discount- the value of FM and television ıslators. They are important ls to enhance our image, our enue and our survival as broad- ters: and it is the broadcaster's ponsibility to make the most out his facility for his ownership and his audience."

Effect of RF Output On TV Picture Quality

peaking before the Broadcast gineering Conference, Thomas Gluyas, Broadcast Systems, A, Camden, N.J., explored the cts of RF output systems on transmitter picture quality.

Describing his subject as limited scope, since he was discussing y the RF circuits which couple nsmitter to antenna, Mr. Gluyas phasized that, nevertheless, the oblem was a multi-faced one vering a number of separate mes relating to performance in ms of picture quality.

Gluyas listed seven parameters. ur of these parameters, he said, re significant for the transmitter tput system: long delayed echo, K" factor 2T pulse and bar, rominance/luminance gain in uality, and chrominance/ ninance delay inequality. The naining three: differential phase, ferential gain and signal to noise io are not ordinarily degraded to y measurable degree by trans- tter 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 deplexers, each of which will reflect, at scattered times, a miniature replica of the main signal.

Parallel transmitters, or parallel amplifiers connected in quadriture, 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-

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 in face equipment in 1965, WINS gineers undertook the problen redesign with the intent of plan the entire transmitter plant in automated mode except for po and modulation adjustment required FCC supervisory con by the licensed operator at the c trol point. The automated sys was completed and put into op tion in midsummer of 1970.

Credit for design of the sys was given to Martin J. Peters Jr., WINS assistant chief engin Edward W. Rose, transmitter e neer, was responsible for the chanical construction and wirin

The automatic installation c sists of nine vertically moun bathtub chassis, with full acces both sides, and which house l and switching equipment. Th racks contain all automation eq ment, plus audio and monito facilities. The remote con equipment occupies two m racks. One contains the orig remote control and telem equipment less the buffer re which were transplanted to the ic and automation section ra The second contains the hel instrument pots for calibratio monitoring samples, the emer cy STL link receiver and misc neous items. The whole is powe by floated storage batteries to sure against interruption.

Ratts pointed out that, altho the plant was designed for nor mode of automatic operation, 'h control point engineer has manual override, and monitorin all necessary circuits." Howe the automatic control is so signed that, were the control p engineer to make a mistake choose an inoperative circuit, 'h automatic equipment will swi back to the functioning circuit."

Special Effects

New techniques for special effects can yield results comp ble to the high-quality capabil of motion picture editing eq ment, broadcast engineers w told today.

Albert E. Busch, Directo Engineering of the Broad Equipment Division, Sark Tarzian, Inc., of Bloomington scribed a newly developed sp effects generator.

)escribing currently used TV
ipment for special effects as
ited as to available effects,
ich demonstrated "Cinematte
as a completely new departure.
A digital special effects genera-
the Cinematte I is designed to
vide a video production tool
h superior technical specifica-
is and with expandable produc-
a capability comparable to that
motion picture editing. The
ipment also has potential for
mputer control and pre-pro-
mming.
The digital generator concept
moves the noise, instability and
n-linearity problems of the ana-
waveform generators. It also
reases the available transition
terns by making transitions
ed on pulse code comparisons
tead of voltage level compari-
ns.
Patterns available with the Cine-
tte I include vertical and guillo-
e wipes, horizontal, diagonal
d circular wipes, squares, and a
mber of specialty patterns. "A
mily of precision rotary wipes
d many specialty wipes such as
rs, pentagons and curtain effects
ve been designed," Busch said.
"he TV production man will have
cilities at his command which
al those of motion picture in va-
ty and surpass them in conve-
nce."

Differential Phase And Gain Measurement

A new technique for differential
in and phase calibration of
oadcast demodulators was de-
ibed to broadcast engineers by
hn Venczel, Senior Engineer of
e Telemet Company.
Venczel pointed out that the cri-
ion of a good quality TV system
n be formulated as one which
ll retain the identity of the input
d output waveforms. However,
n any practical case there will be
difference between input and
tput or, in other words, they will
distorted. To be able to tolerate
stortions, they have to be classi-
d," he said.
The most obvious way to deter-
ne the differential phase and gain
stortion in a TV transmitter is to
d an appropriate test signal into
e modulaton, then modulate it
d measure the differential phase
d 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.

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, its 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 reviewing 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 let 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 unique treatment under the Constitution, Whitehead said. That rationale was described as follows:

(1) Broadcasting is now the most important public forum.

(2) The content of such an important medium must be regulated 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 for 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,

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
deral 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
ducts.

"What this boils down to," Dr.
Whitehead said, "Is that there
uld be government-controlled
cess to the broadcast media to
te a personal opinion on almost
y matter. Although this proposal
s made in the FCC's Fairness
octrine inquiry, it has little to do
th that Doctrine. Rather it would
ape the Doctrine into a new tool
regulate advertising, and thereby
pand it far beyond what was
iginally intended and is now ap-
propriate."

The OPT Director then warned
at, if approved, such a govern-
ent-controlled right of access to
vertising could be logically ex-
nded to apply to **programming** as
ell.

"It's not as farfetched as it may
und," Dr. Whitehead said, then
ked "How would the courts re-
ond to claims that . . . Sesame
reet's Cookie Monster encour-
es poor eating habits? . . . It
uld get so bad that Archie Bunk-
could kickoff the broadcast
eek on Saturday nights and the
st of the week would be devoted
rebuttals."

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

Klein Brings Nixon Message

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

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

broadcasting," the Administration's Director of Communications told his NAB audience.

In remarks designed to tell broadcasters where the Administration stands on issues of importance 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 community." He also said that cross-ownership of broadcast and newspaper properties in the same community 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 Broadcasters," 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 renewal legislation with an additional 68 Congressmen and 18 Senators indicating they are "favorably inclined" 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 broadcasters 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 stability.

(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 representatives back to their public. "Surely," he said, "we can do better than scheduling members 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 constantly 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 Shildhause, 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.

Shildhause 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 the NAB group he heads to sugg to the Commission ways to reli radio broadcasters of unnecess regulation. Commissioner Wi heads the FCC group.

Chapin said the first recomm dations submitted were in the te nical area: use of remote monit relaxation of first class opera requirements, auxillary broadc service, and the visibility and cessibility of transmitters.

Commissioner Wiley said feels the need "to properly adj our administrative focus to m radio's particular problems."

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

All too often, he said, when Commission has attempted to sign "meaningful and appropriat rules for the regulation of bro casting, it has tended to think terms of large market, VHF tele sion.

"Accordingly," he noted, "dio, and particularly small mar radio, has sometimes been sadd with a regulatory burden which, best, is out of proportion to w the public interest realistically require and, at worst, is both practical and wholly unnec sary."

He said the Commission wa to determine if its regulatory thority is being exercised i "meaningful and pragmatic m ner" consistent with the public terest.

To this end, he said, the Co mission will analyze each rule p taining to broadcasting "in orde

(Continued on page

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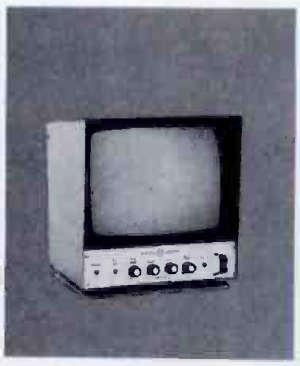
Five inch monochrome assembly features three 5" units in rackmount configuration. Small size requires less rack space than similar units and permits monitoring of 3 separate video signals. High quality, all-purpose monitors with Setchell Carlson UNIT-IZED® plug-in circuit modules.

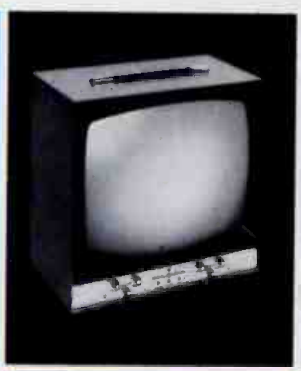
New 10" monochrome video monitors offer horizontal resolution of 640 lines or better plus 100% solid-state circuitry for long-life reliability. Unit is available in rackmount or in attractive metal cabinet. A 12" model is also available.

In addition to 640-line resolution, the 16" monochrome monitors have all major operating controls located on the front panel for ease of operation. Front-panel screwdriver adjustments for vertical linearity, vertical height, and focus provide protection against accidental misadjustment.

Nineteen inch monochrome video monitors offer traditional Setchell Carlson quality, including exclusive UNIT-IZED® plug-in circuit modules for easy maintenance. Horizontal resolution is 640 lines or better. Available in rackmount or attractive cabinet models.

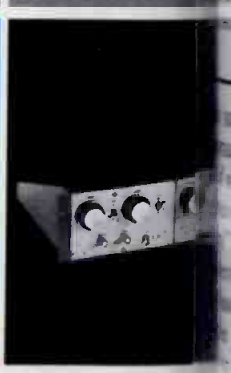
Professional quali color video monito offer broadcast qu a modest price. Horizontal resoluti 300 lines (color) a set-up controls are located behind a h front panel to prev accidental misadju ment. Also availab 25" model.









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.

Regulated circuitry in the 25" color monitor provides extremely stable operation and prevents raster size or brightness deviations due to line voltage fluctuations. Horizontal resolution is 300 lines (color). Set-up and operating controls are front-mounted for ease of operation.

"Educator" Monitor/Receiver, 23" monochrome model, is designed specifically for educational and training applications. Controls are front-located. Tamper-proof control compartment door with lock is optional. Horizontal resolution is 600 lines or better with video signal input. Also available in 25" color model.

The Color "Educator" is a 25" model offering big-screen, sparkling color — 300-line (color) resolution — plus big-room audio. Designed specifically for educational and training applications, the "Educator" series Monitor/Receivers offer the utmost in reliability, flexibility, and ease of operation.

Setchell Carlson's solid-state UHF/VH television receiver RF demodulator pro a high-quality com video signal and separate audio sig assuring excellent monochrome and co picture quality. It is for video recordin as a signal source video monitors.

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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, amorous machines with a multitude of switches, pins, pinwheels, keyboards, flashing lights and "brains" of innumerable composition were introduced with much ballyhoo 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 chagrin of many, the veil of euphoria 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. Frills 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 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 contend showed the Model 600 Digi-c system which uses the small pla card for event control and the D digital programming system co plete with English print loggi One of the few systems to us true ferrite core memory, the D does not lose memory, or use a b tery to minimize chance of loss the event of power failure. Of gr interest is the fact SMC uses co puter compatible ASCII coding the cartridge cue track to log sp while they are playing, not j when the event was scheduled.

A most useful ancillary gimmi is the ability of the system to spond to a sonalert buzer tone o any phone line and make the ca the next scheduled event. What easy way to bring in on-the-sp news reports or remote broadca but be careful who has the m chine's phone number.

Similar to last year, but on a l grandiose scale, Gates Radio d played a fully automated FM s tion, including a 1KW transmit

ning into a dummy load. A digi- programming systems using OS memory and also featuring CII coding on the cartridges, is is a custom installation as are ist of the Gates systems. The iterion vertical stack multiple tridge unit is the other alterna- ie for sequential handling of car- dges.

Hiding in the midst of the glam- ous video and transmitter dis- ays was the RCA automation stem which again is oriented to stom installation. Sparta Elec- nics seems to be concentrating sequential program control for e smaller station with the Sparta- ntion 103 all cart or 121 reel-to- el and cart combination and ilding upwards to add more au- sources. CCA has expanded its nimation to include a little more xibility, but is also a sequential ntroller aimed at the small mar- t broadcaster.

Last, but by no means least, is e Autogram system shown in the ollins display. A relatively simple t quite flexible system, the Auto- gram falls between the simple se- quential switcher and the sophisiti- cated card or digital programming system and is well suited for the small to medium market broadcast- er. The lack of major changes to this system indicates the manufac- turer 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 automa- tion 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 manufac- turers now offer a full line of auto- mation ranging from simple se- quencers to digital control systems. As always, the amount of flexi- bility is directly proportional to the cost and the broadcaster more than ever must make a careful compar- ison of different systems under consideration. With the many combinations now available, cost alone can not be taken as the sole indicator, as an inflexible se- quencer 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. De- fine 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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For your key to trouble-free mixing send for Waters' Audio Attenuator brochure which describes their complete line of linear and rotary attenuators and pan pots. Use the coupon provided, or better yet, phone 617-358-2777 for immediate service.

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Circle Number 24 on Reader Reply Card

g. 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 planning 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.

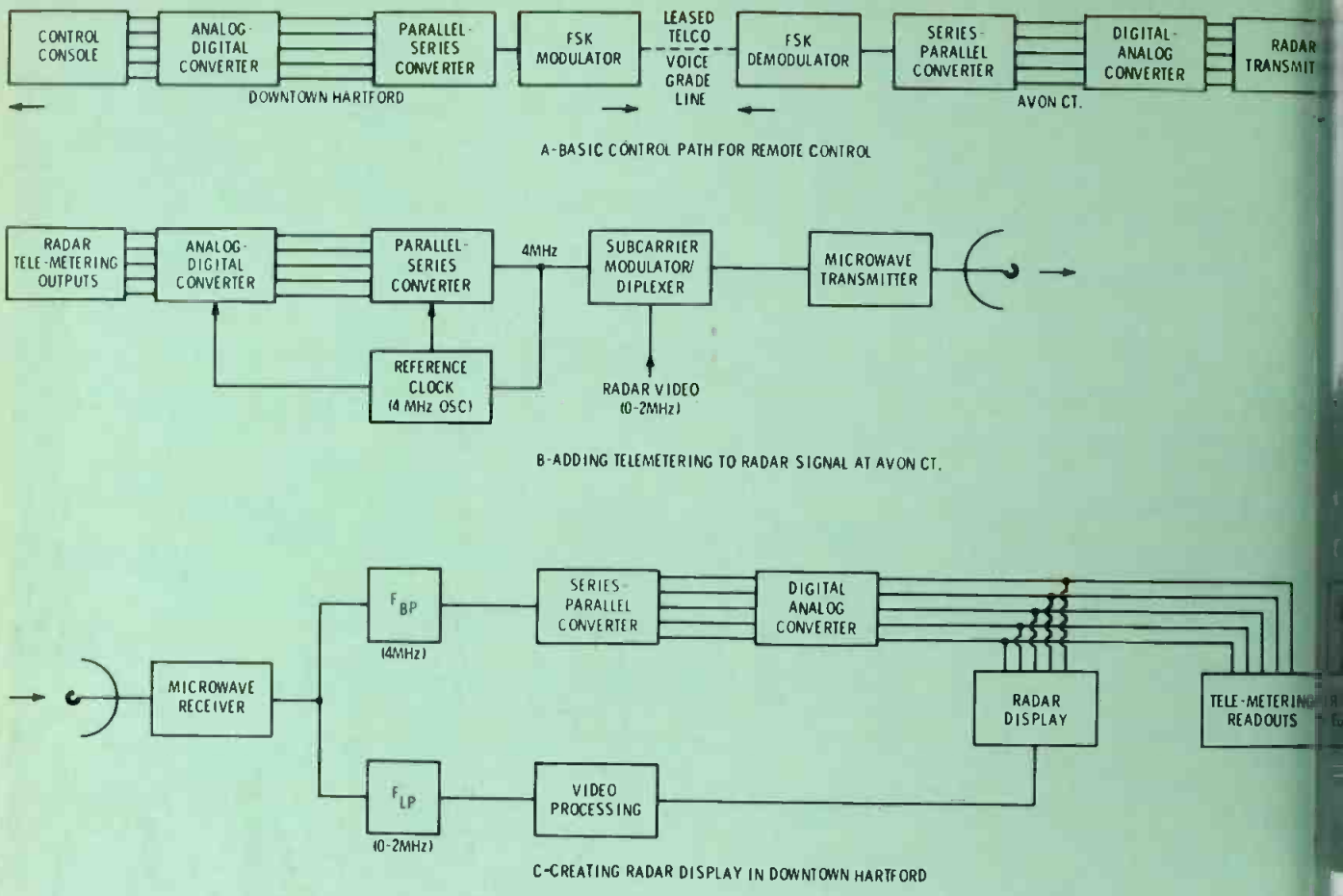


Fig. 2 Block diagram of the basic elements in the radar remote control system at WTIC-TV.

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 "O" 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 connec that point with the Weather Serv terminal. A similar cable plus I control circuits carry on from th to the studio.

The radar system is a ty MR781 manufactured by Vi Services Division of Automati Industries, Inc., Fort Walt Beach, Florida. It operates in t range 5450 to 5825 MHz with peak power output of 250 kW. T normal pulse repetition rate is 2 PPS, but it has been necessary modify this somewhat to avoid teraction with the bit rate of t remote control system. Pulse wid is 2 microseconds.

The antenna is a six-foot di mounted atop an unused FM tow originally 200 feet high. Waveguid connects the antenna and RF u which is housed in a small buildi at the base of the tower. This a rangement is shown in Figure 3.

The remote control sub-syste

g. 3 Radar RF system at Avon, Conn. The ra-
me had not been installed when this picture
s 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, lorida, as a vendor to Vitro.

The main control terminal is nown in Figure 4. The right sec-on contains the Plan Position In-icator (PPI) scope and the major perating controls. The left section as functions of special interest to ne meteorologists. At top is the mplitude Range Indicator and elow it the Range Height Indica-or. These two features allow in-estigation of specific weather henomena useful in forecasting ut which have no meaning to the elevision audience.

At Broadcast House the televi-ion 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 s 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.

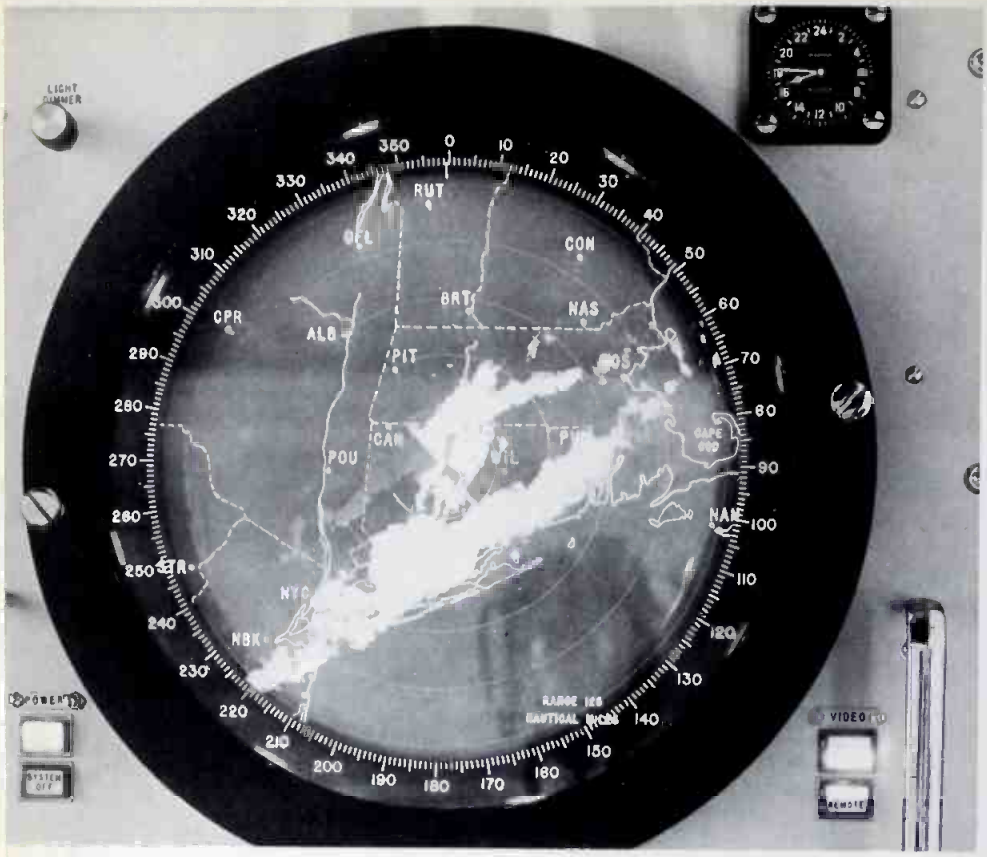


Fig. 6 Example of severe storm center displayed on PPI. The range was 125 miles.

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 that 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 designator for a radar with a control circuit subcarrier is F9.

Operator Requirements

Contrary to popular opinion, a Ship Radar Endorsement is required on the operator's license if the person doing the radar service for this class of station at this time. Section 91.154 (a) requires only that all transmitter adjustments or tests 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 any 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 engineered 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.

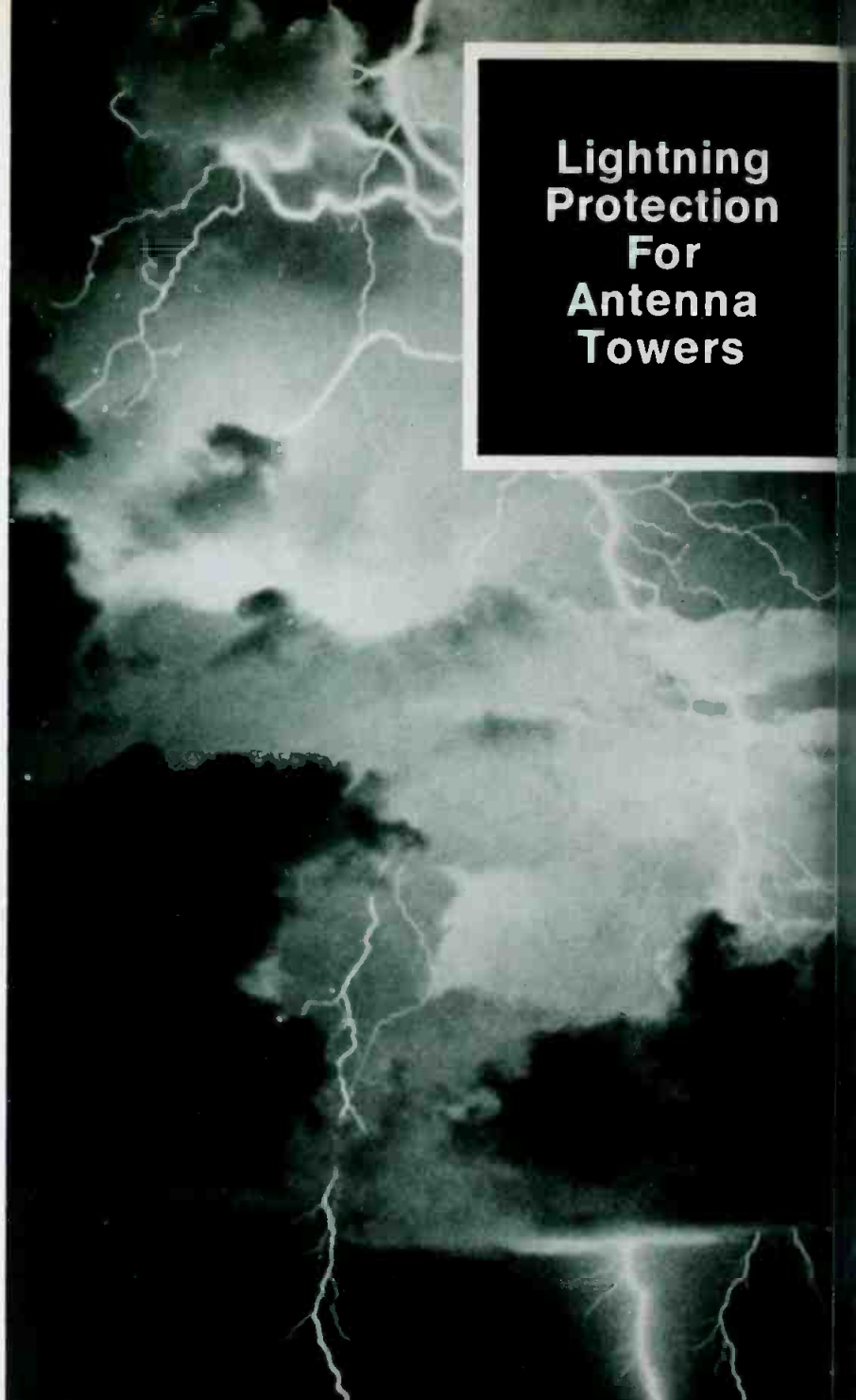
For complete information and specifications on Stanton cartridges, write Stanton Magnetics, Inc., Terminal Drive, Plainview, L.I., N.Y. 11803.

STANTON

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

Circle Number 25 on Reader Reply Card

Lightning Protection For Antenna Towers



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.

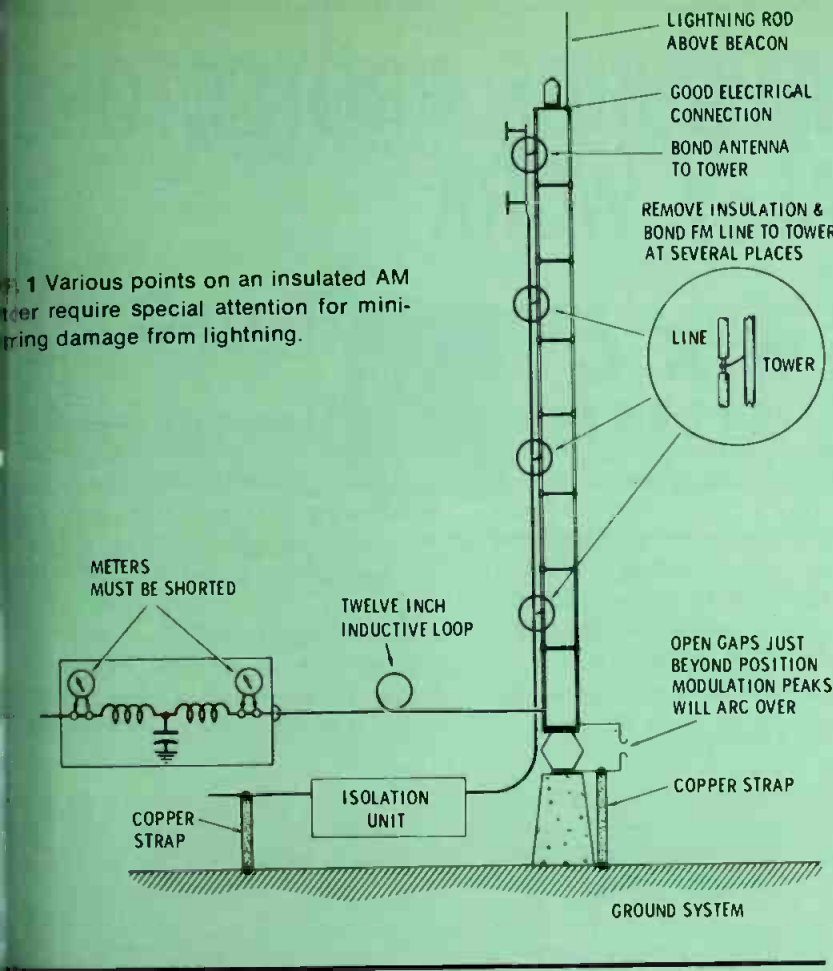
Insulated towers: The insulated AM tower presents more problems since the antenna base must be RF insulated from ground. Protection at the top is the same with lightning rods above the beacon. Since the lightning path will follow the lines of least resistance, try to provide this. The RF feed line to 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 h and cause RF arcovers.

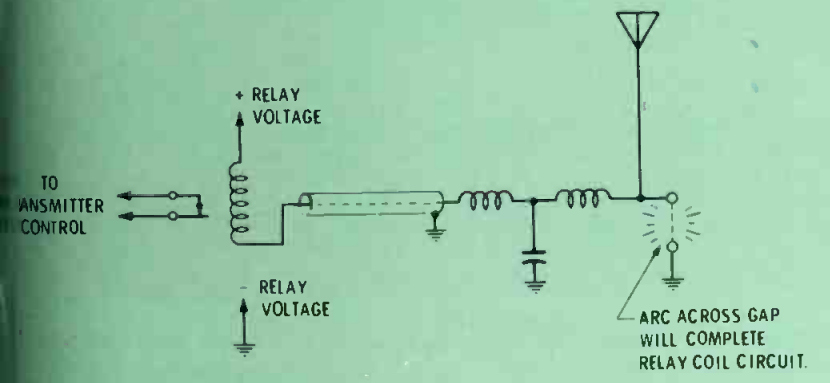
Precautions mentioned so far will not entirely eliminate current surges from lightning, so it is very important that line or antenna meters are not left active in the circuit. They should be either removed, or a good meter shorting system used. A surge of current will invariably burn out delicate meters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

Discharges across the gap will

*BE Maintenance Editor



1 Various points on an insulated AM er require special attention for mini- ring damage from lightning.



3. 2 General arrangement of an arc quencher. Arc across the gap will mplete relay circuit and cause it to operate. Contacts may be normal en or closed, depending upon circuit operated. Capacitor in series with tenna lead for tuning purposes will prevent quencher from operating.

use a short of the RF and thus e load on the transmitter. The ansmitter needs protection in the ay of an arc suppressor. This is mply a relay device whose coil rcuit is completed through the arc self when one occurs. The relay perates to either remove plate oltage or RF drive so as to quench e arc. Once the arc is started, the F will sustain it unless the RF is moved. When making changes in e antenna tuning unit, care must e taken not to add a series capacitor 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 or 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

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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 S1A3. 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 announces 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

KDKB-KORAMAR Communications, Inc.

WILKINSON ELECTRONICS, INC.

1937 W. MacDADE BLVD.

WOODLYN, PA. 19094

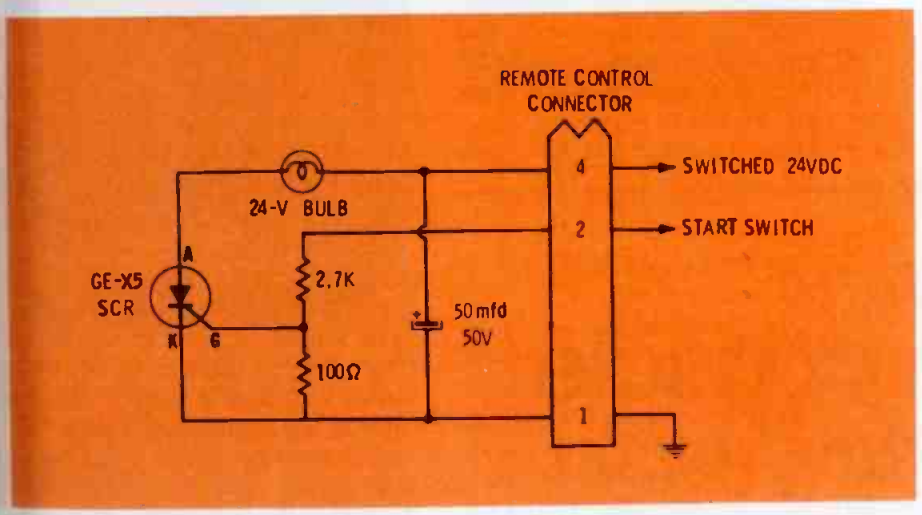
TELEPHONE (215) 874-5236/874-5237

Circle Number 31 on Reader Reply Card

ENGINEER'S EXCHANGE

Cart Reminder Light

In today's fast-paced broadcast world, probably every announcer has found himself staring at a loaded 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 removed from the machine.



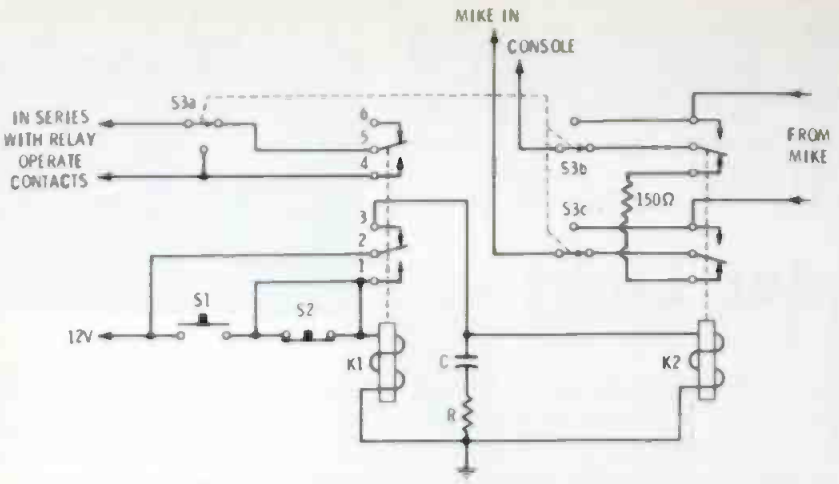
When a cartridge is inserted, the 24-Volt relay power supply voltage appears on pin 4 of the remote control connector. This is wired to a pilot lamp which is controlled by an SCR. Pressing the start button momentarily applies 24 Volts to pin 2 of the connector. This is used to switch the SCR. Once turned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



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 unterminated 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, sealing in K2, and opening the circuit to the console muting relay. When K2 seals in, the mike line 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-A
Huntingdon, I

Quad In Virginia

The acceptance of quadrophonic broadcasting has been terrific in the Richmond area. And we have found that in order to have good direction and separation for the quadrophonic, 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. Also our exciter separation was checked and phase relations in the exciter tuned and corrected. The better the separation, the more exact the phase relationship, the better the quadrophonic broadcast.

We also found that the London Phase-4 recordings are excellent quadrophonic 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 quadrophonic 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,
WR
Richmond,

NEW PRODUCTS

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

Video Cassette Machine

Broadcasting executives and ngineers, meeting for the National ssociation of Broadcasters con- ention saw the first public demon- ration of the Norelco "VCR" or ideo cassette record/playback achine. The unit was shown op- rating in the exhibit area of Philips roadcast Equipment Corp., a ubsidiary of North American Phil- os Corporation.

The Norelco VCR demonstrated t NAB records and plays back in olor and black & white through onventional home receivers. The nit itself is compact, rectangular, nd fits easily on a small tabletop. t is highly portable, weighing ap- roximately 33 pounds. Both ound and picture are carried on ne-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)

(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, aperature correction, masking amplifier, electronic te- perature compensation, neutr density filter turrent, remote reg- tration, red channel compensat- EIA sync generator, and cab compensation (1,000 feet).

The FP-1200 package includes camera head, 5-inch viewfinder, 0 feet of cable, camera control u and 10:1, 16:160mm F2.5 lens (- cludes cable driven zoom and foc and auto iris).

Circle Number 62 on Reader Reply Card

Time Mark Gen For Calibrating Scopes

A new time mark generator, t **Hewlett-Packard** Model 226 supplies narrow one-volt pulses precise time intervals for calibr- ing the time bases of oscilloscop and recorders.

A single front-panel control lects 30 time intervals. The range from 2 ns to 10 s in a 1, 2 sequence, and correspond to t sweep timing on most oscilloscop A crystal-controlled clock assur ±0.002% interval accuracy af only ½-hour warm-up. Marker o- put impedance is 50 ohms.

A 1-volt trigger output pulse is also available. It can be used to externally trigger the oscilloscope being calibrated or other equipment. Trigger rate is coincident with the markers up to the 100-ns range. The trigger on faster ranges is automatically counted down to 10 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

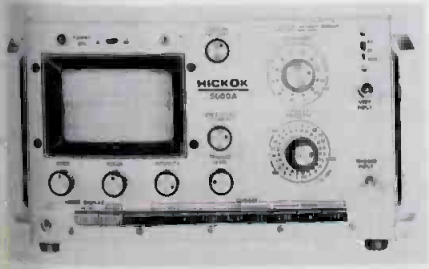
Lens Extender

The new lens extender manufactured and marketed by **Birns & Sawyer** is designed for **Angenieux** lens applications for both the Arri 16 and Arri 35. Firm president, Jack 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 mV/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—6⅞" high × 11¼" wide × 19" deep, including handles—and weighs only 24 pounds.

Circle Number 65 on Reader Reply Card

the first step toward standard.

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 Engineer

REGULAR MATRIX SYSTEM DISC RECORDIN

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

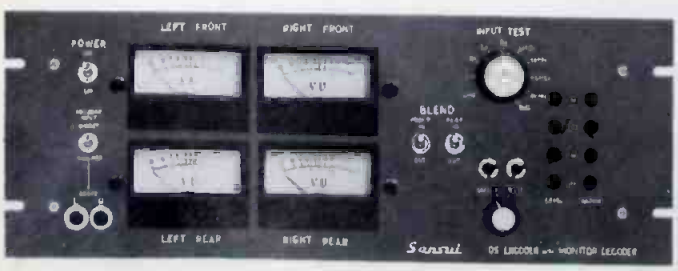
A signal originated at the front center shall be converted into a left signal and a right signal which are mutually in phase and of identical quantity. A signal originated at the back center shall be converted into a left signal and a right signal which are out of phase with each other by 180° but of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

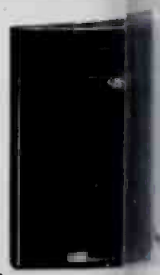
2.1.2. Left and Right Signals

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.





QS

Isn't the Sansui QS encoding system the one you should be evaluating right now?

Put it to the test yourself. Compare it with any othe

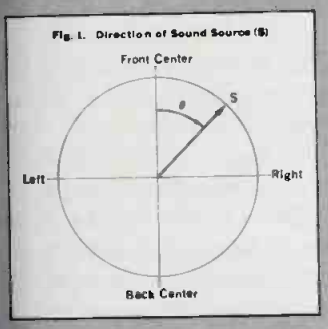
For a demonstration or literature, call or write us directly at any of the locations listed h

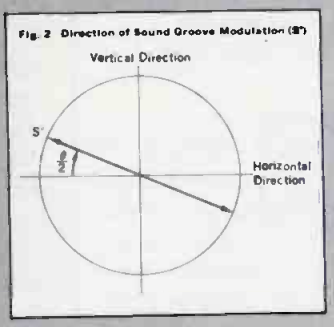
for four-channel matrixing

mmittee, 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

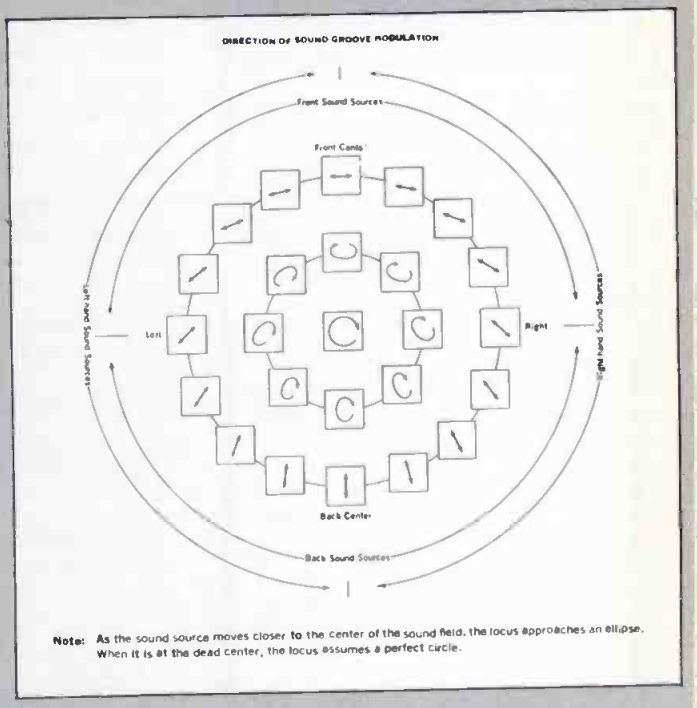
The relationship of the direction of a sound source in the original sound field to the direction of the modulation of the sound groove on the regular matrix system disc recording is set forth in Figure 3.

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.



Note: As the sound source moves closer to the center of the sound field, the locus approaches an ellipse. When it is at the dead center, the locus assumes a perfect circle.

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 [illegible] what I want, I'll beat the h[illegible] out of you.")

(2) The Cross ("Do it because [illegible] is right.") This is effective wi[illegible] the over-30 set since it impli[illegible] that if you don't do what [illegible] right you may get away with [illegible] in this life but not the next.

(3) The Buck ("If you do what [illegible] want, you'll get some pleasu[illegible] out of it.")

(4) The Ego ("Man wants to b[illegible] more competent tomorro[illegible] than he is today.") The adva[illegible] tages of this approach are sim[illegible] plicity, generally acceptabili[illegible] and individuality.

Professor Barnes said a variati[illegible] of this approach is currently pr[illegible] posed by B.F. Skinner in his boo[illegible] **Beyond Freedom and Dignity.**

This approach, the "Behavio[illegible] Technology" approach, Profess[illegible] Barnes said, has one basic premis[illegible] that behavior is determined by i[illegible] consequences—that Tuesday's a[illegible] tion is caused by Monday's cons[illegible] quences of "Sunday's action."

According to this approach, [illegible] continued, man has no brain, a[illegible]

is mind is a blank slate upon ich experience writes." So, "if avior is determined by its con-quences, then the way to change avior is to change the conse-ences and rearrange the way in ich the consequence is related to t behavior," Professor Barnes d.

General managers wanting to tivate employees with this ap-oach, he said, must follow this ttern: If permissiveness is a oblem, the manager must "crack wn," because behavior followed y punishing consequences is less ely to occur again. And when the ender has modified his behavior, kind word should be given soon ier."

"One should not have to bribe d manipulate people," he said. This theory denies that man has a lain . . . Skinner did a lot of his ork with pigeons, but he should member that people are not pi-ons!"

The final motivational approach scussed by the Purdue Professor icalled "The Law of the Jungle." e described it as one that appeals the instincts in order to moti-te. Pointing out that this one is vered in a new book, **Corpora-n Man** by Anthony Jay, he said, his approach tells us that man s a brain that takes the raw mate-al of the senses and shapes and ganizes it into thought in accord-ce with its own built in structure. he more we meddle with his ain, the worse it gets."

If management would "moti-te," the professor said, "it must lk to—and listen to—the ani-als."

Connally Reveals Income Tax Survey

In a luncheon address before the 0th annual convention of the Na-onal Association of Broadcasters, reasury Secretary John Connally aid this country no longer is alone n a pedestal, but is among nations hat are equal.

Mr. Connally also brought per-

(Continued on page 50)

(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 competitive world and there is rough e nomic competition from abro Japan is increasing competition a so is the European Comm Market.

This should concern us, he sa if we want to maintain our stand of living.

Connally also disclosed tha recent survey of income tax retu in the southeast part of the coun revealed that 97% of those not p pared by the individual taxpay were fraudulent.

TECHNICAL DATA

For further information, circle data identification number on reader service card.

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/Amplifie Ballantine "Classics"; Wideba Portable Oscilloscopes and Acc sories; Oscilloscope Calibrato AD/DC Precision High Volta Calibrators; Primary AC/D Transfer Standards and Acces ries; and Accessories (usable w a number of instruments rath than one particular instrument).

101. BURWEN LABORATRIES—A series of data sheets entled "Stop Noise Pollution in yo Program Material" is now ava able. The series includes inform tion on the company's Model 20 Noise Eliminator, Model 10 Dynamic Noise Filter and Mod 1030 Amplifier-Noise Filter. T data sheets include photos, illust tions, features and specifications.

102. EICO ELECTRONI INST. CO.—Eico's 1972 catal features the company's comple line of over 200 electronic kits a factory assembled instruments the fields of Test Instrumentatio Security Electronics, Stereo Hi

Circle Number 39 on Reader Reply Card

Circle Number 33 on Reader Reply Card

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 tape recorder, mechanical properties, tape durability, splicing properties and storage.

104. GENERAL AUTOMATION' INC.—A new 30-page brochure describing the new SPC-16 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 SPC-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 10 channel event recorder, Model TR-820, that provides "on-off" information via a new stylus-less non-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 non-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)

justable arc rule for drawing the true arc of any radius up to 216.9", various metric conversion scales and slide-rules, a simplified ultra-fast desk-top file and retrieval system, do-it-yourself nomograph kits and many other unique products. Also includes a section of several hundred hard-to-find professional and reference technical books.

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 c line drawings are given for l line of silicon and germanium tr sistors. An applications orien table permits the user to locate description which fits his requ ments, and determine the pro transistor; prices are shown each unit in the table.

110. MOHAWK WIRE AN CABLE CORP.—Mohawk n has literature and specifications their Television Color Cam Cables and Connectors. Price l are also included.

111. NEW ENGLAND LAM NATES CO.—A new two-pa data sheet describes the 205NM and epoxy glass laminate of exc tional homogeneity which virtua eliminates printed circuit bo processing problems. Advanta of this high reliability, flame-re dant substrate are given. Compl property values under stated t conditions are presented along wi comparable NEMA specificatio

115. RENTAL ELECTRONI INC.—A new 60-page, 1972 Inst ment Rental Catalog contain specifications and rental prices more than 25 different kinds a hundreds of different models electronic test and producti equipment is now available. T company's catalog offers 1-mon 3-month, and 6-month rental rate

116. ROH CORPORATION Manufacturers of audio process equipment now has available spe fication sheets on their equipme Included are Module Ca Frames, Module Socket Asse blies, Program Amplifier, Circ Board Extender, Microphone/Li Preamplifier and Distributi Amplifier. Price lists are include

bookreview

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

The next two chapters describe the fabriction and trical properties of the injection laser. Coherence, most important aspect of laser light, is explained.

The remaining chapters of the book are devoted to cuitry and practical applications. Circuitry includes se generators, modulators, power supplies, detec-s, and receivers. Optical systems and viewing de-es are described. The last chapter covers several of many applications already a reality and suggests ers to come.

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

Circle Number 71 on Reader Reply Card

Transistor Specifications Manual, Fifth Edition, has en written by the Howard W. Sams Engineering ff. In this updated edition, the electrical and phys-al parameters, along with the manufacturers, of rly 10,000 transistor types, have been compiled. e manual is an excellent reference for engineers, chnicians, servicemen, or anyone who enjoys rking with transistors.

The manual has three main sections designed to pply a maximum of data about the transistors: a ecifications section, a lead identification section, d an outlines section.

The specifications section contains the electrical formation needed for most applications. The max-um voltage, power, current, and temperature limits t should not be surpassed are given as well as the larity, leakage, gain, and frequency parameters for ch transistor. Even a special section of specifica-ns for RF power transistors is included.

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

The outlines section has drawings of the physical ape and contains all important physical dimensions. is section assists tremendously in determining ether or not a transistor will fit into a desired phys-al area.

When available data indicates that a specific tran-stor type is no longer being made, the last known anufacturer is furnished, and that particular tran-stor type is tagged obsolete.

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

Circle Number 72 on Reader Reply Card

New Rules Affect Antenna Resistors

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

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

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

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

Change In Licensing Procedure

The Commission also provided for certain chan in the licensing procedures for AM stations. Under new procedure, each licensee will specify the actu antenna input power, as well as the rated or "no nal" power of the station. While these two val sometimes differ, it has previously been the practic make them equal, on paper, by arbitrarily adjus certain of the antenna parameters. It is believed t the new licensing system is more realistic and l prone to error. Changes in station licenses will o narily be made at renewal time.

To implement the modified licensing procedure, Commission is requiring that applications for licen renewal filed after October 1, 1972, include cert additional information, specified in a Public No being sent to all broadcast licensees. This Notice also contains information for those licensees who wish file applications for modifications of license to eli nate antenna resistors.

This proceeding was initiated with a rulemaking tice on April 8, 1971, in response to a petition by Ch apeake Broadcasting Corporation, licensee of stat WASA, Havre de Grace, Md.

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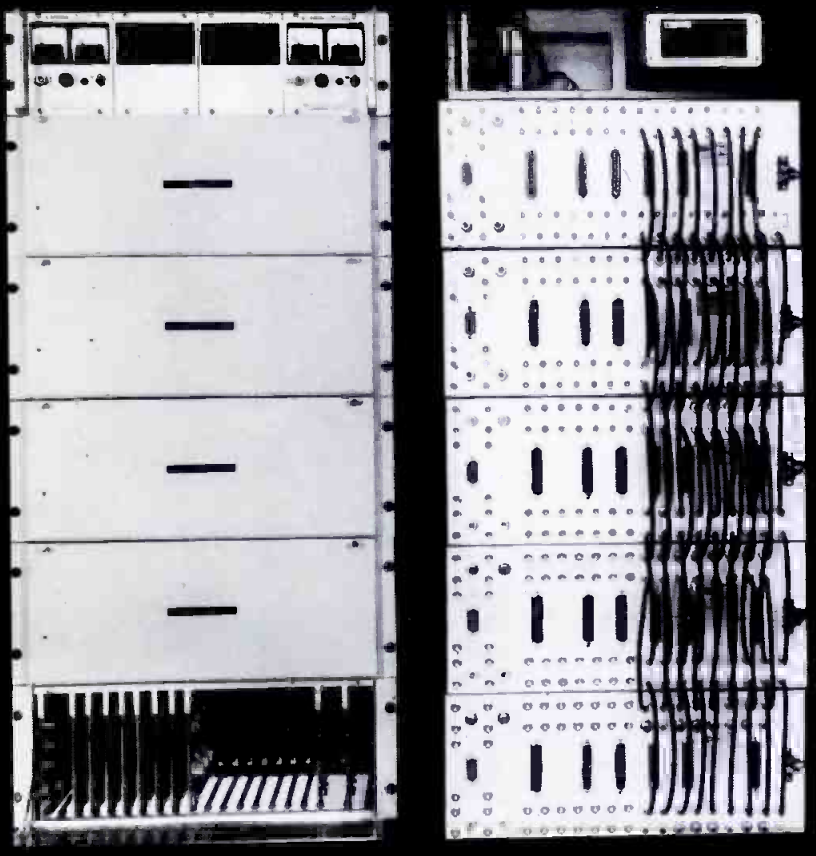

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